UNIVERSITY OF MINNESOTA

RESEARCH REVIEW

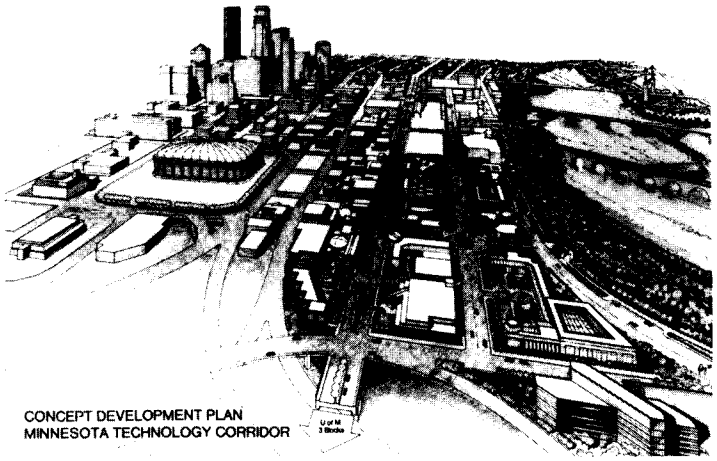
Research and Technology Transfer Administration

July, 1992

The Minnesota Technology Corridor

A Natural Path to the 21st Century

On the east edge of downtown Minneapolis, just down the street from the Hubert H. Humphrey Metrodome, one of America's most unusual research parks is growing, tended by one of Minnesota's leading technology entrepreneurs.



CONCEPT DEVELOPMENT PLAN
MINNESOTA TECHNOLOGY CORRIDOR

The Minnesota Technology Corridor is 130 acres of contrasts: Grain mill ruins loom just across the street from restored mill structures, transformed into a luxury hotel and office building. A national parkway and city park are being developed while acres of asphalt are spread nearby to accommodate ever-growing parking needs. Grain elevators accept their last harvests, as high-tech architecture creeps toward them. A new Minnesota Technology Center shares an intersection with plumbing supply and alcoholic beverage retailers. The world's fastest supercomputers hum nearby, spreading their fiber optic cable networks in support of more high-tech neighbors.

The Corridor is an area in transition, whose developers are struggling against economic and psychological trends to create a successful inner-city science and technology park. They have on their side the area's ideal location for research and development, including proximity to the University of Minnesota's Minneapolis campus. Several of the University's departments recently relocated to the Minnesota Technology Corridor, contributing to a five-year-old effort to effect a wholesale transformation of the area.

The individual leading that transformation is Herbert C. Johnson, founder and former CEO of two technology companies, and former chairman of the Minnesota High Technology Council. As President of the Minnesota Technology Corridor Corporation, he is charged with bringing new tech-

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Inside

CUFS

Payroll Budgeted on Sponsored Accounts

As you know, ORTTA establishes objects in accordance with the proposal budget when setting up budgets in CUFS. Recently we have experienced problems with the budgeting for the payroll objects. The academic salary object (7000) and the civil service salary object (7010) are established *only* when those salary categories are reflected in the proposal. For example, if the proposal only lists civil service salary, only the 7010 will be established. Expenditures cannot be incurred against the 7000 object.

If the project subsequently requires payment of the type of salary not originally budgeted (academic salary in the example above), please notify ORTTA that an EB is needed *before* processing academic payroll documents. Processing payroll documents before the object has been established may cause unnecessary delays in issuing the payroll checks.

Questions concerning this procedure should be addressed to the appropriate grant administrator.

Available

Printer sound hoods:

2 - Stand alone models

1 - Tabletop

Contact: **Carol Perusse**, ORTTA, 624-6389

RESEARCH REVIEW

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July, 1992

Communications Coordinator: Michael P. Moore

Editor: Phil Norcross

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Associate Vice President: A.R. Potami

Research Review is a monthly publication of the Office of Research and Technology Transfer Administration. Its purpose is to inform faculty and administrators who are involved with Sponsored Research and Technology Transfer on procedures and policies of granting agencies; on institutional policy and other information necessary to the preparation of research proposals; and on funding opportunities.

Research Review welcomes ideas and comments from all readers. Write to Research Review at 1100 Washington Avenue South, Suite 201, Minneapolis, MN 55415-1226, or call Michael P. Moore at 624-9398.

Indirect Cost & Fringe Benefit Rates

Indirect Cost Rates

The *provisional* rates for July 1, 1991 through June 30, 1994 are listed below. When budgeting for periods beyond 6/30/94, the 7/1/92-6/30/94 rates should be used. **The rate agreement is dated February 6, 1992.** This date should be used where required on proposal applications. **Please call Marilyn Surbey at 624-4850 with questions on Indirect Costs.**

	07/01/91 06/30/92	07/91/92 06/30/94
Research		
On-Campus	40.00	40.00
Off-Campus *	21.00	21.00
SAFHL	60.00	58.05
Hormel	53.00	44.00
Other Sponsored Activity		
On-Campus	20.00	20.00
Off-Campus *	10.00	10.00
Instruction		
On-Campus	52.00	52.00
Off-Campus *	16.00	16.00

* A project will be considered off-campus if more than 50% of the direct salaries and wages of personnel employed on the project are incurred at a site neither owned nor leased by the University.

Fringe Benefit Rates

If you have questions regarding fringe benefit rate development or need the breakdown of charges, call **Vivian Fickling at 624-2009.**

Current actual rates from July 1, 1991 through June 30, 1992 are:

Faculty	28.75
Civil Service	25.25
Graduate Assistants	8.50

For proposals being submitted with start dates **after July 1, 1992**, the estimated fringe benefit rates to be budgeted are:

Faculty	31.25
Civil Service	29.50
Graduate Assistants	10.50

Estimated rates after **July 1, 1993** are:

Faculty	28.00
Civil Service	30.50
Graduate Assistants	31.25

As rates change they will be reflected in this section.

Timely Receipt of Proposals Requires Teamwork

Blackout Nearly Zaps Proposal

We have notice an increased effort on the part of many Principal Investigators to get proposals to ORTTA two or three days prior to deadline. This has greatly helped us properly review and process proposals. Principal Investigators have also provided us with "advance copies" of budget and assurance pages, an additional great help. We appreciate the effort.

However, a recent incident demonstrates how proposal processing requires coordination between the investigator, departments, colleges and ORTTA. On the morning of June 18, ORTTA discovered a proposal in campus mail with an agency receipt date of June 18. The department was immediately contacted to determine if the date was truly a receipt date or a postmark date, since guidelines were not included and the agency was one with which we were not familiar. Departmental staff did not know. We then contacted the agency directly and discovered that June 18 was a *receipt date* and no deviation would be allowed. ORTTA followed through on the processing and took necessary steps to get the proposal hand delivered to meet the deadline.

The problem occurred in this way: The proposal was sent by the department to its college (according to signature dates on the BA23) on June 16. The college signed the BA23 on June 17, which was the day ORTTA needed to receive the proposal in order to meet the June 18 receipt date. ORTTA was not advised either by the department or the college that a proposal was forthcoming. The college sent the proposal by campus mail and ORTTA received it as part of the 3:00 delivery on June 17.

Unfortunately, at 3:05 ORTTA suffered a power failure, leaving the mail room in total darkness and the office without typewriters or computers; power was not restored until well after 4:30. It was the one afternoon that campus mail was not opened.

ORTTA recognizes that the mail should have been checked and accepts responsibility for that part of the problem. However, we cannot emphasize strongly enough the need for departments and/or colleges to inform us when a proposal is coming that requires overnight handling. Furthermore, we cannot condone the use of campus mail for delivery of proposals when there is a tight deadline.

To assure that such an incident does not happen again, ORTTA highly recommends that investigators and/or their staff assume responsibility for delivery of a rush proposal either by hand or by use of a courier service. Furthermore, had a phone call been made to ORTTA informing us that such a proposal was in process, we would have inquired as to its whereabouts before shutting down that day.

We again assure our constituents that regardless of when proposals are received, every effort will be made by ORTTA staff to meet agency deadlines. We would appreciate your consideration of the suggestions made above, however, and would also appreciate any suggestions you might have that could improve proposal handling. Feel free to contact grant administrators and/or assistant directors: Mary Lou Weiss, 624-5856; Todd Morrison, 624-5066; or Rick Dunn, 626-2265.

Technology and Science Camp

For junior high school students, the University of St. Thomas and Dunwoody Institute will offer a four-week "Technology and Science Clinic" from July 27 through August 21.

Working with faculty members and experienced industrial people, participants will use computer-aided engineering systems to design and construct apparatus for such fields as power generation, environmental protection, food chemistry, and graphic arts.

The program's day runs from 9:00 to 1:00 and begins and ends at Dunwoody Institute in west Minneapolis. The cost is $200. For more information, call Sarah Smith at 647-5566.

Orientation to Animal Use

The University's Research Animal Resources will offer quarterly seminars for new (and current) investigators and technicians involved in the use of research animals. The seminars will present information on policies regarding animal use, on functions of the University Animal Care Committee, on animal ordering and housing, on the Occupational Health Program, and on other relevant issues.

Orientation seminars are scheduled for **July 14** and **September 29, 1992**, and **January 27, 1993**, at 3:00 P.M. in 2-580 Moos Tower. The schedule is subject to change. For more information, please call Dr. Cynthia Gillett at 624-4625.

National Science Foundation

Revised Proposal Guidelines and Forms

Effective October 1, 1992, the National Science Foundation (NSF) is revising the Grants for Research and Education in Science and Engineering (GRESE) brochure and related proposal and grant forms. Major changes will be as follows:

- Increased emphasis on the importance of conformance to the proposal preparation guidelines provided in the GRESE. Proposals not conforming to these guidelines will be returned to the sender unless prior approval for such nonconformance has been obtained from the appropriate NSF Assistant Director. In particular, the fifteen-page limit on the text of the proposal Project Description which comprises the main body of the proposal applies unless alternative or additional guidelines are provided in a specific program announcement or solicitation. The Project Description includes results of prior NSF support.
- Encouragement of submission of longer duration grant proposals. The GRESE now indicates a "norm" of three years for grant award durations.
- A requirement that biographical sketches be limited to two pages per investigator.
- Revised provisions on "group" proposals and equipment proposals.
- Clarification of the significance of the signature requirements in various grant-related forms for Principal Investigators, Co-Principal Investigators and Authorized Organizational Representatives.
- Revision of the proposal cover sheet and the final report form 98A.
- Requirement of a new annual progress report form for all ongoing NSF grants, which includes certification language. Certification language also has been added to the quarterly Federal Cash Transaction Report.
- Clarification of NSF Important Notice 107, Revision 1, that the human resources statement is applicable to academic institutions only.
- Various editorial and updating changes, consistent with changes in NSF programs and organizations.

The principal thrust of these changes is to lessen the burden on proposers and reviewers by reducing proposal length and increasing the average award duration. At the same time, applicants and grantees are reminded that in signing proposals and other grant-related documents they are certifying the truthfulness of the statements and information submitted. The new proposal cover sheet includes certification to this effect on page 2, which must be completed both by the Principal Investigator(s) and by the Authorized Institutional Representative.

The new Progress Report Form includes a similar certification by the Principal Investigator(s). All progress reports must include this form with the Investigator's signature on the certification at the bottom of the form. Progress reports submitted electronically must include the text of the certification. An electronic version of the form, including the required certification, will soon be available.

Copies of the revised GRESE may be obtained from ORTTA when they become available. As yet, that date is unknown.

New Rules for Animal Research

New interpretations of the Animal Welfare Act broaden regulation of research and instruction with animal subjects, especially procedures that are potentially painful.

Before using painful procedures, investigators must provide the University Animal Care Committee with written description of their search for alternatives. The new rules broaden that requirement so that it now applies to procedures, including terminal or recovery surgery, in which pain is relieved by anesthesia or similar means [category b of item 11 on the Animal Usage Form (BA-22)]. Previously, description of the search for alternatives was necessary only for procedures that did not employ pain relief (category c on the form).

The University Animal Care Committee reviews animal use at the University to ensure that it conforms to regulations, especially USDA regulations that enforce the U.S. Animal Welfare Act. For any research or instruction that employs animals, investigators must complete the Animal Usage Form and submit it to the Committee. When an experiment has the potential to cause more than slight or momentary pain, even under anesthesia, the form requires written narrative description of the methods and sources used to determine that alternatives are not available.

The USDA regulations apply to work with all vertebrates except rats, mice, and birds, and farm animals in agricultural research. The regulations may soon be reinterpreted, however, to remove those four exceptions.

For more information, please call Dr. Cynthia Gillett at 624-4625.

ADAMHA Split Nears

After several false starts, Congress has moved closer to approving a plan to split the $3 billion Alcohol, Drug Abuse and Mental Health Administration's research and service functions. Under S.1306, which could take effect as soon as it is signed, the three ADAMHA research institutes (National Institute of Mental Health, NIMH; National Institute of Drug Abuse, NIDA; National Institute of Alcohol Abuse and Alcoholism, NIAAA), would shift to the National Institutes of Health (NIH). ADAMHA service activities, including the $1 billion block grant and substance abuse treatment and prevention programs, would form a new Substance Abuse and Mental Health Services Administration (SAMHSA).

The merger with NIH would give more legitimacy to behavioral and other research on mental health and addictive disorders and at the same time, SAMHSA would provide an increased focus for service activities, freeing grantees from the constraints of working in a research mold.

Following are highlights:

- **Special Review**. ADAMHA research grantees would not compete directly with NIH applicants for funds. Under an agreement with NIH, the special study sections that currently review applications to NIMH, NIDA and NIAAA would continue their work.

  Applications to these institutes would bypass NIH's Division of Research Grants, which handles review of most regular NIH research proposals. In the past, ADAMHA grantees have worried that behavioral oriented studies would get short shrift at NIH. While these fears are probably unfounded, the arrangement does mean that NIMH's review committees, which reorganized last year to establish a closer connection between proposal merit and program intent, would retain that focus.

- **Protected Status**. The reorganization plan would also protect the three institutes from merger with other parts of NIH for at least five years, a period long enough to let them take root.

- **Separate Budget Authority**. Like the National Cancer Institute, the three ADAMHA institutes would continue to receive direct congressional budget authorization instead of being lumped together with all NIH institutes.

Given current pressures to limit federal spending, reorganization does not mean more money for either sector, but at least under the new design research and services would no longer directly compete for the same funds.

Excerpted from Federal Grants and Contracts Weekly, June 8, 1992

Human Geneticists Reject Patenting of Gene Tags Without Proven Utility

The American Society of Human Genetics has issued a statement arguing against the patenting of gene tags. The ASHG says that the tags, called expressed sequence tags or EST, do not have substantial and specific utility, and issuing patents for them will replace collaboration on human genome work with "a morass of competing claims."

An EST is a short piece—usually a couple hundred bases—of DNA of known sequence that serves as a tag to identify an entire gene. That approach is obvious and widely used, said the ASHG, hence it is not patentable.

Furthermore, a tag's only utility is to identify a gene. Any substantial use of the gene requires sequencing both the entire gene and the protein it codes for, as well as determining the protein's structure and function under both healthy and diseased conditions.

Allowing patents for the slight utility of an EST may hinder discovery of any substantial use for the gene it tags. The ASHG fears that allowing patents for ESTs will spur laboratories and nations to concentrate exclusively on isolating ESTs and competing for "ownership" of the genome. Neither academic nor commercial researchers will have incentive for the long, difficult task of sequencing a gene and its protein once someone else has patented a tag for the gene.

To further complicate the matter, said the ASHG, competing claims may be nearly impossible to reconcile because ESTs are not specific enough. A single EST might serve as a tag for several different genes, and several different tags might identify a single gene. Even worse, such difficulties may not show up until after patents are issued.

To prevent patents from hindering research progress, the ASHG recommends that patenting require specific and substantial utility for a DNA clone or fragment and that publishing knowledge of an EST not prevent later patenting of the gene it tags.

The National Institutes of Health has applied for patents on ESTs. But Bernadine Healy, Director of the NIH, says NIH policy on the matter is not yet settled: "NIH is only interested in patenting if it will facilitate product development." She also promises that the NIH will not allow its patent claims to prevent research and publication.

From the Washington FAX

National Center for Research Resources

The National Cell Culture Center

The National Cell Culture Center is a resource facility that provides large-scale mammalian cell culture services. The Center, available to researchers throughout the United States, was established by the National Institutes of Health to alleviate the current shortage of facilities and expertise required to meet the cell culture needs of the biomedical research community. It is an independent business unit located in a facility at Endotronics, Inc.

Specifically, the Cell Culture Center supports basic research by providing investigators with the following customized services:

- Large quantity production of mammalian cells in suspension or monolayer cultures. Quantities range from 10 to 150 liters.
- Large quantity production of monoclonal antibodies. Quantities range from 0.5 to 100 grams.
- Large quantity production of non-hybridoma cell secreted proteins. Quantities vary depending on individual cell lines.

An application form, obtained from the Cell Culture Center, must contain a description of the relevant research project. Following approval of the application by the Cull Culture Center's Scientific Advisory Board, the applicant's cell line is sent to the Center and grown to the requested amount. Researchers are charged only for the consumable materials and a portion of the labor costs required for each project.

The Cell Culture Center is supported by a cooperative agreement award from the National Center for Research Resources, NIH.

Programmatic inquiries regarding this research resource are encouraged and may be directed to: Biological Models and Materials Research Program, NCRR, Westwood Building, Room 8A07, 5333 Westbard Avenue, Bethesda, MD 20892; 301/496-9840. Application forms may be requested from: Director, National Cell Culture Center, 8500 Evergreen Boulevard, Minneapolis, MN 55433; 1-800-325-1112.

National Science Foundation

First Electronic Proposal Submitted

V. Rama Murthy, known for his pioneering work in the analysis of lunar samples, became a pioneer in other respects on June 1. Murthy (Geology and Geophysics) transmitted a proposal via the Internet to the National Science Foundation (NSF). The electronic document contained all of the required forms, text and even graphics. Following ORTTA's on-screen review of the proposal by Dave Lynch, it was transmitted to NSF by Dan Cummings. Within minutes, NSF responded that the proposal had been received and that its format was acceptable.

The electronic proposal submission process eliminated the following steps—which many of you will recognize:

- time-consuming collation of the NSF forms with the author-created portions of the proposal;
- making 20 photocopies;
- carrying the proposal through the department head and dean's offices, often toward the end of the day;
- driving the proposal to ORTTA through rush hour traffic, usually close to 5 P.M.
- ORTTA's correcting with white-out and different type styles. The electronic submission process allows corrections to be made on-screen before the forms are ever printed.

At ORTTA, the new process eliminates the manual steps involved in correction, duplication and collation of proposals, as well as the significant cost of Federal Express shipment to Washington, D.C.

If you are interested in using this procedure for your next proposal to NSF, request an information packet (which includes application software and documentation) from ORTTA's Information Services (info@ortta.umn.edu), or call 624-9004. Excellent candidates for this process are those who are already using a computer text processor to create the non-form portions of the proposal. Be sure to specify whether you intend to submit on an Apple- or IBM-based system.

NSF Electronic Award Transmission

NSF is expanding its process of sending award letters to grantees via electronic mail, a method expected to become standard agency practice. Budgets changed by NSF are also sent electronically. The PI's copy of proposal reviews will continue to be sent through regular mail.

In response to NSF's announcement, ORTTA changed its procedures for NSF award notification effective July 1, 1992. NSF will send the award letters electronically to ORTTA, who will forward them electronically to Principal Investigators with an e-mail address. A copy of the Grant General Conditions will be appended. The Notice of Grant or Contract Review form will be processed as it is now, following setup of the award funds. For PIs with no e-mail address, award letters will be forwarded by campus mail.

If you have questions, please call the appropriate grant administrator or Mary Cybyske at 624-6085.

Alzheimer's Model Developed

In an important advance against Alzheimer's disease, a new laboratory model has been developed by a group led by John E. Maggio of Harvard Medical School and Patrick W. Mantyh of the University of Minnesota and the Veteran's Administration Medical Center, Minneapolis. The new model should allow researchers to discover and test drugs that might interfere with the growth of the brain plaques that characterize Alzheimer's. The proposed model for plaque growth, the first which does not a use a living animal, may also lead to new diagnostic tests for the disease. It provides a simple contained system for studying the basic mechanisms that cause the plaques to grow in such large numbers in the brains of Alzheimer's patients.

"A laboratory model like this one is one of the first steps in solving most illnesses," says Maggio. "The complexity and time course of the disease in patients makes it difficult to study, so we look first to find ways to stop the plaques from growing in a simple system, like a test tube." Maggio, a neurochemist, and Mantyh, a neurobiologist, report their findings in the June 12 edition of the *Proceedings of the National Academy of Science*. The study was supported by grants from the National Institutes of Health and the Veteran's Administration. Medical School.

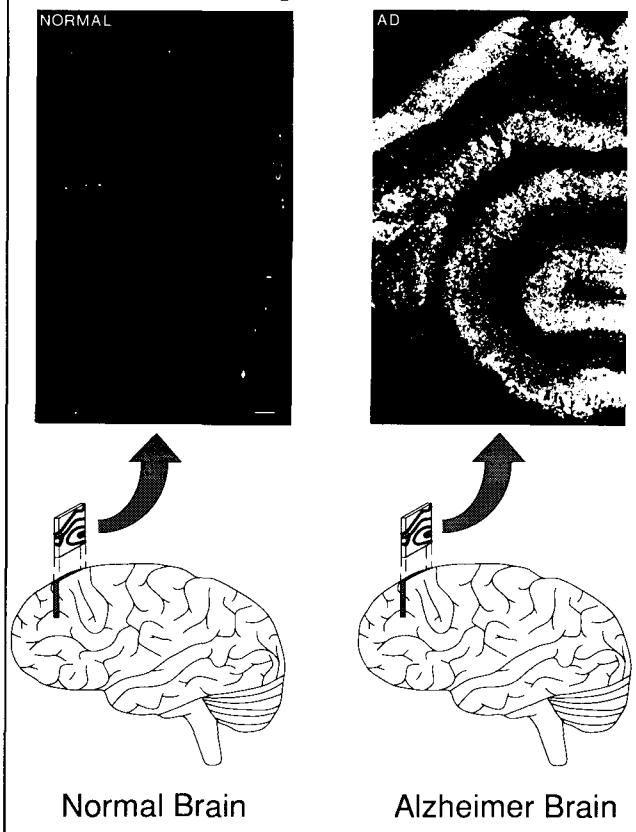
The plaques, which replace healthy tissues as they grow, have been established as the hallmark of Alzheimer's disease. A few similar plaques can be found in the brains of normal older people, but in Alzheimer's patients they are found in dramatically larger numbers. Researchers have established that the major component of the plaques is a substance called beta-amyloid peptide (βA4).

For their model, Maggio and Mantyh developed a means of attaching a highly radioactive label to synthetic molecules of beta-amyloid peptide, and then created conditions under which the labeled molecules would stick and pile up on plaques in small slices of brain tissue from deceased Alzheimer's patients (see Figure 1). Much like a crystal can be grown from a single seed, the beta-amyloid peptide accumulated into plaques like those seen in advanced cases of Alzheimer's disease. "Now we can study how the plaque grows by following the travels of the radioactive label," says Mantyh. "In addition, we can study whether environmental toxins or other factors may contribute to the formation of plaques in Alzheimer's disease."

Using their system, the researchers have already made a couple of intriguing discoveries. They found that the beta-amyloid peptide they added to the plaques would come back off when the tissue sample was moved to a solution without free beta-amyloid peptide. "This shows that the process of plaque growth can be reversed in some circumstances. We need to understand how that happens and what can be done to encourage that process," says Maggio. In another experiment, they found that subtle differences in the structure of the beta-amyloid peptide can prevent it from depositing onto plaques. Thus rat beta-amyloid peptide (which is 93% identical to human beta-amyloid peptide) does not accumulate the way its human analogue does. "Rats do not naturally develop Alzheimer's disease, and this clue may help us find out why," says Mantyh.

Other collaborators on the project were Mark Labenski, Clark Allen, and Joseph Ghilardi of the University of Minnesota; Evelyn Stimson and Charles Dahl of Harvard Medical School; Harry Vinters of the University of California, Los Angeles; and David Whitcomb and Steven Vigna of Duke University Medical Center.

Figure 1.



Drawing by J. Ghilardi and P. Mantyh

New Writer/Editor at ORTTA

On June 8, Phil Norcross joined the ORTTA staff as a writer/editor. Norcross has previously served on the staffs of four magazines, including two university research and technology transfer magazines: *Research/Penn State* and *Penn State Agriculture*. He has also worked as a technical writer and editor for the University of Montana and several state agencies in Montana and Pennsylvania. He earned an M.A. in technical writing at Penn State in 1985 and most recently worked as a research assistant in the University of Minnesota's History of Science and Technology Program and as a teaching assistant in the Department of Rhetoric.

Norcross will assume most of the editing responsibilities for the *Research Review,* which now goes to some 4,800 faculty and staff members, and to physicians at five nearby medical centers. Norcross says, "Every researcher I ask tells me that my most important job is news about funding—application procedures, new grant programs, who at the University is getting funds for what. I will certainly send you that news.

"I would also," he adds, "like to send you news of upcoming events—lectures and conferences, for example—that are of interest to the University research community in general, and to spread news of your successes, awards, publications, personnel changes. I would like to publish your letters and editorials. In short, I invite your mail regarding news the research community needs to hear."

Norcross also will assist Michael Moore with ORTTA's *R&D Outreach* newsletter, which focuses on technology transfer opportunities for industry, and with many of the other communications and marketing projects carried out by ORTTA.

You may write to Norcross in care of ORTTA, or through the Internet at Phil@ortta.umn.edu; phone 625-2354.

Phil Norcross

American Chemical Society

Petroleum Research Fund

American Chemical Society-Petroleum Research Fund (ACS-PRF) research grants permit the principal investigator to charge summer salary to the grant. The maximum amount per year for PI salary benefits has been *$4,000 per grant*. One year ago, this limit was raised to *$5,000* per year, per grant.

At its December, 1991, meeting, the ACS Board Committee on Grants and Awards established a new policy on the payment of summer salaries and benefits to PIs holding ACS-PRF grants. Effective with grants commencing in 1992 and subsequent years, **the number of summer salaries the PI may charge to any ACS-PRF grant may not exceed the number of formal grant years for which the original grant was approved.** Type B and G grants are for two years, so the PI may charge no more than two summer salaries ($10,000) during the life of these grants, including time extensions. Type AC grants may be for one, two or three years with maximum summer salary charges of $5,000, $10,000 or $15,000 respectively, including time extensions.

For accounting purposes, all ACS-PRF grant years end on August 31. While September 1 is the normal start of a grant year, increasingly PIs have been requesting an earlier starting date. Confusion has arisen over the period of time between an "early start date" (which can range from January 1 to August 1) and the formal September 1 start. This time period of one to eight months does **NOT** constitute an additional grant year. An early start, possibly including a summer, does **NOT** entitle the PI to an additional summer salary.

You may call any PRF Program Administrator (202/872-4481) if you have questions concerning this policy or any other aspect of an ACS-PRF grant. Questions may also be referred to your appropriate ORTTA grant administrator.

Clarification of Revised Application Forms PHS 398 and PHS 2590

The following notice appeared in the June 12, 1992, NIH Guide and is intended to clarify questions raised by NIH staff and the research community about modifications and changes to the revised forms PHS 398 and PHS 2590 (revised 9/91).

The application for continuation of a Public Health Service Grant, form PHS 2590, is now available for use. **The last receipt date for the use of previous forms PHS 398 (revised 10/88) and 2590 (revised 10/88) will be October 1, 1992.**

Receipt Date

NIH guidelines governing receipt dates for applications have not changed and may be found on pages 4-14 of the PHS Grants Policy Statement (revised 9/91). Item 2 in the first full paragraph in the instructions on page 8 of the revised PHS 398 application applies to PHS agencies and programs that do not utilize the NIH Division of Research Grants.

Receipt date guidelines are as follows: "For grant applications processed through NIH's Division of Research Grants (DRG), the system requires that applications be *received* by the published application receipt dates. However, an application received after the deadline may be acceptable if it carries a legible proof-of-mailing date assigned by the carrier and the proof-of-mailing date is not later than one week prior to the deadline date."

Type Size

Some fonts designated by the manufacturer as 10-point fonts do not meet the application requirement of 1/8 inch in height for capital letters. Therefore, it is suggested that, when using a 10-point font, the height should be measured with a standard device for measuring type size. If a particular font does not clearly meet the requirement, use of a larger font is recommended.

Page Limitations

The page limit for the Research Plan (exclusive of the publications in the Progress Report) has been increased from 20 to 25 pages. There is now a three-page limit on the Introduction and a six-page limit on Literature Cited. Please note that each literature citation must now include *titles* as well as all authors, book or journal, volume number, page numbers, and year of publication.

Items such as background graphs, diagrams, tables and charts, previously included in the Appendix, now must be incorporated in the Research Plan.

Appendix

There are important changes in the guidelines for Appendix material. Page 24 of the PHS 398 (revised 9/91) contains instructions regarding the Appendix.

The Appendix may now contain 10 publications or manuscripts submitted or accepted for publication. Supplementary background graphs, diagrams, tables, and charts directly pertinent to the application may *not* be submitted as appendix material.

The Appendix is not to be used to circumvent the page limitations on the Research Plan. Only publications, manuscripts, questionnaires, photographs of electron micrographs, gels or other materials that do not copy well should be included in the Appendix. Because secondary reviewers do not get copies of the Appendix, a photocopy of any photographs in the Appendix *must* also be included in the Research Plan. Photocopies must be large enough to be legible to reviewers.

Letters regarding consultants and collaborators must be included in Section 7 of the application, not in the Appendix. See page CC, Table of Contents.

Any application that does not adhere to type size, page limitation, or appendix guidelines will be returned to the applicant without review, for revision and resubmission for a subsequent application receipt date.

Formats and Facsimile Copies

Facsimile copies of forms are acceptable provided they closely resemble the original application. Spacing on forms other than the face page may differ slightly from the actual form. Contact Dr. Patricia Straat, Deputy Chief for Referral, DRG, 301/496-7447, to check acceptability of facsimiles.

The Other Support and the Personnel sections are formats, not forms. The information presented for these two formats does not have to look like the format nor does the exact wording on the page have to be included. Thus, for example, all key personnel who have no other support may be listed on a single page with "Other Support" as the heading, their names typed in and "none" indicated after "active" and "pending."

Description/Abstract

The information provided in the Description is sent to the National Technical Information Service (NTIS) and is avail-

PHS 398 Continued On Page 20

Mn Tech Corridor Continued From Page 1

nology to what once was one of the most blighted areas in the Twin Cities. As a long-time environmentalist he is committed to making it a natural park as well as a research park.

Johnson's background suits him perfectly for his current job. After earning a bachelor's degree in mechanical engineering from the University of Colorado in 1951, he joined the AC Spark Plug Division of General Motors Corp., in Milwaukee. There he helped design one of the first inertial guidance platforms later used in the aerospace industry. Although happy in the role of design engineer, he didn't like Milwaukee's heavily industrialized environment, so he and his wife Erica moved to Minneapolis. There he became the first engineer hired by Foley Manufacturing Corp., where he helped design one of the first rotary lawn mowers. When the company moved it into production, he was asked to supervise its manufacture. Reluctant to leave the creative challenges of design engineering, Johnson sought an alternative.


Herbert Johnson on the balcony of the Minnesota Supercomputer Center

"I ran into a guy I worked with in the Navy when we were electronics technicians. He was working for Research Inc. (a spin-off from the University's Rosemount Research Laboratories), which was doing a wide range of applied engineering research. He didn't have to try too hard to talk me into joining them." Johnson became a systems engineer for Research Inc. in 1953, and for the next ten years he worked on R&D programs under contract to the Air Force. One project, designing a system to simulate the aerodynamic heating of missiles on re-entry to the earth's atmosphere, led to a demand by aerospace companies for innovative radiant heating systems that provided tremendous bursts of controlled energy for the 20 to 30 seconds required to simulate re-entry.

One of those companies, McDonnell Douglas, asked Johnson if he could design a system to simulate aerodynamic loading. Success with that project, which required the use of high-pressure hydraulics and very fast control valves, led to a request from Lockheed for a system to test aircraft materials. That led Johnson and his associates to design various systems for stress testing. It also led him away from design engineering, into management. "Since the systems were in such demand, I spent most of my time traveling around to show companies how we could meet their testing needs. So I asked the president of Research Inc. to make me product manager for the program." Within four years the stress-testing division was as big in sales as the rest of Research Inc., so management decided to spin it off as MTS Systems Corp. In 1966, at the age of 44, Johnson became president of the corporation, where he was to stay for the next ten years, rising to chairman from 1972 to 1975.

In 1976 Johnson left MTS Systems to become President and CEO of Electro/General Corporation, in Minneapolis. The company had earlier designed a portable data-gathering device for a psychology professor at the University of Minnesota. Taking advantage of the new microcomputer "chips" becoming available in the mid-70s, the company designed a hand-held digital data collector for use by industrial engineers. They called it a "Data Myte." As word of the device spread, the automobile industry wondered whether the device could be modified to be used in quality control applications. Two years later it was.

The DataMyte became a hit with industry because of its utility for all types of mobile data gathering, such as inventory control, efficiency studies, and quality control on production lines. That success led Electro/General to rename itself the DataMyte Corp. When DataMyte was acquired by Allen Bradley Co., Johnson left to pursue his many other interests.

Throughout his career Johnson has had many ties to the University of Minnesota. When he headed MTS Systems Corp., Johnson was a founding member of the Institute of Technology Advisory Council (ITAC), established by then-dean Richard Swalin to evaluate programs proposed or offered by the Institute. He also served on the IT's Computer Science Advisory Council. In 1980 Johnson became chairman of the 30-member ITAC, and it was then that the idea of developing a research park near the University first came up. ITAC was later reorganized into the Minnesota High Technology Council, where Johnson served as chairman. He serves currently on MHTC's University Committee, and he is also on the IT Advisory Board.

"In 1983 Mayor Don Fraser formed a group to study how the city could attract high-tech companies," Johnson says. "That brought back the idea of a research park. We looked at areas within the city limits that would be suitable." The group settled on what was once a railroad yard serving the grain elevators and mills lining the west bank of the Mississippi River south of St. Anthony Falls. "It was a very blighted, run-down area, but it had huge location advantages, and with the combination of historic restoration and

development of a river parkway, we could see that it had great promise," Johnson says.

In 1985, the Minneapolis City Council approved a plan for developing the Minnesota Technology Corridor, and the next year city and business leaders established a corporation to carry out that plan. As a partnership of the State of Minnesota, the City of Minneapolis, and the University of Minnesota, the Minnesota Technology Corridor Corp. (MTCC) is dedicated to fostering the development of existing technology corporations and the incubation of new companies in the research park. The challenge for Herb Johnson, who was hired as MTCC president in 1987, was to market the Corridor's location and future amenities to attract corporate R&D centers, research institutes, short-term technology development projects, and high-technology firms.

That was expected to be a long-term project, as most science and technology parks develop over a 15- to 25-year span. Fortunately, some short-term successes fueled early enthusiasm to pursue the long-term mission. In October 1986 the supercomputer facility at 1200 Washington Avenue South was dedicated, thanks to cooperative efforts of the City of Minneapolis, the State Legislature, and the University of Minnesota.

During construction of the supercomputer facility, FMC Corp. expressed interest in building a new R&D facility behind it, along Interstate 35W. "Besides wanting to be near the University and the supercomputer center, the new division manager wanted a location where thousands of people would see the facility every day and realize that FMC Corp. had a major presence in Minnesota," Johnson says. The FMC R&D building was dedicated in October 1987, seemingly setting the stage for rapid development of the Corridor.

The recession and market changes not only put a damper on those hopes, they also forced FMC Corp. to vacate its building less than five years after occupying it. "We really did hit the most difficult part of our development efforts at the worst possible time in the economy," Johnson says. "We were also hindered because we're dealing with privately owned land, so we have to negotiate a sale or the city has to condemn a building before we can bring in an appropriate tenant. Most research parks are either deeded to a city by a large corporation or a developer buys a huge parcel in a suburb. Even so, there typically is a slow growth curve as you bring in the first tenants to fill about 20 percent of the space. Then there is more rapid growth as others see the advantages of being in a recognized research park. And finally, if the park is successful, filling the final 20 percent takes longer because the most desirable spots are taken and rates are higher."

The Corridor's proximity to the University proved to be the answer to continuing its early growth, although not as originally intended. The Minneapolis campus's severe shortage of space led the University to negotiate leases in the former FMC building for several departments, including the School of Public Health's Division of Epidemiology, which was displaced when Memorial Stadium was demolished.

The University also provided the answer to one of Johnson's early objectives for the Corridor: to construct a Minnesota Technology Center that would serve as the "anchor" building for further development. "Opus Corporation had expressed an interest in building leasable space in the Corridor, so I contacted Tony Potami, the University's associate vice president for research and technology transfer, to suggest that a move to the Corridor would be consistent with the University's increased emphasis on collaborating with industry." Potami had been involved in the early planning of the Minnesota Technology Corridor.

Potami also had worked closely with Johnson on developing and implementing Minnesota Project Outreach (MPO), which provides technical information and expertise through computer links to 400 small and medium-size technology-based Minnesota companies and at 75 public access sites. MPO includes data bases that enable users to search for information about the University's research projects and licensable technologies, and biographies of faculty who are available for telephone consultations on technical subjects. "MPO makes it much easier and quicker for companies to find the technical information they need, and it helps them locate University of Minnesota researchers or technologies that can help them succeed," Potami says. "I think that this growing awareness of what the University has to offer, and the collaborative projects that result, will lead to more companies of all sizes wanting to locate R&D functions in the Minnesota Technology Corridor."

Johnson's relocation suggestion reached Potami at the right time, because the Office of Research and Technology Transfer (ORTTA) had outgrown its quarters in the University's Administrative Service Center, in St. Paul's midway district. "I had been looking for space either on the main campus or nearer it, and I agreed with Herb that it made sense for us to be in the Corridor where we could meet with technology companies wanting to collaborate with the University," Potami says. A long-term lease was negotiated with Opus Corp. and in March 1991 ORTTA moved into the upper level of the new two-story Minnesota Technology Center. The first floor was leased to the University's Army Center for High Performance Computing Research, which works closely with the Minnesota Supercomputer Center next door.

The University of Minnesota connection has led to discussions with two private research institutes that expressed an interest in doing applied research in the Corridor. Talks were held with SRI International a couple of years ago, and there seemed to be mutual interest in pursuing specific areas of

Mn Tech Corridor Continued On Next Page

Mn Tech Corridor Continued From Previous Page

collaborative research, but lack of funding ended those talks, Johnson says. More recently, Batelle Institute has expressed an interest in collaborating with the University and possibly establishing a facility in the Corridor to facilitate that research. Those talks are at a conceptual stage at this point, and no specific plans have been agreed to as yet, Johnson says.

Attracting corporate R&D centers has also been difficult. The only such facility now in the Corridor is the Valspar R&D laboratories, which were dedicated in 1984, before development efforts began. Johnson is, however, discussing an especially intriguing plan proposed by the C.E.O. of a local corporation. "This individual is interested in having the best view in town for his R&D offices. He is proposing to put his corporate offices on top of the grain elevators, where they would overlook St. Anthony Falls to the east, downtown Minneapolis to the west, the University of Minnesota to the south, and a long horizon to the north. I've been up there, and it is indeed a beautiful view." Not having to demolish the elevators would save a great deal of money for the Minneapolis Community Development Agency, which bought them from General Mills in 1987 and has leased them back to the company until the land is needed.

"It takes special companies and special people to see the value of locating here for the future," Johnson says. He helped produce a video that describes the plans for the Corridor and shows the many virtues of its location. The video highlights the many research, learning, and cultural resources of the University that are available to tenants. One of the most valuable of those resources, Johnson believes, is students. "I always tell people I meet with that university students make the best employees; undergraduates are bright and motivated, and graduate students are not only good laboratory assistants, they are the world's best technology transfer agents."

Johnson has given more than the five years he promised when he accepted the job of taking the Minnesota Technology Corridor through its infancy. He has promised to stay on until a new president can be hired, but it is clear that the project will remain on the long list of interests he will continue to pursue in his semi-retirement years. "Herb Johnson is a tremendous spokesperson for Minnesota's high-technology industries," Potami says, "and the University owes him a great deal of gratitude for what he has done in support of its educational and research programs, and for his vision in setting the stage for our work with industry in the coming years."

By Michael P. Moore

NIH Strategic Planning

Strategic planning at the National Institutes of Health was summarized at the meeting of the NIH's Advisory Committee during the second week of June. NIH Director Bernadine Healy described the planning's relation to future NIH budgets, the schedule for the June 23-25 meeting of the national planning task force, and the results of regional planning meetings.

The 1994 budget will emphasize programs rather than funding mechanisms. Investigator-initiated research remains the top priority at NIH, Healy explained, but "RO1 grants" are harder to explain and defend than program titles like those described in the strategic plan: "critical science and technology," "research capacity," and "training and infrastructure," for example.

The NIH's national task force for strategic planning—about 170 people from inside and outside the NIH—met June 23-25 in Herndon, Va., to further refine the NIH planning document according to suggestions made at five regional meetings. NIH's institute and center directors will continue the work during a July 15-16 meeting. All are open public meetings.

Healy summarized the results of the regional meetings as follows:

- Peer review needs shoring up.
- Fundamental science remains the engine that drives the rest of NIH.
- Investigator-initiated health science research is key to NIH.
- Expansion of public-private partnerships is desirable.
- The system of institutes and centers with unique missions works well.
- There is a need for long- and short-term training for scientists.
- Public trust and accountability are a priority.
- The problem of failing infrastructure and inadequate instrumentation in the extramural community must be solved.

From the Washington FAX

Deadlines and Meeting Dates

The deadlines and meeting dates for the Committee on the Use of Human Subjects in Research listed below should be used as a guide in preparing submissions to the Committee. Applications will be accepted at any time, but cannot be scheduled for review at the next meeting if they are not received prior to the deadline for that meeting. The deadlines do not vary; they are 4:30 P.M. on the date indicated. Research applications should be submitted as early as possible to ensure agenda space for an upcoming meeting. Occasionally meeting dates will change due to quorum requirements or other schedule changes.

The deadlines apply to all research reviewed at the full Committee level. Research involving minimal risk and research exempt from Committee review may be submitted to the Committee at any time.

As a cost saving measure, researchers are encouraged to mail applications using **Campus Mail** service:

Human Subjects Committee
1100 Washington Avenue South, Suite 201
Minneapolis Campus Mail

For out-of-town and off-campus mailing purposes:

Human Subjects Committee
University of Minnesota
1100 Washington Avenue South, Suite 201
Minneapolis, MN 55415

If you have any questions, please call the Committee office at 624-9829.

	Meeting	Deadline
July, 1992		
HS 01	Jul 08	Jun 24
SS 03	Jul 15	Jul 01
HS 02	Jul 23	Jul 09
August, 1992		
HS 01	Aug 12	Jul 29
SS 03	Aug 19	Aug 05
HS 02	Aug 27	Aug 13
September, 1992		
HS 01	Sep 09	Aug 26
SS 03	Sep 16	Sep 02
HS 02	Sep 24	Sep 10
October, 1992		
HS 01	Oct 14	Sep 30
SS 03	Oct 21	Oct 07
HS 02	Oct 29	Oct 15
November, 1992		
HS 01	Nov 04	Oct 21
SS 03	Nov 11	Oct 28
HS 02	Nov 19	Nov 05
December, 1992		
HS 01	Dec 02	Nov 18
SS 03	Dec 09	Nov 25
HS 02	Dec 17	Dec 03
January, 1993		
HS 01	Jan 13	Dec 30
SS 03	Jan 20	Jan 06
HS 02	Jan 28	Jan 14
February, 1993		
HS 01	Feb 10	Jan 27
SS 03	Feb 17	Feb 03
HS 02	Feb 25	Feb 11
March, 1993		
HS 01	Mar 10	Feb 24
SS 03	Mar 17	Mar 03
HS 02	Mar 25	Mar 11
April, 1993		
HS 01	Apr 14	Mar 31
SS 03	Apr 21	Apr 07
HS 02	Apr 29	Apr 15
May, 1993		
HS 01	May 12	Apr 28
SS 03	May 19	May 05
HS 02	May 27	May 13
June, 1993		
HS 01	June 09	May 26
SS 03	Jun 16	Jun 02
HS 02	Jun 24	Jun 10

HS = Health and Biological Science Committees
SS = Social and Behavioral Sciences Committee

NOTE: Due to quorum requirements, meeting dates are subject to change;deadlines are strictly enforced. Deadlines are latest date for submission to be eligible for upcoming meeting. Studies will be scheduled for review by date received; if an agenda is overcrowded,studies will be deferred to future meetings.

National Institute of Allergy and Infectious Diseases

Research to Better Understand and Prevent Measles

PA-92-84

The National Institute of Allergy and Infectious Diseases (NIAID) invites investigator-initiated research grant applications to explore the basic biology of the measles virus and the host's response to infection. The purpose is to expand the understanding of the biologic basis of measles with the goal of developing improved vaccines to prevent disease and measles-related infant deaths. State-of-the-art application of knowledge derived from this research should lead to new vaccines with reduced primary failure rates that induce long-lasting immunity and can be given safely to very young infants. Success in this endeavor will require basic research in measles virology, immunity, genetics, and pathogenesis.

Background

From 1981 to 1988, a steady average of 3,000 cases of measles occurred each year in the United States. This represents a reduction of over 99% from the 400,000 to 700,000 annual cases per year reported before the introduction of the measles vaccine in 1963. However, in 1989, there were 18,193 cases, and in 1990, the number rose to 27,672 cases. The 1990 outbreak included the largest number of cases since 1977 and the largest number of deaths (89) since 1971. Of the reported cases, 22.7% included complications, and 21.1% required hospitalization.

The epidemiology of the disease in the U.S. is changing and the distribution of cases is shifting from older, previously vaccinated, school-age children to younger, unvaccinated children. As more outbreaks occur in younger children, more infants less than one year old are exposed.

The principal cause of the re-emergence of measles in the United States is the failure to vaccinate children at the appropriate age. Although very effective when used properly, the current vaccine has deficiencies as a public health tool. There is a primary failure rate of about 5%, and thus, susceptible individuals accumulate in the population. The failure rate is higher if the current vaccine is given at less than 15 months of age when a maternal antibody interferes with vaccine efficiency.

In developing countries, measles continues to be a deadly disease claiming over one and a half million deaths each year. In those countries, infants are at greatest risk for serious complications during the interval between loss of the maternal antibody and receipt of vaccine. In both U.S. inner cities and inner cities abroad, this window of exposure is too wide. In order to close this window and protect young infants, new vaccines are needed that can safely overcome the maternal antibody barrier. Development of improved vaccines will depend upon new insights gleaned from basic research.

This is an ongoing program with annual deadlines of **February 1, June 1** and **October 1**. Copies of the announcement are available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The agency contact is James M. Meegan, Ph.D., Virology Branch, Division of Microbiology and Infectious Diseases, NIAID, Solar Building, Room 3A15, Bethesda, MD 20892; 301/496-7453; Fax: 301/402-0804.

Department of Energy

Innovative Concepts Program

The Department of Energy (DOE) Innovative Concepts Program is soliciting grant proposals for advanced concepts having the potential to reduce the energy and/or environmental costs of waste generation/treatment processes.

The concepts must be specific, differ substantially from existing practices or application, and not degrade the quality of the product or service being supplied. Proposed advanced concepts should have the potential to eliminate, reduce or utilize gas, liquid or solid waste streams. The purpose is to identify promising new concepts for saving energy or improving energy utilization while improving industrial efficiency and maintaining the quality of the environment.

$300,000 has been allocated to this program with an intent to award up to 15 grants of approximately $20,000 each. Cost sharing is not mandatory. Grant awards will require innovators to conduct a preliminary technical and market evaluation and to present their concepts to potential sponsors.

The application deadline is **August 3, 1992**. For further information contact Lisa Barnett, U.S. Department of Energy, Seattle Support Office, Seattle, Washington 98104; 202/553-2166.

National Science Foundation

Industry/University Cooperative Research Centers Program

The National Science Foundation (NSF) continues to offer the Industry/University Cooperative Research Centers Program. The program is designed to 1) develop industry, state and other support for industry/university interaction on industrially relevant fundamental research topics; 2) promote university research to provide a knowledge base for industrial and technological advancement while training students; and 3) promote research centers that become self-sustaining with industry, state, or other funding within a five-year period.

The vehicle for this interaction is a research center. NSF supports the initiation of these centers through a phased approach. The first phase is a feasibility study. Next, a center is supplied with seed money from NSF, but a significant proportion of a center's support comes from industrial, state, and other funds. As the center progresses, it becomes less dependent on NSF funds, until it reaches the point of self-sufficiency. Most fully operational centers require funding of $300,000 annually from at least six firms to have a sufficient research base.

Two types of proposals will be accepted:

- **Planning Grants:** For a potential center for which an operational plan, research agenda, and industrial support have not been developed, applicants may submit a proposal to plan the joint industry/university research interests and to determine the feasibility and viability of developing a center. These planning awards typically are for $25,000.
- **Operating Centers:** NSF will accept proposals for a center without the planning phase only when operational plans have been fully developed, industry commitments of at least $300,000 for the first year have been made, and a concept paper has been approved. Where university and/or state support is an added source of funding, the potential for NSF support is significantly enhanced. Centers moving from planning to operational phase must submit a new proposal when they have met the criteria outlined above. Center awards generally are for five years and start at $50,000 - $100,000 per year, to augment existing center funding.

Prior to submission of a formal proposal for a planning or operational center grant, concept papers describing a potential center must be submitted to the program office for comment. Notification of approval of the concept paper is required before submission of a planning grant or operational center grant proposal.

Concept papers may be submitted **at any time**. For more information, write: Alex Schwarzkopf, Industry/University Cooperative Research Centers Program, Engineering Centers Division, National Science Foundation, Washington, DC 20550; 202/357-7307.

National Science Foundation

Arctic System Science Program

The Arctic System Science (ARCSS) Program is a newly established National Science Foundation Global Change Research Program. The ARCSS program goals are:

- To understand the physical, chemical, biological and social processes of the arctic system that interact with the total earth system and thus contribute to or are influenced by global change, in order...
- To advance the scientific basis for predicting environmental change on a decade to centuries time scale and for formulating policy options in response to the anticipated impacts on humans and societal support systems.

Arctic Ocean-Atmosphere-Ice Interactions and Arctic Land-Atmosphere-Ice Interactions are two components of the NSF ARCSS Initiative. These two components are seen as long-term efforts, taking place concurrently with expanded operational capabilities for research, and with improved monitoring capabilities provided by satellite sensors and earth-based autonomous measurement technology. The early phases of ARCSS will emphasize modeling, analysis and synthesis of existing data, and time-series measurements.

A third component of ARCSS is Arctic Paleoenvironmental Studies, including the ongoing second Greenland Ice Sheet Program and Paleoclimates of Arctic Lakes and Estuaries Program.

This is a general program announcement; solicitations for ARCSS competitions will be published annually. Contact Ted E. DeLaca, Director, Arctic System Science, Division of Polar Programs, 1800 G Street NW, Washington, DC 20550; 202/357-7766; FAX: 202/357-9422. Refer to NSF 91-33.

General Service Foundation

Currently, the General Service Foundation has selected as its areas of concern international peace, population, and resources. Applicants are encouraged to submit only applications coming within the following guidelines.

International Peace

The Foundation seeks to address the root causes of conflict and promote peaceful and stable communities, primarily in Mexico, Central America, and the Caribbean. Funding will be given primarily for education and policy analysis and formation, rather than for research.

Support will be considered for programs and projects which address the following issues, as well as their inter-relationships: political rights and civil freedoms; international law and relations; and economic, environmental and development concerns. In addition, the Foundation will make contributions to organizations working to accomplish the following objectives: develop leadership and participation in the nongovernmental organization community; further communication and collaborative efforts among nongovernmental organizations; and strengthen interregional organizations, both governmental and nongovernmental. Grants range from $700 to $70,000.

Population

Primary interest in this category is in making contributions to organizations for population work in foreign countries, preferably in Latin America, in the following areas:

- Programs for the introduction and better distribution of family planning information and services, including abortion and voluntary sterilization;
- Programs that improve maternal and child health, family planning, agricultural and economic development, and
- Programs relating to reproductive health and reproductive rights.

Population interests in the U.S. include programs for primary adolescent pregnancy prevention, family life education, and contraceptive development, and programs relating to reproductive health care and reproductive rights. Grants range from $5,000 to $80,000.

Resources

Interests in this area are:

- Improving the use, management and quality of water in the United States, particularly west of the Mississippi;
- Developing food, water, fuel, forage, forests, and/or fertilizer on a sustainable basis in developing countries, and particularly in conjunction with family planning education and services. Grants range from $1,378 to $70,000.

The application deadline is **September 1, 1992.** A letter of inquiry is strongly recommended before submission of a full proposal. For further information contact: General Service Foundation, 1445 Pearl Street, Suite 201, Boulder, Colorado 80302; 303/447-9541; FAX: 303/447-0595.

National Science Foundation

Hydrologic Sciences

The National Science Foundation announces the availability of the Hydrologic Sciences Program. This new program will address the central role played by hydrologic processes in the geology, physics, chemistry and biology of earth systems.

The Hydrologic Sciences program will provide funding for basic research dealing with the earth's hydrologic cycle and the role of water on and near the continental surfaces of the earth. The Program views hydrologic sciences as geosciences interactive on a wide range of space and time scales with ocean, atmospheric, and solid earth sciences as well as with plant and animal sciences. Supported research will include projects involving water in the form of precipitation, lakes, streams, and groundwater; and interactions with landforms, soils, the atmosphere, the biosphere, and the earth's crust. The Program encourages integrated studies of water balance and fluxes among the various reservoirs.

Where appropriate, proposals will be considered for joint review and possible joint funding with other NSF programs, including those in Engineering, Biological Sciences, and Social and Economic Sciences, as well as with other Divisions in Geosciences. The Program is designed to complement, not duplicate, mission-oriented research programs in the U.S. Geological Survey, the Environmental Protection Agency, the Department of Energy, and other federal or state agencies.

This will be an annual program, with application deadlines of **June 1** and **December 1** each year. A copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. For further information about the Program, contact the Division of Earth Sciences, National Science Foundation, Washington, DC 20550; 202/357-9591.

National Institute of Child Health and Human Development

After-School Care and Its Effects on the Development of Children

RFA: HD-93-02

The Human Learning and Behavior Branch of the Center for Research for Mothers and Children, and the Demographic and Behavioral Sciences Branch of the Center for Population Research, both of the National Institute of Child Health and Human Development (NICHD), are inviting grant applications for the support of research on after-school care and its effects on the development of children.

More than 65% of women with school-aged children are employed out of the home, and this figure is expected to increase to 75% by 1995. At present, research-based information on the quality of after-school care of school-age children of employed mothers is sparse and inconclusive. In the absence of such information, the regulation of quality in such programs is based on studies of preschool-age children. This leads to ambiguous and inappropriate requirements. The systematic investigation of the conditions of after-school care and the impact on the many children involved is timely and has important scientific and policy implications.

The purpose of the RFA is to encourage innovative and highly qualified researchers in the areas of social and behavioral sciences to study 1) the after-school arrangements for school-age children who vary in terms of gender, race, and socio-economic background, and 2) the impact of these arrangements on the development of children. The research needs to be taken into account are a) the after-school environments, including self-care arrangements, b) the demographic and psychological characteristics of the families who choose the care arrangements, c) the characteristics of the communities from which children come, and d) the characteristics of the children who are placed in the different after-school care arrangements.

This RFA will use the NIH individual research grant (R01) mechanism. $600,000 has been set aside for the first year of support, out of which it is anticipated that four grants will be made.

The application deadline is **August 24, 1992**. A copy of the RFA is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. Agency contact: Hildegard P. Topper, Special Assistant, Office of the Director, NICHD, Building 31, Room 2A04, Bethesda, MD 20892; 301/496-0104.

American Cancer Society

Psychosocial Research Related to Cancer

The American Cancer Society has from time to time announced the availability of Special Institutional Grants in areas of research that, for various reasons, deserve special emphasis. Pursuant to this practice, ACS has issued a request for applications in the broad field of psychosocial and behavioral research in oncology.

These grants are designed to provide substantial, flexible and relatively long-term support for interdisciplinary research related to all of the psychosocial and behavioral aspects of the cancer problem. These may include, but are not limited to, studies of behavior as they relate to health-seeking strategies, screening, compliance, coping, pain relief, nausea control, supportive care and quality of life issues. Applications that focus specifically on socioeconomically disadvantaged populations are particularly welcome.

Applications should provide evidence of a cohesive, multidisciplinary unit devoted to psychosocial and behavioral research in oncology. This announcement does not seek applications for demonstration projects, non-research based clinical trials or non-research oriented interventions. Nor is this mechanism appropriate for a request to exclusively support training, although funds for training may be requested as a part of the application.

Successful applicants may receive up to $200,000 per year, including the 25% Institutional Allowance, for a term of up to five years.

The application deadline is **October 1, 1992**. A copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the Bulletin Board. Prior to preparing an application, all applicants should discuss their proposals with Dr. James Lowman, Scientific Program Director, 404/329-7542. Specific application forms may be obtained by calling 404/329-7558.

Faculty Research, Training and Service Awards

This section contains statistics on proposals and awards recently processed by ORTTA. In addition, we have randomly selected awards received by faculty during preceding months. Faculty who have received awards they would like mentioned in a future Research Review may send the pertinent data, as exemplified below, to Phil Norcross at ORTTA.

Proposal and Award Summary

	Number	Amount
Proposals Submitted May, 1992	349	$ 62,698,099
Awards Processed May, 1992	288	30,017,836
Proposals Submitted July, 1991 - May, 1992	3,836	639,499,651
Awards Processed July, 1991 - May, 1992	2,751	233,438,552
Proposals Submitted July, 1990- May, 1991	3,359	472,969,095
Awards Processed July, 1990 - May, 1991	2,624	215,540,263

Environmental Training Programs in Eastern Europe
Zbigniew Bochniarz, Humphrey Institute
James A. Perry, Forest Resources
USDS, Agency for International Development
$3,148,000 - 02/92-05/96

CTS/MNDOT Program for Transportation Research
Richard P. Braun, Civil and Mineral Engineering
St of MN, Transportation
$752,000 - 07/91-06/93

Lithium/Polymer Batteries: High Performance Electrode Structure
William H. Smyrl, Chemical Engineering and Materials Science
Boone B. Owens, Chemical Engineering and Materials Science
Edward L. Cussler, Jr., Chemical Engineering and Materials Science
USDOD, Defense Advanced Research
$688,000 - 05/92-06/93

Epidemiologic and Genetic Studies of Breast Cancer
Thomas A. Sellers, Public Health
NIH, NCI
$498,276 - 03/92-02/93

Evaluation of the Utah Prepaid Mental Health Plan
Jon Christianson, Public Health
HCFA
$370,431 - 02/92-02/93

Heat Shock Proteins in Multiple Sclerosis
Gary Birnbaum, Neurology
Pere Santamaria, Medicine
National Multiple Sclerosis Society
$347,010 - 09/92-03/95

Soil-Specific Management
Pierre Robert, Soil Science
Wallace W. Nelson, Ag Experiment Station, Lamberton
USDA
$217,732 - 04/92-04/94

Developing Outcome Measures for Substance Abuse Treatment
Robert L. Kane, Public Health
MCC Companies, Inc.
$200,698 - 03/92-06/93

Functional Studies on Lectin-Like Molecules on NK Cells
Jeffrey Houchins, Laboratory Medicine and Pathology
NIH, NCI
$173,230 - 05/92-04/93

The Influence of Local and Global Instability on the Development of Countercurrent Mixing
Paul J. Strykowski, Mechanical Engineering
NSF
$155,036 - 03/92-08/95

Peripheral Nociceptors in Inflammation
Patrick Mantyh, Psychiatry
NIH, NINDS
$154,002 - 04/92-03/93

Karst and Hydrogeochemistry/Fillmore County Atlas
E. Calvin Alexander, Jr., Geology and Geophysics
St of MN, Natural Resources
$150,000 - 04/92-06/94

Ultrafast Studies on Intermolecular Electron Transfer and Related Experiments in Contact and Solvent-Separated Ion Pairs
Paul F. Barbara, Chemistry
U.S. Department of Energy
$150,000 - 05/92-04/93

HIV-1 Neurotoxicity: Mechanism and Modulation by Opioids
Stanley A. Thayer, Pharmacology
ADAMHA, NIDA
$148,330 - 03/92-02/93

Molecular Regulation of Liver Regeneration
Clifford J. Steer, Medicine
NIH, NIDDK
$146,592 - 05/92-04/93

Community Interpreter Training Program
Bruce T. Downing, Linguistics
Bush Foundation
$141,970 - 03/92-09/93

Small Business Development Center
Robert E. Heller, Business and Economics, Duluth
Kjell R. Knudsen, Center for Economic Development, Duluth
St of MN: Trade and Economic Development
$140,000 - 01/92-12/92

Effects of Anadromous Salmon on Stream Ecosystems
Anne E. Hershey, Biology, Duluth
NSF
$134,443 - 04/92-09/93

Characterization of the CD66 Antigen
Keith Skubitz, Medicine
American Heart Association
$131,700 - 07/92-06/95

The Human Erythropoietin Receptor
John C. Winkelmann, Medicine
NIH, NIDDK
$130,176 - 05/92-04/93

Solid Waste Compost Utilization in Minnesota Soils and Agricultural Crops
Thomas R. Halbach, Soil Science
Carl J. Rosen, Soil Science
John Moncrief, Soil Science
St of MN, Office of Waste Management
$129,508 - 04/92-01/94

Determination of Cell Types in Developing Retina
Steven McLoon, Cell Biology and Neuroanatomy
NIH, NEI
$122,271 - 05/92-04/93

Environmental and Natural Resources Policy and Training Project
William Fenster, International Agriculture Programs
University of Wisconsin
$112,352 - 04/92-09/96

Evaluation of a Vertical Fiber Membrane Aerator
John S. Gulliver, St. Anthony Falls Hydraulic Lab
Michael Semmens, Civil and Mineral Engineering
NSF
$102,023 - 04/92-09/93

Production of Lysine from Methanol by Fermentation
Michael C. Flickinger, Biological Process Technology Institute
Richard S. Hanson, Gray Freshwater Biological Institute
Kyowa Hakko Kogyo Company, Ltd.
$100,000 - 05/92-04/93

Tunneling and Transport in Mesoscopic Structures
Allen M. Goldman, Physics and Astronomy
USDOD, Navy
$100,000 - 03/92-02/93

SI-Device-Related Interface Research
John Weaver, Chemical Engineering and Materials Science
USDOD, Navy
$100,000 - 01/92-12/94

High Functional Nanoscale Semiconductor Devices
Stephen Y. Chou, Electrical Engineering
USDOD, Navy
$100,000 - 03/92-09/93

Structure and Chemistry of Catalysts for Oxidative Hydrocarbons
John D. Lipscomb, Biochemistry (MS)
Amoco Production Company
$45,000 - 03/92-02/93

Insulin Secretory Reserve in Human Pancreas Allograft
R. Paul Robertson, Medicine
Adrian Teuscher, Medicine
Juvenile Diabetes Foundation
$20,000 - 07/92-06/93

Epithelial Adhesion in C. Albicans and C. Tropicals
Catherine M. Bendel, Pediatrics
Margaret Hostetter, Pediatrics
American Foundation for AIDS Research
$72,600 - 07/92-06/94

Imipramine in the Treatment of School Refusal
Gail A. Bernstein, Psychiatry
Barry D. Garfinkel, Psychiatry
James E. Mitchell, III, Psychiatry
ADAMHA, NIMH
$93,398 - 03/92-02/93

Development of NMR-PET Tomographic Scanner
Bruce E. Hammer, Radiology
NIH, Research Resources
$48,013 - 04/92-04/93

Feedback Control Laws for Highly Maneuverable Aircraft
William L. Garrard, Aerospace Engineering and Mechanics
Gary J. Balas, Aerospace Engineering and Mechanics
NASA
$63,995 - 02/92-01/93

Dynamics of Contaminant Bioaccumulation and Removal by Phytoplankton
Donald C. McNaught, Ecology, Evolution and Behavior
Deborah L. Swackhamer, Public Health
U.S. Department of Commerce, Sea Grant
$30,619 - 02/92-01/93

Studies on the N-Glucuronidation of Antiepileptic Drugs
Rory P. Remmel, Medicinal Chemistry
NIH, Fogarty
$35,150 - 04/92-01/93

Antibody Treatment of Antidepressant Toxicity in Rats
Michael P. Murtaugh, Veterinary Pathobiology
Minneapolis Medical Research Foundation
$78,064 - 04/92-03/93

Research Experience for Undergraduates Site
Lorraine Francis, Chemical Engineering and Materials Science
Alon V. McCormick, Chemical Engineering and Materials Science
Don Birmingham, IT Administration
NSF
$49,755 - 04/92-09/93

Corrosion Studies of Biomedical Materials
William W. Gerberich, Chemical Engineering and Materials Science
Henry S. White, Chemical Engineering and Materials Science
Cardiac Pacemakers, Inc.
$84,000 - 04/92-02/94

A Comparative Study on Sequence Detectors
Jay Moon, Electrical Engineering
IBM
$75,001 - 04/92-04/93

Isotope and Pollen Stratigraphy of Abrupt Late Glacial Climate
Linda C. K. Shane, Geology and Geophysics
Kerry Kelts, Geology and Geophysics
NSF
$80,351 - 03/92-09/93

Interactive Earth Systems: A Curriculum and Course Development
V. Rama Murthy, Geology and Geophysics
NSF
$59,453 - 05/92-10/93

Detection and Interactions of Ultra Heavy Nuclei and Cosmic Ray Propagation
Cecil J. Waddington, Physics and Astronomy
NASA
$64,191 - 03/92-02/93

Role of Organic Matter Production and Fate in Organic Contamination
Donald C. McNaught, Ecology, Evolution and Behavior
Steven J. Eisenreich, Gray Freshwater Biological Institute
U.S. Department of Commerce, Sea Grant
$36,000 - 02/92-01/93

The Secondary Metabolites of Eurasian Water Milfoil and Their Relation to Potential Control Agents
Florence K. Gleason, Plant Biology
Raymond Newman, Fisheries and Wildlife
U.S. Department of Commerce, Sea Grant
$28,759 - 02/92-01/93

Solid Waste Compost Utilization in Plant Production System
Bert T. Swanson, Horticultural Science
St of MN, Waste Management
$88,231 - 04/92-01/94

Standards for Energy Efficient New Home
Patrick H. Huelman, Forest Products
Timothy D. Larson, Forest Products
St of MN, LCMR
$75,000 - 01/92-12/93

Effects of Municipal Solid Waste Compost Application on Early Growth in Forest Plantations
Thomas Nichols, Forest Resources
St of MN, Office of Waste Management
$92,640 - 04/92-01/95

PHS 398 Continued From Page 9

able to the public. Therefore, proprietary information should not be included here as it may affect potentially patentable inventions.

Personnel

NIH is interested in tracking individuals on research projects, especially graduate students, to determine whether or not they subsequently pursue careers in research. Birth dates are needed to track these individuals. (The birth dates of key personnel were previously requested on the Biographical Sketch page of the application kit.)

- Which individuals should be listed at the bottom of form page 2 where it asks for "Personnel Engaged on Project?"

  The instructions (page 16) for page 2 state that those individuals who will participate in the *scientific execution* of the project, including collaborating investigators, individuals in training (who are employees on the project), and support staff, must be listed. In most instances, support staff need not be reported since they rarely participate in the scientific execution of the project. Thus, dishwashers, secretaries, animal caretakers, and most technicians need not be listed here, but should be included on the budget page.

- Summary of Personnel Listings:

  Other Support page - Key Personnel

  Personnel form page 2 - Key personnel plus individuals in research training who are employees on the project.

  Budget page - All personnel who are employees of the applicant organization and who are provoding paid or contributed effort to the project.

- Are dates of birth required or optional?

  For the reasons stated above, whenever possible, dates of birth should be included for key personnel and graduate students.

- In the Form PHS 2590, which individuals should be listed for personnel in the progress report, page 7?

  The same categories of individuals listed on page 2 of the PHS 398 application must be listed here. Thus, current and planned key personnel plus individuals in training who are employees on the project must be listed.

Budget Page

- What is the definition of a full-time appointment?

  NIH staff recognize that full-time appointments may be different in terms of actual months per year or days per week at the applicant organization. Therefore, the definition of a full-time appointment must be in accordance with institutional policy and used consistently by each institution on all federal grant applications. Anything less than full time, in accordance with the organization's policy, should be identified with an asterisk.

  In cases such as the Veterans Administration, where the type of appointment cannot be identified by months, an asterisk should be placed in the column and a full explanation provided under Justification.

- What is institutional base salary?

  The definition of institutional base salary on page 17 has not changed and is the annual compensation that the applicant organization pays for the individual's appointment, whether that individual's time is spent on research, teaching, patient care, or other activities. For example, a physician's clinical salary that is paid by the applicant organization under its standard payroll system is considered part of the institutional base salary.

- Should actual or projected institutional base salary be used in salary calculations?

  The institution must list the salary in effect at the time of submission. However, if, for instance, a known statewide or institution-wide salary or other increase, such as promotion or merit pay, has been approved or is projected, salaries based on that figure may be requested provided the anticipated increase is explained in the Justification section.

- Should the institutional base salary be listed when it is greater than $125,000?

  When an institutional base salary exceeds the salary limitation, the higher salary should be listed. The salary limitation, currently $125,000, is an annual requirement that is subject to change with each appropriation. The salary requested, however, cannot be awarded at a rate in excess of $125,000 per year.

- What should be listed in the institutional base salary category if, for instance, a graduate student is paid hourly and does not have an institutional base salary?

  An asterisk must be placed in the column for base salary and an explanation must be provided under "Justification" to explain the basis for the salary requested.

- Why is institutional base salary required for the continuation application, form PHS 2590, and optional for the competing application, form PHS 398?

  Institutional base salary is optional because those applications are available to outside reviewers. However, institutional base salary will be requested by the grants management staff if the application is funded.

  Since the information on the PHS 2590 is reviewed by NIH staff, not by outside reviewers, and the information

is needed by grants managers, institutional base salary is required for the continuation application.

Biographical Sketch

If the list of publications in the last three years exceeds two pages, select the most pertinent publications. *Do not exceed two pages.*

Other Support

Other Support information is critical for determining effort and resources available to the Principal Investigator for that project. Overlapping support or overcommitment of effort determinations are part of the stewardship roles of NIH program and grants management staff.

The format on form page 7 was designed as a guide to ensure that all of the pertinent information is included. Other Support should not be more than one page per key personnel per other support source. Specific aims of the other projects, for example, should be condensed into about five lines.

- What is institutional support?

  Institutional support includes funds or resources paid for or provided by the institution for personnel, trainees, and/or equipment that has not been reported elsewhere in the application.

- What resources should be listed for Other Support?

  All funds and resources, whether federal, non-federal or institutional, available to the Principal Investigator/program director in direct support of the research endeavors through research or training grants, cooperative agreements, contracts, fellowships, and endowed chairs must be listed on the Other Support page. Research endeavors relate to an investigator's entire program of research. However, in the case of prizes and gifts, only those that support the specific projects must be reported in Other Support.

  While most gifts are monetary, other non-monetary gifts, such as equipment, must be reported when used in direct support of the project and not reported elsewhere in the application.

- What is meant by dates and costs of the entire project?

  The dates of the entire project should reflect only the currently active award for the Other Support, e.g., the current competitive segment. Both direct and indirect costs must be listed here as well as for the Other Support for the current year.

Checklist

For Misconduct in Science, new institutions must report the date of Initial Assurance. Institutions that have submitted Annual Reports must list the date of the most recent submission.

The checklist must be the last page on *all* copies of the application.

Certification/assurance of a Drug-Free Workplace is applicable for new or revised applications (Type 1). It is *not* required in applications for competing and noncompeting continuations (Type 2 and Type 5).

Applicants applying for a non-competing continuation must have filed forms for Civil Rights, Handicapped Individuals, Sex Discrimination, and Age Discrimination in order to have received a competing award. Therefore, applicants should mark "Filed" for these assurances on the checklist for form PHS 2590.

Subjects Enrolled in Studies

- In form PHS 2590, the Application for Continuation, what information should be included in the table for reporting subject data on page 7?

  Use the table on page 7 to provide the number of male and female subjects within each category enrolled in the study to date, that is, cumulative since the most recent competitive award.

Editorial Clarifications

On page 9 of the form PHS 398, the page limitations chart describing the Research Plan should read "Sections 1-4" instead of "Sections A-D."

Institutional National Research Service Awards (NRSA)

Indirect costs under Institutional NRSAs, other than those awarded to state and local government agencies, will be reimbursed according to the PHS Grants Policy Statement (revised 9/91), which states eight percent of total allowable direct costs exclusive of tuition and related fees and expenditures for equipment or *at the actual indirect costs rate, whichever results in a lower dollar amount.* (The italicized portion was inadvertently omitted from the new application forms.)

Research Career Development Awards - Appendix

The Appendix materials instructions should have reflected the new guidelines for the Appendix for individual research grant applications. Thus, no more than six publications and manuscripts submitted or accepted for publication may be submitted with *new* applications.

SPIN

A Method for Finding Grant Opportunities

The Sponsored Project Information Network (SPIN) is a computerized locator system of funding opportunities (federal, nonfederal, and corporate) for faculty and institutional research, development, and education program support. It is available free of charge to University faculty and staff through ORTTA.

Based on a description of your research areas and / or the type of support sought, faculty and staff can search the SPIN Keyword Index to identify sources within specific areas of interest. The Keyword Index, a taxonomy developed by SPIN to catalog funding sources, is divided into the following ten major classifications:

- **Agriculture / Food / Forestry**
- **Arts / Culture / Humanities / Communications**
- **Business / Economics / Management**
- **Education**
- **Health / Medical Sciences**
- **International Affairs / Area Studies**
- **Miscellaneous / Other**
- **Science / Technology**
- **Social / Behavioral Sciences**
- **Social Welfare / Public Affairs**

The result of a search is a set of profiles of applicable funding sources that provides: 1) the sponsor's name; 2) the sponsor's contact address and telephone number; 3) deadline dates; 4) program titles; 5) objectives or interest areas of the sponsor; and 6) restrictions that would affect the submission of a proposal. This set of profiles is sent to the requestor.

Effective September, 1990, the SPIN indexes became available for on-line review through ORTTA's Electronic Bulletin Board (See the September, 1990 *Research Review* for information on Bulletin Board contents and access instructions—or call 624-9004 for a copy of the instructions.) The Bulletin Board contains a section devoted to SPIN and offers users the opportunity to review the Keyword Index alphabetically or within the topics shown above.

Since the Bulletin Board is accessible at any time, faculty and staff can browse the indexes at their convenience and find *keyword codes* of interest to them. From within the Bulletin Board they can forward a note to the Bulletin Board Editor requesting a SPIN search based on the chosen keyword codes (limit, 20 keywords).

Additional **Specialty Codes** used by SPIN that may help in choosing key words appropriate to the project for which funding is sought are:

- **International Travel:** Opportunities to travel to countries or to study their cultures.
- **Opportunities Abroad:** Support to travel identified by country, region or continent.
- **Equipment/Facility Support:** Use code that relates to project, not what is being purchased.
- **Professional Development:** Largely Postdoctoral opportunities.
- **Student Support:** For students seeking external funding support.
- **Foreign Scholar Support:** Bringing foreign scholars to this country or seeking programs in the U.S. for which they are eligible.
- **Conference Support:** Funding to hold or conduct a conference, symposium, or workshop.
- **Publication Support:** Support to prepare or complete a work or for actual cost of publishing a completed work.
- **Sabbatical Support:** To undertake or supplement sabbatical leaves.

For further information regarding the SPIN system, please contact ORTTA at 624-9004.

SPIN searches are also available through the Research and Development Office in the College of Liberal Arts, the Agricultural Experiment Station, the Research Support Office at Duluth, and the Grants Development Office at Morris.

Office of Research and Technology Transfer Administration

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UNIVERSITY OF MINNESOTA

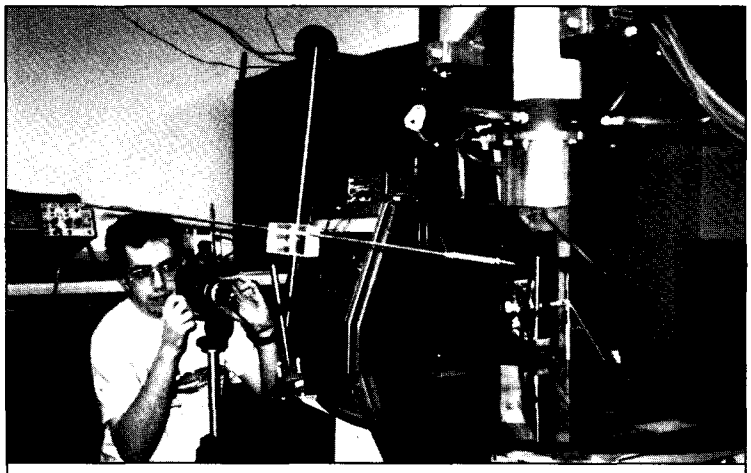
RESEARCH REVIEW

Research and Technology Transfer Administration

August 1992

Undergraduates in the Laboratory

Undergraduate research was once as rare as UFO sightings over the lakes of Minnesota. That changed at the University of Minnesota in 1984 when a Regents' retreat sparked creation of the Undergraduate Research Opportunities Program (UROP).



Aerospace engineering student Chris Landergan with his airjet

Modeled after the Massachusetts Institute of Technology undergraduate research program, UROP was developed in 1985 by Lesley Cafarelli, then Director of the Office of Educational Development Programs. The pilot program started spring quarter of that year with 94 students from the colleges of Agriculture, Biological Sciences and Liberal Arts, and the Institute of Technology. Seven years later, the number of funded students had increased to 340 for 1991-1992, with participants from professional degree programs, all undergraduate colleges on the Twin Cities campus, and students from Duluth, Morris, and Crookston campuses.

To be eligible for UROP, applicants must be full-time students with *fewer* than 216 credits completed at the end of the UROP award. They must also be in good academic standing and enrolled in baccalaureate or pre-baccalaureate degree programs. Prospective undergraduate researchers are required to complete a proposal, fill out an application, and turn in a recommendation from one faculty sponsor who agrees, if the applicant is accepted, to advise and oversee the student's research. Last year 279 faculty members sponsored students in the program. The students received grants of $1,000 maximum, with a designated amount set aside for equipment and the rest paid in hourly wages until the money ran out. At that point a student would have to stop incomplete research or the department could decide to absorb expenses until the project is completed.

UROP gives undergraduates a chance to experience research in their potential future professions. Leslie Carver,

Continued on Page 12

Inside

IDC Rate Agreement Date Changed

Effective immediately, the rate agreement date for Indirect Costs has changed to **May 13, 1992**. Actual rate amounts remain unchanged. See chart at right.

Departmental Purchase Orders under $500

Departmental purchase order acquisitions under $500 *should not* be sent to ORTTA. The blue copy of the document must be retained by the department for audit purposes.

In cases where the document is under $500 but because the grant year is ending encumbrance is required, the vendor copy should be directed to Purchasing with a *bold note to encumber due to grant year end.* It is recommended that Purchasing be contacted for specific instructions on how to assure a speedy encumbrance process.

If you have other questions, please contact the appropriate ORTTA Grant Administrator.

Research Review Index Available

An index for Volume XXI (July 1991 - June 1992) of the *Research Review* is now available. You may call 624-9004 to request a copy.

RESEARCH REVIEW

Volume XXI/Number 2

August 1992

Director of Communications: Michael P. Moore

Editor: Phil Norcross

Editorial Assistant: Tove Jespersen

Associate Vice President: A. R. Potami

***Research Review* is a monthly publication of the Office of Research and Technology Transfer Administration. Its purpose is to inform faculty and administrators who are involved with sponsored research and technology transfer on procedures and policies of granting agencies, on institutional policy and other information necessary to the preparation of research proposals, and on funding opportunities.**

***Research Review* welcomes ideas and comments from all readers. Write to *Research Review* at 1100 Washington Avenue South, Suite 201, Minneapolis, MN 55415-1226, or call Phil Norcross at 625-2354 or Michael P. Moore at 624-9398.**

Indirect Cost & Fringe Benefit Rates

Indirect Cost Rates

The *provisional* rates for July 1, 1991, through June 30, 1994, are listed below. When budgeting for periods beyond 6/30/94, the 7/1/92-6/30/94 rates should be used. **The rate agreement is dated May 13, 1992.** This date should be used where required on proposal applications. **Please call Marilyn Surbey at 624-4850 with questions on Indirect Costs.**

	07/91/92 06/30/94
Research	
On-Campus	40.00
Off-Campus *	21.00
SAFHL	58.05
Hormel	44.00
Other Sponsored Activity	
On-Campus	20.00
Off-Campus *	10.00
Instruction	
On-Campus	52.00
Off-Campus *	16.00

* A project will be considered off-campus if more than 50% of the direct salaries and wages of personnel employed on the project are incurred at a site neither owned nor leased by the University.

Fringe Benefit Rates

If you have questions regarding fringe benefit rate development or need the breakdown of charges, call **Vivian Fickling at 624-2009**.

For proposals being submitted with start dates **after July 1, 1992**, the estimated fringe benefit rates to be budgeted are:

Faculty	31.25
Civil Service	29.50
Graduate Assistants	10.50

Estimated rates after **July 1, 1993,** are:

Faculty	28.00
Civil Service	30.50
Graduate Assistants	31.25

Rate changes will be reflected in this section.

Committee on the Use of Human Subjects in Research

Changes in Approved Research Protocols

Once approval has been granted for a protocol and consent documents, the principal investigator is responsible for informing the Committee of any proposed changes in population, recruitment plans, research procedures, study instruments, study site, or major personnel. Request for approval for a change should be made prior to the implementation of any change. Regulations require that all changes be proposed and approved in writing.

The proposed change may affect the risk/benefit balance already approved by the Committee. In that case, extra protection for the research subject may be required.

Some changes require revision of the consent form and consent procedures. If so, the Committee will not approve the change until revised consent documents are filed for review and approval.

Researchers planning a change should:

1. Write to the Committee office citing the study title and code number of the approved study.
2. Describe the proposed change in lay language and include an explanation of, or rationale for, the change. (If the change is proposed by the sponsor or a national group, the formal notice of change or revised protocol should be provided for Committee record.)
3. Describe the implications of the change for the subjects.
4. Provide revised consent documents if the change will affect the human subjects.
5. Not initiate the change until formal written approval is granted by the Committee.

What happens next?

Some minor changes are handled by administrative action. Many changes are reviewed by expedited review procedures and involve a two to three-week turnaround. In some cases, significant changes that alter the previously approved risk and benefit ratio are reviewed by the full committee.

Researchers are cautioned *not* to implement the changes until written approval is received.

The Committee recognizes that most research projects are further refined after they are approved by the Committee. Every effort is made to handle changes as quickly as possible to disrupt the flow of a project as little as possible.

If you have any questions, please call Moira Keane at 624-1889.

Duluth Medical School Hosts Conference on Blood-Brain Barrier

The first major conference to focus on the molecular and cell biology of the blood-brain barrier took place last month at the University's Duluth School of Medicine. The Cerebral Vascular Biology Conference—or CVB '92—drew about a hundred researchers from North America, Europe and Asia.

"Most of the world's major labs in the field were represented," says one of the conference's two organizers, Lester R. Drewes, Head of Biochemistry and Molecular Biology in Duluth. "There have been a number of 'satellite' symposia at brain or pharmacological meetings, but this is the first CVB meeting to stand on its own. It is a field whose time has come."

Two particularly important topics at the conference, says Drewes, were strategies for delivering therapeutic drugs to the brain and new understanding of blood vessel growth—angiogenesis—in brain tissue.

To understand why drug delivery is an important issue, says Drewes, "you have to appreciate that the blood vessels of the brain are unique. There are no gaps between the endothelial cells that line them. So a drug has no way of getting out of the blood vessel and into the brain tissues." That barrier blocks pharmaceutical treatment of Alzheimer's, stroke, Parkinson's or any neurological disease.

"But a couple sessions at the conference presented strategies for crossing the blood-brain barrier," says Drewes. "People are able to attach a drug to a protein which specifically binds to the blood vessels and is then taken up by the brain."

Regarding angiogenesis, researchers at the conference reported *in vitro* formation of capillary networks by endothelial cells. Understanding that process, and how to block it, might offer treatment of brain tumors, says Drewes: "Brain tumors are dependent on nutrients delivered by blood vessels. So if blood vessel growth could be inhibited, tumor growth could be limited."

The conference took place July 11 through 13 in the Duluth Entertainment Convention Center. It was funded chiefly by a $12,000 NIH conference grant, with additional funding from the UPJOHN, Bristol-Myers Squibb, and SmithKline companies.

National Institutes of Health

Revised PHS 416-1 Application Form Now Available

The newly revised PHS application form for Individual National Research Service Awards—PHS 416-1—is available. The revision is dated 10/91, and replaces the version revised 7/88 and reprinted with a 4/89 date. NIH encourages the use of the new form with the September 10, 1992, deadline, although the older version will be accepted. After September, use of the new form is mandatory.

The newly revised fellowship application contains a number of changes that should facilitate the application process. Some of the more important changes include:

- The review and award schedule for ADAMHA and AHCPR has been added. ADAMHA and AHCPR use the same receipt dates as NIH but have a different review and award schedule.
- The introduction section has been expanded to provide information on the level of fellowships (predoctoral, postdoctoral and senior) available at the three PHS funding agencies, and on what, if any, budget information is requested in the application.
- Item 17, Applicant's Training/Employment, page 2, was modified to consolidate non-degree training, other research and professional experience, and employment into one item.
- A request for the name, institution and department of individuals submitting reference letters was added to Section 3 of the Table of Contents, page 3. This information will be helpful in avoiding potential conflict of interest situations in review.
- An explanation of the required documentation regarding gender and minority representation in study populations has been added to the instructions for the research proposal, page 10.
- The Assurances/Certifications section on the Checklist page have been reformatted and updated. All the updates are in Section II-Sponsoring Institution, and include a revised misconduct in science assurance, and a new assurance on age discrimination.

Questions regarding the use of the PHS 416-1 may be directed to the appropriate ORTTA DHHS Grant Administrators, or to the Office of Grants Inquiries, Division of Research Grants, National Institutes of Health, Westwood Building, Room 449, Bethesda, MD 20892; 301/496-7441.

Woods Hole Panel Discusses Scientific Misconduct

Current laws, rules and regulations may not adequately protect scientists from false or malicious accusations by "whistle-blowers," said panelists last month in the "Woods Hole Dialogue" at the Marine Biological Laboratory.

The three panelists questioned the justice of "confrontation with confidentiality," referring to a system that does not provide for confrontation between accuser and accused. Because such accusations can "kill a scientist's reputation" and even wrong science as a whole, the panel questioned the validity of "holding the whistle-blower harmless."

The panelists were Louis Lasagna, graduate and academic dean of the Tufts University School of Biomedical Sciences; William Curran, professor of Legal Medicine at the Harvard School of Public Health; and Patrick Derr, professor and chair of philosophy at Clark University. Their panel discussion, titled "Professional Codes and Ethical Principles in Science," was part of the "Woods Hole Dialogue" series and was moderated by Paul McHugh, professor and chair of the Department of Psychiatry and Behavioral Sciences at the Johns Hopkins Medical Institutions.

Curran offered advice about ethical conduct before, during, and after research:

In preparation for research, justifiable design and disclosure of conflicts of interest are key, he said. Review by appropriate ethics boards that offer advice and approval can provide protection. Disclosing conflicts of interest must be accompanied by review, said Curran, because we all need an outside interest to question us.

During research, it is important to have a good management plan and good record keeping. The scientist in charge needs to be wary of sloppy or negligent research or intentional mishandling of data. Curran also advised periodic contact with ethics committees.

Concerning authorship, Curran warned of several ethical pitfalls: incomplete or misleading work, failure to acknowledge significant contributions, failure of the senior author to check drafts, tables and author order, and, worst of all, fraud and plagiarism. Honorary authorship, stressed Curran, should be eliminated.

From *Washington Fax*

Laws Protecting Animal Research Enacted

During the first half of 1992, state legislatures debated 54 bills regarding the use of animals in research, testing and education. According to the House and Senate research offices, no such bills were debated in Minnesota.

For the protection of research facilities, 15 bills were introduced and seven became law, according to the National Association for Biomedical Research (NABR). Thus a total of 30 states (including Minnesota) now have laws specifically protecting research facilities, employees and animals.

Five states, says the NABR, debated limits on the use of animals for testing the safety of a given substance. The Illinois legislature defeated a bill to limit such tests. The Vermont legislature approved two such bills that died after it adjourned for the year. At the end of June, bills were still pending in Arizona, Massachusetts and New York. The NABR points out that, thus far, only local laws have limited safety tests. A 1991 ordinance in Berkeley, Calif., prohibits testing for ocular and dermal irritancy.

Bills to restrict dissections in the classroom are being considered in Massachusetts, New York, Pennsylvania and Rhode Island. Such a bill died in Vermont.

From *Washington Fax*

Teaching Materials on Animal Research Available

Teaching materials that describe the importance of animal research are available free of charge from the National Institute of Mental Health.

Animal Research: The Search for Life-Saving Answers is a booklet that describes the importance of continuing animal studies in order to advance human health. It is aimed at a wide audience, including educators, health leaders, students, legislators and the general public. The Institute will supply quantities as well as individual copies. Also available are a poster, lesson plans, a teachers' guide, and a students' brochure meant to serve elementary and high school education. Three more items in the same series will soon go to press.

For more information, contact the National Institute of Mental Health, Room 15C05, 5600 Fishers Lane, Rockville, MD 20857; 301-443-4513.

Orientation to Animal Use

The University's Research Animal Resources will offer quarterly seminars for new (and current) investigators and technicians involved in the use of research animals. The seminars will present information on policies regarding animal use, on functions of the University Animal Care Committee, on animal ordering and housing, on the Occupational Health Program, and on other relevant issues.

The next orientation seminar will meet on **September 29, 1992** in Phillips-Wangensteen Room 6-210. Another seminar will meet the afternoon of **January 27, 1993**. For more information, please call Dr. Cynthia Gillett at 624-4625.

Defense Bill Funds Agriculture

The House version of the 1993 defense bill earmarks $15 million in Army funds for agricultural R&D.

The Army funds are to further development of industrial and biodegradable products from agricultural commodities. The earmark appears in an amendment to the National Defense Authorization Act for Fiscal Year 1993 (H.R. 5006), which the House passed in June. Rep. Ron Dellums (D-Calif.), chair of the House Armed Services Subcommittee on Research and Development, made the amendment at the urging of Kika de la Garza (D-Texas), chair of the House Agriculture Committee. Dellums and de la Garza say they are working for similar language in the Senate version of the bill, expected to be acted on in early August.

The report on H.R. 5006 by the House Armed Services Committee describes the R&D work as follows: "The committee is aware of agricultural products that possess industrial and biodegradable characteristics of interest to the Department of Defense. Recent discoveries and advancements could revolutionize the agricultural industry, creating innumerable jobs and economic security for rural areas, while increasing the domestic source access by the Department of Defense to high performance substances that are environmentally sound.

"The committee directs the Secretary of the Army to expand research activities at the Natick Research, Development and Engineering Center . . . evaluation and exploratory development should utilize the existing university support teams engaged in the current effort."

From *Washington Fax* and the Committee report

NRC Urges Competitive Biotechnology Policies

According to the National Research Council, the U.S. biotechnology industry will lose its lead to Japan by the end of the decade unless concrete steps are taken by U.S. government, industry and universities. With regard to universities, those steps chiefly involve university-industry relations, the training of researchers and several government measures.

The NRC's Committee on Japan, in its 1992 report *U.S.-Japan Technology Linkages in Biotechnology*, acknowledges that cooperation with Japan is inevitable and desirable. But the committee also describes serious concern about 'one-way' technology transfer to Japan without the development of strong global commercialization capabilities in the United States.

Relations between U.S. universities and venture capitalists is essential to long-term competitiveness, says the report. To make the most of collaboration with industry while protecting academic freedom and intellectual property, universities should develop licensing policies that permit faculty to participate in the formation of new companies.

The report also says that Japanese biotechnology companies increasingly invest directly in U.S. academic research rather than in small, private firms. So U.S. universities need better guidelines for contract research and for the conduct of foreign researchers in U.S. laboratories, and they need access to Japanese laboratories and Japanese improvements on U.S.-developed technologies.

Along with those changes in university-industry relations, says the NRC, a new generation of scientists and engineers must be trained as global thinkers and entrepreneurial managers. Training in Japanese language and international business should increase for scientists and engineers, and more of them should get professional experience in Japan.

Among government measures the NRC report considers, several affect universities directly: Funding agencies could place a special priority on nonmedical biotechnology applications, perhaps working with state biotechnology centers. Centers of excellence, with long-term funding from government and industry, could act as bridges between universities and the biotechnology industry. And federal agencies could disseminate information about Japanese biotechnology R&D, perhaps through on-line access to Japanese data bases, patent registrations and electronic-mail reports.

Copies of the NRC's *U.S.-Japan Technology Linkages in Biotechnology* are available from the National Academy Press; phone 1-800-624-6242.

From *Washington Fax*

NRC Wants Changes in Patent Law

The National Research Council recently suggested that the United States consider adopting the "first-to-file" system for patents. Our current "first-to-invent" system encourages innovators, thus it supports the work of small firms. But there are serious differences between U.S. protection of intellectual property and that in Japan, where the first-to-file system is used. Bringing U.S. practices into line with those of competitor nations would help U.S. industry, laboratories and universities profit in the global market, says the NRC.

"First to file" means that the rights to a patentable invention belong to the first applicant for the patent, rather than to the first inventor. The United States is almost unique in having a first-to-invent system.

Giving strong protection to biotechnology processes as well as products would also benefit the United States.

These suggestions are part of *U.S.-Japan Technology Linkages in Biotechnology*, a 1992 report by the NRC's Committee on Japan.

From *Washington Fax*

Arts Funding

How Does Minnesota Measure Up?

In FY91, the last year for which complete figures are available, Minnesota arts groups received $6,156,900 in grants from the National Endowment for the Arts. That figure placed Minnesota third in the nation for total dollars received, right behind the most populous states of New York and California. This means the federal government spends more on the arts in Minnesota than the legislature does.

The Arts Board's state appropriation for FY91 was approximately $4.2 million, which placed Minnesota 22nd in the nation for per capita spending on the arts. Although FY92 saw a 4.6% drop in the Arts Board's appropriation, Minnesota moved into 20th place for per capita spending because some state arts agencies received even larger cuts.

The economic impact of the arts on the entire state has never been formally measured. However, in 1985, the Metropolitan Regional Arts Council found that the arts contributed $392 million annually to the economy in the seven-county metro area alone. Today Minnesota Citizens for the Arts estimates that impact, adjusted for inflation, would be closer to $479 million. And they stress that the figure is a conservative estimate, which doesn't even take into account the 60% increase in arts attendance since 1985, and the growth in the number and size of Minnesota's arts organizations during the same period.

From *Arts Board News*

Marilyn Surbey and Michael Moore

Surbey and Moore to Serve Expanded Roles

Restructuring within ORTTA has resulted in additional duties and changes in title for two ORTTA employees. Marilyn Surbey was promoted to Assistant Vice President for Research and Technology Transfer at the July Regents' meeting. Michael Moore has been assigned an expanded role as Director of Research Communications and Technology Marketing for ORTTA, and as Director of Communications for the Office of the Vice President for Research.

Ms. Surbey has spent 13 years of her 15-year University career with ORTTA. Her additional responsibilities include general oversight of grants management policies and procedures; departmental budgets; coordination among ORTTA units; and policy, procedural and personnel matters within ORTTA. She will continue to be responsible for indirect cost development, other rate development, financial reporting and effort certification.

Mr. Moore joined ORTTA in 1989 after three years as science writer in the University's Health Sciences Public Relations office. He has responsibility for ORTTA's *Research Review* and *R&D Outreach* newsletters and other internal and external communications, as well as providing marketing support for licensing of technologies patented through the Office of Patents and Licensing. He will also work with Dr. Anne Petersen, Vice President for Research, to increase awareness and understanding of the University's research programs.

Richard Miller Joins ORTTA Staff

Effective July 1, 1992, Richard A. Miller joined the ORTTA staff as coordinator of cost studies. Miller will work primarily on the University's indirect cost proposal, although his responsibilities will also include other cost accounting issues such as service center rates.

Miller earned a B.A. in Economics and Political Science at St. Mary's College of Maryland and an M.A. in Public Policy at the University of Chicago. He was previously employed by the University of Chicago, where he worked in the University Financial Planning and Budget Office. Prior to that, he worked as a higher education consultant. Miller has also worked for the President's Office of Management and Budget in Washington, D.C.

Richard Miller

National Institutes of Health

Ozone: Mechanisms of Action (RFA: ES-92-04)

The National Institute of Environmental Health Sciences (NIEHS) and the National Heart, Lung and Blood Institute (NHLBI) have announced joint ozone studies related to the mechanisms of the health effects and better understanding of the risks associated with prolonged ozone exposure as well as the development of biomarkers that can predict the health effects.

The combination of ozone concentration profiles, duration of exposure, lung ventilation, and frequency of ozone exposure that might bring about a change in human lung function is not well understood. The mechanisms responsible for the health effects are not clear. The human population is often exposed to ozone levels exceeding the standard for 6-11 hours repeatedly over a period of 1-4 days. These issues are important to public health and welfare, particularly to children, the aging population, and individuals with pre-existing respiratory disease conditions.

The goals of NIEHS and NHLBI in this solicitation are to determine the relationships and mechanisms of health effects of long-term environmental exposures to ozone. Basic research applications utilizing animal, clinical, and existing data from both epidemiological studies and large-scale health and air monitoring records are solicited. The research may include studies to identify the physiological effects of ozone exposure and studies to determine the underlying cause for such effects. Research toward understanding the chronic and relative permanency of health effects resulting from long-term and multiple exposure to ozone, the degree to which biological function has been compromised as a consequence of exposure, and the degree to which the health effects are physiologically and/or pathologically progressive or regressive is specifically requested.

Approximately $1.8 million is available to fund approximately nine awards: six by NIEHS and three by NHLBI.

The application deadline is **November 24, 1992**. A copy of the RFA is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. Agency contacts are George S. Malindzak, NIEHS, 919/541-3289/1379; David L. Mineo, NIEHS, 919/541-1373; James P. Kiley, NHLBI, 301/496-7332; Tanya McCoy, NHLBI, 301/496-4970. This announcement may also be accessed through the bulletin board by calling up the July 17, 1992, NIH Guide.

National Institutes of Health

Research Supplements to Promote Reentry into Biomedical and Behavioral Research Careers

The Office of Research on Women's Health and the Office of Extramural Research, National Institutes of Health (NIH), wish to announce the initiation of a pilot program to encourage fully trained women and men to reenter an active research career after taking time off to raise children or to attend to other pressing personal or family needs. This program will provide administrative supplements to existing NIH research grants for the purpose of supporting full-time or part-time research experiences tailored to refresh existing research skills and knowledge.

In spite of the increasing participation of women in research training, women constitute only 19% of the pool of NIH principal investigators. NIH is, therefore, launching this new program specifically to offer opportunities to women and men who have interrupted their research. It is anticipated that the positions made available through this program will enable individuals to reestablish careers in biomedical and behavioral research.

In all cases, the proposed research experience must be an integral part of the approved ongoing research of the parent grant or cooperative agreement. Principal investigators are encouraged to contact the appropriate NIH staff identified in the announcement prior to submission in order to obtain specific information about application characteristics and submission requirements.

Supplemental awards may not exceed $50,000 in direct costs per year. A maximum of $40,000 may be requested for salary and fringe benefits; an additional amount up to $10,000 may be requested for supplies and travel. An estimated $1,000,000 will be available for 10 to 15 supplemental awards in FY92.

Eligible award mechanisms are R01, R10, R35, R37, P01, P50, P60 and U01.

The application receipt date is **August 15, 1992**. A copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The announcement may also be accessed through the bulletin board by calling up the July 10, 1992, NIH Guide.

National Library of Medicine

NLM Resource Grant Program

The Resource Awards of the National Library of Medicine (NLM) assist health science libraries in improving services by the application of computer and telecommunication technology.

The Long-Range Plan of NLM states that opportunities for progressing from the present to the "electronic world of the future" are linked to improving the infrastructure for information transfer and facilitating the effective use of this infrastructure. The Plan also emphasizes the importance of providing medical libraries with access to national networks. It is appropriate that the resource grant mechanism concentrate its efforts on the following area of need: the use and improvement of technology necessary to coordinate and disseminate health science information.

NLM wishes to encourage strongly applications that incorporate as an essential feature on-line access to NLM databases by institutions or by individual users. Successful applicants will be those who communicate an understanding that Resource Awards are not merely grants for hardware or telecommunications systems. Most likely to be favorably received are applications for systems capable of expediting the flow of information to end-users; accordingly applicants are also asked to consider ways and means of increasing use of the proposed system by health professionals through training and/or cooperation with medical directors and professional societies, or some other technique.

Single institutions may apply for up to $12,000 for one year of support. Applications involving consortium/contractual arrangements may be for up to $12,000 for one year for each participating institution, and, as an option, the responsible applicant institution may include a request for $12,000 for an initial year for planning and organizing the consortium.

This is an ongoing grant; annual deadlines are **February 1, June 1,** and **October 1.** A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. Potential applicants are encouraged to contact NLM by writing or calling Ms. Frances E. Johnson, Biomedical Information Support Branch, Extramural Programs, National Library of Medicine, Building 38A, Room 5S520, Bethesda, MD 20894; 301/496-4221.

National Science Foundation

Research on Scientific Databases

The Division of Information, Robotics and Intelligent Systems (IRIS) in the Directorate for Computer and Information Science and Engineering (CISE), National Science Foundation, announces a special interest in supporting interdisciplinary research efforts in scientific and engineering databases.

Research on the design, development, management, and use of databases has traditionally focused on concepts and requirements critical to business-like environments. However, current database technology falls short of supporting the diverse needs of scientific and engineering applications. Scientific databases can be viewed as critical repositories of knowledge, both existing and yet to be discovered. Global-change studies, astronomy, human genome mapping, social and economic studies, and engineering design are a few examples of research areas that generate and require access to extraordinarily large amounts of multi-media data forms: numbers, symbols, texts, images and others.

The objective of this program of support is to foster coupling between database technology and scientific or engineering research for the advancement of both. Research is sought on methodologies and tools for the representation and manipulation of very large volumes of scientific or engineering data in highly distributed heterogeneous environments. In this context, research in three interrelated areas is encouraged: 1) Scientific Database Models and Systems; 2) Knowledge Discovery in Scientific Databases; 3) Resource-Sharing Environments.

$2-3 million is available for this program for awards of up to $300,000 per year for 3 years.

Collaboration of CISE researchers with researchers in other scientific or engineering disciplines is strongly encouraged.

The application deadline is **September 15, 1992.** A copy of the full announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The Agency contact is Dr. Maria Zemankova, Program Director, Database and Expert Systems, NSF, 1800 G Street NW, Room 310, Washington, DC 20550; 202/357-9570. Email: mzemanko@nsf.gov; Bitnet: mzemanko@nsf; Fax: 202/357-0320.

National Institutes of Health

The Role of the Family in Preventing and Adapting to HIV Infection and AIDS RFA: MH-92-11

The National Institute of Mental Health (NIMH), the National Institute on Drug Abuse (NIDA) and the National Institute on Alcohol Abuse and Alcoholism (NIAAA) are requesting applications for a study on the role of the family in preventing and adapting to HIV Infection and AIDS.

The purpose of this RFA is critical because little information is currently available about family processes on a wide variety of family configurations, including those that are at high risk for HIV infection. In this RFA, the term "family" refers to the breadth of family configurations, including biological kin networks and non-related persons who consider themselves to be family through a "network of mutual commitment." Thus, family level of analysis may include the family of origin, family of choice, or a combination of these. Results from studies funded under this RFA will be used to develop effective prevention efforts aimed at high risk individuals and their families or to enhance treatment efforts for families already coping with HIV infection.

The HIV epidemic not only takes a toll on the health of those directly infected, but also affects the health and well-being of those close to them. Family members are likely to experience the stress of being caregivers or confidants while the AIDS patient is ill and experience grief upon the patient's death. Several examples from existing literature illustrate the potential radiating effects of AIDS on family members, i.e. parental death has been found to have adverse effects on surviving children's mental health.

Methodology development may be necessary to capture meaningful data on non-traditional family relationships and structures in terms of membership, relationship roles, and patterns of interaction and communication. Study designs may need to clarify the nature of interactions between a family of origin, family of choice, and intimate support networks. Innovations in statistical analysis approaches may also be required to describe these family processes.

The mechanism for support for this RFA is the R01, individual research project. A minimum of $1.8 million is available to support three to five awards for a period of up to three years.

An optional, non-binding letter of intent is requested by August 15, 1992. The application deadline is **September 15, 1992**. A copy of the RFA is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The RFA may also be accessed through the bulletin board by calling up the July 3, 1992 NIH Guide.

The Procter and Gamble Company

University Exploratory Research Program

Procter and Gamble is inviting proposals for the FY93 University Exploratory Research Program. Since its inauguration in 1981, this program has been confirming the belief that funding exploratory research in scientific areas of mutual interest strengthens the interaction between Procter and Gamble and the academic research community.

Most systems for selecting university research projects tend to favor proposals for the logical and systematic extension of current knowledge. Such proposals are less risky, have more predictable outcomes and are relatively easy to defend. In contrast, research proposals which depart dramatically from the current knowledge base entail substantial uncertainty both in methods and outcomes. The focus of the Exploratory Research Program is on research which might not otherwise be funded because it is too speculative even though it has intriguing potential.

The exploratory research supported falls within the broad areas of the chemical, biological and engineering sciences. Funds are intended to be sufficient for one independent unit of research and may be expended for that purpose in whatever way is determined to be most effective by the principal investigator within the policy of the university.

Three proposals will be accepted for funding each year at an amount up to $50,000 per year for up to three years, not renewable. Funds may be carried over from one year to the next within the three-year maximum. Overhead is not to exceed 10% of total direct costs.

The application deadline is January 8, 1993. A copy of the announcement/application is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The company contact is Brandon H. Wiers, Program Administrator, University Exploratory Research Program, Miami Valley Laboratories, Procter & Gamble Company, PO Box 398707, Cincinnati, Ohio 45239-8707; 513/627-2358/Fax: 513/627-1153.

Arthritis Foundation, Minnesota Chapter

The Minnesota Chapter of the Arthritis Foundation invites applications for funds to support clinical and basic research projects in rheumatic disease. This year funds will be awarded for small grants.

The small grants program places particular emphasis on supporting young investigators entering a career of arthritis

Continued On Next Page

research. Priority will be given to requests in the following categories:

- Pilot projects intended to generate data needed to apply for a larger grant from other sources such as NIH or the National Arthritis Foundation;
- Small projects with limited goals unlikely to be successful in national competition because of their size rather than scientific content;
- Interim support for ongoing major projects to bridge a temporary gap in funding to sustain crucial personnel or generate data specifically needed for refunding.

The majority of the grants will be funded at $10,000; a limited number (2-3) of requests of up to $20,000 may be funded. Support may be requested for one or two years.

The application deadline is **August 16, 1992**. Instructions and application materials are available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board.

National Endowment for the Humanities

NEH Summer 1993 Stipends

The National Endowment for the Humanities (NEH) Summer Stipends provide support for college and university teachers to pursue two consecutive months of full-time study or research.

The University of Minnesota may nominate three members of its faculty for Summer Stipends via an internal competition managed by the Graduate School. The scope of support includes, but is not limited to, the following disciplines: history, philosophy, languages, linguistics, literature, archaeology, jurisprudence, theory and criticism of the arts, ethics, comparative religion, and those aspects of the social sciences that employ historical or philosophical approaches.

The stipend is $3,750, with an additional supplement of $1,700 provided by the Graduate School.

Requests for nomination are due at the Graduate School by **September 1, 1992**. Those selected as nominees must submit their proposals to the Graduate School by **September 30** to comply with the October 1 postmark deadline.

Internal eligibility requirements and nomination procedures may be obtained from the Graduate School Research Office, 625-2356. Requests for application forms and additional information may be directed to Geri Malandra at 625-4801.

Midwest Plant Biotechnology Consortium

The Midwest Plant Biotechnology Consortium (MPBC) is requesting preproposals for two 1993 research competitions: *Plant Biotechnology Competition* and *Energy from Biomass Competition.* The Consortium supports basic plant biotechnology research and technology transfer, and promotes research interactions among academic, government and industrial scientists. Preproposals are requested for both programs in plant biotechnology research areas including basic biochemistry, physiology, genetic manipulation, and cell/tissue culture techniques.

Funding is for one to two years in the range of $40,000 to $200,000 from MPBC. MPBC funds must be matched at least 1:1 with non-federal funds. Principal investigators are responsible for securing matching funds. The match may come from industry, state or local government, foundations, universities, etc., but some industrial matching is required. The deadline for principal investigators to submit written documentation of matching funds is April 1, 1993.

Investigators participating in the 1993 competition must present preproposals in person at the MPBC Annual Symposium to be held in Indianapolis on November 8-10, 1992. Some travel assistance is available.

Plant Biotechnology Competition

Preproposals are requested for industrially relevant research opportunities are in the:

- agrichemical industry;
- alternative or non-food agricultural product industry;
- food industry;
- pharmaceutical industry;
- process applications; and
- seed industry.

Energy from Biomass Competition

Preproposals are requested to address industrial problems and opportunities related to:

- developing biofuels from plant tissue;
- improving biomass production;
- creating new and improved biomass conversion; and
- creating processes and products to reduce the demand for or to replace other currently utilized, non-renewable energy sources.

The preproposal deadline for both competitions is **October 1, 1992**. For more information contact the University's MPBC representative, Burle Gengenbach, Director, Plant Molecular Genetics Institute, Department of Agronomy and Plant Genetics, 411 Borlaug Hall, University of Minnesota, 625-6282; or the Midwest Plant Biotechnology Consortium 317/494-2426.

Undergraduates in the Laboratory

Continued From Page 1

Niloufar Hadidi, Chris Landergan, Moffit Kable, and Neil Krasnoff are five students who took advantage of that chance.

Investigating Autism

When Leslie Carver applied to the University of Minnesota, she knew nothing about undergraduate research. Her main reason for choosing the University was the reputation of the Institute of Child Development. As a senior CLA student, Carver learned of UROP from Associate Professor Charles A. Nelson. Carver did her initial research for credit through the Department of Psychology and then applied for a UROP grant winter quarter of 1991. Nelson then introduced Carver to Associate Professor George Realmuto in the Department of Psychiatry because of Carver's interest in autism and neural science. Armed with the knowledge of what she wanted to study, a UROP grant, and the guidance of two faculty, Carver began an investigation of emotions and what part of the brain controls them. The data acquired will be used as a control for a future project comparing reactions to stimuli by autistic people and normal people.

Her UROP stipend permitted Carver to conduct research four to five hours a week over the rest of the school year. Although her project went slower than she first expected, Carver says she would definitely do it again because the experience taught her about the entire process of research and the changes a researcher often has to make to complete a project. "When the project first started, I didn't realize I could be so creative and involved with my research," Carver explains.

"When the project first started, I didn't realize I could be so creative and involved with my research." —Leslie Carver, senior, CLA

Currently working under another UROP grant, Carver has begun a second project in communication disorders. It looks into the use of "safety signals" to keep undesirable behaviors under control. Comparing the two projects, Carver explains that the second project deals more with treating people so it is more structured. "I've learned the difference between basic and applied research."

She also found that the school-year program is not as intensive as the summer program. During the school year the student proposes a study and carries it out as far as time and money allow. In the summer, however, research is more intensive because it becomes a full-time job where a lot of experience is gained and there are fewer of the distractions that occur during the regular school year.

UROP gives students an experience that can be useful in graduate school. Carver's results will be published by the time she graduates, quite an accomplishment for any university student. She recommends the program to other undergraduate students because it is a good way to get involved. "In a school this size it's hard to get to know a professor and this is a good way to do it."

Analyzing Father-Child Relationships

Niloufar Hadidi enrolled in the University's School of Nursing because her husband got a job in Minneapolis, and because of the University's good reputation in the health field. She did not know undergraduates could be involved in research until staff at the HONORS Program for nursing students, that also requires a research project, discussed the opportunities with her. Like Carver, Hadidi benefitted from two advisors: Associate Professor Laura Duckette and Associate Clinical Specialist Karen Brand in the School of Nursing.

Hadidi suggests that the work is not unlike a master's thesis and there is a great sense of accomplishment once finished.

Also like Carver, Hadidi's project took more time than she first anticipated. She began her research on the "Relationship Between Iranian Fathers' Involvement in Childbearing Practices and Father-Child Relationships During Infancy and Pre-School Years" in 1988, her junior year, and has just recently completed her final paper. Hadidi suggests that the work is not unlike a master's thesis, and there is a great sense of accomplishment once finished. She remarks, "I've learned to appreciate the complications researchers have to overcome." If students are enthusiastic about a subject and really have the desire to do research, Hadidi believes that UROP is for them: "Otherwise it is too easy to procrastinate."

Studying Jet Streams

An aerospace engineering major who came to the University of Minnesota mainly because it was the nearest large university, Chris Landergan is a hearty supporter of UROP. Landergan had three months experience as an assistant to Assistant Professor Ellen Longmire in the Department of Aerospace Engineering and Mechanics when he applied for a UROP grant. He had the freedom to propose a project on just about anything in his academic field, and Longmire agreed to be his advisor. Weekly meetings with her provided guidance if he needed it. Other faculty and graduate students were helpful as well when he had difficulties his faculty advisor could not cover.

Landergan emphasizes that writing the UROP proposal and final report is good experience for engineering students. It helps them learn to write better, a skill too easy to overlook because many advanced students can test out of the required freshman composition class.

More than anything, he found his two research projects to be tools for learning. "You spend a lot of time and effort doing things that aren't immediately applicable to what you are investigating," Landergan says. "I did not get to gather data until the last week."

The first of Landergan's UROP studies investigated a jet flow of a narrow column of air. He constructed an apparatus, similar to a toaster, that sends powerful electric currents through a small metal wire with oil on it. The heat vaporizes the oil and smoke is produced. Nearby, a blower system built by Steve Anderson, a second-year graduate student, releases jet streams of air at different speeds while a camera photographs the smoke to analyze the structure of the airflow at the various speeds. Landergan invested a lot of time during this first project evaluating the validity of his method. For his second UROP project, he expanded his investigation, using the same apparatus except for an air nozzle with teeth instead of the original flat nozzle.

When asked about potential applications of his research, Landergan envisions his data applied to the mixing of gaseous fuels or fluids that come out of a jet, as in a fuel-injected car. Understanding the development of particle-wave jets can aid engineers in creating methods of combustion that produce less waste material, he explains.

The undergraduate research experience changed Landergan's academic plans, spurring him to go on to graduate school. Not only that, says Landergan, "I had fun!"

Looking for Antibodies

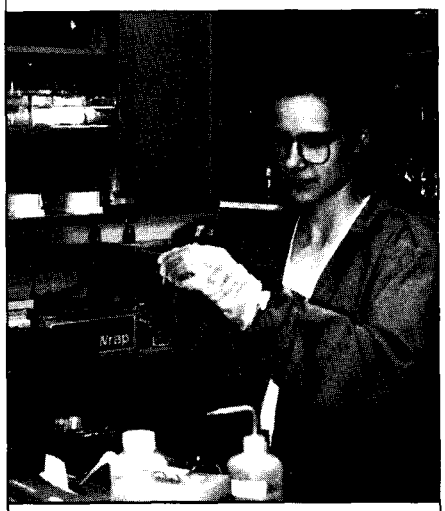
When she embarked on a double major in genetics and microbiology, Moffit Kable knew the University of Minnesota's research strengths would be to her benefit.

Kable thinks she will pursue a career in academic research

The chance to be paid while acquiring good work experience as a laboratory assistant played a large part in her selecting the University. Research became part of her life in her sophomore year when she applied to the UROP program after hearing about it from a fellow lab worker and from her faculty sponsor Assistant Professor Judith G. Berman of the Department of Plant Biology.

Before attaining a UROP award, Kable was responsible more for the upkeep of the laboratory than for any research. Now she can concentrate on her project and not have to worry so much about other duties in the lab.

Her project involves looking for antibodies against CGTBPs (Chalmy G-strand Telomere Binding Proteins). CGTBPs bind to telomeres, found on the ends of chromosomes, and keep nucleases and DNAases from chewing up the nucleus and DNA in a cell. To see if antibodies are bound to CGTBPs, Kable injects chickens with a specific protein she wants the chickens to make antibodies against. Then she harvests the antibodies from the eggs the chickens produce to make acid blots. The data are being used to find out more about how genes are regulated.



Genetics and Microbiology doublemajor, Moffit Kable preparing to transform bacterial cells.

Working in the lab has helped her in classes, making them more meaningful because she sees how the subjects taught in the classroom apply to the field of biology. Based on her UROP experience Kable thinks she will pursue a career in academic research rather than industrial science. She feels that a university setting allows researchers more freedom to pursue their own interests and ideas.

Experimenting with Biological Control

Neil Krasnoff graduated from the College of Agriculture in June 1992 with a major in forest pathology and an emphasis in soil science. He also took with him some hands-on experience searching for ways to save trees from a devastating fungus. His senior year, with Professor Robert A. Blanchette in the Department of Plant Pathology as his faculty sponsor, Krasnoff proposed a UROP project focused on the fungus *Phellinus weirii*. This fungus is a causative agent in laminated root rot—a disease that degrades lamellae, or thin membranes, between plant cells.

During winter and spring quarters he studied whether the fungi *Trichoderma spp*, antagonists and predators of *Phellinus weirii* which prevent its nutrient uptake, could compete with the destructive fungi in different niches. *Trichoderma* would be a safer means of control than using chemical agents. Successful prevention of laminated root rot would be very valuable, as an estimated 4 million cubic

Continued on Next Page

feet of Douglas fir lumber has been lost due to the root rot-causing fungus.

Krasnoff says UROP experience is realistic—it helps undergraduates learn that problems and their solutions are not simple. He also gained some insight into himself. With a wry smile, Krasnoff admits that he surprised himself because he did not realize he was capable of so much.

Preparation + Motivation = Success

The Undergraduate Research Opportunities Program is recognized by its participants as an invaluable addition to their education. All students interviewed said they would encourage and recommend the program to other students. Several pointed out, however, that to get the most out of the opportunity candidates should have good grades, genuine interest and motivation, and a good background concerning not only their field of study but also the workings of the University.

Participants emphasized UROP's need for better publicity. Most undergraduates do not know about the program, according to those interviewed, who believe the venture creates opportunities that every student should know about. Participants also think there should be more funding for the program.

Administrative Fellow for UROP, Vicki Munro-Bjorklund observes, "Undergraduate research is a good foundation for students on their way to graduate school, but even those who do not plan to continue on in school are given an education whose impact will last a lifetime. That is education of the best kind." As one aspect of President Hasselmo's Undergraduate Initiative, the program offers undergraduates the chance to experience directly some of the benefits of attending a leading research institution.

Support From Faculty

Dr. Conrad E. Firling of the Department of Biology at University of Minnesota, Duluth, currently has three undergraduate students researching in his lab. His research studies the effect of aluminum citrate on embryonic bone formation, and Firling asserts, "Once these undergraduates get turned on, it's hard to get them out of the laboratory. I have two now who sometimes spend weekends in the laboratory until ten, eleven o'clock at night." Firling continues, "It really says something to the fact that maybe hitting our heads against a wall has some worth after all. These are unique kids, just tremendous."

"Once these undergraduates get turned on, it's hard to get them out of the laboratory." —Conrad Firling, Professor of Biology and Anatomy, Duluth

Firling tends to accept almost exclusively junior- and senior-level students because they are more mature and able to follow through with planning, record keeping and protocol. He finds that a solid junior or senior undergraduate student differs little from an introductory graduate student, and comments that in some ways they are more aggressive and more motivated.

Firling hopes the University continues to support undergraduate research, and points out that anytime there are interested people in the laboratory it generates new ideas, new ways of viewing problems, and new ways of solving them. Undergraduate research really complements teaching, he says. "We tend to separate teaching and research. But I think the very fact that I get to sit down with three or four people in the laboratory on a one-to-one basis—that's where I do my best teaching. I'm putting my imprint on them, and hopefully developing them as research scientists."

Not the only faculty member sold on the importance of undergraduate research, Firling believes faculty should support it and realize there are certain trade-offs. "We end up advising, acting as academic father or mother to the student," Firling reveals. "It's fun working with undergraduates because they're more open to ideas and they get results. There's a lot of excitement. It makes the faculty advisor feel good to see that kind of interest and excitement on their [the students'] part."

by Alice Chen

Alice Chen is a senior in the Scientific and Technical Communications program of the Department of Rhetoric and is serving a summer internship in the Office of Research and Technology Transfer.

UROP Administrative Fellow, Vicki Munro-Bjorklund shows off a T-shirt

SPIN

A Method for Finding Grant Opportunities

The Sponsored Project Information Network (SPIN) is a computerized locator system for funding opportunities (federal, nonfederal and corporate) for faculty and institutional research, development and education program support. It is available free of charge to University faculty and staff through ORTTA.

Based on a description of your research areas and / or the type of support sought, faculty and staff can search the SPIN Keyword Index to identify sources within specific areas of interest. The Keyword Index, a taxonomy developed by SPIN to catalog funding sources, is divided into the following ten major classifications:

- **Agriculture / Food / Forestry**
- **Arts / Culture / Humanities / Communications**
- **Business / Economics / Management**
- **Education**
- **Health / Medical Sciences**
- **International Affairs / Area Studies**
- **Miscellaneous / Other**
- **Science / Technology**
- **Social / Behavioral Sciences**
- **Social Welfare / Public Affairs**

The result of a search is a set of profiles of applicable funding sources that provides: 1) the sponsor's name, 2) the sponsor's contact address and telephone number, 3) deadline dates, 4) program titles, 5) objectives or interest areas of the sponsor, and 6) restrictions that would affect the submission of a proposal. This set of profiles is sent to the requestor.

Effective September 1990, the SPIN indexes became available for on-line review through ORTTA's electronic bulletin board (See the September, 1990 *Research Review* for information on Bulletin Board contents and access instructions—or call 624-9004 for a copy of the instructions.) The Bulletin Board contains a section devoted to SPIN and offers users the opportunity to review the Keyword Index alphabetically or within the topics shown above.

Since the Bulletin Board is accessible at any time, faculty and staff can browse the indexes at their convenience and find *keyword codes* of interest to them. From within the Bulletin Board they can forward a note to the Bulletin Board Editor requesting a SPIN search based on the chosen keyword codes (limit, 20 keywords).

Additional **Specialty Codes** used by SPIN that may help in choosing key words appropriate to the project for which funding is sought are:

- **International Travel:** Opportunities to travel to other countries or to study their cultures.
- **Opportunities Abroad:** Support to travel identified by country, region or continent.
- **Equipment/Facility Support:** Use code that relates to project, not what is being purchased.
- **Professional Development:** Largely postdoctoral opportunities.
- **Student Support:** For students seeking external funding support.
- **Foreign Scholar Support:** For bringing foreign scholars to this country or seeking programs in the U.S. for which they are eligible.
- **Conference Support:** Funding to hold or conduct a conference, symposium or workshop.
- **Publication Support:** Support to prepare or complete a work or for actual cost of publishing a completed work.
- **Sabbatical Support:** To undertake or supplement sabbatical leaves.

For further information regarding the SPIN system, please contact ORTTA at 624-9004.

SPIN searches are also available through the Research and Development Office in the College of Liberal Arts, the Agricultural Experiment Station, and the Grants Development Office at Morris.

Faculty Research, Training and Service Awards

This section contains statistics on proposals and awards recently processed by ORTTA. In addition, we have randomly selected awards received by faculty during preceding months. Faculty who have received awards they would like mentioned in a future Research Review may send the pertinent data, as exemplified below, to Phil Norcross at ORTTA.

Proposal and Award Summary

	Number	Amount
Proposals Submitted June 1992	366	$ 52,285,902
Awards Processed June 1992	390	39,893,126
Proposals Submitted July 1991 - June 1992	4,202	691,785,553
Awards Processed July 1991 - June 1992	3,139	273,301,678
Proposals Submitted July 1990 - June 1991	3,696	553,483,306
Awards Processed July 1990 - June 1991	2,825	232,846,093

Adult AIDS Clinical Trials Unit
Henry H. Balfour, Jr., Laboratory Medicine and Pathology
Courtney Fletcher, Pharmacy Practice
Alejo Erice, Laboratory Medicine and Pathology
NIH, NIAID
$1,212,138 - 03/92-12/92

Emerging Policy Issues for the Nineties: Transportation and Economic Development in the Upper Midwest, New Models for Federal and Local Cooperation in Infrastructure Development
G. Edward Schuh, Humphrey Institute
Lee Munnich, Humphrey Institute
Candace Campbell, Humphrey Institute
St of MN, Transportation
$750,000 - 11/91-12/92

Common Ground Consortium for Recruiting and Research Collaborations
Dale L. Lange, Curriculum and Instruction
Mary L. Bents, College of Education
Vanessa McKendall, College of Education
Bush Foundation
$423,701 - 07/92-06/95

Study of the Osteoconductive and Osteoinductive Properties of Synthetic Peptides Derived from the Extracellular Matrix
Daniel L. Mooradian, Laboratory Medicine and Pathology
Sentron Medical, Inc.
$400,142 - 03/92-02/94

Colon Neoplasia Studies: A Genetic/Environmental Resource
John D. Potter, School of Public Health
NIH, NCI
$232,466 - 06/92-04/93

Beaver, Succession and Ecosystem Dynamics Across the Boreal Landscape
Carol A. Johnston, Natural Resource Research Institute, UMD
John Pastor, Natural Resource Research Institute, UMD
NSF
$223,967 - 06/92-11/93

Processing of Natural and Synthetic Polymers
Mrinal Bhattacharya, Agricultural Engineering
Environmental Technologies USA, Inc.
$187,500 - 06/92-05/94

Natural Resource Conservation & Historic Preservation
Barbara Koth, Agricultural and Applied Economics
Midwest Universities Consortium for International Activities
$179,956 - 09/91-09/96

How Does K Reduce and NACL Increase Hypertensive Injury?
Louis Tobian, Jr., Medicine
NIH, NHLBI
$175,116 - 05/92-04/93

Coping with Early Adolescent Challenge: Gender-Related Mental Health Outcomes
Anne C. Petersen, Institute of Child Development
William T. Grant Foundation
$172,479 - 05/92-04/93

Urban Angling Aquatic Resource Education Program
Richard A.W. Byrne, Natural Resource Research Institute, UMD
St of MN, Natural Resources
$171,552 - 07/91-06/93

Long-Term Ecological Studies at Minnesota
G. David Tilman, Ecology, Evolution and Behavior
Margaret Davis, Ecology, Evolution and Behavior
Eville Gorham, Ecology, Evolution and Behavior
Andrew Mellon Foundation
$320,000 - 07/92-06/96

Far Infrared Studies of Molecular Interaction
Kenneth R. Leopold, Chemistry
NSF
$152,600 - 06/92-05/94

Immunomodulation of Poultry
Jagdev Sharma, Veterinary Pathobiology
Solvay Animal Health, Inc.
$142,888 - 06/92-05/94

Individual Responsibility for Health
Arthur Caplan, Medical School
Northwest Area Foundation
$139,476 - 06/92-03/94

Determination of Cell Types in Developing Retina
Steven McLoon, Cell Biology and Neuroanatomy
NIH, NEI
$122,271 - 05/92-04/93

Research and Training in Nanofabrication and Nanodevices
Stephen Y. Chou, Electrical Engineering
USDOD, Navy
$116,999 - 03/92-04/95

Efficient Dynamic Data Structures for Geometric Problems
Ravi Janardan, Computer Science
NSF
$112,128 - 07/92-12/94

Assessment/Intervention for Children with Cocaine Exposure
David Rotholz, Institute for Disabilities Studies
Susan C. Hupp, Educational Psychology
St of MN, Human Services
$102,766 - 04/92-03/93

Hierarchical Program Analysis in High Performance Compilers
Zhiyuan Li, Computer Science
NSF
$100,000 - 07/92-12/95

An HIV Risk Prevention Program for Transvestites and Transexuals
Eli Coleman, Family Practice and Community Health
American Foundation for AIDS Research
$69,976 - 06/92-05/93

Mechanisms of T Lymphocyte Migration Into Skin
Elizabeth A. Wayner, Laboratory Medicine and Pathology
Leukemia Task Force
$20,000 - 03/92-03/93

Acyclovir Treatment of VZV in Adolescents and Adults
Henry H. Balfour, Jr., Laboratory Medicine and Pathology
Alejo Erice, Laboratory Medicine and Pathology
Burroughs Wellcome Company
$50,000 - 03/92-06/93

Cell Surface CS Proteoglycans and Melanoma Cell Invasion
James B. McCarthy, Laboratory Medicine and Pathology
Leukemia Task Force
$20,000 - 03/92-03/93

A Double-Blind, Placebo-Controlled, Parallel Group High Dose Study of Tacrine (I-970) in Patients with Alzheimer's Disease
David Knopman, Neurology
Warner-Lambert Company
$48,675 - 05/92-11/92

Safety, Tolerability and Immunogenicity Testing of Pneumococcal Type 6B Conjugate Vaccine in Adults, Children and Infants
G. Scott Giebink, Pediatrics
Kathleen Daly, Otolaryngology
Merck, Sharp and Dohme
$45,600 - 11/91-11/93

Mortality Study, 3M Plant in Decatur, Georgia
Jack S. Mandel, Environmental and Occupational Health
Minnesota Mining and Manufacturing Co.
$81,327 - 05/92-11/93

Validating Methods for Estimating Nutrient Values
I. Marilyn Buzzard, Epidemiology
NIH, NCI
$35,738 - 06/92-05/94

Processing and Toughening of Dental Ceramics
Lorraine Francis, Oral Sciences
Minnesota Mining and Manufacturing Co.
$19,200 - 01/92-12/92

Evaluation of Perceived Discomfort Following Scaling and Root Planing Process
Bruce L. Pihlstrom, Preventive Sciences
Kenneth M. Hargreaves, Restorative Sciences
Procter and Gamble Co.
$48,000 - 04/92-08/92

Determining the Cause of Mystery Swine Disease
Robert Morrison, Clinical and Population Sciences
James E. Collins, Veterinary Diagnostic Medicine
William T. Christianson, Clinical and Population Sciences
American Veterinary Medical Association Foundation
$12,955 - 01/92-12/92

Cardiac Network Dynamics
George R. Sell, Army Project
NSF
$44,400 - 07/92-12/94

Numerical Methods for Differential Algebraic Equations in Real-Time Integration of Mechanical Systems
Linda Petzold, Computer Science
USDOD, Army
$40,400 - 06/92-09/92

Fast, High-Resolution Wavelet Based Magnetic Resonance Imaging
Ahmed H. Tewfik, Electrical Engineering
NSF
$22,782 - 06/92-11/93

Propagation of Deformation Traced by 40AR/39AR Dating of White Mica in the Grand St. Bernard, Nappe, Western Alps
Christian Teyssier, Geology and Geophysics
NSF
$63,738 - 06/92-11/94

Particle Velocimetry and Sizing in an Arc Spray Coating System
David L. Hofeldt, Mechanical Engineering
NSF
$99,304 - 06/92-11/95

Introductory University Physics Project
J. Woods Halley, Physics and Astronomy
Paul J. Ellis, Physics and Astronomy
American Institute of Physics
$77,000 - 08/91-07/92

Effect of Radon Mitigation on Interior Basement Moisture
Lester Shen, Underground Space Center
St of MN, Health
$33,466 - 09/91-10/92

A Revitalized Undergraduate Biochemistry Laboratory
Bianca M. Conti-Tronconi, Biochemistry (CBS)
Robert M. Horton, Laboratory Medicine and Pathology
Jane Ann Phillips, College of Biological Sciences
NSF
$12,423 - 07/92-12/94

Cellulose Rayons for Biodegradable Packaging
Rex E. Lovrien, Biochemistry (CBS)
Bemidji State University
$79,460 - 01/92-06/93

Abstract Gambling Theory, Stochastic Games, and Statistics
William D. Sudderth, Statistics
NSF
$25,000 - 07/92-12/93

Daylighting in Minnesota Schools
Carol Prafcke, Architecture
Northern States Power
$26,000 - 03/92-09/92

Sustainable Agricultural Development: Into the 21st Century
Vernon W. Ruttan, Agricultural and Applied Economics
Rockefeller Foundation
$15,000 - 01/92-12/92

Water Quality Programs
Frederick G. Bergsrud, Agricultural Engineering
St of MN, Pollution Control
$39,800 - 03/92-03/93

Effects of Insurance Audits and Incentives on Farm Safety
John M. Shutzke, Agricultural Engineering
St of MN, Agriculture
$44,000 - 05/92-08/93

More Awards Next Page

Awards

Continued From Page 17

Sustainable Agriculture on Farm Demonstration Project Soil
Kenneth R. Ostlie, Entomology
St of MN, Agriculture
$24,382 - 05/92-07/96

Mixed Paper Recycling: Demonstration Project
Mutombo Muvundamina, Forest Products
EPA
$45,220 - 07/92-06/93

Analysis of Cultural Values in Resources Management
Dorothy H. Anderson, Forest Resources
USDA
$43,000 - 05/92-09/94

Holocene Paleoenvironments of Great Lakes Parks
Kenneth Cole, Forest Resources
Margaret Davis, Ecology, Evolution and Behavior
USDI, National Park Service
$66,000 - 06/92-06/93

Satellite Remote Sensing of Minnesota Forests
Marvin E. Bauer, Forest Resources
St of MN, Natural Resources
$40,000 - 04/92-06/93

Conference on Youth, Unemployment and Society
Anne C. Petersen, Institute of Child Development
Johan Jacobs Foundation
$27,372 - 05/92-06/93

Theoretical and Empirical Study of World Class Manufacturing
Roger Schroeder, Operations and Management Science
Sadao Sakakibara, Operations and Management Science
NSF
$30,072 - 06/92-11/93

Analytical/Provenance Studies of Prehistoric Chinese Pottery
George R. Rapp, Jr., Archaeometry Laboratory, UMD
NSF
$9,200 - 04/92-09/93

1992 Summer Internship Program
Kay Thomas, Office of International Education
Kathleen Sellew, Office of International Education
Midwest Universities Consortium for International Education
$12,025 - 04/92-12/92

Commercial Recycling Survey
Rossana Armson, Center for Urban and Regional Affairs
Hennepin County
$15,000 - 01/92-12/92

ORTTA Electronic Bulletin Board

Since September, 1990 ORTTA has operated an electronic bulletin board under the University Public Access Information Service. The bulletin board is menu-driven and designed to be used with no printed documentation. Once logged onto the bulletin board, there is sufficient information on screen or within the on-line help screens to use it.

Bulletin board users can send electronic messages to the bulletin board editor to request additional information on program announcements, to request proposal application kits, to request a SPIN search, etc. The bulletin board also lists all ORTTA staff and telephone numbers, information needed to prepare proposals, i.e. fringe benefits rates, indirect cost rates, agency deadlines and the NIH Guide.

The Internet address is 128.101.109.1 or PUBINFO.AIS.UMN.EDU. For further information, call Kim Makowske at 624-9004.

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A Quick Reference Guide

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- If your mailing label has a string of numbers above your name, the label has been generated by Administrative Information Services (AIS).
- **Changes and deletions should be handled by departmental staff by use of a Staff Directory Card.** (Additions are automatic for Assistant Professors or above, Deans, Directors and Department Heads).
- ORTTA neither generates nor controls this information.

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- All other mailing labels are maintained on a supplemental list by ORTTA. Additions/changes/deletions to **this supplemental list only** may be initiated by filling out and sending ORTTA the following:

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UNIVERSITY OF MINNESOTA

RESEARCH REVIEW

Research and Technology Transfer Administration

September 1992

We Patent Trees Now

"I claim: 1. A new and distinct apple tree substantially as shown and described, particularly characterized by a superior fruit with a crisp and juicy texture, an extended season of harvest but with generally even ripening of fruit whereby repeat pickings are unnecessary, a moderately vigorous growth, little winter injury, annual fruit production and with no flower thinning required." —U.S. Plant Patent No. 7197 "Apple Tree: Honeycrisp"

Honeycrisp™ apples grow on a tree to which the University received patent rights on March 29, 1990.
Credit: U/M Agricultural Experiment Station

We patent trees now. James Luby, director of the fruit breeding program in the Department of Horticultural Science, and David Bedford, the scientist in charge of apples, patented the Honeycrisp™ apple tree in 1990. Harold Pellett, who directs Horticulture's breeding of ornamental shrubs and trees, patented the Autumn Spire™ red maple tree last February.

It wasn't always so. For 55 years, up until 1948, the University's horticulture department gave orchard and garden plants of new varieties to the Minnesota Horticultural Society, which in turn gave them away as membership premiums. And the University continues to release most of its plants without patents. Most of its new fruit and ornamental varieties are distributed through the state's commercial nurseries, and the nurseries return the favor by contributing money to the horticulture research program. With regard to vegetables, the department complements a strong commercial breeding industry by releasing plants that carry particular traits—resistance to a certain parasite, for example—that breeders want to incorporate into their own commercial varieties. Potato varieties are released in tissue cultures to a handful of seed potato propagators, who then distribute them throughout the industry. But sometimes, as with the Autumn Spire red maple and the Honeycrisp apple, the horticulture department takes a much more formal approach to disseminating its research results

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Inside

CUFS Conversion Cleanup

As of the end of August, ORTTA staff has completed correcting the fund and area errors that occurred in converting from the old accounting system to CUFS. If you believe your ORTTA-monitored accounts still have fund or area problems, please notify Linda Lorenz at 624-8053. We appreciate your patience and understanding during this long and difficult cleanup process.

Mark Your Calendar!

University-Industry Research:

Practical Approaches to Balancing Public and Private Trusts

A conference will be held November 19, 1992, to explore and discuss effective ways of dealing with professional, ethical and practical issues arising from industry-sponsored research and transfer of technology from universities to the private sector.

A full program and registration information will be published in next month's *Research Review*.

RESEARCH REVIEW

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Editor: Phil Norcross

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***Research Review* is a monthly publication of the Office of Research and Technology Transfer Administration. Its purpose is to inform faculty and administrators who are involved with sponsored research and technology transfer on procedures and policies of granting agencies, on institutional policy and other information necessary to the preparation of research proposals, and on funding opportunities.**

***Research Review* welcomes ideas and comments from all readers. Write to *Research Review* at 1100 Washington Avenue South, Suite 201, Minneapolis, MN 55415-1226, or call Phil Norcross at 625-2354 or Michael P. Moore at 624-9398.**

Indirect Cost & Fringe Benefit Rates

Indirect Cost Rates

The *provisional* rates for July 1, 1991, through June 30, 1994, are listed below. When budgeting for periods beyond 6/30/94, the 7/1/92-6/30/94 rates should be used. **The rate agreement is dated May 13, 1992.** This date should be used where required on proposal applications. **Please call Marilyn Surbey at 624-4850 with questions on Indirect Costs.**

	07/91/92 06/30/94
Research	
On-Campus	40.00
Off-Campus *	21.00
SAFHL	58.05
Hormel	44.00
Other Sponsored Activity	
On-Campus	20.00
Off-Campus *	10.00
Instruction	
On-Campus	52.00
Off-Campus *	16.00

* A project will be considered off-campus if more than 50% of the direct salaries and wages of personnel employed on the project are incurred at a site neither owned nor leased by the University.

Fringe Benefit Rates

If you have questions regarding fringe benefit rate development or need the breakdown of charges, call **Vivian Fickling at 624-2009.**

For proposals being submitted with start dates **after July 1, 1992**, the estimated fringe benefit rates to be budgeted are:

Faculty	31.25
Civil Service	29.50
Graduate Assistants	10.50

Estimated rates after **July 1, 1993,** are:

Faculty	28.00
Civil Service	30.50
Graduate Assistants	31.25

Rate changes will be reflected in this section.

Senate Debates, Then Approves Funding for Super Collider

Dave Durenberger and Paul Wellstone, Minnesota's U.S. Senators, both opposed the majority of the Senate by voting against funding for the superconducting super collider. In the closing half-hour of debate on the collider, Wellstone argued that the collider is worthwhile science that he hopes to fund in the future, but this year "human and community needs" should take priority.

The Senate debated the issue last August 3 and voted to provide $550 million for the collider, as part of its energy- and water-projects appropriations bill. Because the House rejected collider funding last June, the matter will be debated again in a House-Senate conference.

Closing arguments against the collider pointed to its cost and to the merits of funding individual researchers rather than big science. Arguments for the collider said that it is a small portion of the federal budget, that we need to finish what we have already begun, and that spinoffs from the collider will provide "the kinds of jobs and a dynamic economy that spell a successful nation."

The following presents excerpts from the last half-hour of Senate debate on the super collider and records Wellstone's remarks in full. Moments after he spoke, Wellstone became the presiding officer over the debate.

The Collider Debate

As examples of social problems that he thought should have priority over the collider, Wellstone chiefly cited the health of mothers and children. "When we cannot find the funds for prenatal care, how do we justify spending $550 million for the super collider?"

Dale Bumpers of Arkansas recounted the history of cost estimates for the collider: In 1987, the estimate was $4.4 billion; in 1989, $5.9 billion; in 1991, $8.25 billion. "The Energy Department's internal audits say the cost is going to be $11.8 billion, and the lifetime cost even at today's figure is $20 billion" said Bumpers, "every single penny of which must be borrowed, and with compounded interest. During the life of this thing it comes to $53 billion."

J. Bennett Johnston of Louisiana claimed Bumpers' cost estimates were exaggerated: "He takes the highest estimate, which is not the current estimate, for this project. He adds on to that all of the interest in the meantime. He adds on to that the operating costs and all the other expenses. It is as if when you bought a house you would add on the cost of mowing the lawn, heating the house, painting the house, paying the insurance, all of those expenses."

Johnston described the collider's budget as 0.6 percent of the federal R&D budget and .043 percent of the total federal budget. In an indirect rebuttal of Wellstone, Johnston added that "If we are going to balance the budget, it has to be because we address the question of medical care and entitlements, and everybody knows that."

Citing a total-cost estimate for the collider of $8.3 billion over seven years, Pete Domenici of New Mexico said, "If we cannot put that small amount on the real future of America, then what are we here for?"

In reply to Wellstone's suggestion that we fund the collider in some later year, Johnston argued that we must follow through on earlier plans. "The state of Texas has floated bonds in the hundreds of millions of dollars. We have expropriated land. We have moved people out of homes. We have a team of thousands of the finest scientists in the United States who have been assembled for the purposes of building the superconducting super collider."

Tom Harkin of Iowa presented a different assessment of the scientific community. "The Research Society in America was asked where we should spend our money. Number one, in untargeted individual research awards; dead last, superconducting super collider. That is where we ought to be putting our money, in the Einsteins and the Madam Curies, into the individual awards, the small sciences, but not this."

Text of Wellstone's Remarks

"Mr. President [the presiding officer was then Daniel Akaka of Hawaii], over the past month or so, many people have called me and have talked with me; Nobel laureates, project scientists, physicists from the University of Minnesota, many good friends. And they have told me that the super collider represents real frontier science and research. Mr. President, I am quite convinced that they have said that in good faith. But the question before us tonight on this vote is not whether the super collider is a project with scientific merit. I think we all agree. The question is as follows: Many meritorious projects come before us. Many people ask us for help. There are competing claims, and that is what makes this such a difficult decision.

"Last week, Mr. President, the Senate Appropriations Committee marked up the Interior appropriations bill. The committee cut funding for low-income weatherization. For thousands of families who will not receive this funding for low-income weatherization, this is the difference between having housing and maybe being homeless. Or it is the difference between being able to have heat or being able to eat. Mr. President, if we cannot find funds for low-income weatherization, how can we justify spending $550 million for the super collider?

"I was a teacher before I came to the Senate. I insist on the floor of the Senate tonight that the most important education program is to make sure every woman expecting a child has a diet rich in vitamins, minerals and protein. But, Mr. Presi-

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Committee on the Use of Human Subjects in Research

Emergency Use of a Test Article

The Committee on the Use of Human Subjects in Research, in compliance with FDA and Office for Protection from Research Risks (OPRR) regulations, has a policy and procedure for the "Emergency Use of a Test Article."

In treating a patient, whether that patient is a subject in an Institutional Review Board (IRB) approved clinical trial or is being treated according to standard medical practice, a physician may be faced with the need to administer a drug, biologic or experimental device that has not yet been approved for marketing by the FDA.

For purposes of this discussion, "emergency use" is defined as the use of a test article, (e.g., investigational drug, biologic or experimental device) on a human subject in a life-threatening situation in which no standard acceptable treatment is available, and in which there is not sufficient time to obtain (full) IRB approval. An emergency use situation, therefore, is one in which the use of a test article was not foreseeable, there is no standard acceptable treatment available or useful, and one in which time is critical to the patient's survival.

Procedures to secure emergency approval are:

1. Notify the IRB office (by telephone) of a pending request for emergency approval;

2. Upon notification, the Committee administrative staff will refer the requesting physician to a chair of the Committee, or a physician designated by him, to secure **oral approval** to proceed;

3. The Investigator must provide, within five working days of the request, **written documentation** of the oral approval, a copy of the blank consent form used to document informed consent of the subject, and a report of experience, to the full Committee for confirmation.

4. Written documentation of Committee confirmation is provided to the researcher and should be maintained with his/her records for audit purposes.

Many drug companies require IRB certification of approval to release drugs or biologics. The paperwork and report filing required by a sponsor, drug company, or the FDA, are responsibilities assumed by the investigator requesting emergency approval.

Provisions for Emergency Medical Care "After Hours:"

Recently, the Committee was made aware of an emergency situation that required special permission and that occurred after regular business hours.

When a patient is faced with a life-threatening situation and the physician must employ experimental medicines or devices to carry out the mandate to care for patients in the most beneficial manner, neither the Committee, nor the clock, nor the calendar should interfere with those duties.

The regulatory requirement for informing the Committee and securing appropriate requests for treating patients in life-threatening situations, requires prior notification when possible and post-facto notification when such prior oral approval is not feasible. In a case such as that described, the physician should secure approval, or agreement, from another physician who is not involved in the treatment of this particular patient. It would not be necessary to track down the chair of the Committee, nor the Committee office under these circumstances. Following the concurrence of the physician colleague that the proposed action was most appropriate, that action should be documented to the Committee office within five working days. These measures would be in keeping with the letter and spirit of the regulations.

The Committee trusts that physicians will exercise their best clinical judgment, use experimental medications when necessary, and take the appropriate steps to request approval or inform the Committee following those treatments. Of course, during the regular work week prior approval should be obtained before taking any of these actions.

University of Minnesota policies are based on Food and Drug Administration (FDA) regulations.

Further Clarification from the Office for Protection from Research Risks (OPRR)

The Committee on the Use of Human Subjects in Research has received official correspondence from OPRR clarifying the requirements of Health and Human Services Regulations concerning emergency medical care. Following is a quote from OPRR memo #91-01, May 15, 1991.

"This letter is being forwarded to Institutional Officials and Institutional Review Board (IRB) chairs throughout the country. Its purpose is to clarify requirements in the HHS regulations for the protection of human research subjects (45 CFR Part 46) concerning provisions for emergency medical care.

Your attention is called to two provisions in the regulations. First, 46.116(f) states: '*...nothing in these regulations is intended to limit the authority of a physician to provide emergency medical care...*' This provision makes it clear that the regulations are *not* intended to interfere with the provision of emergency care for patients who need such care.

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National Research Council

NRC Proposes Institute of Plant Biology

The federal government needs to dramatically change its support of plant biology, says the National Research Council's committee on plant sciences. The committee recommends creation of a National Institute of Plant Biology (NIPB) within USDA. Modeled on NSF and NIH grant programs, the NIPB would support extramural, competitively awarded research and comprehensive training. Congress has expressed interest in implementing that recommendation.

The NRC's Committee on an Examination of Plant-Science Research was chaired by Robert Goodman, a plant pathologist at the University of Wisconsin. Its summer 1992 report, "Plant Biology Research and Training for the 21st Century," advises that "it is time to apply to the plant sciences the lessons learned from the support of biomedical research and training."

Goodman told *Research Review* that the staffs of Sen. Patrick Leahy (VT) and Rep. George Brown (CA) have asked him for a briefing on the report.

Plant biology's isolation and lack of progress, says the report, is the result not only of low funding levels but also of a "defective" funding mechanism. When the committee compared the funding mechanisms of USDA with those of NIH and NSF, it found a 45-year "experiment" in science funding whose results are clear. The committee congratulates USDA for its recent moves towards extramural, competitive grants—the 1992 National Research Initiative Competitive Grants Program—and it urges USDA to take much larger steps in that direction.

"The historical mission of USDA is too narrow to encompass the breadth of fundamental plant-biology research and teaching as we envision it," wrote the committee. The NIPB would replace the "patchwork system of support for research and incomplete system of support for career training in the plant sciences." It would be overseen by USDA's assistant secretary of agriculture for science and education and cooperate with other federal agencies that currently support plant biology: NSF, NIH, NASA and the Department of Energy.

Implementation of the proposal depends, says the committee, on USDA's willingness to "effect major changes in its funding philosophy, its operational patterns, and its relationship to Congress and the scientific community."

"If USDA should prove unwilling to fulfill the role we have proposed for it," says the committee's report, "NSF would be assigned the task."

National Institutes of Health

PIs' Opinions of NIH Surveyed

Ninety-four principal investigators (PIs) from across the United States were surveyed recently regarding their opinions of the NIH award process. The PIs reported concerns about indirect costs, funding priorities, the time and effort required for the application and review process, and the lack of feedback from NIH, especially feedback regarding the progress of research projects.

Half of the PIs surveyed support caps on indirect costs. They also agreed that funding research through block grants or mandatory institutional cost-sharing would hinder research.

The PIs objected to the NIH cutting the budgets of proposed research projects with no corresponding reduction in the scope or magnitude of the research.

The PIs also objected to targeted research, which makes a predetermined amount of money available in a given field, because it "results in low-quality projects getting funded... and fails to fund higher-quality projects in other areas."

Finally, the PIs called on NIH to award more grants to less-experienced PIs in order to encourage them to stay in research.

The survey results are part of a report by Richard Kusserow, Inspector General in the U.S. Department of Health and Human Services. The report "does not draw conclusions or make recommendations. Rather it is intended to provide NIH management with a body of knowledge which will help it identify areas where NIH may want to focus additional study," says Kusserow.

From *Washington Fax*

National Institutes of Health

Change in NIDCD NRSA Deadline

The National Institute on Deafness and Other Communication Disorders (NIDCD) announces a new receipt and review cycle for Institutional National Research Service Award (NRSA) (T32) applications. Beginning in 1993, such applications *will be accepted and reviewed only once a year.*

For this annual cycle, applications will be accepted only for the May 10 deadline, and will receive initial review in October/November, followed by National Advisory Council review in January. Annual funding decisions will be made shortly following the January Council meeting. Most Institutional National Research Service Awards have had, and will continue to have, July 1 start dates.

For more specific information and guidance contact Daniel A. Sklare, Ph.D., Program Administrator, Division of Communication Sciences and Disorders, NIDCD, Executive Plaza South, Suite 400B, Bethesda, MD 20892; 301/402-3461.

Human Subjects Committee

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Second, 46.103(b) states: '*The Department will conduct or fund research covered by these regulations only if the institution has certified to the Secretary that the research has been reviewed and approved by an IRB...*' This provision calls for IRB review and approval *prior* to the initiation of the research.

These regulatory provisions accomplish two objectives. The first objective is to make clear that emergency medical care for patients may be provided without regard to IRB review and approval. The second objective is to require IRB review and approval prior to initiation of *research* involving human subjects. Confusion can arise when both objectives appear to pertain to the needs of the same person. The National Institutes of Health's Office for Protection from Research Risks (OPRR) is, therefore, providing the following clarification. Whenever emergency care is initiated without prior IRB review and approval, the patient *may not* be considered to be a research subject. Such emergency care may not be claimed as research, nor may the outcome of such care be included in any report of research activity. Simply stated: HHS regulations for the protection of human subjects do not permit *research* activities to be started, even in emergency, without prior IRB review and approval."

For questions concerning emergency use of test articles, or other issues relating to review and approval from the Committee on the Use of Human Subjects in Research, please call Moira Keane at 624-1889.

Termination of NCNR Program

The National Center for Nursing Research (NCNR) announces plans for the orderly phaseout and termination of its small grants program for bioethics and clinical decision making research. All non-competing commitments for future-year support made to current grantees will continue to be honored, as well as applications selected for award that have completed the review process in FY92. No new applications will be accepted for review for FY93.

NCNR continues to encourage investigators to use alternative grant mechanisms, such as the R01 and R29, for addressing bioethical and clinical practice studies. Training in bioethics for nurses also continues to be encouraged.

For additional information and for questions concerning this notice, contact Dr. Barbara Pillar, Nursing Systems Branch, National Center for Nursing Research, Westwood Building, Room 754, Bethesda, MD 20892; 301/496-0523.

Animal Research News

Congress Passes Animal Lab Protection Law

The U.S. House and Senate have both passed the "Animal Enterprise Protection Act of 1992," which makes violence against animal-handling facilities, including research laboratories, a federal crime.

The House passed its version of the bill on Aug. 4. The Senate adopted and passed the House version on Aug. 7. President Bush had not yet signed the bill when *Research Review* went to press.

Rep. George Gekas of Pa. described the bill as "a careful balance between the right of animal rights groups to legitimately protest and the right of the facilities to have adequate protection from illegal and sometimes violent activities. It provides federal protection, resources and expertise to investigate and arrest radical activists who use violence to further their cause."

The law sets criminal penalties for violence against an animal enterprise or its personnel. Causing more than $10,000 in damage or loss of property, including loss of animals and records, is punishable by a fine and up to one year in prison. That may include restitution for the cost of repeating experiments. For harm or death of personnel, the maximum prison sentences increase to 10 years and life, respectively. Like all of federal criminal code, this law applies only to actions that cross state lines.

From the National Association for Biomedical Research

Proposal and Award Activity — FY 1992

Increases in proposals and awards were substantial in FY92. The number of proposals increased 14 percent over FY91, from 3,696 to 4,201. And 11 percent more awards brought in 17 percent more dollars. The table below shows the distribution of proposals and awards among University colleges. One word of caution, however: proposals submitted during one fiscal year are generally not awarded until the next year. Therefore, comparing the level of proposals submitted to awards received is not appropriate. For example, UM-Waseca submitted no proposals but received one award; the proposal for that award was obviously submitted last year and was included with the FY91 numbers.

UNIVERSITY OF MINNESOTA
Proposal and Award Activity — FY 1992
By College

	Proposals Submitted		Awards Received	
	Number	Amount	Number	Amount
Medical School	1,220	$ 192,941,189	906	$ 88,789,200
School of Dentistry	56	5,709,616	63	3,386,262
College of Pharmacy	60	9,137,476	43	2,000,509
School of Nursing	25	3,065,824	12	1,241,738
School of Public Health	174	58,236,139	151	31,297,785
College of Veterinary Medicine	127	12,130,817	86	4,451,266
UMD-School of Medicine	46	4,872,809	22	1,555,111
Health Sciences Administration	1	206,843	1	182,031
U Hospital - CUHCC	23	2,124,788	17	2,325,609
Total Health Sciences	1,732	$ 288,425,501	1,301	$ 135,229,511
Institute of Technology	808	$ 179,935,855	728	$ 60,607,074
College of Biological Sciences	193	38,063,186	133	11,334,734
College of Liberal Arts	150	27,736,460	91	8,165,316
College of Architecture & Landscape Architecture	24	3,808,967	13	993,299
General College	9	1,352,680	8	1,401,832
Total Arts, Sciences, Engineering	1,184	$ 250,897,148	973	$ 82,502,255
College of Agriculture	355	$ 37,616,993	245	$ 12,574,783
College of Natural Resources	138	18,067,566	97	5,615,190
College of Human Ecology	67	7,311,607	34	1,537,055
Other IAFHE Programs	47	6,731,965	46	2,859,535
Total IAFHE	607	$ 69,728,131	422	$ 22,586,563
College of Education	211	$ 30,862,009	120	$ 9,599,869
UM-Duluth	208	22,985,699	147	8,560,049
Graduate School	33	6,725,763	33	3,459,710
Carlson School of Management	21	1,978,050	16	1,079,657
HHH Institute of Public Affairs	48	6,512,980	17	5,857,981
UM-Morris	31	2,796,259	15	183,885
UM-Crookston	16	1,436,664	22	816,268
UM-Waseca	0	0	1	53,000
Law School	13	1,109,426	2	171,314
Continuing Education and Extension	20	576,861	20	542,377
Other Units	77	7,751,062	52	2,689,238
Grand Total	4,201	$ 691,785,553	3,141	$ 273,331,677

U.S. Patents Issued

April - June 1992

1. **Title:** **Andover Parsnip (Plant Variety Protection Certificate)**

   Purpose: A new variety of parsnip that is resistant to root canker.

   Inventors: David W. Davis, Francis L. Pfleger, Horticultural Science

2. **Title:** **Carbon-Clad Zirconium Oxide Particles**

   Purpose: Novel particles that are useful in sorbent applications, particularly as packing materials for high-performance liquid chromatography.

   Inventors: Peter Carr, Chemistry; Eric Funkenbusch, Doug Hanggi, Tom Weber, 3M

3. **Title:** **Multi-Input Compound Function Complementary Noise-Immune Logic**

   Purpose: A digital logic circuit that operates at high speed and is easily expandable. The invention employs noise-immune circuit design to implement powerful logic gates that perform complex operations involving many input variables, while maintaining near-ideal performance and reliability advantages.

   Inventors: Roger J. Gravrok, Cray Research; Raymond M. Warner, Jr., Electrical Engineering

4. **Title:** **Dynamic Containment Vessel**

   Purpose: A means of containing particles in an area defined by stable fluid recirculation in a cylindrical container. The particles can be retained until reduced to a preselected particle size and discharged, such as in combustion of fuel.

   Inventors: Wilhelm J. Reindl, Kenneth J. Reid, Civil & Mineral Engineering

5. **Title:** **Preparation of Islet Amyloid Polypeptides (IAPP) and Antibodies to IAPP**

   Purpose: Subunits of the full-length amino acid sequence of human islet amyloid polypeptide and feline islet amyloid polypeptide, which have been found to be associated with human type II diabetes and feline diabetes. The subunit sequences are suitable for induction of anti-IAPP antibodies useful for further research on the role of IAPP.

   Inventors: Per Westermark, University Hospital, Linkoping, Sweden; Kenneth H. Johnson, Veterinary Pathobiology

6. **Title:** **Preparations of Islet Amyloid Polypeptides (IAPP) and Antibodies to IAPP**

   Purpose: Islet amyloid polypeptide substantially free of islet amyloid, which is deposited on the islet cells of the pancreas and may contribute to human type II diabetes and to feline diabetes. Preparations of IAPP or its antibodies may be useful for therapeutic, diagnostic, or research purposes.

   Inventors: Per Westermark, University Hospital, Linkoping, Sweden; Kenneth H. Johnson, Veterinary Pathobiology

7. **Title:** **Method for Aggregating Cells with Small Microspheres**

   Purpose: A method of aggregating and cultivating animal cells used for the production of viral vaccines, growth factors, receptors and therapeutic proteins by providing microspheres on which the cells can anchor and grow at very high cell concentrations.

   Inventors: Wei-Shou Hu, Chemical Engineering; Stephane Goetghebeur, France

8. **Title:** **Polypeptides with Fibronectin Activity**

   Purpose: A composition that can bind heparin and promote cellular adhesion and neurite outgrowth, with potential medical uses including coating prosthetic implants, catheters and cell culture substrates.

   Inventors: James B. McCarthy, Leo T. Furcht, Laboratory Medicine & Pathology

9. **Title:** **Synthetic Polypeptide with Laminin Activity**

   Purpose: A composition that can bind heparin and promote cellular adhesion and neurite outgrowth, with potential medical uses including coating prosthetic implants, catheters and cell-culture substrates.

   Inventors: Aristidis S. Charonis, Laboratory Medicine & Pathology

10. **Title:** **Xanthenylamide Handle for Use in Peptide Synthesis**

    Purpose: Several methods for solid-phase synthesis of acid-sensitive carboxyl-terminal peptide amides (including oxytocin, secretin, apamin, and several releasing hormones from the brain) under mild conditions.

    Inventors: George Barany, Chemistry

11. **Title:** **Method and Apparatus for Catheterization**

    Purpose: Joint catheterization in which access is gained to the joint cavity and its synovial fluid through an adjacent bone. A tap device is anchored to the bone so that an attached catheter may withdraw fluid or transport drugs as desired.

    Inventors: Bruce Wigness, Surgery; Frank Dorman, Mechanical Engineering

12. **Title:** **Method and Apparatus for Manipulating Computer-Based Representations of Objects of Complex and Unique Geometry**

Purpose: A computer-assisted design, computer-assisted manufacturing (CAD/CAM) system for constructing a three-dimensional model of an object, superimposing an ideal geometry on the computer-based model, and altering the ideal geometry to fit the form and function required of the physical reproduction, which could be a dental or orthopedic prosthesis.

Inventors: Donald R. Riley, Barney Klamecki, Arthur Erdman, Mechanical Engineering; Yang Zhu, Jeong-Ho Ahn, formerly Mechanical Engineering; Elizabeth D. Rekow, formerly Dentistry now Digital Dental Systems, Inc.

13. **Title:** **Method and Apparatus for Automated Machining of Objects of Complex and Unique Geometry**

Purpose: A computer-assisted design, computer-assisted manufacturing (CAD/CAM) system for constructing a three-dimensional model of an object, superimposing an ideal geometry on the computer-based model, and altering the ideal geometry to fit the form and function required of the physical reproduction.

Inventors: Donald R. Riley, Barney Klamecki, Arthur Erdman, Mechanical Engineering; Yang Zhu, Jeong-Ho Ahn, formerly Mechanical Engineering; Elizabeth D. Rekow, formerly Dentistry now Digital Dental Systems, Inc.

14. **Title:** **Antiviral Combination Comprising Nucleoside Analogs**

Purpose: Potential antiviral and antitumor compositions consisting of synergistic combinations of carbocyclic antiviral agents with other antiviral agents, such as AZT and ribavirin.

Inventors: Robert Vince, Medicinal Chemistry; William M. Shannon, Southern Research Institute

15. **Title:** **Synthesis of Purine Substituted Cyclopentene Derivatives**

Purpose: A new process for synthesizing carbovir, an experimental antiviral and antitumor agent.

Inventors: Robert Vince, Medicinal Chemistry; Mark Peterson, John Lackey, Robert Mook, John Partridge, Glaxo, Inc.

Licenses Negotiated

April - June 1992

1. **Title:** **Method for Stimulating Recovery from Ischemia Employing Ribose and Adenine**

Purpose: A method for reducing tissue damage to the heart and stimulating recovery of function following a heart attack or heart surgery.

Licensee: MGI Pharma, Minnetonka, Minnesota - Exclusive Sublicense from Bioenergy, Inc.

Inventors: John Foker, Surgery

2 **Title:** **Autumn Spire™ Red Maple**

Purpose: A unique variety of maple tree with upright, broad-columnar form, early autumn maturity, winter hardiness, excellent autumn leaf color, and absence of seeds.

Licensee: J. Frank Schmidt & Son, Boring, Oregon - Non-exclusive License

Inventors: Harold Pellett, Horticultural Science

3. **Title:** **Food-Grade Integration Vectors for Industrial Bacterial Strains**

Purpose: Biological materials used in fermentation processes.

Licensee: Margaret Chen, San Antonio, Texas - Materials Transfer Agreement

Inventors: Kayla Polzin and Larry McKay, Food Science and Nutrition

4. **Title:** **DNA Probes for Chickens**

Purpose: Material used in genetic research on chickens.

Licensee: Gentra Systems, Plymouth, Minnesota - Materials Transfer Agreement

Inventors: Mike Boyce-Jacino, Institute of Human Genetics

5. **Title:** **System for Detecting Wood-Destroying Insect Infestations in Structural Wood**

Purpose: A method and apparatus for detecting termites by acoustic emissions.

Licensee: Dow Elanco, Indianapolis, Indiana - Exclusive Option

Inventors: Bill Robbins and Rolf Mueller, Electrical Engineering

6. **Title:** **System for Detecting Wood-Destroying Insect Infestations in Structural Wood**

Purpose: A method and apparatus for detecting termites by acoustic emissions.

Licensee: Dow Elanco, Indianapolis, Indiana - Non-exclusive License

Inventors: Bill Robbins and Rolf Mueller, Electrical Engineering

Trees

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for public consumption—it patents them and then licenses the right to grow and sell them.

Minnesota had the first public fruit breeding farm on the continent—the Minnesota Fruit Farm established in Minnetonka in 1878—because it takes a special effort to produce fruit in this climate. The University's present Horticultural Research Center, the fruit breeding farm in Excelsior, was created in 1908, and has since provided us with hardy varieties of apples, apricots and plums; blueberries, gooseberries, and cherries; raspberries and strawberries; and crabapples, currants, grapes and plums—91 different cultivars altogether. The horticulture department began breeding potatoes in the 1920s and has since released a dozen new varieties, most recently the Eide Russet. And working chiefly from its Minnesota Landscape Arboretum, established in 1958, the University has also been releasing new cultivars of ornamentals—chrysanthemum flowers, maple trees, azalea, forsythia and dogwood shrubs. Pellett sees thousands of individual plants leave the Arboretum's nurseries every year.

What we see in the horticulture department, then, is an organization with a long history of turning research into products, of moving things out of its "labs" and into commercial and public hands, and with a variety of mechanisms for doing so. So after giving us 18 new varieties of apple between 1920 and 1979—Haralson, State Fair and Keepsake, for three examples—why did Horticulture decide to take a new route and patent the Honeycrisp apple?

It wasn't possible to patent a plant, in the United States or anywhere else, until 1930. Before that, plant breeders were not "inventors," and patents only applied to devices and chemical processes. Then the Plant Patent Act of 1930 added 74 words to the U.S. Statutes and allowed patent rights to anyone who has "invented or discovered and asexually reproduced any distinct and new variety of plant other than a tuber propagated plant." The tuber exception was meant to safeguard the public's right to potatoes. Asexual reproduction is essential because it yields "daughters" that are genetically identical to their "parent"; hence a patent on the parent applies to the daughter. By 1934, patents had been granted on 53 flowers, 27 fruits, two nuts, an evergreen tree, and a mushroom. Patent lawyers of the time speculated that we might someday patent animals, which finally happened in 1988, when Harvard patented a laboratory mouse.

The University of Minnesota now has seven plant patents.

The University of Minnesota now has seven plant patents. The first came in October 1978, when Richard Widmer, now an emeritus member of the horticulture faculty, received Plant Patent No. 4,327 for the Minngopher chrysanthemum. (Like all patents by University researchers, the Minngopher patent names Widmer the "Inventor" and the University regents the "Assignee.") The Minngopher is distinguished for its dark red blooms on a short, compact plant. By 1990 horticulture faculty had patented three more 'mums. Pellett and the late Leon Snyder patented the Northwood red maple in 1983. Pellett applied for the patent on the Autumn Spire maple in May 1990 and was granted the patent last February. Both maples are distinguished for their colorful autumn foliage and winter hardiness. The Autumn Spire also has a relatively narrow, rather than broad, crown; hence the name Autumn *Spire*. Patent applications are now pending for two varieties of corn and the Pike's Bay aspen tree. For the Andover parsnip, which is reproduced from seed, we have a "Certificate of Plant Variety Protection" dated February 1992.

Luby and Bedford applied for the Honeycrisp patent in November 1988 and received it in March 1990. Honeycrisp's chief virtues are crisp fruit, late harvest and winter hardiness. It is clearly among the most successful of UM's patented plants, and a good example of why we patent plants.

"That's a great tree," says Rodney Bailey, secretary-treasurer of Bailey Nurseries. "We're probably going to sell 20 to 30 thousand of them over the next few years." Bailey Nurseries is the Upper Midwest's largest wholesale nursery and it licenses rights to Honeycrisp. Rodney's parents, Margaret and Gordon Sr., gave the University $1 million in 1980 to create a chair in environmental horticulture.

What nurseries license is the right to asexually propagate the Honeycrisp trees. The Horticultural Research Center provides them with "scion" wood, bits of tree that the nurseries graft onto rootstock from other trees. It takes several years for the nurseries to grow enough trees to make commercial sales possible. So when records say the Honeycrisp was released in 1991, that means nurseries began to sell saplings in 1991, and it will be a few more years before we see any Honeycrisp apples in the produce market.

Actually, the Honeycrisp apple tree is 32 years old. Cecil Stushnoff, Bedford's predecessor, cross-pollinated the Honeygold and Macoun trees at the Excelsior nursery in 1960. Honeygold is another of the University's trees; its forbears include Golden Delicious and Haralson. Macoun is an older variety out of Canada, a descendent of McIntosh.

"Once the cross is made, these things go through several cycles of asexual propagation," Luby explains. "It takes about six years to get flowers and fruit and seed from a new cross, then seedlings are planted out and we wait another six years

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for them to fruit. We go through the orchards weekly to evaluate the seedlings that are fruiting. The ones that appear promising receive a selection number—*MN 1711* for Honeycrisp—and we take stems from them for grafting onto other root stocks so we can see how several trees perform at different sites around the state, like the Morris and Grand Rapids experiment stations.

"After those grafts, we go through another period of three or four years before we can see the fruit again, and the tree's evaluated for yet another four or five years," says Luby. "That last cycle is primarily to determine if the tree is adapted to Minnesota's climate. We pretty much know what the fruit is like by then, though it can differ a little from year to year. The main thing is to sample the infinite possibility of Minnesota winters. Towards the end of this last cycle we'll also send scion wood for evaluation at experiment stations in other states.

Whether to disseminate a new variety via patent licenses or less formal arrangements chiefly depends on the breadth of the market.

"If it performs well through all those cycles," says Luby, "we go to the Agricultural Experiment Station for approval of a new release. That's when we decide what kind of protection to seek—patenting, going through the Nurseryman's Research Corporation, no protection at all."

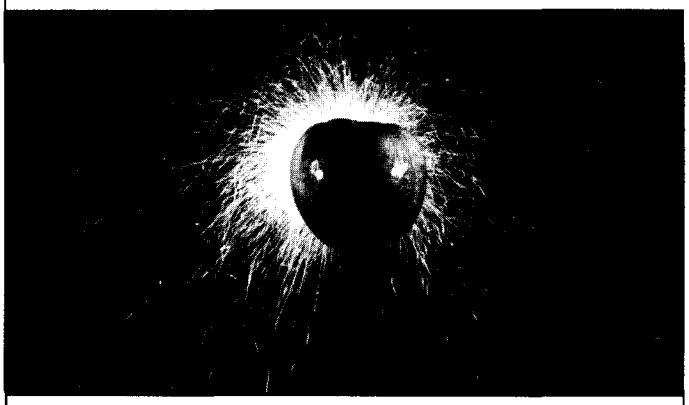
Like all products of research at the University, new plant varieties belong to the University and must be disclosed to the Office of Patents and Licensing. Its staff assists inventors with market studies, helps prepare patent and trademark applications, negotiates license agreements, monitors and administers royalty payments, and ensures that legal action against infringements is taken if necessary.

The decision about whether to disseminate a new variety via patent licenses or less formal arrangements chiefly depends on the breadth of the market. "There's two reasons we decided to patent Honeycrisp, instead of going the other route," says Luby. "One, we expected it to have broad appeal in the United States; we expected a wide range of nurseries to come on as licensees. For their protection and our protection, it's better if we have the patent. Second, we expected—and still expect, it's too early to know yet—that Honeycrisp will have some international appeal too, in Northern Europe especially, maybe in Southern Europe. In which case, again, we're better off if we have patent protection."

Study of the Honeycrisp's market is almost as old as the tree itself. In search of the Honeycrisp, Bedford looked for an apple that could be harvested late in the year, would keep in storage for nearly half a year, and could be fully harvested on one pass through an orchard. He also sought a crisp, good-tasting apple, traits he tested via seven years of volunteer tasting panels that met weekly during harvest season. Through those panels, Bedford and Luby gauged the average consumer's point of view. They also took their show-and-tell to the pro's. "We brought fruit to professional horticulture meetings, and there was a lot of interest," says Luby. "We showed it to fruit producers, and they were excited about it. And the nursery people, they got excited about it too." That's why Luby and Bedford were confident enough of Honeycrisp's market—nationally and internationally—to recommend that the University go to the expense of patenting it.

But underneath the legal issue of *how* to best protect the University's income on the Honeycrisp is the philosophic issue of *whether* to protect that income. Land-grant universities were created, after all, to invest tax dollars in agricultural progress. So some people argue that the results of our research are public property to be distributed freely. Luby defends the patenting and licensing of Honeycrisp this way:

"In the past the feeling was that Agricultural Experiment Stations got most of their funding from tax dollars, therefore it wasn't ethical to try and collect royalties on something we developed," says Luby. "That used to be the case. But let's face it. A lot of the research money does not come from the public anymore. Experiment Station funding has been going down for at least 15 years, maybe longer, and conventional plant breeding is not sexy enough for public granting agencies. For virtually all the plant breeding funds, except for salaries, we rely on gifts from industry and royalties from previously released varieties."



The Honeycrisp — billed as "explosively crisp" — promises to rival the Red Delicious in the market for winter dessert apples.
Credit: U/M Agricultural Experiment Station

For smaller markets than Honeycrisp's, disseminating results by routes other than patent licenses serves the horticulture department very well. The Alderman plum and Summercrisp pear, for example, which became available to

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the public in 1986 and 1987, are bred specifically for Minnesota's climate and serve a regional market that doesn't have much call for plums and pears. "So we expect them to be rather minor cultivars that, quite frankly," says Luby, "would never pay back the fees for the patent lawyers."

But precisely because their markets are small, regional varieties can earn royalties without a patent. "Propagation is tightly controlled by just a few nurseries in the region that are members of the Minnesota Nurseryman's Research Corporation," says Luby. "They support the University's research mission, so they pass on royalties that they assess themselves. We even get good cooperation from nurseries in neighboring states." The Minnesota Nurseryman's Research Corporation (MNRC) is a nonprofit organization created in 1957 for the sole purpose of collecting voluntary royalties from nurseries and putting the money back into the horticultural research program. The nurseries contribute 15 to 45 cents for every plant of a University variety that they sell, depending on the variety. By all accounts it's a simple and elegant arrangement that works very, very well.

"It works just wonderfully," says Bailey, chair of the MNRC. "Its been a good thing for the nurserymen and a good thing for the university." Bailey's records show that the corporation gave $55,000 to the horticulture department for 1991 sales. "Its been around $60,000 for the last seven or eight years," he says. He puts the MNRC's total donations to the department at $400,000 to $500,000 since 1957.

"But it's a kind of honor system," explains Bailey. "We try to monitor it, but thousands of people have access to the material once it gets out. Just about anybody can get the wood. Whereas, with the patent system, the law protects the owner from anybody propagating and selling the plant without paying the royalty."

That's why the Honeycrisp tree is patented; its market is too widespread to trust the royalties to an honor system. Since our regional nurseries pay royalties even on unpatented plants, the patent does not hinder them. "It doesn't affect us one way or the other," says Bailey. But it does protect the University's royalties across a much wider market than the honor system can.

"We've produced things we didn't patent that sometimes I wish we had," says Luby, "like the blueberries." Horticulture has introduced four varieties of blueberry in the last ten years. Luby estimates that they've brought his research program about $100,000 dollars through the MNRC. "That's much more than we expected," he says. "That's why we didn't patent any of them. But now our blueberries are growing all across the northeastern United States and Southern Canada, and the Scandinavians are interested as well." Patent protection would have insured royalties from such far-flung markets.

The patent on a local plum might run out before royalties pay the cost of the patenting process, but the Honeycrisp apple will easily pay for its legal fees. At 60 cents a tree, Bailey Nurseries paid $5700 for the right to propagate and sell Honeycrisp saplings in 1991. Compare that to older, better-known, unpatented University apples: The Sweet Sixteen earned $2500, the State Fair $3600 and the Keepsake $450. Eleven nurseries and orchards, from New York to Oregon, have licenses to Honeycrisp now. "That's a great plant," says Bailey. "It's going to be used pretty generally throughout the country. If it becomes a popular apple in the apple country of Washington, it could mean hundreds of thousands of trees."

The royalties from those trees will support the Department of Horticultural Science's plant breeding program and patenting of future varieties. In the next few years, Luby foresees the release of a couple new blueberries, an early-season apple, and some grapes—both wine and table varieties. "If we estimate that the market potential is sufficient, we will patent them too," says Luby.

By Phil Norcross

Super Collider

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dent, we do not fully fund prenatal programs; we have cut Medicaid programs. Is not an investment in prenatal care an investment in our future? Is not investing in healthy children an investment in our future? When we cannot find the funds for prenatal care, how do we justify spending $550 million for the super collider?

"Mr. President, we talk about preventive health care, but our public health care system is in a shambles in our country. Just look at the state of childhood immunization. We are seeing diseases reappear: measles, whooping cough, polio. Where are the funds for childhood immunization? How can we, when we say we do not have the funds for childhood immunization to protect our children in our own country, justify spending $550 million on the super collider?

"For me, today's vote is a question of conscience. I cannot vote for the funding of the super collider when we do not meet basic human and community needs in our own country. And under the budget agreement that we labor under, this is the tradeoff.

"Many times I voted to waive that budget agreement, but we have not done so. My vote tonight is not a vote against science funding. We have a significant amount of spending that goes to science funding, $20 billion or thereabout, and this is not a no-never vote on the super collider. I have had many close friends and many people convince me that this is important research. I hope that we will be able to fund this research in the future. But the choice tonight is not a choice for the future, it is our vote now, and in good conscience I am going to support the amendment [against the collider] offered by the Senator from Arkansas."

National Cancer Institute

Biology and Immunology of Breast Cancer: An Interdisciplinary Approach

RFA: CA-92-24

The intent of this initiative is to encourage interdisciplinary approaches to research on the basic biology and immunobiology of breast cancer. Areas have been identified that would benefit greatly from additional basic research carried out in a multidisciplinary context, including:

- Immunology—Studies of both positive and negative effects of immune responses on breast cancer development and progression, molecular identification of relevant breast cancer antigens, and the development of effective strategies for immunologically based prevention or treatment of breast cancer;
- Molecular Genetics—Studies of the contribution of changes in the structure or regulation of oncogenes, tumor suppressor genes, and other important cellular genes to the development and biologic behavior of breast cancer;
- Endocrinology (hormones/growth factors)—Studies of the roles of soluble factors and their receptors in breast cancer development and the response to therapy. These may include, but are not limited to, steroid and nonsteroid factors such as estrogen, progesterone, insulin-like growth factor, prolactin, TGF-ALPHA, and TGF-BETA;
- Cell biology of breast cancer development—Studies of the organization and differentiation of breast epithelial cells during normal development and progression to malignancy, including studies of interactions between normal and malignant epithelial cells and the surrounding tissue/stroma.

The overall goal of this basic research in biology and immunology is to translate findings into practical clinical applications for early tumor detection and diagnosis, for treatment of established tumors and ultimately for prevention intervention in high-risk women. However, these clinical and prevention applications are outside the scope of this RFA.

This RFA will use the Interactive Research Project Grant (IRPG) mechanism. Each IRPG must contain at least three individual R01 applications and address a minimum of two of the major areas of research listed above. Broader diversity of scientific areas is preferred and although not a requirement, applicants are encouraged to include one or more projects in immunology. One Principal Investigator out of the group must be identified as the "Program Coordinator." Applicants must describe how their integrated approach will provide a more comprehensive understanding of important problems in breast cancer basic research.

Approximately $1,500,000 in total costs per year for four years will be committed to fund applications submitted in response to this RFA. It is anticipated that at least two IRPG awards will be made, comprising a total of six to eight individual R01 grant awards. The total project period may not exceed four years.

Although not required, the designated "Program Coordinator" of each prospective applicant is asked to submit a letter of intent by November 3, 1992.

The application receipt date is **December 1, 1992**. A copy of the RFA is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The agency contact is Dr. Grace L.C. Shen, Cancer Immunology Branch, Division of Cancer Biology, Diagnosis and Centers, National Cancer Institute, Executive Plaza South, Room 634, 6120 Executive Boulevard, Rockville, MD 20892-9904; 301/496-7815.

National Center for Research Resources

Laboratory Animal Small Research Grants

This is to advise potential applicants that the National Center for Research Resources (NCRR) Comparative Medicine Program will henceforth accept Small Research Grant (R03) applications for Laboratory Animal Small Research Grants at any of the three standard annual application receipt dates — **February 1, June 1** and **October 1**. Such applications have previously been accepted only for the February 1 deadline.

These awards are limited to $25,000 direct costs and only one year of support. They are intended to provide support for pilot projects, testing of new techniques and feasibility studies of innovative research in the areas of laboratory animal biotechnology, normative biology, disease, welfare and model development.

Further information concerning these awards and updated guidelines for applications may be obtained by sending two self-addressed mailing labels to Comparative Medicine Program, National Center for Research Resources, Westwood Building, Room 857, Bethesda, MD 20892; 301/496-5175. Guidelines are also available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board.

National Institute on Aging

Centers of Research on Applied Gerontology

RFA: AG-93-02

The National Institute on Aging seeks to establish Centers of Research on applied Gerontology. The Centers' purpose will be to facilitate the process of translating basic behavioral and social research theories and findings into practical outcomes that will benefit the lives of older people. They will focus on strategies to improve quality of life, enhance productivity and minimize the need for care.

Researchers are encouraged to seek funding to apply the theories, paradigms and methodology of the behavioral and social sciences in order to address practical problems of late-middle-aged and older people at work, in the home, in transportation, in health care, or in other areas of concern to the population. The focus of this initiative is on translating encouraging research results obtained in laboratory and other scientific settings into practical benefits for older adults. The organizing principle behind each Center should reflect this aim of establishing a pattern of research translation from basic research to practical outcome.

The support mechanism for these Centers will be the specialized center (P50) mechanism. Such awards cover a spectrum of activities that comprise a multidisciplinary attack on a particular problem area. A maximum of five years of support may be requested. An estimated $3,000,000 will be made available in FY93 for support of up to six awards at a maximum of $400,000 direct costs per award for the first year.

A condition of eligibility is that some member of the proposed research team at the institution has received grant or contract funds or was active in research through an external peer-reviewed process during the three years preceding the date of application.

An optional, non-binding letter of intent is requested by October 2, 1992. The application deadline is **November 18, 1992**. A copy of the RFA is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The agency contact is Dr. Robin A. Barr, Behavioral and Social Research, NIA, Gateway Building, Room 2C234, 7201 Wisconsin Avenue, Bethesda, MD 20892; 301/496-3136; Fax: 301/402-0051; E-mail: Barr@NIHNIAGW.BITNET

American Cancer Society

Psychosocial Research Related to Cancer

This is a repeat of a program description first run in July. Further information has been added: See box, below.

The American Cancer Society has from time to time announced the availability of Special Institutional Grants in areas of research that, for various reasons, deserve special emphasis. Pursuant to this practice, ACS has issued a request for applications in the broad field of psychosocial and behavioral research in oncology.

These grants are designed to provide substantial, flexible and relatively long-term support for interdisciplinary research related to all of the psychosocial and behavioral aspects of the cancer problem. These may include, but are not limited to, studies of behavior as they relate to health-seeking strategies, screening, compliance, coping, pain relief, nausea control, supportive care and quality of life issues. Applications that focus specifically on socioeconomically disadvantaged populations are particularly welcome.

Applications should provide evidence of a cohesive, multidisciplinary unit devoted to psychosocial and behavioral research in oncology. This announcement does not seek applications for demonstration projects, non-research based clinical trials or non-research oriented interventions. Nor is this mechanism appropriate for a request to exclusively support training, although funds for training may be requested as a part of the application.

Successful applicants may receive up to $200,000 per year, including the 25% Institutional Allowance, for a term of up to five years.

> Since applications are limited to one per institution, and it is a discipline which crosses collegiate lines, faculty should be aware that an internal selection process is being used. Internal review is being conducted by the University's Cancer Center. The internal application date is Tuesday **September 15, 1992**, to Mary Sumpmann, Box 806, UMHC, 626-1439.

The application deadline to the American Cancer Society is **October 1, 1992**. A copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the Bulletin Board. Application forms may be obtained by calling ACS at 404/329-7558, or Ms. Sumpmann at the number above.

United States Institute of Peace

Fellowships for 1993-94

The United States Institute of Peace invites applications for in-residence fellowships offered by the Institute's Jennings Randolph Program for International Peace. Fellowships are awarded for research and education projects that will increase knowledge and spread awareness among the public and policy makers on a broad range of topics that concern the sources and nature of violent international conflict and the full range of ways to end or prevent conflict and to sustain peace.

Applications are encouraged from outstanding practitioners and scholars with backgrounds in government, diplomacy, higher education, international affairs, law, military service, the media, business, labor, religion, humanitarian affairs, and others.

During 1993-94, particular emphasis will be given to the following subjects: a) factors that bear on the peaceful settlement of the Arab-Israeli conflict, as well as peace and conflict in the Persian Gulf region and the northern tier states from Turkey through Pakistan; b) potential for interstate and ethnic conflict, the development of democratic institutions, and the rule of law to prevent such conflict, in Eastern Europe and the Former Soviet States, with a special focus on the republics of Central Asia; c) prevention management and resolution of conflicts, especially in Africa and Latin America, with emphasis on the roles of regional and international organizations as third parties, and on the development of democratic institutions as a means for building long-term peaceful relations; d) measures to control the spread of conventional and unconventional arms, including coordination among supplier states, multilateral organizations, and local actors in various regions.

There are three types of awards:

Distinguished Fellows are eminent statesmen, scholars or other professionals who have achieved national or international stature by virtue of extraordinary accomplishments in international peace and conflict management or other endeavors. Awards are for twelve months. Stipends are keyed to the recipient's earned income in the year preceding the fellowship, not exceeding $83,502.

Peace Fellows are professionals or scholars who have demonstrated substantial accomplishment or promise of exceptional leadership in their careers. A small number of Peace Fellow awards may be made to outstanding candidates who are in the early stages of their professional or scholarly careers. Awards are for twelve months. Stipends are keyed to the recipient's earned income in the year preceding the fellowships, not to exceed $64,233.

Visiting Fellows fall into either of the above categories but have shorter tenures, generally two to six months. Stipends are prorated at either the Distinguished Fellow or Peace Fellow level.

The Institute expects to make at least eleven Distinguished Fellow and Peace Fellow awards and two Visiting Fellow awards for 1993-94.

Distinguished Fellow candidates must be nominated on an official form by a person well-acquainted with the nominee's career and achievements. Self-nominations will not be accepted. Peace Fellow and Visiting Fellow candidates must submit an official application on a form available from the Institute.

The application deadline for all three programs is **October 15, 1992**. For further information or to receive a nomination or application form, contact the Jennings Randolph Program for International Peace, United States Institute of Peace, 1550 M Street NW, Suite 700F, Washington, DC 20005-1708; 202/429-3886; Fax: 202/429-6063.

American Cancer Society

Institutional Research Grant

The University of Minnesota Pediatric Oncology Office is receiving proposals for the American Cancer Society's Institutional Research Grant. The stated goal of the American Cancer Society (ACS) is to "foster meritorious research on cancer that cannot be supported through other available types of support." The purpose of the Institutional Research Grant is to serve as "seed" money to permit the initiation of promising new projects or novel ideas by junior faculty investigators.

The Institutional Research Grant has been restructured considerably. The award amount has been increased to $15,000 direct costs. Eligible applicants must be faculty members at the level of assistant professor or instructor and must not have received a prior ACS Institutional Research Grant nor have a current competitive national research grant.

The grants are available to anyone engaged in cancer related research at the University of Minnesota. Cancer-related research also includes analysis of developmental biology, gene regulation, or alteration of intracellular or extracellular processes which may lead to an improved understanding and/or therapy of potential or actual oncogenic events in prokaryotic or eukaryotic cells.

The application deadline is **October 1, 1992**. Instructions and application forms are available from the Pediatric Oncology Office, D-557 Mayo Building; 612/626-2778.

National Science Foundation

Instrumentation and Laboratory Improvement

The National Science Foundation (NSF) has announced the Instrumentation and Laboratory Improvement (ILI) Program for FY93. The program aims to improve the quality of undergraduate instruction by supporting the acquisition of instruments for laboratory courses in science, mathematics or engineering. ("Laboratory" for ILI purposes means any setting affording students active participation in learning subject matter; the setting may be an observatory, the field, or a computer room, or the traditional laboratory.)

The specific objectives of ILI are to encourage and support the following:

- use of modern instruments to improve the education of undergraduate students, both majors and non-majors, in science, mathematics and/or engineering;
- introduction of new instrumental technology into science, mathematics and engineering instruction;
- development of new experiments or applications for instruments that extend the instructional capabilities of the equipment;
- establishment of equipment-sharing via consortia or centers.

ILI provides matching grants in the range of $5,000 to $100,000 for instrumentation that serves as the basis for undergraduate instructional improvement at universities and two-year and four-year colleges in the U.S.

Leadership Projects in Laboratory Development (LLD)

In addition to awards solely to support the acquisition of instruments, the program anticipates making a small number of awards for innovative pilot projects that have the potential to provide national models for undergraduate laboratory instruction. The purpose of ILI-LLD is to support the extensive development required to undertake fundamental reform and improvement of undergraduate laboratory instruction. Proposals may address content, methods, modes of operation, new technology, or the contexts for science, mathematics and/or engineering education.

Awards of approximately $100,000 will be made for up to three years.

The ILI-LLD portion of the program requires a preliminary proposal, including project outline, personnel involved and an approximate budget, due no later than six weeks before the formal proposal closing date of November 16, 1992. Individuals or groups wishing to consider the LLD option should contact a Program Director at 202/357-7051 before preparing the preliminary proposal.

The formal application deadline is **November 16, 1992.** A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. Questions regarding the program not addressed in the announcement may be directed to Division of Undergraduate Education, National Science Foundation, 1800 G Street NW, Washington, DC 20550; 202/357-7051; Bitnet: Undergrad@NSF; Internet: Undergrad@NSF.gov.

National Science Foundation

Visiting Professorships for Women

The National Science Foundation (NSF) has announced its continuing program supporting Research Professorships for Women. This program enables experienced female scientists and engineers to undertake advanced research and teaching at host institutions where they can also provide guidance and encouragement to other women seeking to pursue research careers. The objectives of the program are:

- to provide opportunities for women to advance their careers in engineering and in the disciplines of science supported by NSF; and
- to encourage female students to pursue careers in science and engineering by providing greater visibility for female scientists and engineers employed in industry, government and academic institutions.

To be eligible, an applicant must hold a doctorate by the application deadline of November 1, 1992; have independent research experience (beyond a postdoctorate) in an academic institution, industry, or the public sector; be currently or recently affiliated with an institution of higher education, research, government or industry; not have a salaried position, or the promise of one, with the proposed host institution, nor be part of a research grant through that institution as of November 1, 1992.

The award support period may not be less than six months or more than 36 months. Funds may be requested to defray such normally allowable costs as salary (based on the home institution salary), travel, relocation costs (not to exceed $3,000) and research support.

The application deadline is **November 1, 1992.** A copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board.

National Science Foundation

Global Change Research Program

The necessity for understanding our global environment, its natural variability, and the changes imposed on it through human activities is recognized internationally. In the United States, the high priority placed by the Government on understanding the global environment led to the establishment of the U.S. Global Change Research Program as a Presidential Initiative in January 1989.

In June 1992, the Administration designated the U.S. Global Change Research Program as a National Research Program. This new status for the program recognizes its maturity as an interagency coordinated research effort, its importance in addressing national needs and the need to establish long-term stability in funding for the program.

The seven interdisciplinary science priorities established for the U.S. Global Change Research Program, representing interconnected parts of the total Earth system are:

- Climate and Hydrologic Systems
- Biogeochemical Dynamics
- Ecological Systems and Dynamics
- Earth System History
- Human Interactions
- Solid Earth Processes
- Solar Influences

Current priorities result in proposed FY93 activities focusing primarily on the first three of the above priorities.

Within the U.S. Global Change Research Program, NSF is responsible for maintaining the health of basic research in all areas of solid Earth, atmospheric, ocean, terrestrial, and social sciences as well as research in the polar regions. The basic research program is focused on ground-based studies on regional and global scales; large-scale field programs; interpretation and use of remotely sensed data and geographic information systems; theoretical and laboratory research; research facilities support; and the development of numerical models, information and communication systems, and data bases.

In FY92, the NSF budget for focused global change research programs is $108.5 million. The President's FY93 budget request for global change research includes $162.5 million for NSF, an increase of 50% over FY92; however, FY93 funding levels are uncertain as they must still pass through congressional and agency budget processes. Final program allocations are usually in place by December. Most proposals currently being submitted will be competing for FY93 funds.

NSF has released a publication outlining all the opportunities it offers for competitive research activities in the focused global change program, including submission requirements, deadline dates, etc. This publication is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board.

Department of Energy

Subsurface Science Program

The Office of Health and Environmental Research of the Office of Energy Research, U.S. Department of Energy (DOE), announces its interest in receiving applications for Special Research Grants in support of research on the origins of microorganisms in the deep subsurface.

This is a coordinated, multidisciplinary program directed towards determining the origins of microorganisms that occur in deep sediments and geological formations, with emphasis on field investigations. Included is the refinement of innovative concepts for investigating the survival, adaptation, and physiological capabilities of these microorganisms, provided that such techniques can be integrated rapidly into a field program. Emphasis is on collaborative, interdisciplinary research that draws on the fields of microbiology, geology, geochemistry, hydrology, microbial ecology, and molecular biology.

The major goals of the program are 1) to determine the distinctive physiological mechanisms and environmental conditions by which microorganisms are maintained in the deep subsurface for long periods, and 2) to determine the distinctive physiological mechanisms and environmental conditions by which microorganisms are transported to the deep subsurface.

It is anticipated that approximately $2.5 million will be available for awards during FY93 in the range of $80,000 to $125,000 per year for 3 years, contingent upon availability of appropriated funds.

The application deadline is **November 16, 1992**. A copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. For further information contact Dr. Frank J. Wobber, Office of Health and Environmental Research, ER-74 (GTN), Office of Energy Research, U.S. Department of Energy, Washington, DC 20585; 301/903-5324. Refer to Program Notice 92-18.

Minnesota Sea Grant

Minnesota Sea Grant is seeking innovative, creative research projects related to Great Lakes issues. Pre-proposals are being solicited on a broad range of issues that affect 1) Lake Superior; 2) The Great Lakes; and 3) the industries that rely on the coastal region, the lake, and its resources.

Sea Grant supports hypothesis-based, peer reviewed research related to aquatic or Great Lakes topics and issues. Research supported through Sea Grant may address problems of national concern, contribute toward the needs of other regions, or use Minnesota's Lake Superior and/or North Shore as a study area. While projects addressing Minnesota's needs may gain some higher priority, all research should have components that are generalized to the nation as a whole. Projects directed solely toward solution of local problems or surveys of local content, and monitoring efforts or projects relevant only to freshwater areas other than the Great Lakes are considered *inappropriate* for Sea Grant funding.

Research areas include, but are not limited to:

- policy and law,
- fisheries management and development,
- aquaculture,
- tourism and recreation,
- port development and transportation,
- coastal and environmental concerns.

The following kinds of research are most fundable:

- research which explores issues surrounding conservation of natural resources and sustainability of development;
- research in which the rationale and user relationships are well-established and well-documented;
- research undertaken jointly with industry or business, or research with goals and objectives supported by the affected industry. Contributions may be in the form of collaboration, in-kind services or dollars;
- interdisciplinary and multidisciplinary research, especially in the area of policy and law;
- cooperative projects with other programs that deal with a single problem or broad approach to national and regional issues.

Each two-year project receives $15,000 to $50,000 per year. Most are funded for one additional year if they show success. Graduate research assistants are funded. Only faculty of Minnesota's institutions of higher education or not-for-profit educational/research institutions are eligible for funding. Grants will begin in January 1993.

The application deadline for pre-proposals is **September 30, 1992**. For pre-proposal forms or details on past Sea Grant-funded research, call the Sea Grant director's office, 612/625-9288.

U.S. Department of Agriculture

Alternative Agricultural Research & Commercialization

The Alternative Agricultural Research and Commercialization (AARC) Center is requesting pre-proposals under the AARC Grant and Cooperative Agreement Program to assist emerging industrial products/processes involving the use of agricultural or forestry materials.

The objectives of the AARC Center are:

- To search for new non-food, non-feed products that may be produced from agricultural commodities and for processes to produce such products;
- To conduct product and co-product/process development and demonstration projects, as well as provide commercialization assistance for industrial products from agricultural and forestry materials;
- To encourage cooperative development and marketing efforts among manufacturers, private and government laboratories, universities, and financiers to assist in bridging the gap between research results and marketable, competitive products and processes;
- To collect and disseminate information about commercialization projects that use agricultural or forest materials and industrial products derived therefrom.

Currently, approximately $4 million is available. Some level of matching funds is required, with the amount of such matching to be determined after pre-proposals are received. In no case will funds provided by the AARC Center exceed two-thirds of the total cost of the project.

Pre-proposals may be submitted by any private firm, individual, public or private educational or research institution or organization, Federal agency, cooperative, or nonprofit organization. Cooperative projects involving any of the above are encouraged.

The pre-proposal is due **October 30, 1992**. A copy of the announcement, including pre-proposal guidelines, is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. Questions regarding the AARC Center or the pre-proposal process should be directed to Beverly Gillot, 202/401-4860 or Patricia Dunn, 202/401-4640.

Environmental Protection Agency

1993 Exploratory Research Grants

The U.S. Environmental Protection Agency (EPA), through its Office of Exploratory Research (OER), is seeking grant applications to conduct exploratory environmental research in biology, chemistry, physics, engineering or socioeconomics. Investigators are sought in who can focus on any aspect of pollution identification, characterization, abatement or control, or address the effects of pollutants on the environment. In addition, research is sought on environmental policy and its social and economic consequences.

Proposed projects must be investigative research which advances the state of knowledge in the environmental sciences and technology. Proposals will not be accepted that are routine monitoring, state-of-the-art or market surveys, literature reviews, development or commercialization of proven concepts, or the preparation of materials and documents, including process designs or instructional manuals. Applications containing proprietary or other types of confidential information will be immediately returned to the applicant without review.

Superfund grants, which in the past have been awarded via the RFA mechanism, will be awarded under this general solicitation to successful applicants who focus on the identification, remediation and monitoring of Superfund sites. Applications in the environmental health area are solicited by RFA only.

The typical grant is for approximately $100,000 per year; funding levels range from a minimum of about $40,000 to approximately $150,000 per year. The maximum project period is three years; shorter periods are encouraged, as are funding requests substantially lower than $150,000 per year.

Applicants may telephone the OER info-line for further information on schedules and review processes: 202/260-7474. Applicants with additional questions may contact the appropriate individuals as follows:

Biology:	Clyde Bishop	202/260-5727
Chemistry/Physics: Air	Deran Pashayan	202/260-2606
Chemistry/Physics: Water/Soil	Louis Swaby	202/260-7453
Engineering	Louis Swaby	202/260-7453
Socioeconomics	Robert Papetti	202/260-7473

Application deadlines for FY93 are **February 1, 1993** and **August 2, 1993**. A copy of the announcement (Federal Register, July 29, 1992) is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. For further information contact Virginia Broadway, U.S. Environmental Protection Agency (RD-675), 401 M Street SW, Washington, DC 20460; 202/260-7664.

American Heart Association - Minnesota Affiliate

Applications are being requested for support of cardiovascular research by the Minnesota Affiliate of the American Heart Association. The goal of the American Heart Association Research Program is to acquire new knowledge regarding the cardiovascular system and the causes, prevention, treatment and control of cardiovascular diseases and stroke. This new knowledge comes from research in accordance with the scientific method. This implies the formulation of a hypothesis, methods to test the hypothesis, acquisition of evidence and publication of results.

The Minnesota Affiliate supports three awards.

Post-Doctoral Research Fellowships

These awards are available to beginning researchers seeking to work with established Minnesota investigators on cardiovascular research projects. Awards are for one to two years, subject to annual review. The first year stipend is $24,000 ($19,000 stipend with an additional $5,000 for use as salary or for the project); second year, $26,000 ($21,000 stipend with an additional $5,000 for use as salary or for the project).

Grants-In-Aid: Beginning

These awards are available to post-doctoral investigators for clinical and basic science research in cardiovascular and related fields. Awards are primarily intended to be of help to the independent investigator at a rank of assistant professor or lower. Senior investigators who are changing fields are also eligible. Awards are for one to two years, subject to annual review. The stipend is $24,000 yearly maximum.

Grants-In-Aid: Standard

These awards are available to postdoctoral investigators pursuing independent research in cardiovascular and related fields. Awards are primarily intended to be of help to the independent investigator at a rank of assistant professor or above. Investigators whose programs are already well-funded are discouraged from applying. Awards are for one to two years, subject to annual review. Stipends are $24,000 yearly maximum.

The application deadline for all three programs is **December 15, 1992**. For application information contact the American Heart Association, Minnesota Affiliate, 4701 West 77th Street, Minneapolis, MN 55435; 612/835-3300.

Department of Commerce

National Institute of Standards and Technology

Potential applicants are hereby informed that the Materials Science and Engineering Laboratory, National Institute of Standards and Technology (NIST) is continuing its Research Grants Program to academic institutions, non-federal agencies, and independent and industrial laboratories. The Laboratory conducts, directly and through grants and cooperative agreements, a basic and applied research program.

Applications are now being accepted for grants in the areas of ceramics, metallurgy, polymer sciences, neutron scattering research and spectroscopy. The program supports grants for innovative ideas which are generated by the proposal writer on what research to carry out and how to carry it out.

Approximately $500,000 will be available to support grants for up to three years.

Specific objectives are:

1) Office of Intelligent Processing of Materials, 851 (George Birnbaum 301/975-5727): to measure the far infrared (FIR) and mid-infrared continuum absorption of primarily nonpolar gasses and liquids found in the atmospheres of the outer planets, in particular, gaseous and liquid CH4 and gaseous mixtures of N2 and CH4, and to analyze these data.

2) Ceramics Division, 852 (Sandy Dapkunas 301/975-6119): to supplement division activities in the area of ceramic processing, tribology, composites, machining, interfacial chemistry and microstructural analysis.

3) Polymers Division, 854 (Bruno Fanconi 301/975-6762): for synthesis of polymers for research purposes, and collaborative research efforts in which the contractor provides mechanical, electrical, optical, transport or structure data on polymeric materials.

4) Metallurgy Division, 855 (John Manning 301/975-6157): to develop techniques to predict, measure and control transformations, phases, microstructure and kinetic processes in metals and their alloys.

5) Metallurgy Division, 855 (Leonard Mordfin 301/975-6168): to develop new and improved sensors and analytical models for metallurgical processes in order to facilitate the development and adoption of intelligent processing systems for materials.

6) Metallurgy Division, 855 (Richard Ricker 301/975-6023): to develop techniques to predict, measure and control the degradation of materials in their service environment.

7) Reactor Radiation Division, 856 (John Rush 301/976-6220): to develop cold and thermal neutron research approaches and related physics and materials applications.

Proposals will be received **throughout the remainder of the year**. Applicants should allow up to 120 days processing time. Contact the above-listed personnel for questions.

Animal Research News

Supplier Runs Seminar on Transgenic Animals

Transgenic and immunodeficient animal models will be the subject of a seminar sponsored and led by Charles River Laboratories, a supplier of small animals for the laboratory.

The seminar will take place Sept. 22 from 12:30 to 4:30 pm in Moos Tower Room 2-530. Registration is required, but free of charge. For more information, please phone Dr. Cynthia Gillett, Research Animal Resources, 624-4625, by Sept. 15.

The seminar speakers are all Charles River employees. Their schedule is as follows:

12:30	Registration
1:00	Opening Remarks, Catherine S. Adams, Sales Manager
1:05	Transgenic Animals: Science and Strategy, Glenn M. Monastersky, PhD
2:15	Cryopreservation and Practical Issues in Transgenic Animal Production, Glenn M. Monastersky, PhD
3:30	Immunodeficient Mouse Models, Kathleen A. Murray, DVM

Faculty Research, Training and Service Awards

This section contains statistics on proposals and awards recently processed by ORTTA. In addition, we have randomly selected awards received by faculty during preceding months. Faculty who have received awards they would like mentioned in a future *Research Review* may send the pertinent data, as exemplified below, to Phil Norcross at ORTTA.

Proposal and Award Summary

	Number	Amount
Proposals Submitted July 1992	241	38,325,281
Awards Processed July 1992	212	14,606,230
Proposals Submitted July 1991	236	34,672,736
Awards Processed July 1991	309	23,794,102

Genetics, Response to Exercise, and Risk Factors
Arthur S. Leon, Kinesiology/Leisure Studies
Robert C. Serfass, Kinesiology/Leisure Studies
NIH, NHLBI
$468,558 - 07/92-06/93

Scarce Medical Services Contract - Anesthesiology
James G. Boulger, Medicine, Duluth
HRSA
$250,415 - 07/92-06/93

Natural History of Nephropathy in Type I Diabetes
S. Michael Mauer, Pediatrics
McGill University
$227,001 - 04/92-03/93

Malignant Conversion of Large Bowel Cancer and its Prevention
Lee W. Wattenberg, Laboratory Medicine and Pathology
American Cancer Society
$200,000 - 07/92-06/94

The Chemistry of Biological Denitrification
William B. Tolman, Chemistry
Chicago Community Trust
$180,000 - 07/92-06/95

Expand Master's Program: Partnership Model
Marilee Miller, Nursing
HRSA
$176,906 - 07/92-06/93

New Radiotracers for Mapping Cholinergic Innervation
S. Mbua N. Efange, Radiology
NIH, NINDS
$152,249 - 07/92-06/93

Effect of HVAC Ventilation Systems on Radon Concentrations
David Grimsrud, Graduate School
St of MN, Department of Health
$143,336 - 04/92-10/92

Caenorhabditis Genetics Centers
Robert K. Herman, Genetics and Cell Biology
NIH, DRR
$137,428 - 06/92-05/93

Learning to Lead...Leading to Learn: A Youth Leadership Development Program
Jennifer York, Educational Psychology
Brian Abery, Educational Psychology
USDE
$133,732 - 07/92-06/93

Field Initiated Research
Robert H. Bruininks, Educational Psychology
Mary Hayden, Educational Psychology
USDE
$130,000 - 07/92-06/93

Effectiveness of Bonding Sealant to Wet Enamel
Robert J. Feigal, Preventive Sciences, Dentistry
NIH, NIDR
$129,430 - 05/92-04/93

Computational Techniques to Quantify Chemical Similarity: Tools for Risk Assessment
Subhash C. Basak, Natural Resources Research Institute, Duluth
Gerald Niemi, Natural Resources Research Institute, Duluth
George E. Host, Natural Resources Research Institute, Duluth
EPA
$126,325 - 07/92-06/95

Efficient Dynamic Data Structures for Geometric Problems
Ravi Janardan, Computer Science
NSF
$112,128 - 07/92-12/94

Modeling Copper Protein - Nitrogen Oxide Interactions
William B. Tolman, Chemistry
NIH, NIGMS
$112,043 - 08/92-07/93

Charles E. Culpeper Foundation Medical Scholar
Karen Hsiao, Neurology
Charles E. Culpeper Foundation
$108,000 - 07/92-06/93

Making Decisions About Long-Term Care
Paul D. Thuras, Health Services Research and Policy
Brookdale Foundation
$105,000 - 07/92-06/94

Control of Gene Expression by Peptide and Steroid Hormones
Michel Sanders, Biochemistry (MS)
American Cancer Society
$104,000 - 07/92-06/93

Perceptual Constraints for Image Understanding in Humans
David C. Knill, Psychology
NIH, NEI
$101,493 - 08/92-07/95

Velocity Measurements in a Simulated Microburst
Ellen Longmire, Aerospace Engineering
NSF
$100,000 - 07/92-12/95

Subunit Pasteurella Vaccine for Shipping Fever Pneumonia
Samuel K. Maheswaran, Veterinary Pathobiology
Trevor R. Ames, Large Animal Clinical Sciences
USDA
$100,000 - 07/92-06/94

Molecular Biophysics of Calcium Transport
James Mahaney, Biochemistry (MS)
American Heart Association, MN Affiliate
$23,250 - 07/92-06/93

Bioavailability of Nicotinic Acid Nicotinamide
Joseph Keenan, Family Practice and Community Health
Innovite Inc.
$47,092 - 02/92-05/92

Randomized, Dose-Ranging Study of Foscavir in HIV+ Subjects: Blood Level to Suppress CMV
Henry H. Balfour, Jr., Laboratory Medicine and Pathology
Astra Pharmaceutical Products
$28,012 - 06/92-05/93

Insulin Dependent Diabetes: Effects of 2 Diets on Fasting and Post-prandial Lipoprotein Metabolism
Angeliki Georgopoulos, Medicine
American Diabetes Association
$60,000 - 07/92-06/93

Bioenergetic Consequences of Left Ventricular Hypertrophy
Jianyi Zhang, Medicine
Robert J. Bache, Medicine
American Heart Association, MN Affiliate
$24,000 - 07/92-06/93

Structure and Function of Reovirus Major Outer Capsid Protein
Leslie A. Schiff, Microbiology
NIH, NIAID
$98,000 - 07/92-04/93

Meniere's Disease and Autoimmunity
Peter A. Santi, Otolaryngology
American Otological Society
$24,981 - 07/92-06/93

Collagenase, Timp and Timp-2 in Diabetic Nephropathy
Atul Sharma, Pediatrics
Alfred F. Michael, Pediatrics
Kidney Foundation of Canada
$43,000 - 07/92-06/93

Role of Endothelium and Nitric Oxide in Adenosine Modulation
Earl W. Dunham, Pharmacology
American Heart Association, MN Affiliate
$24,000 - 07/92-06/93

Current Developments in Assisted Living
Rosalie A. Kane, Health Services Research and Policy
American Association of Retired Persons
$70,000 - 07/92-12/92

Resuscitation Decision for Residents with No DNR Order
Muriel B. Ryden, Nursing
NIH, NCNR
$37,800 - 07/92-06/93
American Heart Association
$43,890 - 07/92-06/93

Evaluation of Pentoxifylline for Treatment and Prevention of Swine Pleuropneumonia
Michael P. Murtaugh, Veterinary Pathobiology
Carlos Pijoan, Clinical and Population Sciences
Thomas W. Molitor, Clinical and Population Sciences
National Pork Producers Council
$18,000 - 07/92-06/93

Domestic Violence Program for Southeast Asian Families
Amos S. Deinard, Hospital and Clinic
Otto Bremer foundation
$40,000 - 07/92-06/94

Conducted Microvascular Responses
David E. Mohrman, Physiology, Duluth
American Heart Association, MN Affiliate
$23,729 - 07/92-06/93

High Performance Computing in Free Surface Fluid Flows
Tayfun E. Tezduyar, Aerospace Engineering
NSF
$44,000 - 07/92-12/94

Syngas By Direct Oxidation of Methane: Homogeneous Reactions
Lanny D. Schmidt, Chemical Engineering
Shell Oil Company
$30,000 - 07/92-06/93

Roofing Shingle Waste in Asphalt Concrete
David E. Newcomb, Civil and Mineral Engineering
Andrew Drescher, Civil and Mineral Engineering
St of MN, Transportation
$55,800 - 01/92-04/93

Paleoclimate Change in China: Rock Magnetic Indicators and Their Validation
Subir K. Banerjee, Geology and Geophysics
Christopher P. Hunt, Geology and Geophysics
NSF
$71,679 - 07/92-12/93

Experimental Study of Downstream Fining in Coarse Grained River Channels
Gary N. Parker, St. Anthony Falls Hydraulic Laboratory
Christopher Paola, Geology and Geophysics
NSF
$ 57,143 - 07/92-12/93

Chlamydomonas Telomere Functions: A Telomere Binding Protein
Judith G. Berman, Plant Biology
NSF
$95,000 - 07/92-12/93

Sampling-Based Approaches to Bayesian Inference
John Geweke, Economics
NSF
$63,197 - 08/92-01/94

Two-Way Transfers in Intergenerational Co-Residence
Earl W. Morris, Design, Housing and Apparel
American Association of Retired Persons
$74,192 - 07/92-06/94

Commercialization of Northern Minnesota Vegetable Industry
Gary C. McVey, Northwest Experiment Station, Crookston
David K. Wildung, North Central Experiment Station, Grand Rapids
Agricultural Utilization Research Institute
$79,750 - 04/92-03/93

Institutional Workshops for Sustainable Development in Hungary
Zbigniew Bochniarz, HHH Institute
EPA
$55,000 - 03/92-12/92

Expansion of Law Clinics: Human Rights and Immigration Law Clinic
Stephen Befort, Law School
USDE
$37,881 - 07/92-06/93

Theatre of the Fraternity: Staging the Sacred Space
Lyndel I. King, University Art Museum
Barbara Reid, Theatre Arts
NEH
$45,070 - 07/92-11/93

Nonlinear Oscillations in Functional Differential Equations
Harlan W. Stech, Mathematics and Statistics, Duluth
NSF
$45,750 - 07/92-12/93

Nongame Bird Surveys on the Sandstone and Rice Lake Units of Rice Lake National Wildlife Refuge
Joann M. Hanowski, Center for Water and Environment, NRRI, Duluth
Gerald Niemi, Natural Resources Research Institute, Duluth
$3,810 - 05/92-12/92

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A Quick Reference Guide

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UNIVERSITY OF MINNESOTA

RESEARCH REVIEW

Research and Technology Transfer Administration

October 1992

University Will Certify Its Genetic Engineering Labs for State

In compliance with state law, the University's Institutional Biosafety Committee (IBC) is now in the process of certifying the safety of the University's genetic engineering facilities. The state certification process began in mid-August, when the Minnesota Environmental Quality Board (MEQB) sent a letter to biologists throughout the state that reads as follows:

"If a genetically engineered organism is being used in a facility, the facility must be certified as a containment facility or a permit for a release or a permit exemption must be obtained. . . . *A self-certification of existing containment facilities by the owner, operator, or institutional biosafety committee is required by November 1, 1992.*"

In response, Michael Flickinger, Chairman of the University's Biosafety Committee, urges faculty to understand that the state does not seek direct responses from individual faculty members, nor does it seek a detailed list of who is doing genetic engineering in which labs and greenhouses. The Biosafety Committee will certify all of the University's containment facilities, and faculty should not respond individually to the MEQB's directive. Flickinger urges anyone in the University who wants further information to call the Biosafety Committee. (See roster on page 8.)

"The mechanism to certify safe genetic engineering at the University is already in place and working," says Flickinger. "The Biosafety Committee will make a single filing to the MEQB on behalf of the entire university. It will cover everyone at every campus currently doing genetic engineering work. For the most part individual investigators can work directly with the biological safety officer. The institutional response will come from the IBC and through Anne Petersen, the Vice President for Research."

The state agrees with Flickinger. "If the faculty have any questions or doubts, they should call the University's IBC," says John Hynes, the MEQB staff officer responsible for

{continued on page 8}

A Special Issue On

Minnesota Regulation of Genetic Engineering

University-Industry Research:

Practical Approaches to Balancing Public and Private Trusts

Inside

New NSF Application Form

Please Be Advised

A new application kit for the National Science Foundation (NSF) has been issued. Unfortunately, there is a very short period of time between the announcement (July *Research Review*) and the implementation date of **October 1, 1992.**

ORTTA has learned that NSF is very serious about enforcing the use of the new kit. Proposals received by NSF on or after October 1 using the old forms **will not be accepted.**

New kits are available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board.

CUFS

DHHS Awards to Have New Account Numbers

ORTTA will be assigning new CUFS and new payroll numbers to DHHS renewal awards (Type 2) effective with October 1, 1992, start dates. This is applicable to all DHHS awards funded by the DHHS letter-of-credit.

The change is necessary to correct revenue recording problems that occurred during the CUFS conversion.

We apologize for the inconvenience caused by this change. If you have any questions, please contact the appropriate ORTTA grant administrator or Marilyn Surbey.

RESEARCH REVIEW

Volume XXII/Number 4

October 1992

Director of Communications: Michael P. Moore

Editor: Phil Norcross

Editorial Assistant: Tove Jespersen

Associate Vice President: A. R. Potami

***Research Review* is a monthly publication of the Office of Research and Technology Transfer Administration. Its purpose is to inform faculty and administrators who are involved with sponsored research and technology transfer on procedures and policies of granting agencies, on institutional policy and other information necessary to the preparation of research proposals, and on funding opportunities.**

***Research Review* welcomes ideas and comments from all readers. Write to *Research Review* at 1100 Washington Avenue South, Suite 201, Minneapolis, MN 55415-1226, or call Phil Norcross at 625-2354 or Michael P. Moore at 624-9398.**

Indirect Cost & Fringe Benefit Rates

Indirect Cost Rates

The *provisional* rates for July 1, 1991, through June 30, 1994, are listed below. When budgeting for periods beyond 6/30/94, the 7/1/92-6/30/94 rates should be used. **The rate agreement is dated May 13, 1992.** This date should be used where required on proposal applications. **Please call Marilyn Surbey at 624-4850 with questions on Indirect Costs.**

	07/91/92 06/30/94
Research	
On-Campus	40.00
Off-Campus *	21.00
SAFHL	58.05
Hormel	44.00
Other Sponsored Activity	
On-Campus	20.00
Off-Campus *	10.00
Instruction	
On-Campus	52.00
Off-Campus *	16.00

* A project will be considered off-campus if more than 50% of the direct salaries and wages of personnel employed on the project are incurred at a site neither owned nor leased by the University.

Fringe Benefit Rates

If you have questions regarding fringe benefit rate development or need the breakdown of charges, call **Vivian Fickling at 624-2009.**

For proposals being submitted with start dates **after July 1, 1992**, the estimated fringe benefit rates to be budgeted are:

Faculty	31.25
Civil Service	29.50
Graduate Assistants	10.50

Estimated rates after **July 1, 1993,** are:

Faculty	28.00
Civil Service	30.50
Graduate Assistants	31.25

Rate changes will be reflected in this section.

UNIVERSITY-INDUSTRY RESEARCH:

PRACTICAL APPROACHES TO BALANCING PUBLIC AND PRIVATE TRUSTS

November 19, 1992

Hubert H. Humphrey Center, University of Minnesota, Minneapolis Campus

Welcome	
8:30-9:00	President Nils Hasselmo
Session One:	**What are the Major Issues Confronted When the University Collaborates with Industry?**
9:00-9:25	Benefits and Drawbacks of Industry-Sponsored Research and Faculty Entrepreneurship Speaker pending
9:25-10:00	Oversight and Disclosure Needed to Manage Conflicts of Interest Nelson Dong, Dorsey and Whitney (Confirmed)
10:00-10:15	Break
Session Two:	**Protecting the Integrity of Research**
10:15-10:45	Issues and Concerns in Designing, Conducting, and Disseminating Research Results Arthur Caplan, University of Minnesota Center for Biomedical Ethics (Invited)
10:45-11:15	Monitoring of Research in Progress and Relationships with Sponsors Nicholas H. Steneck, Ph.D., Director, Historical Center for the Health Sciences, University of Michigan (Confirmed)
11:15-12:00	Presenting Research Results to Professionals and the Public Speaker pending
Luncheon Address	
12:00-1:30	An Idealist's Vision for the Future: Science and Technology Understood, Appreciated, and Conscientiously Applied Erich Bloch, former director of NSF (Invited)
Session Three	**Who Benefits from University-Industry Collaboration?**
1:30-2:00	The University Perspective Lita Nelson or John Preston, MIT (Invited)
2:00-2:45	The Industry Perspective Paul Citron, Vice President, Science & Technology, Medtronic (Confirmed)
Session Four	**How Can University Knowledge and Technology Be Transferred to Maximize Public and Private Goals?**
2:45-4:00	Speakers pending
Wrap-Up	
4:00-4:30	**The Evolving Role of University Research** Dr. Anne Petersen and Dr. Ettore Infante

Registration Information

Preregistration is not required but is encouraged to ensure that sufficient materials, seating, and lunches are available. Nonregistered attendees will be accepted to the conference sessions and lunch on a space-available basis. To register, send via campus mail the completed form at right to Continuing Medical Education, Suite 1-107, Radisson Hotel Metrodome; or fax it to 625-5673. For more information about the conference, call Michael Moore at 624-9398.

Name: _____

Department: _____

Campus Address: _____

Will Attend Conference: Yes No

Will Attend Lunch: Yes No

Animal Research News

New Animal Usage BA-22 Forms

The University's Animal Care Committee has revised the BA-22 "Animal Usage Form" to reflect new federal policies regarding animal use. The new forms will be available in early October, and the old forms will not be acceptable after that time. To receive copies, call University Stores.

The BA-22 form allows the Animal Care Committee to review animal use, as required by the U.S. Public Health Service. University personnel proposing to use vertebrate animals for research, teaching or any other purpose need to fill out and submit a BA-22. For internally sponsored research or teaching projects, the BA-22 should go directly to Research Animal Resources, Box 351 UMHC. If animal usage is part of a research proposal that requires review by ORTTA, the BA-22 should be sent with the proposal to ORTTA.

Workshops on Using Laboratory Animals

The National Institutes of Health (NIH), Office for Protection from Research Risks (OPRR), is continuing to sponsor workshops on implementing the Public Health Service Policy on the Humane Care and Use of Laboratory Animals. Each of the workshops scheduled for FY93 will focus on a specific theme.

The workshops are open to institutional administrators, members of Institutional Animal Care and Use Committees, laboratory animal veterinarians, investigators and other institutional staff who have responsibility for high-quality management of sound institutional animal care and use programs.

The next workshop, "Minimizing Pain and Distress in Laboratory Animals," will be held December 3-4 at Vanderbilt University and Meharry Medical College, Nashville, Tennessee. Direct inquiries to Ms. Marilyn Dasaro, Division of Continuing Medical Education, Vanderbilt University, D-8211 Medical Center North, Nashville, TN 37232-2337; 615/822-4030, fax 615/343-0809.

Bush Signs Lab Protection Law

It is now a federal crime to do violence against animal-handling facilities, including research labs. Last month, *Research Review* reported that Congress had passed the "Animal Enterprise Protection Act of 1992" but President Bush had not yet signed it. Now we can report that he did sign it, on August 26.

GAO Urges Changes in Indirect Cost System

The General Accounting Office in late August urged junking the current system for repaying research grant costs and called for giving grantees a formal say in its redesign.

GAO gave the highest figure yet—$400 million—to recently totaled mischarges to the government, costs it blamed partly on unclear, complicated policies and practices.

Recent accounting improvements undertaken by universities and revisions to Circular A-21, the Office of Management and Budget's cost principles, fall far short of needed reforms, GAO said. Even more changes to A-21, due this fall, may not go far enough. OMB has generally left universities out of the planning process.

Without making specific recommendations, GAO urged replacing the current system of individually negotiated reimbursement rates with a system that would limit repayment and simplify calculating and monitoring costs. It called for these reforms in a report to Rep John Dingell (D-Mich) who is leading the cost probe.

The options GAO laid out include establishing uniform flat rates on all or some cost categories, which could hurt big grantees. For example, a 50 per cent indirect cost cap would have cost HHS's top grantees $222 million in indirect cost support in 1989, GAO estimated.

Other steps include negotiating multiyear, fixed, predetermined rates, a method close to current HHS practices; eliminating special studies and agreements grantees have used to increase rates; and establishing varying rate levels among universities, basically different caps or flat rates for different types of institutions. Agencies also could award research grants on the basis of total cost, an alternative that would leave negotiated rates in place but create more competition for grants.

To make oversight less complicated, GAO urged leaving one agency in charge. Currently, the Health and Human Services Department, which watches 600 institutions, and the Office Naval Research, which monitors 39, share the job.

Single copies of the report *System for Reimbursing Universities' Indirect Costs Should Be Reevaluated* (GAO/RCED-92-203) are free from General Accounting Office, PO Box 6015, Gaithersburg, MD 20877.

From *Federal Grants & Contracts Weekly*

Public Health Service

Policy Relating to Distribution of Unique Research Resources

Investigators conducting biomedical research frequently develop unique research resources, including synthetic compounds, organisms, cell lines, viruses, cell products, cloned DNA, and DNA sequences, mapping information, crystallographic coordinates and spectroscopic data.

The U.S. Public Health Service (PHS) has issued a statement of policy concerning these unique research resources developed through PHS awards.

The policy of PHS is to make available to the public the results and accomplishments of the activities that it funds. Restricted availability of unique resources upon which further studies are dependent can impede the advancement of research and the delivery of medical care.

Therefore, when these resources are developed with PHS funds and the associated research findings have been published or after they have been provided to the agencies under contract, it is important that they be made readily available for research purposes to qualified individuals within the scientific community. This policy applies to PHS intramural investigators as well as extramural scientists funded by PHS grants, cooperative agreements and contracts.

PHS encourages investigators who have such resources to consult the appropriate PHS Program Administrators who may be of assistance in determining a suitable distribution mechanism. Such a mechanism should take into consideration all applicable Federal regulations, including, but not limited to, those regarding human subjects, animal welfare, and the use and handling of hazardous materials, where applicable.

Investigators requesting materials should provide evidence of having the proper training, experience and facilities to make use of the items they request. Program staff of the agencies will be available to assist in verification of credentials of requesters where such concern exists on the part of suppliers.

Institutions and investigators may charge the requester, if necessary, for the reasonable cost of production of unique biological materials, and for packaging and shipping. Such costs may include labor, supplies and other directly related expenses. Investigators should note, however, that such a charge accrues as general program income.

Federal policy encourages the commercialization of the products of research developed as a consequence of Federal funding; therefore, the intent of this policy is not to discourage, impede or prohibit the organization that develops unique research resources or intellectual property from commercializing the products. Investigators may make their materials available to others for commercial purposes with appropriate restrictions and licensing terms as they and their institution deem necessary.

The above is an excerpt from the "PHS Policy Relating to Distribution of Unique Research Resources Produced with PHS Funding." The complete version may be found in the September 11, 1992, issue of the NIH Guide, and may also be requested from ORTTA by calling 624-9004 or by sending a note through the bulletin board.

NIEHS

Application Receipt Date Changes for Two Programs

The National Institute of Environmental Health Sciences (NIEHS) has announced two changes in application receipt dates.

NIEHS uses a variety of award mechanisms to accomplish its mission of studying the mechanisms and effects of environmental agents on human health. Among these are Environmental Health Sciences (EHS) Center Grants, a program of core center support (P30). The objective of this program is to provide core support for an administrative structure, scientific leadership, and shared core equipment to groups of productive scientists with programs in environmental health. The award allows these scientists to 1) focus research efforts on issues of relevance to NIEHS, 2) work in an environment conducive to interdisciplinary approaches to such research, 3) serve as a resource to NIEHS by providing scientific expertise on critical public health issues, and 4) engage in community outreach and education programs dealing with regional environmental health issues.

The application receipt date for this program is now limited to **February 1** of each year only.

A corresponding change in the receipt date for program project (P01) grants is also announced. Annual submissions will now be accepted only on **June 1** and **October 1**.

For both programs, it is important that planned submissions be discussed with NIEHS program staff as content, focus and size of these applications are critical factors in determining funding.

Contact Dr. Thorsten Fjellstedt, Deputy Director, Division of Extramural Research and Training, NIEHS, PO Box 12233, Research Triangle Park, NC 27709; 919/541-0131.

CUFS

Proposal Budgeting: Local Mileage vs. Travel

When developing proposal budgets, if funds are being requested from a sponsor for local mileage (within the seven-county metro area) reimbursement, the cost must be budgeted in the Other Expense or Supply categories, *not* in Travel. The only exception to this is if the sponsoring agency has an *established written policy* which requires local mileage to be treated as a travel cost. Most federal agencies such as NIH and NSF leave it to the grantee to determine how to treat mileage costs. The exception is the U.S. Department of Education, which defines local travel as Other Expenses.

The University does not consider local mileage reimbursement or use of university vehicles a travel cost. As defined in the expense object definitions created by the University, local mileage reimbursement is considered part of general operating supplies and services (object 7300, sub-object 55); and vehicle use as rents/leases (object 8030, sub-object 30).

ORTTA will now be setting up funds awarded for local mileage into the 7300 object and will be changing proposal budgets to move local mileage costs out of travel into other expenses, unless agency policy dictates otherwise. If the proposal doesn't identify whether mileage is local or not, it will be assumed to be local.

If agency rebudgeting rules limit rebudgeting of travel costs based on a percentage of the awarded travel budget, the limit will be based upon the total, excluding local mileage, regardless of how the agency awarded the funds. Some agencies are very restrictive about rebudgeting any funds between awarded categories, which makes it critical that mileage costs be properly reflected in your proposal.

Contact any of the ORTTA Grant Administrators if you have questions.

Stopping Reports for Inactivated Accounts in GDES

Many departments have requested that the hard copy reports for inactivated accounts be stopped. ORTTA is not able to stop these reports. A request has been submitted to Financial Systems Support—they will try to comply after the end of the calendar year.

Thanks for your patience.

NOAA Creates Ombudsman's Office

The National Oceanic and Atmospheric Administration (NOAA) seeks to improve its relations with academe by establishing an ombudsman's office in NOAA. The September 3 announcement from NOAA reads as follows:

NOAA wants to improve its communications with the nation's academic institutions. The research, prediction, and resource management issues which NOAA has had to address in recent years have grown in complexity, scale (both temporal and spatial), and impact. They are multidisciplinary in nature, global in domain, and often capture front-page headlines. To meet these challenges in the past, NOAA has frequently sought assistance from university scientists and their supporting infrastructure. These efforts, although substantial and individually successful, have not led to the coherent relationship between NOAA and academia that both partners require for the future. On a procedural level, the applied science challenges that we face require a streamlining of NOAA's grants process (already underway). However, the long-term and complex nature of global environmental and resource issues argue for a partnership between in-house and extramural research that must be more than a financial arrangement. It must foster the intellectual links that are essential to our mutual interests. We need to provide for academic access to NOAA facilities, and joint planning of major observing systems for the future. We must allow for a broad spectrum of NOAA-university interactions, ranging from short-term, ad hoc relationships with individual principal investigators to enduring institutional agreements.

Good communications are vital to all these efforts. NOAA has used many vehicles to further needed dialogue: academic committees; ad hoc panels; the Federal Coordinating Council for Science, Engineering, and Technology. Sometimes, however, things go wrong. NOAA has therefore established, within the office of the Chief Scientist, an ombudsman function. The objective is to identify and assist in solving any problems that arise in the course of NOAA-academic interactions. The service is designed to be impartial and results-oriented.

To utilize the service, contact NOAA Ombudsman, NOAA Office of the Chief Scientist, U.S. Department of Commerce, 14th and Constitution Ave., NW, Room 5809,

Unusual-Event Reporting

Reporting Requirements

Investigators are reminded that all "serious adverse drug experiences" or "unexpected adverse experiences" should be reported to the Committee on the Use of Human Subjects in Research. The Committee bases its policy on Food and Drug Administration (FDA) requirements for reporting drug experiences. The policy applies to all research involving human subjects regardless of the FDA designation of status on drugs or devices, and regardless of the funding source for the research.

What to Report: Adverse Experiences

According to FDA regulations (21 CFR 312.32 [4-1-92]), a "serious adverse drug experience" with respect to human clinical experience includes "any experience that suggests a significant hazard, contraindication, side effect, or precaution." This includes "any experience that is fatal or life-threatening, is permanently disabling, requires inpatient hospitalization, or is a congenital anomaly, cancer, or overdose."

With respect to results obtained from tests in laboratory animals, a "serious adverse drug experience" means any experience suggesting a "significant risk for human subjects, including any finding of mutagenicity, teratogenicity, or carcinogenicity."

"Unexpected adverse experiences" means any adverse experience that is neither identified in nature, severity, or frequency of risk in the information provided for Committee review nor mentioned in the consent form.

Unusual Events

Occasionally during the informed consent process or during the course of data gathering, an unusual event will occur. Sometimes the event is unrelated to the research protocol but will have an effect on the research subject, e.g. a misstep in the consent documentation, a breach of confidentiality, etc. These unusual events should be reported promptly to the Committee so that a response may be prepared if a subject or legal authority enquires about a study.

Content of the Report

Written reports are required by the Committee on the Use of Human Subjects in Research whether the study sponsor requires such a report or not. In some instances, an unusual event occurs at a study site other than the University of Minnesota; a written report is still required to ensure that the risks and benefits of participation have not changed.

All written reports should include:

1. An explanation of the event, including date and subject description. The report may include a standard report form as required by the study sponsor.
2. A cover letter from the principal investigator commenting on the event and describing the likelihood that the event might occur again. This statement should include an explanation of the investigator's reaction to the event in terms of implications for future subjects.
3. A revised consent form, including the new risk information if necessary and if not already covered in the current consent form.

The Committee on the Use of Human Subjects in Research will review all adverse-experience reports. The Committee will review these reports to ensure that the adverse events do not change the risk/benefit ratio. If a pattern of unanticipated events should emerge, the Committee may require a change in the study protocol and consent documents to reflect the shift in risks.

Unanticipated Events

Any serious event as described above should be reported to the FDA and to the Committee within 10 working days of the incident. **Note**: an event of this nature is probably dramatic enough to be immediately recognized as a reportable event.

Anticipated Side Effects

Events that were anticipated—factored into the protocol and mentioned in the original consent form—should be reported to the Committee at the time of annual review and renewal. The Committee may require changes in protocol or revisions in the consent form if the gravity of risk was underestimated originally. The converse may also occur—the investigators and Committee may have underestimated the benefit to research subjects. In such cases, revisions may be recommended at the time of annual renewal.

The principal investigator should exercise discretion as to whether additional subjects should be entered into a study, or whether current subjects should be continued, based on the information in the event report. The Committee may, on the advice of the Committee chair, temporarily suspend any study while the event is reviewed. Revisions in the protocol or the consent form may be required following the Committee's review of the event. If the Committee determines that the risks to subjects have increased dramatically, a full review of the study may be required. The Committee on the Use of Human Subjects in Research may permanently terminate a study based on an adverse experience. That decision, like all Committee decisions, is subject to investigator appeal procedures.

If you have any questions on this or other human subject issues, please call Moira Keane at 624-1889.

Genetic Engineering

{continued from page 1}

enforcing Minnesota's genetic engineering regulations. "All I want is a general idea where genetic engineering is being carried out and a contact person at each campus who knows the details."

The prospect of state regulation of genetic engineering has certainly caused tension in the university. Debate as to the wisdom and efficiency of the regulations will continue. But in many ways the Biosafety Committee has been pleasantly surprised by its dealings with the state. "We've come a long way," says Flickinger, "in negotiating with the MEQB a real workable system, given the guidelines. A lot of groundwork has been laid with John Hynes that should allay the fears of the faculty. No one is going to get shut down."

"To think new regulations will cause problems for us is a fairly predictable and automatic response. But I just don't think that's the case," says Robert Brambl of the IBC and the Department of Plant Biology. "We see no difficulty in complying with these rules."

The University's immediate task, according to state law, is to take account of its genetic engineering facilities and to certify that they are adequate "containment facilities." This article describes the process of containment certification, the state regulations governing release of genetically engineered organisms out of containment, and several regulatory issues that have yet to be resolved. Sidebars accompanying the article provide names and numbers for the University's IBC and key state officials, and an abstract of the pertinent Minnesota statutes and rules. Please understand that the following account of the regulations is accurate, but not precise enough to substitute for the original state legal documents.

Certification of Containment Facilities

State law says that releasing a genetically engineered organism requires environmental assessment and a state permit. But genetic engineering inside a "containment facility," says the law, is not a release and does not require a permit. As the MEQB wrote the rules by which it will enforce the law, it defined "containment facility" by adopting the National Institutes of Health (NIH) guidelines for recombinant DNA research. A containment facility, says the MEQB, is a facility that complies with NIH guidelines. And to practice genetic engineering without a release permit, says the MEQB, researchers must certify that their containment facilities meet the NIH guidelines. On August 17, Hynes sent the certification form and a letter of explanation to Minnesota biologists, teachers, and research administrators at high schools, colleges, corporations, and trade groups. The rules took effect August 3, and allow 90 days for certification, making the deadline November 1.

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University of Minnesota Institutional Biosafety Committee (IBC)

As prescribed by NIH guidelines for recombinant DNA research, the University's Biosafety Committee is responsible for ensuring the safety of genetic engineering at the University, and the Committee includes both faculty and state public health officials. Anyone in the University who has questions or comments regarding genetic engineering is encouraged to call committee members.

Michael Flickinger, IBC Chair
Biological Process Technology Institute
240 Gortner Laboratories
624-9706, fax 625-1700

James Lauer, Biosafety Officer
Department of Environmental Health and Safety
W140 Boynton Health Service
626-5621, fax 624-1949

Robert Brambl
Department of Plant Biology
220 Biological Sciences Center
625-7080 or 625-5223, fax 625-5754
brambl@graz.cbs.umn.edu

D. Peter Snustad
Department of Genetics and Cell Biology
250 Biological Sciences Center
624-3499, 624-6215, fax 625-5754
pete-s@molbio.cbs.umn.edu

Louise Hawley
Department of Medical Microbiology and Immunology
336 School of Medicine Building
University of Minnesota, Duluth
Duluth, MN 55812
218-726-8143

Myron Falken
Clinical Laboratory Specialist
Minnesota Department of Health
717 Southeast Delaware Street
Minneapolis, MN 55440
623-5362, fax 623-5775

George Lavelle
Chief, Clinical Laboratory Section
Public Health Laboratory
Minnesota Department of Health
717 Southeast Delaware Street
Minneapolis, MN 55440
623-5258, fax 623-5514

Currently the IBC reports to the President of the University. However, with the creation of the new position of Vice President for Research, the IBC will likely soon report to Anne C. Petersen. This reporting structure will be confirmed as soon as the proposed delegation of authority document outlining the duties of the new VP position is presented to the Board of Regents for approval.

The certification form is a single page. It asks for the name and *general* location of the institution—"For example, the east and west bank campuses of the University of Minnesota are considered one location," wrote Hynes. It asks for the name, address, and phone number of a contact person at that location and of the IBC chairperson. It asks how many containment facilities are being certified at each of four NIH biosafety levels. (Note that the state, contrary to practice elsewhere, calls facilities at NIH biosafety levels one and two "containment facilities.") And the form asks for references to standards like the NIH guidelines.

The state's certification form will be filled out by the University's Biosafety Committee. "The current IBC was organized in 1986, in accordance with the NIH guidelines," says Flickinger. "It includes public health and safety people from outside the University, and it includes the University's biological safety officer, Jim Lauer." Biosafety Officer James Lauer is a Senior Public Health Specialist in the Department of Environmental Health and Safety. Lauer routinely asks investigators working with recombinant DNA to report to him about vectors, toxic molecules, infectious agents, and release into the environment.

Since Lauer already has the information that allows him to provide campus-by-campus lists of the University's containment facilities, "the general faculty need to do nothing new," he says. On the other hand, Lauer is anxious that no one slip through the cracks: "If you didn't obtain outside support, you might not know about my office. And all investigators need to update their reports to me annually. So if you haven't submitted or updated for me, you have to do so *now*. We have only so many days to go through the list."

MINNESOTA ENVIRONMENTAL QUALITY BOARD

CONTAINMENT FACILITY CERTIFICATION

1. Institution _____

2. Location _____
Street
_____
City State

3. Contact for this location _____
Name Title
_____
Address City
( ) ( )
State Zip Work Phone Home Phone

4. Number of containment facilities at this location maintained at:

NIH Biosafety level 1 _____ NIH Biosafety Level 3 _____

NIH biosafety level 2 _____ NIH Biosafety Level 4 _____

5. Bibliography of procedural manuals relating to biosafety.
(May be included as an attachment.)

6. Institutional Biosafety Committee Chairperson

_____
Name Title
_____
Address City
( ) ( )
State Zip Work Phone Home Phone

7. Certification

I hereby certify that the above containment facilities are maintained at the biosafety levels indicated, that the facilities comply with the applicable National Institutes of Health guidelines, and that the level of biosafety maintained at the facilities are appropriate for the genetically engineered organisms being used in the facility.

_____
Name Title

_____
Date

Return this form to the Environmental Quality Board, Attn. John P. Hynes, 300 Centennial Bldg., St. Paul, MN 55155

A sample copy, for display purposes only, of the form by which containment facilities for genetic engineering in Minnesota must be certified.

For faculty who are not members of the IBC, then, certifying containment facilities for the state requires no new paperwork. And since most, if not all, of the University's genetic engineering laboratories already comply with NIH guidelines, certification requires no new equipment, protocols, or precautions. "Lauer and I will inspect a few labs as needed before we certify them," says Flickinger, "but if you're following NIH guidelines, no changes are necessary."

Containment Guidelines for Greenhouses

Greenhouses are an exception. A significant portion of the University's genetically engineered organisms are plants in greenhouses rather than microbes in laboratories. But the NIH guidelines do not provide containment standards for greenhouses, nor do any other federal rules. "The USDA drafted containment standards for greenhouses, but during the review process they evolved into fairly loose advice and the USDA has withdrawn plans to release them. The FDA and EPA have been interested, but their future role is unclear," says Brambl, a professor of plant biology.

To provide for such exceptions, the state rules say that a facility that does not meet NIH guidelines, but does provide adequate containment, may receive an exemption from the MEQB. Brambl has taken charge of applying for the exemption for the University's greenhouses. "Our plan is to explain modifications to the greenhouses that restrict insects and people, and control and sterilize waste," he says.

Hynes and the MEQB welcome the University's effort to solve the greenhouse problem. "When the state rules were

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MEQB Advisory Committee on Genetically Engineered Organisms

David Andow, Entomology, UM, 624-5323

Anthony Faras, Institute of Human Genetics, UM, 624-9180

Anne Kapuscinski, Fisheries and Wildlife, UM, 624-3019

Alan Kowalchyk, Advisory Committee Chair, Merchant & Gould

Tom Hagerty, Minnesota Board of Animal Health

Paul Homme, Farmer and Veterinarian

Jim Payne, Popham Haik Ltd.

Duane Pearson, Farmer

Leslie Reindl, Technical Editor

Dean Rizer, Retired M.D.

Ruth Shuman, Gentra Systems

Kestutis Tautvydas, 3M

Elizabeth Wattenburg, Minnesota Department of Health

Diana Williams, Northrup King Co.

Jack Wingate, Department of Natural Resources

MEQB Staff

John P. Hynes
Environmental Quality Board
300 Centennial Building
658 Cedar Street
St. Paul, MN 55155
296-2871, fax 296-3698

Genetic Engineering

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first drafted, they actually defined containment as meeting NIH *or* USDA guidelines. Then the USDA rules were withdrawn. People working in greenhouses all over the state are frustrated," says Hynes. "As the University of Minnesota group develops its guidelines for greenhouses, there is a potential for other groups to use those guidelines. I don't see any problem with that at all."

State Permits for Release of Genetically Engineered Organisms

Genetically engineered organisms have been released in Minnesota on about 20 occasions, according to Hynes. There were tests of a corn resistant to the European corn borer, for example, and of a potato that produces the same protein that keeps eggs from rotting. Those releases took place with U.S. Department of Agriculture permits—permits that the USDA sent to the Minnesota Department of Agriculture for review before they were granted. The USDA wrote draft permits, then it asked the MDA to concur. To make its decision, the MDA performed an "environmental assessment," which means it studied the matter long enough to learn whether there was potential for a "significant environmental impact." Had there been potential for significant impact, the state would have written an "environmental impact statement."

"The federal government wouldn't issue a permit unless the state concurred," says Paul Burns, the assistant director at the MDA who is responsible for genetic engineering. Minnesota never blocked a federal permit. "In a few cases we asked the permittee for more information," says Burns, "or asked for additional monitoring or expanded border rows and buffer strips at a planting."

That was the old system. The new rules require a researcher planning a release in Minnesota to apply directly to the state for a release permit. Most of the details have yet to be worked out.

"We don't yet have application forms," says Hynes. "But we basically know what will go on them. We have a special environmental assessment work sheet [an *EAW*] that we've been using when the USDA asks the state to concur with a federal permit. That EAW will essentially end up as most of the state's permit application form, though we may revise it some."

The state's "Environmental Assessment Worksheet for the Release of Genetically Engineered Organisms" is 21 pages. The first two pages describe the criteria to consider when deciding whether an EIS is necessary for a release permit: the predictability of the organisms involved and their potential for harming the environment, the adequacy of confinement measures, and the results of previous assessments and permits for this or other releases. Later pages ask standard environmental assessment questions about land use; flora and fauna; waste water, ground water, and water quality; hazardous waste, noise and dust; and soil and erosion. They also ask questions specific to genetic engineering: Why is release necessary? What is known *and unknown* about the recipient organism and the introduced genetic material? How long can the modified organism survive? How far can it disperse? Can the introduced genes move to other organisms? How will these matters be monitored?

To help avoid duplication, a state release application can refer to information in a federal application. "There may be some information that the federals don't ask for that we will," says Hynes. "But I want our application to be such that you can say 'This answer is attached as section 5f on page 30 of the federal application.'" The logic behind requiring state permits in addition to federal ones, says Hynes, is that the state can begin and end its review sooner if it doesn't have to wait for a federal agency's request for concurrence, and that there are "holes" in the federal regulations. "People were concerned that transgenic fish, for example, could be released without any federal review."

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Minnesota Genetic Engineering Regulations: An Abstract

The following summarizes key passages from the state's genetic engineering statutes and rules. It is an accurate but incomplete account meant as an introduction or guide. Copies of the complete, legally binding texts are available from the University's Biosafety Committee or from John Hynes at the MEQB. A bibliography follows.

Minnesota Statutes 116C.91-96: Genetically Engineered Organisms

Genetic engineering is the introduction of new genetic material into an organism or the regrouping of an organism's genes using techniques or technology designed by humans, not including traditional breeding methods. Releasing a genetically engineered organism means placing it outside a contained laboratory, greenhouse, or other conditions specifically determined by the MEQB to be adequately contained. The MEQB coordinates state and federal regulation of genetically engineered organisms. The MEQB shall establish an advisory committee and adopt rules that require environmental assessment and a state permit for the release of genetically engineered organisms. When a federal permit is required for release, an applicant may, under certain conditions, apply for and receive an exemption from the state requirement. The applicant pays the state's expenses for processing a permit or exemption application.

Minnesota Rules Chapter 4420: New Rules Governing the Issuance of a Permit for the Release of Genetically Engineered Organisms

- **4420.0010** "Containment facility" means a laboratory, greenhouse, building, or similar facility that complies with applicable NIH guidelines and is certified or has been exempted by the MEQB.
- **4420.0015** This chapter of the state rules applies to all releases of genetically engineered organisms except their direct medical application to humans or animals. The MEQB shall cooperate with other state and federal agencies to reduce duplication.
- **4420.0020** A state release permit is required for all releases of genetically engineered organisms, but the use of such an organism inside a containment facility is not a release.
- **4420.0025** The MEQB must accept or reject an application for a release permit within 14 days. When an application is accepted, the applicant must publicize the fact within 15 days.
- **4420.0030** An application for release shall undergo interdisciplinary evaluation, and, within 45 to 75 days of accepting the application, the MEQB shall publicize the draft permit and provide copies. After 30 days for public comment and meetings, and in some cases additional time for hearings or environmental impact statements, the MEQB issues, modifies, denies or orders a hearing on the permit.
- **4420.0035** When studying a possible release of a genetically engineered organism, the MEQB should consider the predictability of the introduced DNA, previous use of the organism, its potential to cause adverse environmental effects, measures for confining it, previous assessments by other agencies, and the reversibility and accumulation of the effects.
- **4420.0040** The genetic engineering advisory committee shall advise the MEQB on permit releases. Trade secrets shall be protected.
- **4420.0045** Application for a release permit shall contain the information necessary to evaluate the release according to the criteria above (in 4420.0035), a list of all the other necessary permits, and a copy of the federal application. The application to the MEQB may refer to the federal application.
- **4420.0050 and .0055** A permit may be changed by the MEQB or at the request of the permittee, after public notice, comment, and hearings.
- **4420.0060** If you ask in writing, the MEQB will put you on its mailing list.
- **4420.0070** In order to be exempt from needing a release permit, owners, operators, or biosafety committees need to certify containment facilities and their compliance with NIH guidelines. The state may inspect containment facilities. If a containment facility does not meet requirements, but provides adequate safety, one may apply for and receive an exemption from permit requirements.
- **4420.0075 and .0080** For release of a genetically engineered organism, an MEQB permit is not required if a significant permit is required from another *state* agency with sufficient authority and standards.
- **4420.0085** The MEQB shall take appropriate measures to improve this chapter and help people understand them.

Bibliography

The NIH guidelines were published in the *Federal Register* in eight parts:

"Guidelines for Research Involving Recombinant DNA Molecules," *FR* 51 (May 7, 1986):16958-985; and seven "Recombinant DNA Research: Action(s) Under the Guidelines," *FR* 52 (Aug. 24, 1987):31848-850; *FR* 53 (July 29, 1988): 28819; *FR* 53 (Oct. 26, 1988):43410-411; *FR* 54 (March 13, 1989): 10508-510; *FR* 55 (March 1, 1990):7438-448; *FR* 55 (Sept. 12, 1990): 37565-567; *FR* 56 (July 18, 1991): 33174-33183.

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Genetic Engineering

{continued from page 10}

Continuing Revision of the State Rules

The precise wording and content of the state release application will be worked out with the help of the MEQB's Advisory Committee on Genetically Engineered Organisms, 15 people appointed by the MEQB and representing a broad range of interests. Such an advisory committee helped the MEQB draft its rules in the first place. In mid-September, a new committee was selected from 61 applicants. From the University faculty, that new committee includes David Andow, Anthony Faras and Anne Kapuscinski. (See roster, page 10.)

Flickinger expects to see four matters on the Advisory Committee's agenda. First, everyone involved expects responsibility for state certification and permits to pass from the MEQB to the Minnesota Department of Agriculture (MDA), especially with regard to plants. "It could mean a significant reduction in our work," says Flickinger. "My sense is that it will be possible to get multi-year permits, a single permit for a four-year investigation. And MDA permits cost just $125." The cost of MEQB permits, as estimated by Hynes, is $2,000 to $15,000. Second, "the MEQB is particularly anxious to have the advisory committee work on medical applications," says Flickinger. The current rules specifically state that they do not apply to medical applications, human or veterinary. Third, "Where do you deal with transgenic animals—fish, poultry, swine—and at what level of containment?" asks Flickinger. "That is not clear." Fourth, "Commercialization is a key issue that's not in the existing guidelines. Once a transgenic organism has been shown to be not harmful to the environment, you should be able to get a state permit to commercialize it."

At the MDA, Burns hopes to have genetic engineering rules drafted by early October. "Then I don't how long it will take to review and adopt the rules," he says. "But in the meantime, for releases of the type we've reviewed in the past, we will request that the MEQB accept our review just short of an actual permit. We will ask it to accept what we've been doing and intend to do once we have rules in place. But that's only if we don't have rules when applications start coming in for next growing season."

"The way we've set things up, there is no question the MDA would be allowed that authority, provided its rules are appropriate," says Hynes.

Regarding the other issues Flickinger raises, Hynes says that "the committee's charge this year includes looking at direct medical applications of genetic engineering. That issue we hadn't done enough talking about last year, so the thing to do was exempt them for the moment."

"Another charge is to look at commercialization," says Hynes. He has spoken with the people who probably have the first transgenic organism to go commercial—the "Calgene" tomato. "I would guess, just to make sure that everything goes smoothly, that they would apply to us for a permit," he says. "Otherwise you could buy some tomatoes in a grocery in Iowa, bring them across the line, and technically be in violation. The law was not intended to make such things require permits. That's why we have to take a careful look at commercialization. We don't know what all the impacts might be."

Conclusion

In short, the state's genetic engineering rules took effect August 3, 1992, and require certification of containment facilities by November 1, but the rules are not yet set in stone. "The thing to recognize," says Hynes, "is that we're in an evolving field that's moving swiftly. When it comes to research and test releases, we want to work hard and carefully to make sure it isn't an onerous process. We need caution, and people need to follow a reasonable set of guidelines, and in 999 out of 1,000 cases they already are."

"We at the University are anxious to test the system," says Flickinger. "We're anxious to have our investigators apply for release permits to see what happens. There certainly aren't any internal University roadblocks. The Biosafety Committee wants to facilitate this any way we can."

Regulations Abstract

{bibliography, continued from page 11}

The Minnesota rules were published as "Proposed Permanent Rules Relating to the Release of Genetically Engineered Organisms," *State Register* 16 (Aug. 26, 1991):422-433. Amendments to those proposed rules were published as "Adopted Permanent Rules Relating to the Release of Genetically Engineered Organisms," *State Register* 17 (July 27, 1992): 139-146. The adopted rules amend *Minnesota Rules*, Chapter 4410, "Environmental Quality Board Environmental Review; Critical Areas;" and they add a new Chapter 4420, "New Rules Governing the Issuance of a Permit for the Release of Genetically Engineered Organisms."

The Minnesota genetic engineering statutes are in *Minnesota Statutes 1990*, Chapter 116C, "Environmental Quality Board," sections 116C.91-95, "Genetically Engineered Organisms;" and amended in *Minnesota Statutes 1991 Supplement*, sections 116C.91-96.

NRRI Allocates Minnesota Technology Funds

The Natural Resources Research Institute (NRRI) at the University of Minnesota, Duluth, recently allocated $515,000 to 17 of its applied research projects. The funding comes from Minnesota Technology, Inc., and the NRRI conducts the research in collaboration with corporate partners.

According to NRRI director Michael Lalich, "It's quite different than a grant program. Minnesota Technology, Inc. funding is relegated through the state legislature to NRRI each year. NRRI then solicits proposals and uses a specific set of criteria to decide which applied research projects will be given a 'booster shot' with the Minnesota Technology funding, in addition to the business and/or industry's own investment."

Since 1988, through this funding mechanism, the state has helped manufacturers develop and use new technology and processes to commercialize products. Many of NRRI's projects with industries lead to new or expanded businesses, and thus jobs for Minnesotans.

Here are some examples of NRRI projects that are beginning or continuing with the support of Minnesota Technology, Inc.

Clay Products

NRRI is evaluating clays and clay products for Ochs Brick and Tile Company in Springfield, Minnesota. Ochs is the state's only brick plant and mines its clays from Minnesota pits. NRRI is helping to define the grade and distribution of clay in the mining areas which supply two-thirds of Ochs' clay for bricks. This will aid the expanding company in its mining and quality control plans.

Taconite Processing

Among many NRRI projects designed to help the state's taconite producers, one is helping to develop and apply column flotation as a means to reducing the silica content of taconite. Less silica contributes to higher pellet quality, a main goal, along with cost reduction, of the state's taconite plants. Scientists at the NRRI's Coleraine Minerals Research Laboratory have tested the flotation method and assisted in its implementation at Minntac, the area's largest taconite plant.

Wood Products

In the wood products area, NRRI is using Minnesota Technology, Inc. funding to develop the Minnesota market for wood roofing shingles. The work is supported by several government and private sponsors. The funding pays for study of prototype red-pine and northern-white-cedar shingles. Grade information, manufacturing economics and resource supply are being investigated.

Funded in part by a Minnesota Technology, Inc. grant, testing and modifications continue on foam-core logs and siding products developed at NRRI for Husky Panel Systems, a Minnesota company. The foam-core panel with log-design exterior siding and custom interior siding is an environmentally sensible alternative to whole, hardwood log-home construction. The product has high insulation values and installs easily. Marketing and manufacturing evaluations are part of the project, and the evolving product has been well-received at home and builders' expositions.

Funding from Minnesota Technology, Inc. also helps development of red-pine millwork and better fire retardants and preservatives for flakeboard, a widely used structural material.

Peat Products

Many of NRRI's peat product development efforts are funded in part by Minnesota Technology, Inc. Peat as horticultural compost, as an oil sorbent and as compost with farm animal waste are being developed. Pulp, paper, and utility industries are using wood fiber and peat booms, socks and mats to contain and absorb spills.

Peat is also being used as a filter for mine runoff, and a new project to develop methods for removing toxic heavy metals from mine seepage receives Minnesota Technology, Inc. funding.

By Lisa Hawkinson, NRRI

NIDA

Methods to Identify Medications for Treating Cocaine Abuse

DA-93-01

The Medications Development Division of the National Institute on Drug Abuse (NIDA) invites the submission of research applications to develop innovative preclinical (non-human) methods for the identification of potential treatment agents for the entire spectrum of cocaine abuse, from pre-addiction through abstinence, relapse and recovery. The methods may be based on behavioral, neurophysiological, neurochemical or other approaches as long as a strong case is made for relevance to human cocaine abuse and its pharmacologic treatment. These methods should be novel or expand other underdeveloped or unrecognized methods as tools for evaluating pharmacotherapies for drug abuse disorders.

This RFA is targeted for preclinical studies in non-human species, including rodents, monkeys, and cell preparations from non-human sources.

In general, the areas of research interest include, but are not limited to:

- An innovative behavioral model of craving that does not employ the standard self-administration paradigms;
- Models of behavioral toxicity that look at attenuation of important adverse effects of cocaine through a new approach;
- Techniques to study post-addictive behavior as experimental models of recovery and possible relapse;
- Neurophysiological techniques that utilize the putative underlying mechanisms of cocaine abuse to identify new medications; and
- Electrophysiological methods that will identify and develop new pharmacotherapeutic agents.

Support mechanisms include the research project (R01) and the FIRST Award (R29).

Approximately $1,000,000 has been made available for this program in FY93. It is expected that four to five grants will be supported.

The application receipt date is **December 11, 1992**. For further information please contact Heinz Sorer, Ph.D., Medications Development Division, NIDA, 5600 Fishers Lane Room 11A-55, Rockville, MD 20857; 301/443-6270.

NINDS

Research Career Development Award Program

The purpose of the National Institute of Neurological Disorders and Stroke (NINDS) program for re-entry into the neurological sciences is to assist basic and clinical neurological scientists to re-enter into active careers in science and academic medicine related to the neurological sciences.

The program is designed to provide the re-entry opportunity to individuals who have experienced an interruption of three to eight years in their careers. It is a postdoctoral award (K01) designed to support individuals who would have high potential for careers as independent investigators in basic or clinical research in the neurological sciences following a period of support that will allow the individuals to update their research skills. These awards will allow individuals to pursue research projects that will enable them to update research skills, learn new techniques, and obtain any other experience necessary. This effort may be complemented by taking courses appropriate to the research objectives of the award.

The award provides salary for the awardee of up to $50,000 per year and a research allowance of up to $20,000 per year.

For further information contact Mr. Edward M. Donohue, Deputy Director, Division of Extramural Activities, NINDS, Bethesda, MD 20892; 301/496-4188.

U.S. Department of Education

Fulbright-Hays Group Projects Abroad Program

The Fulbright-Hays Group Projects Abroad program provides grants to institutions of higher education, state departments of education and private nonprofit educational organizations to support overseas projects in training, research and curriculum development in modern foreign languages and area studies by teachers, students and faculty engaged in a common endeavor.

Projects may include short-term seminars, curriculum development, group research or study or advanced intensive language projects. Competitive preference will be given to short-term seminars that develop and improve foreign language and area studies at elementary and secondary schools.

Under this program, only applications that meet certain absolute priorities will be funded. The priorities are the following world areas:

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- Absolute Priority 1 - Sub-Saharan Africa
- Absolute Priority 2 - Latin America and the Caribbean
- Absolute Priority 3 - East Asia
- Absolute Priority 4 - Southeast Asia and the Pacific
- Absolute Priority 5 - East Central Europe
- Absolute Priority 6 - The Near East and North Africa
- Absolute Priority 7 - South Asia

$2,300,000 has been requested to fund an estimated 32 awards, ranging from $40,000 to $200,000. Project periods are five weeks for short-term seminar projects, six to eight weeks for curriculum development projects, two to twelve months for group research or study projects and up to 36 months for advanced overseas intensive language training projects.

The application deadline is **October 23, 1992**. For application information contact Lungching Chiao, U.S. Department of Education, 400 Maryland Avenue SW,

American Society of Clinical Oncology

Clinical Research Career Development Awards

The American Society of Clinical Oncology (ASCO) is a nonprofit organization committed to promoting and fostering the development and diffusion of information relevant to the biology, diagnosis and treatment of human neoplastic diseases. The ASCO Clinical Research Career Development Awards are intended to provide clinical investigators in the early years on a clinical faculty with the support and protected time needed to establish an independent clinical cancer research program that is competitive for national funding. The award involves clinical research in the project to test a clinical hypothesis.

The applicant must be a physician (M.D. or D.O.) who, at the time of grant submission, is in the first or second year of a full-time, primary faculty appointment in a clinical department (not a department of basic science) of an academic medical institution. Candidates must have completed productive, postdoctoral research and demonstrate qualifications to undertake independent, investigator-initiated clinical research. The application must have *both* a sponsor and a mentor for this clinical research; the sponsor must be a member of the Society and the applicant must qualify and apply for active membership in the Society before the grant is awarded.

The application deadline is **December 15, 1992**. For further information contact the American Society of Clinical Oncology, 435 North Michigan Avenue, Suite 1717, Chicago, IL 60611-4067; 312/644-0828; fax 312/644-8557.

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ASCO also offers a Young Investigator Awards program. The deadline is **December 15, 1992**. For a brochure, call ORTTA at 624-9004 or send a note through the bulletin board.

W.K. Kellogg Foundation

Kellogg National Fellowship Program

The W.K. Kellogg Foundation is pleased to announce the availability of the Kellogg National Fellowship (KNFP) for 1993. Initiated in 1980, KNFP is designed to prepare leaders who can function effectively and knowledgeably in dealing with complex problems where narrow expertise is not sufficient. It seeks to involve professional men and women in the earlier years of their careers who are interested in developing interdisciplinary and cross-cultural perspectives on contemporary human and social problems.

KNFP awards will be made on behalf of up to 50 individuals of exceptional merit and competence who have exhibited leadership potential in their communities, organizations or professions. To be eligible for the three-year program, an applicant must be a U.S. citizen, agree to participate in *all* required activities related to KNFP, and receive 25 per cent released time from his/her employer to carry out a non-degree, self-directed learning plan to expand personal horizons beyond the confines of a chosen profession. In addition to completion of the learning plan, Fellows must attend seven required seminars sponsored by the Foundation, one of which is a two-week seminar in Latin America; all others are one-week seminars held in various cities in the United States. Attendance is required at *all* seminars.

Financial awards include $35,000 for the development and completion of the learning plan and $8,000 to be used *only* for travel expenses incurred while participating in required seminars. Individuals employed in both non-profit and for-profit sectors may apply. Employers that are non-profit organizations are eligible to receive from the Foundation 12½ per cent of the Fellow's salary, up to $32,000 over the three years, as partial reimbursement for the released time.

The deadline for complete KNFP applications is **December 15, 1992**. For further information contact Kellogg National Fellowship Program, W.K. Kellogg Foundation, PO Box 5196, Battle Creek, MI 49015; 1/800/367-0873

Department of Energy

High-Performance Computing and Communications

Program Notice 92-20

The Scientific Computing Staff of the Office of Energy Research, U.S. Department of Energy (DOE), announces its interest in receiving applications for Special Research Grants supporting DOE's role in the President's High-Performance Computing and Communications (HPCC) Initiative.

The five-year program was announced in February 1991; in December, Congress passed the "High-Performance Computing Act of 1991," which provides for a coordinated Federal program to ensure continued U.S. leadership in high-performance computing.

DOE has an integral and broad program within the eight-agency HPCC Initiative. The primary goals of the DOE HPCC program are 1) to extend U.S. technological leadership in high-performance computing and computer communications, 2) to improve U.S. productivity and industrial competitiveness by making high-performance computing and network technologies an integral part of the design and production process, and 3) to provide wide dissemination and application of the advances in these technologies to both speed the pace of innovation and serve the national economy, security and education.

The DOE program will approach these goals by 1) supporting research and development to solve important scientific and technical challenges; 2) reducing the uncertainties in industrial research and development through increased cooperation between government, industry, and universities and by continued use of government and government-funded facilities as prototype users of early commercial HPCC products; 3) supporting the underlying research, network, and computational infrastructures on which U.S. high-performance computing technology is based; and 4) supporting the U.S. human resource base to meet the needs of industry, universities and government.

Applications are requested to support research in the major HPCC components:

1. High-Performance Computing Systems—Research to advance the capabilities of future generations of computing systems and to evaluate advanced prototype systems;

2. Advanced Software Technology and Algorithms—Software support for the computational grand challenges by research and development of software tools, components and computational techniques, and by the establishment of High-Performance Computing Research Centers;

3. National Research and Education Network (NREN)—Research and development on very high-speed digital communications (gigabits) and participation in the Interagency Interim NREN; and

4. Basic Research and Human Resources—Research participation and training, educational infrastructure, education, and curriculum development.

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Approximately $3,000,000 will be available for awards. Awards will generally be for a 3-year period, funded one year at a time, and may range from $50,000 to $850,000.

Applications are due **November 4, 1992**. A copy of the announcement (August 20, 1992, *Federal Register*) is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. For further information contact The Scientific Computing Staff, Office of Energy Research, ER-7/GTN, U.S. Department of Energy, Washington, DC 20585; 301/903-5800.

Burroughs Wellcome Fund

For 1993, the Burroughs Wellcome fund is offering two new research awards.

The Experimental Therapeutics Scholar Award is intended to support clinical scientists, typically with an M.D. or M.D./Ph.D., "who will bring advanced scientific principles to the process of developing, studying and using drugs in humans." Applications are due **November 2, 1992**.

With the guidance of the Society of Toxicology, the fund is also offering the Toxicology Scholar Award to Ph.D.'s, generally at the rank of assistant professor and not necessarily from an established toxicology program, to support "broad-ranging toxicological research which may span the spectrum of molecular mechanisms of biological processes." The application deadline is **December 1, 1992**.

Both five-year awards will be funded at $70,000 a year. For information on both awards, contact the Burroughs Wellcome Fund at 3030 Cornwallis Road, Research Triangle Park, NC 27709; 919/248-4136.

National Science Foundation

Presidential Faculty Fellows Program

Guidelines have been published to be used for nominating candidates for the NSF Presidential Faculty Fellows Program for FY93. To be eligible for a Presidential Faculty Fellow award, nominees must be:

- U.S. citizens, nationals or permanent residents as of October 30, 1992;
- Have a doctoral degree (Ph.D. or equivalent) awarded between January 1, 1985, and October 30, 1992;
- Hold a tenure-track, tenured, or equivalent position at the nominating institution by October 30, 1992, and *must not* have begun such a position at any eligible institution prior to January 1, 1989; and
- Be conducting research in an NSF-supported field.

NSF seeks nominations of tenure-track faculty members who have demonstrated an exceptionally high level of research and teaching competence and who have the highest potential for leadership in academic pursuits. Awards are intended to allow Fellows to undertake self-designed, innovative research and teaching projects, to establish research and teaching programs and to pursue other academic related activities.

Nominees may work in any branch of science or engineering normally supported by the Foundation. Research in the teaching and learning of science, mathematics, technology and engineering is also eligible for support. However, activities such as the development of instructional materials or courses (including software, hardware, or laboratory equipment design) to teach education, or informal education, *do not* satisfy the criterion for the research plan.

Awards will carry a grant from NSF of $100,000 per year for five years. Thirty PFF awards are planned of which fifteen will be in engineering disciplines and fifteen in science disciplines.

Nominations for PFF awards *must* be submitted by the institution's chief academic officer, such as the President, the Chancellor or the Provost.

All nomination submissions must be received by NSF by **October 30, 1992**. A copy of the complete announcement, including specific guidelines for preparation of the nomination, is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The agency contact is Presidential Faculty Fellow (PFF) Program, NSF, 1800 G Street NW, Washington, DC 20550; 202/357-9466.

National Science Foundation

For Women Scientists and Engineers

The mandate of the National Science Foundation (NSF) to ensure the vitality of the nation's scientific enterprise includes concern for the quality, composition, distribution and effectiveness of the human resource base in science and engineering. Within this context, the Foundation is committed to enhancing the current rate of participation of women in science and engineering careers, in general and as active participants in all of its programs. The Foundation considers unsolicited research proposals from qualified investigators for support of research in any NSF-supported field of science and engineering, and strongly encourages applications from women.

This announcement highlights two of the special opportunities for women scientists and engineers at NSF:

- Research Planning Grants, for women who have not had prior independent federal research support to develop a competitive research project; and
- Career Advance Awards, through which women may undertake one-year enhancement projects to increase their research capability and productivity.

The programs described here are research oriented, and hence are subject to the prevailing policies within the investigator's discipline. Since the representation of women and the barriers to their full participation vary considerably among the disciplines of science and engineering, responsibility for the activities listed is located in the disciplinary programs of the Foundation. Thus, eligible costs and the level of support for the various targeted activities may vary somewhat among NSF disciplinary divisions.

Deadlines vary. Proposals must be submitted by the investigator's home institution in accordance with target dates or deadlines, if any, of the NSF disciplinary field in the proposed research area. A complete list of NSF deadlines may be obtained from ORTTA, through the bulletin board, or by consulting the NSF Bulletin.

A complete copy of the above referenced announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. For further information contact: Senior Staff Associate for Cross-Directorate Programs, Directorate for Education and Human Resources, NSF, 1800 G Street NW, Washington, DC 20550; 202/357-9549.

United States Institute of Peace

The United States Institute of Peace announces the 1993 cycle of its Solicited Grant competition. There are three solicitations:

Solicitation A invites proposals addressing the following: 1) the relationship between democratization and peacebuilding in Africa; 2) the role of African regional institutions in maintaining peace; and 3) the future course of civil-military relations on the continent.

Solicitation B invites proposals on 1) the regional impact of Kurdish political and political-military activities within and between Iraq, Turkey, Syria and Iran, including the effects upon Iraq and its neighbors of growing Kurdish political autonomy; 2) Iranian and Turkish involvement in the Armenia-Azerbaijan confrontation, and their competition for influence in Central Asia, particularly when viewed from the perspective of their relations with other powers (e.g. Russia, the United States, the European Community); and 3) the effect of Iranian-Syrian relationships upon Israeli-Arab relations and the peace process, particularly upon the government of Lebanon and militant groups in Lebanon, but also upon the attitudes of Palestinian organizations both inside the Occupied Territories and outside Israel, etc.

Solicitation C invites proposals for training programs to enhance the ability of local actors, whether in Eastern Europe, the former Soviet Union, or parts of Africa, Asia and Latin America, both to reduce the potential for conflict and to sharpen peacemaking and peacebuilding skills. Project objectives should include the development of new training materials and innovative models or the modification of existing training materials and models to new contexts. Project activity may include how to use Track II and similar efforts in informal diplomacy and dispute resolution, the training of individuals in conflict management and resolution techniques and the development of indigenous institutional capabilities to carry out such skills training.

Most solicited grants are two years in duration. In this cycle of competition, the Institute expects to award several grants in the range of $40,000 to $60,000 for research projects on Africa or the Middle East. Several grants of up to $100,000 each will be made in support of conflict resolution training projects.

The receipt date for applications is **January 2, 1993**. For further information and application forms, please write or call Solicited Grants, United States Institute of Peace, 1550 M Street NW, Washington, DC 20005-1708; 202/429-3844.

National Science Foundation

Environmentally Benign Chemical Synthesis and Processing

Program Announcement NSF 92-13

The National Science Foundation's Divisions of Chemistry and Chemical and Thermal Systems have announced the first set of awards in a new program on Environmentally Benign Chemical Synthesis and Processing.

The new program, begun earlier this year, is designed to link academic chemists and chemical engineers with intellectual partners from industry in research to reduce pollution at its source. The Council for Chemical Research (CCR) is a partner in the new activity and serves the key role of helping academic researchers make necessary links with industrial partners. CCR's industrial members are also building an "idea list" to share with potential academic research partners.

Chemicals going up industrial stacks and down the drains simultaneously reduce profitability and environmental quality, so research to minimize wasteful byproducts has double value. Advances in fundamentals are necessary to achieve the byproduct reductions sought. Although grants go to academic institutions, industrial research participation is required to ensure the viability of proposed projects in real-world manufacturing situations. The program is also designed to encourage appropriate collaborations between chemists and chemical engineers.

Typical chemistry projects may include new synthetic methodologies to minimize or eliminate toxic intermediates, more selective catalysts to reduce byproduct formation, low-energy separation techniques for purification and/or recycling, new membranes and molecular sieves to integrate transport and reaction to enhance specificity, and design of low-temperature, energy-efficient methods for synthesis and processing.

This year's awards, mostly in chemical engineering, totalled approximately $1 million, a number that is expected to grow substantially.

There is no deadline. A copy of the guidelines is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The agency contact is Margaret A. Cavanaugh, 202/357-7499.

SPIN

A Method for Finding Grant Opportunities

The Sponsored Project Information Network (SPIN) is a computerized locator system for funding opportunities (federal, nonfederal and corporate) for faculty and institutional research, development and education program support. It is available free of charge to University faculty and staff through ORTTA.

Based on a description of your research areas and / or the type of support sought, faculty and staff can search the SPIN Keyword Index to identify sources within specific areas of interest. The Keyword Index, a taxonomy developed by SPIN to catalog funding sources, is divided into the following ten major classifications:

- **Agriculture / Food / Forestry**
- **Arts / Culture / Humanities / Communications**
- **Business / Economics / Management**
- **Education**
- **Health / Medical Sciences**
- **International Affairs / Area Studies**
- **Miscellaneous / Other**
- **Science / Technology**
- **Social / Behavioral Sciences**
- **Social Welfare / Public Affairs**

The result of a search is a set of profiles of applicable funding sources that provides: 1) the sponsor's name, 2) the sponsor's contact address and telephone number, 3) deadline dates, 4) program titles, 5) objectives or interest areas of the sponsor, and 6) restrictions that would affect the submission of a proposal. This set of profiles is sent to the requestor.

Effective September 1990, the SPIN indexes became available for on-line review through ORTTA's electronic bulletin board (See the September, 1990 *Research Review* for information on Bulletin Board contents and access instructions—or call 624-9004 for a copy of the instructions.) The Bulletin Board contains a section devoted to SPIN and offers users the opportunity to review the Keyword Index alphabetically or within the topics shown above.

Since the Bulletin Board is accessible at any time, faculty and staff can browse the indexes at their convenience and find *keyword codes* of interest to them. From within the Bulletin Board they can forward a note to the Bulletin Board Editor requesting a SPIN search based on the chosen keyword codes (limit, 20 keywords).

Additional **Specialty Codes** used by SPIN that may help in choosing key words appropriate to the project for which funding is sought are:

- **International Travel:** Opportunities to travel to other countries or to study their cultures.
- **Opportunities Abroad:** Support to travel identified by country, region or continent.
- **Equipment/Facility Support:** Use code that relates to project, not what is being purchased.
- **Professional Development:** Largely postdoctoral opportunities.
- **Student Support:** For students seeking external funding support.
- **Foreign Scholar Support:** For bringing foreign scholars to this country or seeking programs in the U.S. for which they are eligible.
- **Conference Support:** Funding to hold or conduct a conference, symposium or workshop.
- **Publication Support:** Support to prepare or complete a work or for actual cost of publishing a completed work.
- **Sabbatical Support:** To undertake or supplement sabbatical leaves.

For further information regarding the SPIN system, please contact ORTTA at 624-9004.

SPIN searches are also available through the Research and Development Office in the College of Liberal Arts, the Agricultural Experiment Station, and the Grants Development Office at Morris.

Faculty Research, Training and Service Awards

This section contains statistics on proposals and awards recently processed by ORTTA. In addition, we have randomly selected awards received by faculty during preceding months. Faculty who have received awards they would like mentioned in a future *Research Review* may send the pertinent data, as exemplified below, to Phil Norcross at ORTTA.

Proposal and Award Summary

	Number	Amount
Proposals Submitted August 1992	240	$ 28,976,225
Awards Processed August 1992	366	24,686,599
Proposals Submitted July 1992 - August 1992	481	67,301,506
Awards Processed July 1992 - August 1992	578	39,292,829
Proposals Submitted July 1991 - August 1991	503	79,371,941
Awards Processed July 1991 - August 1991	389	29,403,253

Sodium Sensitivity in Blacks
Richard Grimm, Jr., School of Public Health
NIH, NHLBI
$686,273 - 07/92-06/93

National Center on Educational Outcomes
James E. Ysseldyke, Educational Psychology
Martha L. Thurlow, Educational Psychology
Robert H. Bruininks, College of Education
U.S. Department of Education
$619,000 - 10/92-09/93

Teacher Mentoring Program
Dale L. Lange, Curriculum and Instruction
Independent School Districts
$500,377 - 06/92-06/94

Center for Advanced Studies in Child Welfare Practice, Policy and Research
Esther F. Wattenberg, School of Social Work
Bush Foundation
$485,735 - 07/92-06/94

Regulation of Neuropeptides and Receptors Functions
Horace Loh, Pharmacology
Nancy Lee, Pharmacology
ADAMHA, NIDA
$473,942 - 08/92-07/93

Common Platform: A Case Distributed Shared Multiprocessors
Gyungho Lee, Electrical Engineering
Samsung Electronics Company, Ltd
$390,835 - 08/92-09/95

Family and Genetic Studies of Cardiovascular Disease—Field Center
J. Michael Sprafka, Epidemiology
NIH, NHLBI
$356,294 - 06/92-05/96

Establishment of a Facility: Institute for Rock Magnetism
Subir K. Banerjee, Geology and Geophysics
NSF
$250,021 - 09/92-08/93

Immune Mechanisms in Multiple Sclerosis
Gary Birnbaum, Neurology
NIH, NINDS
$175,660 - 07/92-06/93

DNA Damage, Free Radicals, Ortho Quinones and Cancer
Yusuf J. Abul-Hajj, Medicinal Chemistry
Louise M. Nutter, Pharmacology
NIH, NCI
$158,731 - 08/92-07/93

Spatial Dynamics of Nutrient and Sediment Removal Processes
J.P. Schubauer-Berigan, Natural Resources Research Institute, Duluth
Carol A. Johnston, Natural Resources Research Institute, Duluth
Scott D. Bridgham, Natural Resources Research Institute, Duluth
USDA
$200,000 - 09/92-08/94

Maternal Diet and Progeny Cardiovascular Injury
Silvia H. Azar, Medicine
NIH, NICHD
$143,392 - 08/92-07/93

Ground Water Contamination From Depression Focused Recharge
Bruce Wilson, Agricultural Engineering
John L. Nieber, Agricultural Engineering
Satish C. Gupta, Soil Science
USDA
$130,000 - 06/92-06/95

Family and Genetics Study of Cardiovascular Disease—Blood
John Eckfeldt, Laboratory Medicine and Pathology
NIH, NHLBI
$127,248 - 07/92-05/93

Open Enrollment and Students with Disabilities: Issues, Implementation and Policy
James E. Ysseldyke, Educational Psychology
U.S. Department of Education
$124,739 - 10/92-09/93

Basis for Anesthetic-Induced Fatalities
Esther M. Gallant, Veterinary Pathobiology
NIH, NIAMS
$123,408 - 08/92-07/93

Traineeships for Students in Schools of Public Health
Edith D. Leyasmeyer, School of Public Health
DHHS
$121,206 - 07/92-06/93

Development and Application of On-Line Strategies for Optimal Intersection Control
Yorgos J. Stephanedes, Civil and Mineral Engineering
Panos G. Michalopoulos, Civil and Mineral Engineering
Eil Kwon, Civil and Mineral Engineering
St of MN, Department of Transportation
$120,000 - 07/92-10/93

Neuropeptide Y: Effects on Energy Metabolism
Charles J. Billington, Medicine
NIH, NIDDK
$112,385 - 08/92-07/93

Quaternary Vegetation and Climate History of Hawaii
Margaret Davis, Ecology, Evolution and Behavior
NSF
$103,317 - 07/92-12/93

Multiprocessor Memory Design for High-Performance Computing
David J. Lilja, Electrical Engineering
NSF
$100,000 - 08/92-01/96

After Cataract: Lens Epithelia Adhesion and Migration
Dennis Olivero, Laboratory Medicine and Pathology
Leo T. Furcht, Laboratory Medicine and Pathology
NIH, NEI
$31,200 - 07/92-06/93

Hormonal Regulation of Insulin Gene Expression
Bruce Redmon, Medicine
R. Paul Robertson, Medicine
NIH, NIDDK
$92,475 - 07/92-06/93

Career Development Award
Kathy Faber-Langendoen, Medicine
American Cancer Society
$90,000 - 07/92-06/95

Paraneoplastic Autoimmunity: Calcium Channels
Edward H. Lambert, Neurology
Mayo Foundation
$49,726 - 07/92-04/93

Use of Peripherally Inserted Central Venous Access Port
Clark M. Smith, Pediatrics
Arnold S. Leonard, Surgery
Pharmacia, Inc.
$29,600 - 06/92-06/94

Quinones, DNA Damage and Heme Oxygenase
Louise M. Nutter, Pharmacology
American Cancer Society
$90,500 - 07/92-06/95

PET Imaging and Chronometric Studies of Linguistic Attention
Jose V. Pardo, Psychiatry
Scottish Rite Schizophrenia Research Foundation
$34,500 - 08/92-07/93

Filter Efficiencies of Single Use Masks Against Mycobacteria
Donald Vesley, Environmental and Occupational Health
Lisa M. Brosseau, Environmental and Occupational Health
James H. Vincent, Environmental and Occupational Health
Minnesota Mining and Manufacturing (3M)
$26,704 - 08/92-02/93

Anoka-Metro Regional Treatment Center—Dental Residency
Leslie V. Martens, Preventive Sciences, Dentistry
St of MN, Department of Human Services
$48,000 - 07/92-06/93

Frequency of the Porcine Stress Syndrome Gene in Purebred Breeds of Swine and the Relationship of the Gene to Performance and Muscle Quantity and Quality Parameters
Charles F. Louis, Veterinary Pathobiology
James R. Mickelson, Veterinary Biology
National Pork Producers Council
$40,000 - 07/92-06/93

Victim Services—FY93
Amos S. Dienard, Hospital and Clinic
St of MN, Department of Corrections
$41,500 - 07/92-06/93

Mechanism and Regulation of Cellular Iron Uptake
David J. Eide, Biochemistry and Molecular Biology, Duluth
NIH, NIGMS
$95,136 - 08/92-07/93

Development of Advanced Flow Models and Implementation
Anastasios S. Lyrintzis, Aerospace Engineering and Mechanics
Panos G. Michalopoulos, Civil and Mineral Engineering
St of MN, Department of Administration
$50,000 - 07/92-06/93

Theoretical and Computational Issues of Nonlinear Dynamics
George R. Sell, Army
USDOD, Army
$60,000 - 06/92-06/93

Electron-Transfer Mechanism in Concentrated Organic Redox Solution
Henry S. White, Chemical Engineering
NSF
$84,000 - 09/92-02/94

Flexible Collaborative Software Engineering
John Riedl, Computer Science
NSF
$48,936 - 08/92-01/94

Fillmore County Geologic Atlas
Priscilla Grew, Geological Survey
Kenneth Harris, Geological Survey
Fillmore County Water Coordinator
$90,000 - 07/92-06/95

E-Tran Vehicle Propulsion Technology Assessment
Max Donath, Mechanical Engineering
St of MN, Department of Administration
$50,000 - 07/92-06/93

Epitaxial Magnetic Films
E. Dan Dahlberg, Physics and Astronomy
USDOD, Air Force
$97,235 - 07/92-06/95

Chaotic Strategies in Interdependent Decision Making
Diana E. Richards, Political Science
NSF
$57,138 - 08/92-01/95

Economic Reports and Economic Forecasts
Thomas Stinson, Agricultural and Applied Economics
St of MN, Department of Finance
$48,890 - 08/92-06/93

Unique Barley for Food Use: Phase II
R. Gary Fulcher, Food Science and Nutrition
Agricultural Utilization Research Institute
$57,652 - 07/92-06/93

Eurasian Water Milfoil
Raymond M. Newman, Fisheries and Wildlife
St of MN, Department of Natural Resources
$55,000 - 05/92-06/93

Observational Studies: Subcontract Between MDRC and University
Byron Egeland, Institute of Child Development
Manpower Demonstration Research Corporation
$91,767 - 07/92-07/95

Minnesota Inclusive Education Technical Assistance Program
Scott McConnell, Educational Psychology
Terri Vandercook, Educational Psychology
St of MN, Department of Education
$70,500 - 07/92-06/93

Theoretical and Empirical Study of World Class Manufacturing
Roger Schroeder, Operations and Management Science
Sadao Sakakibara, Operations and Management Science
Minnesota Mining and Manufacturing (3M)
$50,000 - 06/92-06/93

International Agricultural Policy and Foreign Aid
John Stovall, Humphrey Institute
American Council on Education
$11,400 - 06/92-06/92

Specialized Analyses at the Hannaford Site
George R. Rapp, Jr., Archaeometry Laboratory, Duluth
Susan Mulholland, Archaeometry Laboratory, Duluth
Leech Lake Indian Reservation
$42,962 - 07/92-02/93

Engineering and Economic Analysis of Wood Hydrolysis Project
Kjell R. Knudsen, Center for Economic Development, Duluth
Mark Mueller, Center for Economic Development, Duluth
Iron Range Resources Rehabilitation Board
$25,000 - 07/92-06/93

Sediment Matrix Control of Magnetization: Effects on Inclination Error and Intensity
Subir K. Banerjee, Geology and Geophysics
NSF
$62,609 - 06/92-06/93

MDI Adhesives for Veneer Applications
Brian K. Brashaw, Appl Res and Tech Development Cntr, Duluth
Minnesota Technology, Inc.
$19,500 - 07/92-06/93

Green Hardwood Rough Dimension
John Gephart, Appl Res and Tech Development Cntr, Duluth
Minnesota Technology, Inc.
$40,000 - 07/92-06/93

Clay Testing Proposal
John J. Heine, Appl Res and Tech Development Cntr, Duluth
Minnesota Technology, Inc.
$8,400 - 07/92-06/93

Fire Retardant Treated Flakeboard
Kenneth D. Roos, Appl Res and Tech Development Cntr, Duluth
Minnesota Technology, Inc.
$17,000 - 07/92-06/93

Production and Marketing of Red Pine for Millwork
Patrick K. Donahue, Appl Res and Tech Development Cntr, Duluth
Minnesota Technology, Inc.
$40,000 - 07/92-06/93

Concurrent Engineering in Hardwood Product Networks
Steven H. Kossett, Appl Res and Tech Development Cntr, Duluth
John Gephart, Appl Res and Tech Development Cntr, Duluth
Minnesota Technology, Inc.
$35,000 - 07/92-06/93

Heavy Metal Removal from Acid Mine Seepage
Thomas Malterer, Appl Research and Tech Development Cntr, Duluth
Minnesota Technology, Inc.
$19,220 - 07/92-06/93

Peat as an Adsorption Medium for Dissolved Organics
Timothy S. Hagen, Appl Research and Tech Development Cntr, Duluth
Minnesota Technology, Inc.
$21,610 - 07/92-06/93

Sedimentary Analysis of Glacial Deposits, West Central Minnesota, *and*

A Comparative Study of Pleistocene and Pre-Pleistocene Glacial Sedimentary Processes
James F.P. Cotter, Geology, Morris
NSF
$38,576 - 07/92-12/94

Retired Senior Volunteer Program
Harl P. Gamber, Arts and Sciences, Crookston
St of MN, Board on Aging
$12,485 - 07/92-06/93

NSF Official Questions New Misconduct Definitions

According to James Zwolenik, assistant inspector general for the oversight at the National Science Foundation (NSF), "Universities do an excellent job [of handling misconduct investigations]. Their commitment to integrity is their life blood."

Zwolenic was addressing members of the Society of Research Administrators gathered in mid-September in Orlando for their annual meeting. The topic was scientific misconduct, more specifically, new definitions of misconduct proposed by the National Academy of Sciences and the Public Health Service's Advisory Committee on Scientific Integrity.

Although research institutions are clearly more vulnerable to attacks on their integrity than ever in the past, said Zwolenik, it would be a mistake to adopt a government wide definition of misconduct that leads away from standards of conduct being set for investigators by their peer community. The current accepted definition of misconduct contains a "tolerance for correction" explained Zwolenik.

A definition that considers only research fraud as misconduct raises the potential for "lawyers to replace investigators in influence," said Zwolenik. "The [investigation] process will eventually be controlled by lawyers," he said.

From The Washington Fax

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A Quick Reference Guide

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UNIVERSITY OF MINNESOTA

RESEARCH REVIEW

Research and Technology Transfer Administration

November 1992

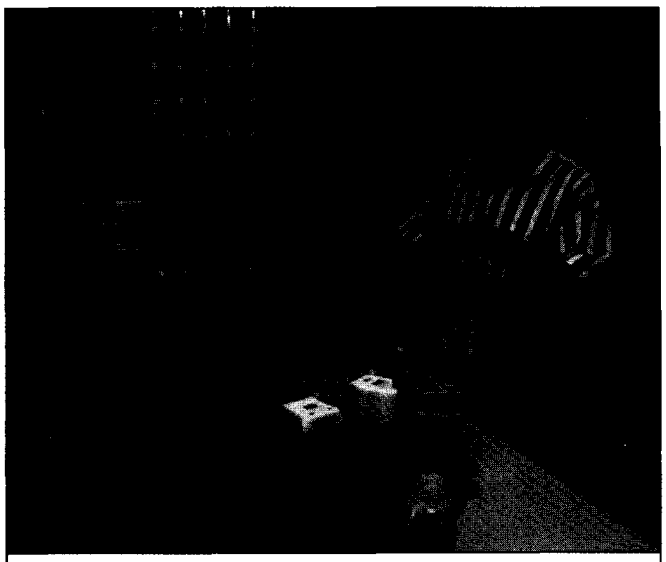
Teachers Do Science—Then Teach How Research Works

Jack Netland, president of the Minnesota Science Teachers Association in 1991-'92, sums up his recent experience in a University of Minnesota physics lab this way: He was two stories underground, manipulating an electromagnet the size of a truck engine, and measuring its electrical effects on a dime-sized disk of copper and cobalt. "I asked Dr. Dahlberg what I was looking for. He didn't know. There I was, puttzing with the magnetic field and the shape of the curve, and he wasn't even sure how it would come out," says Netland. "For me, that was profound. My students are surprised when I don't know. But I will never again be afraid to tell them so. Even world-class physicists don't have the answers sometimes. I've seen that first-hand."

Netland teaches physics at Osseo Senior High, a suburban school northwest of the Twin Cities. Dan Dahlberg, a professor of physics, investigates magnetism and superconductivity. The two met in the summer of 1991 through the Research Explorations (REX) for Teachers program, an extension program that put some 75 elementary- and secondary-school teachers into the University's laboratories and field research during 1991 and 1992. The teachers come to the University because they want to share in the passion for unanswered questions that drives research, and they want to pass it on to their students.

"Here is a way," says Sue Henderson, the REX program's co-director, "that the faculty can connect with K through 12 teaching, while we take care of the administration, the housing, the stipends, the orientation, the recruiting and all the other red tape." Henderson is a Program Director in the Department of Extension Classes. She recruits teachers for REX by direct mail to every school in the state, then an advisory board selects from among the applicants. Participating teachers receive a stipend from the REX program—$60 a day—and three to six graduate credits in the scientific field they help research. In return, the teachers spend two to four summer weeks as research assistants to

{Continued On Page 4}



"A lot of the science my students have had was 'Read this; memorize that.' It's hard to break that habit." —Phil Carollo, St. Louis Park Junior High.

Inside

A Conference: University-Industry Research: Balancing Public and Private Trusts. November 19 — See Page 20

Who Teaches Grant Writing?

A number of people in the University offer lessons in grant writing. A number of other people in the University have called ORTTA looking for grant writing advice. Please help us unite these two groups of people for their mutual benefit. If you know of a seminar, class or workshop on grant writing, please call Tove Jespersen at 624-0061 or Tove@ortta.umn.edu. Thank you.

ADAMHA/NIH Reorganization

Effective October 1, 1992, the National Institute of Alcohol Abuse and Alcoholism (NIAAA), the National Institute of Drug Abuse (NIDA), and the National Institute of Mental Health (NIMH) merged into NIH. The three institutes' previous parent agency, the Alcohol Drug Abuse and Mental Health Administration (ADAMHA) has been replaced by the Substance Abuse and Mental Health Services Administration. The moves were required by the ADAMHA Reorganization Act of 1992, which was signed into law July 10.

NIAAA, NIDA and NIMH will continue to accept research grant and research training applications as they have in the past. No substantial changes in policy or procedure are anticipated. If changes or adjustments of policy or procedure are necessary, they will be announced in the NIH Guide. The ongoing policy previously announced jointly by NIH/ADAMHA on the inclusion of women and minorities in clinical research study populations will continue in force until revised or reissued.

RESEARCH REVIEW

Volume XXII/Number 5

November 1992

Director of Communications: Michael P. Moore

Editor: Phil Norcross

Editorial Assistant: Tove Jespersen

Associate Vice President: A. R. Potami

***Research Review* is a monthly publication of the Office of Research and Technology Transfer Administration. Its purpose is to inform faculty and administrators who are involved with sponsored research and technology transfer on procedures and policies of granting agencies, on institutional policy and other information necessary to the preparation of research proposals, and on funding opportunities.**

***Research Review* welcomes ideas and comments from all readers. Write to *Research Review* at 1100 Washington Avenue South, Suite 201, Minneapolis, MN 55415-1226, or call Phil Norcross at 625-2354 or Michael P. Moore at 624-9398.**

Indirect Cost & Fringe Benefit Rates

Indirect Cost Rates

The *provisional* rates for July 1, 1992, through June 30, 1994, are listed below. When budgeting for periods beyond 6/30/94, the 7/1/92-6/30/94 rates should be used. **The rate agreement is dated May 13, 1992.** This date should be used where required on proposal applications. **Please call Marilyn Surbey, 624-4850, or Richard Miller, 626-9895, with questions on Indirect Costs.**

	07/01/92 06/30/94
Research	
On-Campus	40.00
Off-Campus *	21.00
SAFHL	58.05
Hormel	44.00
Other Sponsored Activity	
On-Campus	20.00
Off-Campus *	10.00
Instruction	
On-Campus	52.00
Off-Campus *	16.00

* A project will be considered off-campus if more than 50% of the direct salaries and wages of personnel employed on the project are incurred at a site neither owned nor leased by the University.

Fringe Benefit Rates

If you have questions regarding fringe benefit rate development or need the breakdown of charges, call **Vivian Fickling at 624-2009**.

For proposals being submitted with start dates **after July 1, 1992**, the estimated fringe benefit rates to be budgeted are:

Faculty	31.25
Civil Service	29.50
Graduate Assistants	10.50

Estimated rates after **July 1, 1993,** are:

Faculty	28.00
Civil Service	30.50
Graduate Assistants	31.25

Rate changes will be reflected in this section.

Committee on the Use of Human Subjects in Research

The "Human Subjects" Portion of an Investigator's Research Records

Given the rising concern about scientific misconduct, scrupulous record keeping of human subject material is essential. Every investigator is responsible for creating and maintaining records of *all research involving human subjects.* All research records involving human participants, tissues, and records are subject to review by the Committee on the Use of Human Subjects in Research and by the federal authorities who regulate research with human subjects: The Office for Protection from Research Risks (OPRR) and the Food and Drug Administration (FDA).

The Committee on the Use of Human Subjects in Research keeps records of all submissions; these records are not signed originals but rather are copies of various materials sent to investigators. The principal investigator's records regarding human subjects should be exactly the same as the Committee's records; where the Committee holds an original, the PI should hold a copy and vice versa.

Signed original consent forms should be maintained by the principal investigator in a secure location separate from the correspondence with the Committee office, but readily available to inspectors, e.g. a locked file cabinet. In every case where a subject is a patient of The University of Minnesota Hospital and Clinic, a copy of the signed consent form should be placed in the patient's medical chart as a precautionary measure in the event that complications with the research protocol occur, requiring emergency medical treatment.

Sanctions for incomplete or non-existent records include suspension of research funds, fines, exclusion from future funding, suspension of laboratory access, and possible sanctions imposed by institutional officials. A recent incident at another institution prompted formal sanction by the OPRR. The formal reprimand was issued for failure to keep accurate records of subject-signed consent forms for a study which was conducted with *institutional funds.*

The University of Minnesota has assured the OPRR that we will protect human subjects irrespective of funding source for research projects. The University is vulnerable to federal sanctions if *any research project* is not conducted with the highest standards.

All Investigators should keep the following information:

1. Initial submission to the Committee on the Use of Human Subjects in Research:
   - copy of original (signed) application form
   - copy of original consent form (sample submitted for Committee review)
   - copy of original protocol.
2. Written (original) response from the Committee following the initial review.
3. Copy of the response to stipulations/additional information requested by the Committee, including cover letters, etc.
4. Notice of Final Approval (original).
5. Copy of "Certification of Committee Approval" as sent by the Committee to the funding agency.
6. Copies of all correspondence sent to the Committee requesting consideration of changes or reporting adverse events.
7. Original responses from the Committee to all requests for changes, etc.
8. Copies of completed "Continuing Review" forms and attachments.
9. Original notice of renewal of approval and certification, where applicable.

The most recent consent form approved by the Committee should always be maintained and readily identifiable.

For further information, or if you have questions on this or other human subjects issues, please call Moira Keane at 624-1889.

Please Note: The Committee office does not have the staff or resources to routinely duplicate Committee files.

Repeated from the February 1991 Research Review

REX Program

{Continued From Page 1}

University faculty—two weeks for elementary teachers, four for secondary teachers. They also spend ten days, over the course of a year, in seminars for orientation and curriculum development.

In evaluations at the end of summer 1991, 84 percent of the faculty who worked with REX teachers agreed that it helped their research programs, and all of them recommended the program to other faculty. Henderson has $40,500 to run REX for Teachers in summer 1993, "so we'll be continuing on a more modest scale," she says. The original grants provided $400,000 for REX teachers to visit the University in the summers of 1991 and 1992. The money came from NSF, General Mills and the U.S. Department of Education. It covered the teachers' research time, ten days of curriculum seminars, small payments to the research faculty, materials to help the teachers create curricula, and the publication of the new curricula. REX for Teachers is a part of a larger extension program that brings members of the lay public into the University as volunteer research assistants.

"They were a wonderful set of people to work with. Very interested, self-motivated," says Jim Anderson, a soil scientist who directs research on the movement of agricultural chemicals through groundwater. "We had four teachers in '91, two from elementary schools, two from high schools. When we gave them a project, they took off with it. It's been a good situation for everybody." Anderson hosted six more REX teachers in 1992. They helped harvest potatoes, collect soil and water samples, and perform chemical analyses in the laboratory. Anderson thanks them for providing insight as well as labor: "Sometimes the teachers ask questions we haven't thought about before. It is by no means a one-way street."

The faculty involved with REX like to stress that their role has nothing to do with teaching people how to teach. "I wouldn't presume to tell these people how to teach geography. They have a much harder job than I do here at the University," says Roger Miller, a geographer who is creating a computerized historical atlas of St. Paul. Miller took on REX teachers partly out of a simple need for labor. He needs some initial results before he can seek grant money, and REX assistance helped produce those results.

REX teachers come to University labs to learn the act of doing science, the processes by which the questions of the day get asked and answered: how grants are gotten, how experiments are built, how masses of data are turned into useful interpretation. They turn that knowledge into "inquiry-based instruction" for their students, teaching methods based on solving problems rather than memorizing facts. By those methods the teachers hope to overcome their students' fear or boredom with science, to fill the "pipeline" of future scientists that NSF fears is drying up, and to educate a reasonably literate general public that can deal with increasingly technical public decisions.

Learning science by solving problems is apparently not the norm for elementary and secondary students. "A lot of the science my students have had was 'Read this. Memorize that. Remember all these details and facts.' They come into my classes expecting to continue that way. It's hard to break that habit," says Phil Carollo, a junior-high science teacher who worked with Anderson in 1992. Nor is problem solving the norm for teachers. "We don't often get a chance to learn about the scientific process," says Melinda Bennet, a biology teacher at Minneapolis South High School. "We were not ourselves taught in a process kind of way. We've been lectured to and done labs but not really been out in the field." Bennet worked in the field during the summer of 1992, observing and collecting insects for research associate Catherine Reed of the entomology department. Reed works to compare the insect population on native prairies with those on restored prairies, in order to learn if there are sufficient insects to pollinate the restored prairies.

Gene Gennaro, who retired from the Department of Curriculum and Instruction last June, is the other co-director of REX for Teachers. Among other things, he helped design the program, and he helped decide which research projects were suitable for REX teachers. "We've had teachers in a whole range of projects, from theoretical to practical," he says. "But we won't let teachers spend lots of time in the library or in some gopher role. We want them to get a feeling for the nature of science, for what science is and what scientists do."

Wondering What If . . .

What physicists do that impressed Jack Netland is experiment—*I wonder what happens if. . .* —and then wade through lots and lots of data, searching for useful ways to interpret it. "I'm starting to see the incredible amount of information they take down—and hardly use," says Netland. There's only a few things they pull out." So experiment and data interpretation are precisely what Netland set out to teach his students last winter when he gave them the "four-terminal connection" problem.

The four-terminal problem goes like this: In the summer of 1991, in Dahlberg's lab, Netland learned that a four-terminal connection, instead of a simple two-terminal connection, would yield a more accurate measure of the electrical resistance in a sample of material. One pair of wires supplies current from a voltmeter to the sample; the other pair measures the resistance in the sample with an ammeter. The result is considerably more accurate than trying to both supply and measure through a single pair of wires. "So last winter I set up an experiment where my students would compare two- and four-terminal connections," says

{Continued On Page 8}

REX Teachers Define Science

By Bruce Palmquist[1]

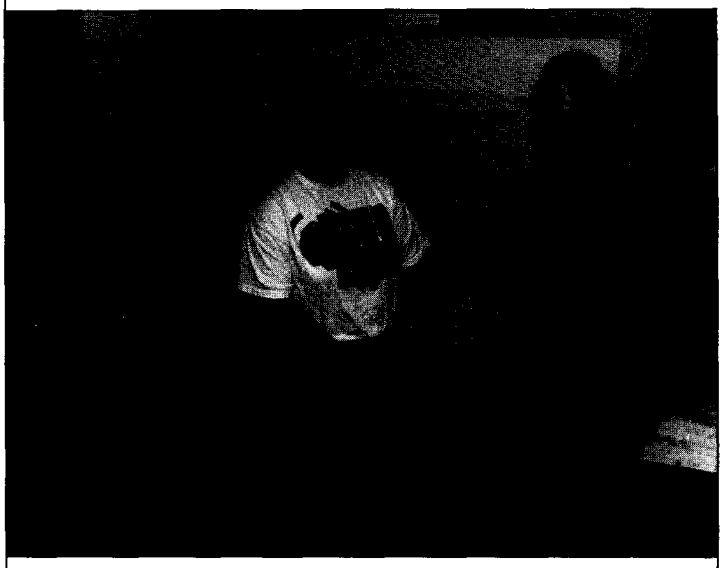
I was interested in determining if and/or how the REX experience changed teachers' views of the nature of science. In the 40 minutes I had to administer surveys, I felt it would be interesting to concentrate on scientific knowledge and the scientist's role in "formulating" that knowledge. Thirty-four REX teachers responded, both before and after their research experience, to 16 statements about scientists and scientific knowledge by either agreeing, disagreeing or expressing neutrality, and by explaining their answers.

There are many different schools of philosophical thought with respect to the nature of science. I concentrated on two opposing groups: "traditional" and "modern."[2] Many teachers' responses could be classified as traditional. One teacher addressed the relationship between observation and theory by stating that "[Lamarck's] theory was evolved [sic] and changed due to observations of nature."[3] Another added, "it is observations that fuel the entire scientific process." Emphasizing that scientists get answers by looking at nature for a longer time, one teacher noted that as time goes on, "there are more observations to use to increase scientific knowledge." Of course observation is an important part of science, but according to the traditional view of science, scientists gain knowledge *simply* by looking at nature. In fact, as one teacher wrote, "if scientists make accurate observations, they should have accurate theories."

The traditional view leaves little room for the creativity of the scientist, an integral part of the modern view. After all, "it takes imagination and creativity to design experimental projects." Even after the projects have been completed, "raw data is of very little use unless it can be interpreted and conclusions about it can be formulated." While the interpretations and conclusions may be subject to particular biases of a scientist, "all scientific progress has been the result of humans making their 'fallible' judgments." Thus the modern view of science acknowledges that scientists play an important role in converting natural phenomena to scientific knowledge. The best summary of the modern view came from the teacher who concluded, "without creativity and imagination, the possibility of new knowledge becomes questionable."

My original hypothesis for the investigation was that the REX teachers would change from a traditional view of science to a modern view owing to their REX experience. Much of the current literature about changing people's views on the nature of science would support that hypothesis. However, when I compared the teachers' pre-test responses with their post-test responses, 64 percent showed no change from pre-test to post-test.[4] In fact, 46 percent of all teacher responses showed a modern view of science on both the pre-test and post-test. It did not matter if I was looking at a subset of the whole group such as science teachers (67 percent no change, 50 percent started and ended with a modern view), social studies teachers (63 percent and 47 percent, respectively), elementary teachers (50 percent, 30 percent) or secondary teachers (70 percent, 53 percent). The teachers' views remained fairly static. One positive outcome of this study is that a relatively large number of teachers' views matched the modern view. A lot of the past research has concluded that most teachers hold a traditional view of the nature of science. Yet there is still room for improvement in teachers' views. Many REX teachers held on to their traditional view of the nature of science and some even changed away from the initial modern view.

While the limited number of changes in the teachers' views is not what was desired, this result is not surprising. The teachers' views of the nature of science may not be changing because the REX program does not overtly try to change those views. Perhaps including formal discussion of the nature of science as teachers are trying to turn their research into instructional activities for their students would be useful.



Middle-school geography teachers David Anderson (left) and Susan Forve helped UM geographer Roger Miller digitize a nineteenth-century map of St. Paul.

[1] Bruce Palmquist is a graduate student in the Department of Curriculum and Instruction.

[2] For a good summary of the schools of thought, see Abimbola, I.O. (1983), The Relevance of the "New" Philosophy of Science for the School Curriculum, *School Science and Mathematics*, *83*, 181-193.

[3] All quotations have been copied, verbatim, from REX teacher surveys. I do not believe that any of the statements misrepresent their context. However, a single statement may not represent the entire view of the person who wrote it.

1993 Appropriations for NIH

	Fiscal 1992 Actual Spending	Fiscal 1993 President's Request	Fiscal 1993 Approved By House	Fiscal 1993 Approved By Senate	Fiscal 1993 Signed by the President
Cancer Institute	$1,951,541,000	$2,010,439,000	$1,998,616,000	$2,010,439,000	$1,991,423,000
Heart, Lung and Blood Institute	1,191,500,000	1,245,396,000	1,228,455,000	1,228,455,000	1,218,627,000
Institute of Dental Research	159,057,000	166,742,000	163,269,000	163,269,000	161,963,000
Institute of Diabetes, Digestive and Kidney Diseases	662,678,000	699,809,000	688,633,000	688,633,000	683,124,000
Institute of Neurological and Communicative Disorders and Stroke	581,847,000	615,190,000	605,100,000	607,100,000	601,747,000
Institute of Allergy and Infectious Diseases	960,914,000	1,010,845,000	990,055,000	989,055,000	983,871,000
Institute of General Medical Sciences	815,134,000	862,069,000	842,229,000	824,529,000	833,086,000
Institute of Child Health and Human Development	519,724,000	545,238,000	534,094,000	534,094,000	529,821,000
Eye Institute	270,300,000	285,133,000	279,102,000	279,102,000	276,869,000
Institute of Environmental Health Sciences	252,031,000	261,513,000	255,115,000	255,115,000	253,074,000
Institute on Aging	383,611,000	407,284,000	402,218,000	405,218,000	402,232,000
Institute on Alcoholism	172,050,000	180,915,000	174,335,000	180,169,000	177,281,000
Institute on Drug Abuse	399,736,000	420,908,000	404,421,000	410,502,000	405,710,000
Institute of Mental Health	561,255,000	596,098,000	573,449,000	596,098,000	585,713,000
Institute of Arthritis, Musculoskeletal and Skin Diseases	203,913,000	214,929,000	214,619,000	214,619,000	212,902,000
Research Resources	314,551,000	330,231,000	314,351,000	315,551,000	312,729,000
Center for Nursing Research	44,970,000	48,568,000	47,363,000	49,000,000	48,202,000
Institute of Deafness and Other Communication Disorders	149,102,000	157,301,000	153,466,000	157,301,000	155,091,000
Center for Human-Genome Research	104,878,000	110,429,000	107,217,000	107,217,000	106,359,000
Fogarty International Center	19,609,000	20,727,000	20,133,000	19,609,000	19,842,000
Library of Medicine	103,323,000	108,662,000	105,024,000	105,024,000	104,184,000
Total NIH	10,071,567,000	10,579,684,000	10,368,551,000	10,387,721,000	10,362,802,000

1993 Appropriations for NSF

	Fiscal 1992 Plan	Fiscal 1993 President's Request	Fiscal 1993 Approved By House	Fiscal 1993 Approved By Senate	Fiscal 1993 Approved By Both Houses
Research	$1,872,000,000[a]	$2,212,000,000	$1,879,000,000	$1,859,000,000	$1,859,000,000
Education	465,000,000	479,000,000	465,000,000	510,000,000	487,000,000
Instrumentation and Facilities	33,000,000	33,000,000	33,000,000	50,000,000	50,000,000
Antarctic	88,000,000[b]	163,000,000	163,000,000	143,000,000	158,000,000
Antarctic Logistics	N/A	N/A	63,400,000	0	63,400,000
Defense Conversion Engineering Traineeship Program	N/A	N/A	0	55,000,000	0
Salaries and Expenses	109,000,000[c]	135,000,000	115,500,000	111,000,000	111,000,000
Critical Technologies Institute	N/A	1,000,000	1,000,000	1,000,000	1,000,000
Inspector General	3,500,000	4,000,000	3,600,000	3,800,000	3,700,000
Total NSF	2,570,500,000	3,027,000,000	2,723,500,000	2,732,800,000	2,733,100,000

[a] Reflects $5 million rescission enacted within the FY92 DoD appropriations bill and $2 million rescission enacted this spring.

[b] An additional $105 million was included in the FY92 DoD appropriations bill to support NSF activities in the Antarctic.

[c] An additional $7 million was included in the GSA section of the FY92 Treasury-Postal Appropriations Act for NSF's relocation.

Success Rate Up for NIH Applications

The success rate for competitive research applications at the National Institutes of Health was 29.3 percent for fiscal year 1991, up 5.3 percent from fiscal 1990, according to the annual report "NIH Extramural Trends." The report is published by the NIH Division of Research Grants and becomes available in early November.

The report covers fiscal years 1982 through 1991 and shows that success rates have ranged from 34.8 percent in 1987 to 24 percent in 1990.

The low success rate for competing applications in 1990 can be partly attributed to the large amount of funds, $3.4 billion, devoted to noncompeting continuations of previous grants in that year.

The length of grants peaked in 1990. In 1982, 18 percent of competing projects were awarded for five years or more; that portion increased to nearly 60 percent for 1990. But the average length of grants decreased last year, from 4.2 years for 1989 and 1990 to 3.9 years for 1991.

New investigators continue to compete successfully for their first grants. First-time applications have increased in number, from 3,000 in 1970 to 5,200 in 1992. Approximately 90 percent of investigators receive their first NIH award within five years of their first application.

The success of different kinds of departments compares as follows: Departments of biochemistry had the highest success rate in 1991—34.4 percent in medical schools and 37.4 in other schools and colleges. Departments of physiology, chemistry and psychology had success rates over 30 percent.

The largest portion of extramural funding went to departments of medicine—15.7 percent, over $1 billion. Departments of biochemistry received $397 million, of biology $245 million, pediatrics $221 million, microbiology $203 million and chemistry $192 million.

From *Washington Fax*

NIH Budget Up 3 Percent

The appropriation for the National Institutes of Health is $10.4 billion for fiscal 93, up 3 percent over fiscal 92. The changes are almost evenly distributed through the 23 lines of the appropriation.

An additional cut of $110 million in salaries and expenses remains to be made across all agencies in the Department of Health and Human Services.

From *Washington Fax*

U.S. Congress Imitates Minnesota Project Outreach

Shortly before it recessed in early October, the U.S. Congress reauthorized the federal Small Business Innovation Research program (SBIR). The federal bill includes a new provision for technical information services modeled on Minnesota Project Outreach. When *Research Review* went to press, President Bush had not yet signed the bill.

Minnesota Project Outreach (MPO) provides small, hi-tech businesses with access to technical information and expert consultants. The federal SBIR program earmarks a portion—now 1.25 percent, gradually increasing to 2.5 percent by 1998—of federal research and development funds for research by small businesses. The new provision allows federal agencies to provide research contractors with information services like MPO's.

MPO is a collaboration of the University of Minnesota, the Minnesota Department of Trade and Economic Development and Minnesota Technology, Inc. It was developed by the University's Office of Research and Technology Transfer in 1988 and 1989. Of the consultations provided by MPO, 20 percent draw on University faculty.

Minnesota's Senator Paul Wellstone called SBIR "the most successful small-business program in the federal government." Then he added, "We are improving it with a provision based on Minnesota's experience in government cooperation with the small, hi-tech sector." Wellstone is a member of the Senate Small-Business Committee. He published his remarks in an October 6 news release.

According to the Wellstone release, Minnesota has directly benefitted from the federal SBIR program, moving up from 38th among states in attracting SBIR projects in 1983, to 15th in 1990. In 1990, Minnesota companies received 55 SBIR research contracts worth nearly $8 million. In 1991, 51 such contracts totalled $7 million.

"We know that smaller firms are generating most of this country's new ideas," said Wellstone. "They also are generating most of our new products and jobs in the technology area. Promoting this sector is crucial to the health and international competitiveness of the American economy."

From *Washington Fax* and Wellstone's office

NSF Budget Up 6 Percent

The federal appropriation for the National Science Foundation is $2.733 billion for fiscal 93. That is $163 million or 6 percent more than fiscal 92 and about $10 million more than the original House figure for 1993, but about $294 million less than the President's 1993 request.

From *Washington Fax*

REX Program

{Continued From Page 4}

Netland. "And when they got done I said 'OK, now you tell me what is the more accurate way of measuring this? They hadn't a clue. We figured out the percentages of error—60 percent with the two-terminal connection and 2 or 3 percent with the four-post connection—but they had no idea what they had just done, what it meant. All these years I've been teaching experiments and I've missed the part that's most difficult. I just assumed much more power of interpretation. So I'm going to totally readjust how I approach these things. My idea now is to work at interpretation before doing the experiment, to give students example after example after example and ask what the graphs show and what a margin of error means."

Netland's students, it seems, didn't yet understand the question. Reed and Bennett, the entomologists, approach the problem of interpreting data from the other direction. They struggle with the difficulty of settling on an answer: "For data to be useful, you have to have so much of it," says Bennett "loads and loads and loads of numbers. And then two people may come up with two different conclusions that are both equally valid. They're just different interpretations."

To that common complaint, Reed replies, "That is the struggle you go through. But at some point you have to say a certain interpretation makes more sense than others. You have to go that far. And ideally you go beyond that and say what might happen in general: 'When we try to restore other ecosystems these are the things we should watch for . . . ' "

Fighting Science Phobia

That kind of interpretation, problem solving and generalization is a scary thing for students trained to think that science means memorizing results or that experiment means tweaking the apparatus until it gives the expected results. REX teachers mean to overcome that fear in their students. "I've gotten to the point where I only give answers two or three times a year," says Carollo. "I don't give vocabulary words. I don't have students read a section of the book because it's the section of the book that we're on. I say 'This is the problem. What information do we need?' "

The problem might be which crops will grow on a given plot of land? Or is a certain herbicide safe to use? Or where should a building go? Carollo learned to answer such questions when his work in Anderson's lab taught him to read soil surveys. This school year, he will ask his students to solve similar problems, partly just to prove that they can. "Kids have been coming to us with less and less interest in science, to the point of being afraid of it," says Carollo. "One of the causes of that fear seems to be an unwillingness to actually do some serious problem solving."

Another way to tackle fear of science is to inspire enthusiasm in students. Susan Forve, of Westwood Middle School in Blaine, intends to get her students personally engaged in geography. In the course of entering historic maps of St. Paul into Roger Miller's geographic information system, she realized that her students could build scale models of a St. Paul city block for 1886, 1928 and the present. "The students will see livery stables in 1886, then nothing in 1928, and now four-story parking garages," she says. "We take that for granted, but for seventh and eighth graders it will be a huge revelation." Forve expects that kind of first-hand discovery to get her students personally engaged in geography. She can easily imagine them, during a field trip to the city block they map and model, indignantly wondering "What happened to *my* building?"

Raymond Arsenault did anthropology with Peter Wells in the summer of 1991—"I had read a great deal about anthropology and archaeology and how research takes place. Now I've taken part in it" —and he has clearly turned his experience into successful teaching.

Arsenault teaches history at Waterville-Elysian High School. In 1991 he spent two weeks in the south of Germany, helping Wells dig up the remains of an Iron Age German village. When he got home, Arsenault created an archaeological dig for his students. He simulated Iron Age artifacts in the high school's pottery and metal shops, gathered bones and stones and charcoal to imitate fire places, and then buried the lot three feet deep in a farmer's field. The students dug up the artifacts, measured and sketched the sites, and wrote articles on what they'd found and what type of culture would have left such remains.

"I've been teaching for 20 years," says Arsenault, "and sometimes it's like going to the dentist for root canal work But this class was interesting. Students of lower abilities, the ones not really interested in daily routines like note taking, really enjoyed it. I ended up with one student applying for a summer archaeology workshop at the University of Illinois and another for work on Pueblo sites with the University of Colorado. A school counselor came and asked 'What the heck did you do with these kids? We never had anyone interested in archaeology before.' " Arsenault's archaeology unit has inspired Arsenault himself to make some education plans. "I'm returning to my masters work after twenty years. I hope my contact with the University is not over," he says.

Filling the Pipeline

One of the chief reasons NSF encourages inquiry-based science education and helped to fund the REX for Teachers program is that NSF wants, as past director Eric Bloch so often put it, to "fill the pipeline" of future scientists. When Arsenault inspired a couple of his students to pursue university archaeology, he was filling the pipeline. When Netland answers questions like "What do physicists do?" and "How do you get a PhD?" he is filling the pipeline. "I used to say

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University of Minnesota

Policies and Procedures for Dealing with Academic Misconduct

Adopted by the Regents, September 1992

Guidelines for

Research Investigators and Creative Artists

October 1989

A 12-page pull-out section

Research Review, **November 1992**

UNIVERSITY OF MINNESOTA

Policies and Procedures for Dealing with Academic Misconduct

[*The University of Minnesota Board of Regents adopted this policy in September 1992. It supersedes the November 1989 interim policy.*]

Introduction

Academic misconduct (defined below) undermines the scholarly enterprise in ways that go far beyond the waste of public or private funds. Although these are rare events relative to the large body of scholarly literature, violations inevitably appear in scholarly publications. As a leading research university, the University of Minnesota has a major responsibility not only to provide an environment that demands integrity but also to establish and enforce policies and procedures that deal effectively and judiciously with allegations or evidence of academic misconduct.

The University of Minnesota expects the utmost professionalism from its employees at all times and in all circumstances. University employees may not engage in actions that constitute misconduct in research or other scholarly activity.

In dealing with this problem it is important to avoid creating an atmosphere that might discourage openness and creativity. Exemplary and innovative science, scholarship, and artistic endeavors cannot flourish in an atmosphere of heavy regulation. Moreover, it is particularly important to distinguish academic misconduct from honest error and the ambiguities of interpretation that are inherent in the scientific and scholarly process, but are normally corrected by further research.

Once an allegation of academic misconduct has been made, the procedures that should be pursued to resolve the allegation are detailed below in the following stages: (1) an inquiry to determine whether the allegation or related issues warrant further investigation, (2) when warranted, an investigation to collect and thoroughly examine evidence, (3) a finding and appropriate personnel action, (4) a hearing by procedures beyond this policy to be initiated by the respondent that will result in a formal finding, and result in (5) appropriate disposition of the matter.

Application

The policy and procedures set forth herein shall apply to all research, scholarly and artistic activities of all University employees and others who are involved in such activities[1] under the aegis of the University as part of their employment responsibilities. This policy and procedures shall not apply to consulting by University employees with entities outside the University carried out according to other applicable University policies (Disclosure of Conflict of Interest) except where considered appropriate under the circumstances of the alleged misconduct. Copies of the University of Minnesota Policies and Procedures for Dealing with Academic Misconduct shall be disseminated widely.

Due to the difficulties of investigating old claims and the unfairness to the respondent, allegations of misconduct that occurred seven or more years prior to the submission of the allegation will not be investigated unless the circumstances indicate that the alleged conduct was not discoverable earlier.

Definitions

Academic Misconduct[2] for the purpose of this policy shall mean the fabrication or falsification of data, research procedures, or data analysis; plagiarism; or other fraudulent actions in proposing, conducting, reporting, or reviewing research or other scholarly activity.

Retaliation shall mean any damaging action against a person who reports or provides information about suspected or alleged misconduct. Individuals alleged to have retaliated against others involved in an academic misconduct case shall be subject to the appropriate disciplinary actions according to the policies or applicable collective bargaining agreements for the respective University employee groups.

Complainant(s) shall mean the individual(s) who submits an allegation of academic misconduct.

Respondent(s) shall mean the individual(s) against whom the allegation(s) has been submitted.

Senior Administrator shall mean the dean or other individual identified by the academic vice president, vice provost, or vice chancellor of the line unit of the respondent and approved by the Senior Vice President of Academic Affairs. The Senior Administrator has the responsibility of directing the case from the inquiry process through disposition of the case.

Inquiry/Investigative Panel, also referred to as *the Panel*, shall mean the group of individuals appointed by the Senior Administrator and given the charge to determine whether the allegation(s) is frivolous or to identify sufficient infor-

[1] In those instances in which it is not clear whether this policy should apply to an individual, the Scientific and Scholarly Activity Panel (described below) will adjudicate the question.

[2] Intent has been deliberately omitted as part of this definition, but should be considered if any disciplinary action is recommended. Scholastic dishonesty, as differentiated from academic misconduct defined by this policy, by a student in the performance of academic work is a violation of the Student Conduct Code. Complaints of alleged scholastic dishonesty are resolved in accordance with established collegiate and Student Conduct Code policies and procedures.

mation to warrant an investigation. (See Inquiry - Process Section for further details.) If an investigation is warranted, the same panel shall be given the additional charge by the Senior Administrator to further seek and analyze all relevant information regarding the allegation, and then determine whether sufficient evidence exists to report that academic misconduct occurred. The report of the Panel is the basis of any disciplinary action assigned by the Senior Administrator. (See Investigation - Process Section for further details).

Sponsor shall mean any external entity, including, but not limited to, a company, agencies of the U.S. federal and state governments, foundations, industry associations, and others, that supports the scholarly work upon which the allegation is based.

Science and Scholarly Advisory Board (SSAB) shall mean a committee representing the various scientific and scholarly disciplines at the University. The SSAB shall have the following responsibilities: (1) provide advice on the implementation of this policy, (2) assist the steering of potential allegations, (3) advise the Senior Administrator on potential members of the Inquiry/Investigation Panel, and (4) advise the Senior Administrator on the appropriate disciplinary actions when misconduct has been found. Members will be nominated for staggered three-year terms. The Twin Cities Campus, Crookston Campus, Morris Campus and the Duluth School of Medicine shall have a single committee with nine members. Its members will be nominated by the Regents Professors and appointed by the Senior Vice President for Academic Affairs. The Duluth Campus (excluding the School of Medicine) will have a five-member committee, with its members nominated by the Duluth Campus Assembly and appointed by the Academic Vice Chancellor of the Duluth Campus. Resolution of issues regarding advice on implementation of this policy shall be by the nine-member SSAB representing all units except the Duluth Campus and that board shall be augmented with two members from the Duluth Campus SSAB. Each SSAB will elect annually a chair.

Process for Handling Allegations of Academic Misconduct

Submission of an Allegation

The University has the responsibility to pursue an allegation of academic misconduct and shall carry out this responsibility fully to resolve questions regarding the integrity of the scholarly activity. In an inquiry and any investigation that may follow, the individuals involved in considering the case shall focus on the substance of the issues and shall be vigilant to prevent any personal conflicts between colleagues from obscuring the facts.

Prior to submitting a complaint, a potential complainant is encouraged to meet privately with any member(s) of the SSAB or an academic administrator (dean or other academic officer) from the unit in which the alleged misconduct occurred. All parties involved shall be informed that all issues related to the complaint (allegation) must be kept private at this stage. The purpose of this meeting is to provide advice to the complainant. The meeting shall help distinguish whether the case is one of academic misconduct or one to be resolved by other deliberative or mediation procedures, or by other specialized committees, such as the Student Conduct Code, the Human Subjects Committee or the Animal Care Committee, or by labor agreements between the Regents and any employee group.

Within 10 working days of having sought advice from either the dean, academic officer, or SSAB member, the complainant must inform the individual(s) consulted of whether an allegation will be filed. If the complainant wishes to file an allegation, he/she shall submit a written allegation to the Senior Vice President for Academic Affairs. Until an allegation is filed, there shall be no inquiry or investigative activity regarding concerns expressed by the complainant.

The member(s) of the SSAB or academic administrator who meets with a complainant has the responsibility of submitting the allegation if the complainant chooses not to make a formal allegation and the SSAB member or academic administrator believes there is sufficient cause and evidence to warrant an inquiry. In such a case, there is no complainant for the purposes of these procedures. Instead, a three-member subcommittee of the SSAB or the academic administrator (the party the complainant consulted) shall draft a written report (allegation) to be submitted to the Senior Vice President for Academic Affairs.

The Senior Vice President for Academic Affairs shall refer the case to the academic vice president, vice provost, or vice chancellor of the unit in which the alleged misconduct occurred. The academic vice president, vice provost, or vice chancellor shall refer the allegation to the dean of the unit in which the case originated. The dean shall be assigned to serve as the Senior Administrator and shall be responsible for pursuing all allegations to resolution. This includes directing an inquiry and, if necessary, an investigation of academic misconduct. If the dean has a conflict of interest with a case, the case shall be referred to a dean from another unit or another individual, who shall serve as the Senior Administrator.

From the time the allegation is received, all activity related to the case shall be carefully documented. All individuals who are contacted shall be assured that, as much as possible, the privacy of their comments will be maintained. In turn, all individuals involved with the case are expected to sustain the privacy of the case. The Senior Administrator shall promptly attempt to locate and secure the originals of all relevant research data if it is ascertained that such data will be part of the case. Supervised access to the data shall be available to the Inquiry/Investigative Panel and the re-

spondent. The Senior Administrator also shall chart the elements of the case as it is understood at that time.

Even if the respondent leaves the University before the case is resolved, the Senior Administrator on behalf of the University, when possible, shall continue the examination of the allegation and reach a conclusion. Further, the University shall cooperate with the process of another institution to resolve such questions to the extent permissible under the Minnesota Government Data Practices Act or any applicable federal law.

Conflicts of Interest

Possible conflicts that must be avoided in the appointment of the Senior Administrator and members of the Inquiry/Investigative Panel include the following: a) co-authoring a book, paper, or grant proposal with any of the individuals directly involved with the misconduct case (complainant or respondent); b) professional or personal relationship with any of these individuals (e.g., current or former students or mentor, direct supervisory or subordinate relationship, direct collaborator within the past seven years, close friendship); c) professional differences of opinion with any of the involved individuals that might reasonably be expected to affect objectivity in considering the case; d) financial ties to the involved individuals; or e) other reasons that might affect the ability of the individuals to make fair and impartial judgments.

Inquiry

A. Purpose

Whenever an allegation or a complaint involving the possibility of academic misconduct is made, the Senior Administrator shall initiate an inquiry, which is the first step of the review process. In the inquiry stage, factual information is gathered and expeditiously reviewed to determine if an investigation of the charge is warranted. An inquiry is not a formal hearing or an in-depth analysis of the allegation; it is designed to separate allegations deserving further investigation from frivolous, unjustified, or clearly mistaken allegations. As soon as sufficient information is obtained that indicates an investigation is warranted, the inquiry process shall terminate, and a report shall be submitted to the Senior Administrator. It is the responsibility of the Senior Administrator to ensure that the inquiry is conducted in a fair and just manner.

B. Process

The Senior Administrator shall meet with the complainant to review details of the allegation and describe the process that shall be followed to resolve the allegation. The Senior Administrator shall explain that while every attempt will be made to maintain anonymity through the inquiry phases of the process, the respondent shall learn the complainant's identity during the investigative process, and the complainant may have to face the respondent during a subsequent hearing if the case proceeds that far.

The Senior Administrator shall meet with the respondent to present the details of the allegation (a written statement of the allegation shall also be provided along with a copy of this policy) and the evidence[3] upon which the allegation is based, explain the process to be followed, and obtain the respondent's preliminary explanation of the allegation. The Senior Administrator shall inform the respondent of the obligation to provide all the evidence relevant to the allegation. In order to avoid claims of alteration of the data, the Senior Administrator shall attempt to secure all original pertinent documents (for example, data books and manuscripts) at the time the respondent is notified of the allegation. The Senior Administrator shall also inform the respondent that unreasonable refusal to provide relevant material or other uncooperative behavior may result in an immediate recommendation that an investigation is justified. The Senior Administrator also shall tell the respondent that he/she shall have the opportunity to be interviewed by the Inquiry/Investigative Panel and to provide any documentation or names of individuals who might help clear the claim against the respondent.

After the Senior Administrator has met with both the complainant and respondent, he/she then shall decide within 10 working days whether to personally handle the inquiry or refer the case to an Inquiry/Investigative Panel. Alternatively, the Senior Administrator may make a determination that the allegation is frivolous, or that it is more appropriate to refer it to another deliberative resolution system (Grievance, Student Conduct Code, Human Subjects, Animal Care). If the Senior Administrator determines on the basis of a preliminary investigation that there is no substance to the allegation, he/she shall submit a written report that explains the basis for closing the case to the academic vice president, vice provost, or vice chancellor of the unit in which the allegation is based. If the academic vice president, vice provost, or vice chancellor approves closing a case, the Senior Administrator shall notify both the complainant and the respondent of the decision.

If the Senior Administrator wishes to have the case examined by an Inquiry/Investigative panel, then individuals who have the appropriate scientific, scholarly, or artistic expertise on the issues in question shall be selected. Members of the Inquiry/Investigative Panel may be chosen from within or outside of the University. They shall have no direct involvement in the academic activity under inquiry, be impartial, and have no inter-

[3] A summary of the evidence shall be provided if the allegation is based on extensive documentation; however, the respondent shall have supervised access to review all of the evidence held by the Senior Administrator.

ests that would conflict with the interests of the University in securing a fair and thorough inquiry. The Senior Administrator shall obtain nominations from the SSAB on suitable members to serve on the Inquiry/Investigative Panel and shall obtain approval from the academic vice president, vice provost, or vice chancellor of the unit before the final Inquiry/Investigative Panel is appointed. While normally the Panel shall be composed of all faculty members, at least one member of the Panel should be from the same employment category as the respondent [faculty (94xx), graduate students and professional trainees (95xx), P & A (96xx, 93xx, 97xx), or civil service]. The Panel shall have an odd number of members, preferably three. The Senior Administrator shall identify one member as chair. The Senior Administrator shall inform both the complainant and respondent of the proposed composition of the Panel and give each of them five working days to notify the SSAB if any of the Panel members might have a potential serious conflict of interest. The SSAB shall arbitrate all claims of conflict of interest.

The Senior Administrator shall provide the Panel with an explicit charge for the inquiry activity. The University's Office of General Counsel shall advise the chair of the panel on the appropriate protocol and practices that should be followed.

Whether a case can be reviewed effectively without the involvement of a complainant depends upon the nature of the allegation and the evidence available. Cases that depend specifically upon the observations or statements of a complainant cannot proceed without the open involvement of that individual. Cases that can rely on documentary evidence may permit a complainant to remain anonymous. While it may be desirable to keep the identity of a complainant private during an inquiry, such privacy cannot necessarily be guaranteed under the Minnesota Government Data Practices Act.

The Senior Administrator shall assume responsibility for disseminating information to the appropriate individuals. Notification shall be made in writing, and copies shall be filed in the office of the Senior Administrator. The safety and security of all documents must be assured. All individuals involved with the case shall be reminded that they are responsible for keeping all aspects of the case private.

The Senior Administrator shall inform all individuals involved in the case that the original data produced as part of research at the University belong to the University and the sponsor, if applicable. Therefore the data must be accessible upon request of the Senior Administrator. If the Senior Administrator chooses to secure the original data, the individual who provided the data shall be provided with copies on request.

The Panel shall examine the appropriate material to determine whether there is evidence that academic misconduct has occurred. All faculty, staff, and students are obligated to cooperate with the Panel by supplying requested documents and information. The following types of information relevant to the allegations raised by the case shall be submitted to the Panel upon request: a) research notes, papers and notebooks, logs, source documents, computer printouts, and machine-readable materials; b) a list of all current and former collaborators and co-workers; c) a list of published abstracts, papers, and books; and copies of abstracts, papers, and books pending publication; d) a list of reports and grant applications submitted to outside foundations and funding agencies and copies of such reports and applications; and e) other pertinent scientific or scholarly data the Panel deems necessary. The Panel may also take written or oral evidence in considering the case. Transcripts of taped interviews shall be prepared and submitted to the interviewed person(s) and the Panel for comment or revision.

Due to the sensitive nature of an allegation of academic misconduct, each case shall be resolved expeditiously. Reasonable deadlines shall be established for each case to facilitate the process. An inquiry (conducted by either the Senior Administrator or the Panel) shall be completed as quickly as possible and not more than 25 calendar days after its initiation unless circumstances clearly warrant a longer period of time. If, when the Panel convenes, it anticipates that the established deadlines cannot be met, a report, citing the reasons for the delay and progress to date, shall be submitted for the record to the Senior Administrator, and the respondent and other involved individuals shall be informed.

C. Findings of the Inquiry Activity

Upon completion of the inquiry a written report shall be produced that states what evidence was reviewed, summarizes relevant interviews, and includes the conclusion of the inquiry. The report shall be sufficiently detailed regarding the reasons for determining that an investigation is not warranted, if such is the case. The Panel's written report then shall be referred to the Senior Administrator and the respondent. If the report recommends that an investigation be conducted, it may propose subject matter to be included in the investigation. The respondent has 10 working days to review the report and submit written comments to the Senior Administrator. Summaries of all interviews and data examined by the Panel shall be made available for the respondent to review.

If the Senior Administrator obtains information at any stage of the inquiry that reasonably indicates the occurrence of possible criminal violations, the Senior Administrator shall notify an appropriate office of the sponsoring federal agency and the appropriate law enforcement officials within 24 hours.

D. Senior Administrator's Determination Based on the Inquiry Report

Upon receiving the Inquiry Panel's recommendation and the respondent's statement, the Senior Administrator shall determine within 10 working days whether the case shall be closed or an investigation initiated. The Senior Administrator shall notify the complainant and respondent as to whether the complainant's allegations shall be subject to further investigation. The Senior Administrator shall maintain the records of an inquiry in a secure manner for at least three years.

If the Senior Administrator decides not to conduct an investigation, no further formal action shall be taken other than informing all parties involved. The procedures shall preserve privacy consistent with law for all parties to these procedures. If privacy is breached, the Senior Administrator shall take reasonable steps to minimize the damage to reputations that may result from inaccurate reports. Allegations that have not been brought in good faith may lead to appropriate disciplinary actions according to the University policies[4] or applicable collective bargaining agreements for the respective employee groups. Complainants shall be made aware from the outset that their privacy shall not be maintained if a complaint is maliciously motivated and false.

Investigation

A. Purpose

An investigation shall be initiated only after the Senior Administrator issues a finding that an investigation is warranted. The purpose of the investigation is to explore further the allegation(s) and assemble all the evidence that supports or refutes the allegation. The investigation shall focus on allegations of academic misconduct as defined above and shall examine the factual materials of the case. The investigation shall look carefully at the substance of the charges and shall examine all relevant evidence. The Inquiry/Investigative Panel's charge is to generate a report that compiles all the information it considers and its conclusion regarding whether there is sufficient evidence to support the allegation of misconduct. This report is the basis of any subsequent hearing. During an investigation, additional information may emerge that justifies broadening the scope of the investigation beyond the initial allegations. The respondent shall be informed if new and different allegations are discovered during the course of the investigation.

B. Structure

The investigation shall be carried out by the Panel described above as a continuance of its work. If the inquiry was completed without a Panel then one should be appointed as described above (Inquiry - Structure). If additional expertise for the Panel is deemed desirable, the Senior Administrator shall request additional nominations from the SSAB. If the Panel is augmented, it still shall have an odd number of members. The Senior Administrator shall identify one member as chair. The respondent and complainant shall be informed of the proposed new members for the Panel and each given five working days to notify the SSAB of potential serious conflicts of interest any of the Panel members might have. The SSAB has the authority to arbitrate any questions regarding conflicts of interest.

C. Process

The Senior Administrator shall provide a charge to the Panel within 10 days of the notification that an investigation is warranted. An investigational process shall be established for each investigation, and the complainant and respondent shall be notified when the investigation phase of this procedure commences. The respondent may seek the assistance of an advisor (legal counsel or another individual) at this point, if he or she has not already done so. All parties involved shall cooperate with the proceedings in providing information relating to the case. All necessary information shall be provided to the respondent in a timely manner to facilitate the preparation of a response. The respondent shall have the opportunity to address the charges and evidence in detail at the inception and close of the Panel's activities during the investigative phase of this procedure.

The University reserves the right to take interim administrative actions to protect the health and safety of research subjects and patients, and/or the interests of students and colleagues. Such actions may range from slight restrictions to reassignment of the activities of the respondent. In extreme circumstances, the respondent may be suspended temporarily. Any actions shall be in accordance with the procedures specified in the University Regulations Concerning Faculty Tenure, the contract between the Regents and unionized groups, any other labor agreements, or other applicable employee policies. Interim administrative actions shall be taken in full awareness of how they might affect the respondent and the ongoing research projects of the University.

If the sponsoring agency of the academic activity requires notification of suspected academic misconduct, that agency shall be notified as soon as the decision has been made to undertake an investigation. Significant developments during the investigation, as well as the final determination of the case shall be reported to the sponsor when required. If at any stage during the investigation there is a reasonable indication of possible criminal violations, the Senior Administrator shall notify the appropriate office of the sponsoring agency and

[4] Tenure Code, the Academic Professional and Administrative Staff Policy and Procedures, the Civil Service Rules.

the appropriate law enforcement officials within 24 hours. The Senior Administrator also shall notify the sponsoring agency during the investigation if emergency conditions exist as defined under federal regulations.

All interviews conducted during this investigative phase by the Panel shall be tape recorded. A transcript first shall be approved by the Panel and then shall be submitted to the interviewed person(s) for comment or revision.

If the respondent wishes to have an advisor present during his/her interview with the Panel, notice of the advisor's participation shall be submitted to the Panel at least 48 hours prior to the interview. The respondent shall have the opportunity to provide evidence, request expert witnesses, identify witnesses directly involved in the case, and be directly interviewed.

The investigation shall be conducted as expeditiously as possible and generally shall be completed within 120 days. However, the nature of some cases may render that schedule difficult to meet. If the Panel determines that the deadline cannot be met, it shall request an extension, which the Senior Administrator shall grant or deny. If necessary, the Senior Administrator shall submit a report to the sponsoring agency regarding this action.

D. Findings of the Investigation

When the Panel reaches a conclusion regarding the case, a preliminary report, which reviews all the information considered and the Panel's conclusion, shall be transmitted to the respondent. The report shall detail the explicit evidence that supports or refutes each allegation included in the Panel's charge. The report shall then specify the Panel's conclusion as to whether any of the proven allegations represent academic misconduct. The respondent shall be allowed 10 working days to prepare written comments, which the Panel shall consider before the report is finalized. The completed report along with the respondent's comments on the preliminary report then shall be submitted to the Senior Administrator. When there is more than one respondent, each shall receive all parts of the report that are pertinent to his/her role.

If either a finding of no misconduct is reported by the Panel or the Senior Administrator does not accept the findings of the Panel, the process shall be considered completed, with no disciplinary action taken by the University. New evidence may be an appropriate basis to initiate a new inquiry/investigation.

Finding and Proposed Resolution

Upon receipt of the Panel's report, the Senior Administrator shall review the report and determine whether to accept all or part of the Panel's recommendations. There are two possible findings:

1. that academic misconduct was committed;
2. that no academic misconduct was found.

For those cases in which the Senior Administrator accepts a finding of misconduct, he/she shall determine the disciplinary action within 15 days of receiving the report. The Senior Administrator may consult with a subcommittee of the SSAB in arriving at a decision. This decision must also be made with the concurrence of the appropriate dean of the respondent's unit if the Senior Administrator is not the respondent's dean, the academic vice president, vice provost, or vice chancellor. The Senior Administrator shall notify the respondent in writing of his/her determinations on the case and the reasons for them. The respondent, who may be accompanied by his/her advisor, shall meet with the Senior Administrator and the appropriate academic vice president, vice provost, or vice chancellor to discuss the disciplinary action.

The University may choose disciplinary action as warranted by the circumstances of each case. Subject to the Tenure Code or appropriate labor agreements, examples may include:

- Oral reprimand with no permanent record
- Letter of reprimand that becomes part of the respondent's permanent record
- Special monitoring of future work
- Removal from particular project
- Probation
- Suspension
- Salary reduction
- Rank reduction
- Termination of employment

The respondent may accept the disciplinary action or request a hearing as specified for his/her employment classification.[5]

If the Senior Administrator determines that no academic misconduct was found, then the discussion with the respondent shall focus on how the respondent's record shall be cleared. This shall include removing all material related to this case from the respondent's personnel files.[6] The complainant and other concerned parties shall be informed by the Senior Administrator of

[5] When the respondent files a grievance pertaining to the case, the University shall bear the burden of proof for all issues related to the allegation(s) of misconduct. The respondent shall bear the burden of proof for any claims against the process followed.

[6] The respondent shall be informed by the Senior Administrator of the source of all correspondence regarding the case so that records developed for this case may be tracked and removed.

the disposition of the investigation to the extent permitted under the Minnesota Government Data Practices Act. The Senior Administrator also shall discuss with the respondent the appropriateness and desirability of notifying other individuals or agencies about the outcome of the investigation. All records related to this case shall be maintained privately and securely under the supervision of the Senior Administrator for at least three years. All parties involved in the case shall be reminded that except as required by federal and state law, all information about the case cannot be released outside the institution unless and until: 1) the allegations result in a finding of misconduct, 2) final discipline is imposed and 3) all avenues of appeal (if pursued) have been exhausted.

If the allegations of academic misconduct are found to be maliciously motivated, appropriate disciplinary actions shall be taken against those responsible. If the allegations, however incorrect, are found to have been made in good faith, no disciplinary measures shall be taken.

The sponsoring agency initially informed of the investigation shall be notified promptly of the outcome of the investigation and any subsequent hearing. The Senior Administrator shall retain the records of the investigation. Even when no culpable misconduct was found but serious erroneous information was published, the Senior Administrator shall consider means to correct the published record affected by the alleged misconduct.

Records of the investigation and possible hearing shall include all documentation reviewed by the Investigative Panel, summaries of witness interviews, and the findings of the panel.

Retaliation

When a complaint has been brought in good faith, even if mistakenly, the University shall seek to protect the complainant against retaliation. Individuals who provide information to assist in resolving an inquiry or investigation also shall be protected by these same guidelines. Individuals engaging in acts of retaliation shall be disciplined according to the appropriate University policies or applicable collective bargaining agreements.

Minnesota Government Data Practices Act

References are made throughout this policy to the Minnesota Government Data Practices Act. This act governs access to and release of all data collected, created, received, maintained or disseminated by public entities, including the University of Minnesota. The University will adhere to the requirements of the Minnesota Government Data Practices Act with respect to all actions taken and all information generated in the course of an academic misconduct inquiry and/or investigation under this policy.

Reminder Regarding Disclosure of Conflict of Interest

In October 1991 a major change to the University's Conflict of Interest policy was adopted by the Board of Regents. *All* proposals for sponsored research, teaching and public service programs—not just those going to an industry sponsor—must indicate whether a potential for conflict of interest exists. The policy now provides that, if individuals who are or will be working on a sponsored project have an interest in a company and the company may be affected by the research, the interest must be reported. Question 19 on the BA23 form (January 1992 Revision) has been modified to address this. *It is imperative that all faculty review this question and answer it appropriately.*

Effective immediately, Grant Administrators will be contacting principal investigators who have neglected to complete this question. To the extent possible, resolution of this issue will be done prior to submission of the proposal to the funding agency. In addition, ORTTA will return the BA23 form for proposals submitted before October 1, 1992, that left Question 19 unanswered. Faculty are requested to review the potential for conflict of interest, indicate the appropriate response on the BA23 form, then sign and return the form to ORTTA.

To facilitate submission of proposals in the future, please remember that the BA23 form accompanying all proposals *must* answer Question 19 regardless of the agency to which the proposal is being submitted.

For a copy of the Disclosure of Conflict of Interest policy, please refer to the December 1991 issue of the *Research Review*. If you have questions, contact the appropriate ORTTA Grant Administrator.

UNIVERSITY OF MINNESOTA

Guidelines for Research Investigators and Creative Artists

October 1989

[*These guidelines are a companion to the September 1992 "University of Minnesota Policies and Procedures for Dealing with Academic Misconduct."*]

Introduction

Science, scholarly inquiry, and artistic creation are traditionally conducted in an atmosphere free from interference as a part of the natural course of academic freedom. While benefiting from the contributions of other scientists, scholars, and artists, a key major objective of research and artistic creativity is to develop new information. Society benefits from these activities while expecting that the ethical standards guiding all faculty and students will fulfill the highest standards of individual conduct. The University of Minnesota endorses these principles and expects all faculty and students to conduct their activities in accordance with this commitment.

Each professional field defines the standards of conduct of its members by traditions which have been established and accepted through the practice of their work. It would be difficult to codify effectively uniform standards which apply to all professions. However, society expects to be assured that faculty, entrusted with the rights and privileges of their professions, will reinforce through practice and education the standards which assure the highest quality of the products of their research and scholarship. Therefore, it is vital that faculty and students actively reflect upon the ethical bases which guide their judgments in order to warrant the public trust.

To merit public trust and avoid misconduct, including fraud and plagiarism which compromises the research and scholarly objectives of the investigator and university, it is necessary to review obligations of supervision, peer review and individual responsibility. Each faculty member and each academic unit is responsible for maintaining awareness and compliance with the standards of their professions.

Prevention of misconduct in research and scholarship is dependent upon careful fulfillment of responsibilities for supervision and peer review, for data gathering and retention, and for authorship.

Principles of Supervision

Careful supervision of new investigators by their preceptors is in the best interest of the institution, the preceptor, the scholar, and the scientific community. The complexity of scientific methods, the necessity for caution in interpreting possibly ambiguous data, and the need for advanced statistical analysis, all require an active role of the preceptor in the guidance of new investigators. In humanistic and artistic units of supervision, there is growing recognition of the advantages of mentoring at all levels of faculty and student interactions. There are personal and shared responsibilities for assuring that the supervision will be effective and complete.

Recommendations:

1. The provision of supervision should be established and apparent in each research and academic unit. Responsibility for supervision should be clear to both faculty and students.
2. The ratio of trainees to preceptors should be small enough that close interaction is possible for scientific interchange as well as oversight of the research at all stages. The burden of such interactions should also be assessed to allow genuine and continuous use of mentors. The privileges of responsibility for supervision should not exceed the ability to fulfill that role.
3. The primary investigator should supervise the design of experiments and the processes of acquiring, recording, examining, interpreting and storing data. In all academic units, senior faculty should be available to offer aid in conducting scholarly or artistic work, and should include regularly scheduled meetings with faculty and students whom they supervise. Such aid should be collegial and advisory and avoid the attributes of excessive direction or control.
4. Regular and recurring collegial discussions among all preceptors and trainees constituting a research or other academic unit is desirable, both to contribute to the scientific and scholarly efforts of the members of the group and to provide informal peer review of projects.
5. The chair, preceptor, or mentor (as indicated by unit policy) should provide each new investigator, whether student, postdoctoral fellow, or junior faculty, with applicable governmental and institutional requirements for conduct on studies involving healthy volunteers or patients, animals, radioactive or other hazardous substances, and recombinant DNA.
6. Senior investigators, whether teachers dealing with graduate students or colleagues dealing with junior members, have an obligation to make the research experience a learning experience. The training and apprenticeship should include appreciation of proper research protocol and ethical consideration of subjects or those affected by it.

Data Gathering, Storage, Retention

The retention of accurately recorded and retrievable results is of utmost importance for the progress of scientific inquiry. A scientist must have access to his/her original results in order to respond to questions including, but not limited to, those that may arise without any implication of impropriety. Moreover, errors may be mistaken for misconduct when the primary experimental results are unavailable. In addition, when statistical analysis is required in the interpretation of data, it should be used in the design of studies as well as in the evaluation of results. All research records are the property of the University of Minnesota and must be retained in accordance with Public Health Service (PHS) rules which require that complete and original records be maintained by the University for a minimum of three years after completion of the funding of the project under the guidelines of PHS. These guidelines will also apply to all other research records at the University of Minnesota.

Recommendations:

A. Laboratory Experimental Data Recommended Procedures
   1. Custody of all original primary laboratory data should be retained by the unit in which they are generated. An investigator may make copies of the primary data for his/her own use.
   2. Original experimental results should be recorded, preferably in bound books with numbered pages. An index should be maintained to facilitate access to data.
   3. Computer output should be affixed to or referenced from the laboratory notebook.
   4. Primary data should remain in the laboratory at all times and should be preserved as long as there is any reasonable need to refer to them. The chief of each research unit must decide whether to preserve such primary data for a given number of years or for the life of the unit. In no instance, however, should primary data be destroyed while investigators, colleagues, or readers of published results may raise questions answerable only by reference to such data.

B. Other Units

   Teaching-research or teaching-creative units should also consider periodically the appropriateness of archiving and/or maintaining data and possible reconstruction of the history of a project or artistic creation. Where there are known disciplinary practices or codes establishing norms for maintenance of records, probationers should be informed of their existence and units should periodically review how they have been followed. (The time of outside review of the unit might be an appropriate point to assess this.)

Authorship

Multi-authored or collaborative studies may lead to the publication of papers for which no single author is prepared to take full responsibility. Two critical safeguards in the publication of accurate, scientific reports are the active participation of each co-author in verifying that part of a manuscript that falls within his/her specialty area, and the designation of one author who is responsible for the validity of the entire manuscript.

Recommendations:

1. Criteria for authorship of a manuscript should be determined by each unit or group of investigators. Each co-author should have made a significant intellectual or practical contribution to the work. The concept of "honorary authorship" is deplorable. Senior faculty who demand *ex officio* authorship violate academic freedom as well as principles of justice. Omission of a contributor is clearly an improper appropriation of intellectual property.
2. The first author should review all the primary data on which the report is based, and be prepared to provide a brief description of the role of each co-author. (In multi-institutional collaborations, the senior investigator in each institution should be prepared to provide such descriptions.)
3. Each co-author should review and approve the manuscript to the extent possible, given individual expertise. The senior author should assume responsibility for resolving issues that arise during such reviews.
4. Where disciplines have rules and procedures for determining authorship, those shall be called to the attention of all faculty and students.
5. Investigators should review each proposed manuscript with these principles in mind. Publication practices to be avoided include: the rapid publication of data without adequate tests of reproducibility or assessment of significance, the publication of fragments of a study, and the submission of multiple similar abstracts or manuscripts differing only slightly in content.

References on Misconduct in Research

1. The Responsible Conduct of Research in the Health Sciences, report of a study by a Committee on the Responsible Conduct of Research, Institute of Medicine, Division of Health Sciences Policy, National Academy Press, Washington D.C., 1989.
2. On Academic Authorship, Donald Kennedy, President, Stanford University, September 1985. A systematic discussion of two related issues: first, the allocation of responsibility and credit for scholarly work; and second, those forces that are pushing us toward a level of complexity in the conduct of research at which it be-

comes difficult to determine responsibility of authorship.

3. Maintaining the Integrity of Scholarship, a report prepared by the University of Michigan Joint Task Force on Integrity of Scholarship, June 1984.

4. Statement of Policies and Procedures related to Academic Fraud and Professional Misconduct, Stanford University School of Medicine, with cover memo from David Korn, Vice President and Dean, School of Medicine, December 15, 1988.

5. *UCLA Faculty Handbook*, Supplement B, Facilities and Services, 1987.

6. The Morality of Scientists; on Drafting Rules and Procedures for Academic Fraud, Richard A. Epstein, Chairman, Committee on Academic Fraud, The University of Chicago; *Report of the Committee on Academic Fraud*, The University of Chicago; 21 January 1986.

7. Policies for Responding to Allegations of Fraud in Research, Penelope J. Greene, Jane S. Durch, Wendy Horwitz, Valwyn S. Hooper, reprinted from *Minerva*, Vol. XXIII, No. 2, Summer, 1985, Harvard University Division of Health Policy Research and Education.

8. Ethical Guidelines to Publications of Chemical Research, endorsed by the American Chemical Society Committee on Publications, January 1985.

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10. Research Malpractice, Daryle E. Chubin, in *Science Off the Pedestal, Social Perspectives on Science and Technology*, Wadsworth Publishing Company, Belmont, California.

11. Beyond Plagiarism: Ethical Misconduct in Scientific and Technical Publishing, Marcel Chotkowski LaFollette, *Book Research Quarterly*, Vol. 4, No. 4, Winter 1988-89.

12. *Ethical Misconduct in Research Communication: An Annotated Bibliography*, Chotkowski LaFollett, 1988.

University-Industry Research

Balancing Public and Private Trusts

November 19, 1992

To Register:

This is a free conference sponsored by the University of Minnesota, Office of the Vice President for Research and the Office of Research and Technology Transfer. The content of the conference should be of interest to university researchers and administrators, as well as to representatives of companies that collaborate with university researchers.

Preregistration is not required but is encouraged to ensure that sufficient materials, seating, and lunches are available. Nonregistered attendees will be accepted to conference sessions and lunch on a space-available basis. To register, send the completed form below to Continuing Medical Education, Suite 1-107, Radisson Hotel Metrodome, 615 Washington Avenue SE, Minneapolis, MN 55414; or fax it to Michael Moore at 624-4843. For further information, call Michael Moore at 624-9398.

Name:

Address:

Will Attend Conference: Yes No

Will Attend Lunch: Yes No

UNIVERSITY-INDUSTRY RESEARCH:
BALANCING PUBLIC AND PRIVATE TRUSTS

November 19, 1992

Hubert H. Humphrey Center, University of Minnesota, Minneapolis Campus

(To register, copy and return form on page 19)

8:30 - 9:00 **Welcome and Introduction**

Anne Petersen, Vice President for Research and Dean of the Graduate School, University of Minnesota

Nils Hasselmo, President, University of Minnesota

9:00 - 10:15 **Session One: The Major Issues in University-Industry Collaborations**

Moderator: A.R. Potami, Assoc Vice President for Research and Technology Transfer, University of Minnesota

Issues Faced in Licensing University Technology to Industry

Lita Nelsen, Associate Director of Technology Licensing, Massachusetts Institute of Technology

Legal Considerations in University-Industry Collaborations

Nelson Dong, High Technology Practice Group, Dorsey & Whitney

10:15 - 10:30 Break

10:30 - 12:15 **Session Two: Protecting the Integrity of Research**

Moderator: David M. Brown, Dean, University of Minnesota Medical School

Ethical Prophylaxis: Research Design, Conduct, and Dissemination

Arthur L. Caplan, Director, University of Minnesota Center for Biomedical Ethics

University and Government Approaches to Fostering Research Integrity

Nicholas H. Steneck, Director, Historical Center for the Health Sciences, University of Michigan

The Impact of Academic Ties with Industry

Jules B. LaPidus, President, Council of Graduate Schools

12:15 - 1:45 **Luncheon and Keynote Address**

Introduction: E.F. Infante, Senior Vice President for Academic Affairs and Provost, University of Minnesota

A Realist's Vision for the Future

Erich Bloch, Former Director of NSF, Current Member of the Council on Competitiveness

1:45 - 3:00 **Session Three: Conflict of Interest Issues: The Federal Perspective**

Moderator: Mark Rotenberg, General Counsel, University of Minnesota

George Galasso, Associate Director for Extramural Affairs, National Institutes of Health

Charles H. Herz, General Counsel, National Science Foundation

3:00 - 3:15 Break

3:15 - 4:30 **Session Four: The Benefits of University-Industry Collaboration**

Moderator: Mark Brenner, Associate Dean, University of Minnesota Graduate School

The University Perspective

Edward L. MacCordy, Former Associate Vice Chancellor for Research (retired), Washington University, St. Louis

The Industry Perspective

Paul Citron, Vice President, Science and Technology, Medtronic, Inc.

4:30 - 4:45 **Wrap-Up**

The Evolving Role of University Research

Anne Petersen, Vice President for Research and Dean of the Graduate School, University of Minnesota

4:45 - 5:30 **Reception**

Environmental Protection Agency

Environmental Education Grants

The Environmental Protection Agency (EPA) is soliciting pre-applications for cooperative agreements or grants to support projects to design, demonstrate or disseminate practices, methods or techniques related to environmental education and training.

EPA is interested in funding environmental education activities that go beyond providing information. Environmental education is a process that leads to responsible individual and group actions. Environmental education should enhance critical thinking, problem solving and effective decision-making; it should engage and motivate individuals as well as enable them to weigh various sides of environmental issues to make informed and responsible decisions.

Specific activities eligible to receive funding are:

- Design, demonstration or dissemination of environmental curricula, including development of educational tools and materials;
- Design and demonstration of field methods, practices and techniques, including assessment of environmental and ecological conditions and analysis of environmental pollution problems;
- Projects to understand and assess a specific environmental issue or a specific environmental problem;
- Provision of training or related education for teachers, faculty or related personnel in a specific geographic area or region; and
- Design and demonstration of projects to foster international cooperation in addressing environmental issues and problems involving the U.S. and Canada or Mexico.

Funds may be used to develop new programs or to significantly improve the quality of existing programs. Funds for the program are *not* intended for technical training activities directed toward environmental management professionals or activities primarily directed toward support of non-educational research and development.

The statutory ceiling for any one grant is $250,000. Matching funds are required for 25 percent or more of the project's total budget, which may be provided in cash or by in-kind contributions and other noncash support.

Pre-applications must be postmarked by **January 15, 1993**. Interested applicants are encouraged to read the complete announcement (Federal Register #201, October 16, 1992), available from ORTTA by calling 624-9004 or by sending a note through the bulletin board. The agency contact is George Walker, Environmental Education Specialist, Office of Environmental Education (A-107), 401 M Street SW, Washington, DC 20460; 202/260-3335.

National Science Foundation

Engineering Research Deployment Teaching Initiative

Technology deployment is a difficult but essential component of the structure of our research/industrial base. The gap between the analysis, feasibility evaluations and prototypes which come out of research and the commercialized products which industry expects is large. In universities, one of our best technology transfer links to help bridge that gap is our students. By bringing the results of research programs to the classroom, and providing those results in a form which students can not only learn from but actually take into industry, we can significantly narrow the transfer gap.

The principal objective of this initiative is to serve as a catalyst to support and motivate faculty and their doctoral candidates to bring the results of their research into the classroom in a form which may be used by students and transferred by the students to industry. The emphasis is on completed research and may be from any research project by the PI, not just those funded by NSF.

Interested institutions may submit a proposal for a grant to support the project. The project may include the equivalent of release time for one course. The development of support material and tools may also be included. While small proposals on the order of $15,000 are preferred, awards will be made for up to $50,000 where appropriate. A matching dollar commitment *is not* required, but a proposal with a matching intellectual commitment from industry will be given preferred treatment. Commitment from the PI's institution regarding utilization of the results in the curriculum is required.

The target date for submission is **January 15, 1993**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. Telephone and mail inquiries are welcomed and should be addressed to The Division for Design and Manufacturing Systems, NSF, 1800 G Street NW, Washington, DC 20550; 202/357-7676, Fax 202/357-5166.

National Institute on Drug Abuse

Development of Immunological and Molecular Biological Approaches to Effect Reduction of Cocaine Use

The National Institute on Drug Abuse (NIDA) invites research grant applications for "The Development of Immunological and Molecular Biological Approaches to Effect Reduction of Cocaine Use," —studies on the discovery/development of antibodies, enzymes, or catalytic antibody substances as potential treatments to reduce cocaine use. The proposed medication would provide either active or possible protection against the pharmacodynamic/neurotoxicological action of cocaine.

It is anticipated that the proposed medication could function by rapidly reducing the concentration of the cocaine in plasma or serving as a novel antagonist. Within this general field of research, special emphases should be placed on 1) using a novel protein to block receptor sites through competitive inhibition, 2) using catalytic antibodies to rapidly react with the abused substance and convert the substance into a nonactive species, 3) using anti-idiotype based vaccines to produce antibodies that bind with cocaine and reduce its free plasma concentration, 4) using monoclonal antibodies to bind with the abused substance and reduce its effective concentration in the plasma, and/or 5) enhancing the body's own natural ability to eliminate cocaine.

The mechanisms of support for this program are Research Projects (R01) and the FIRST Award (R29).

This is an on-going program with annual deadline dates of **February 1, June 1** and **October 1**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The agency contact is James B. Terrill, Ph.D., Medications Development Division, NIDA, 5600 Fishers Lane, Room 11A-55, Rockville, MD 20857; 301/443-6270.

BFGoodrich and the National Invention Center

Collegiate Inventors Program

The National Invention Center and BFGoodrich company seek entries in their second national competition for student inventions. For 1993 they offer awards of $5,000 to student-inventors, $2,500 to the students' advisors, patent workshops for the students' schools and special recognition at the National Inventors Hall of Fame.

The "BFGoodrich Collegiate Inventors Program" seeks to encourage invention, student-advisor relations and understanding of the U.S. patent system. The competition is open to any full-time student in a U.S. college or university. It will make three awards in the three standard categories of patentable invention: *utility*, for new and useful products or processes of manufacture; *design*, for original ornamental design of a manufactured product; and *plant*, for a new breed or variety.

The entries are judged by a panel of nationally recognized mathematicians, scientists, environmentalists, biologists, doctors and patent attorneys. The judges' criteria are originality, completeness, usefulness/benefit and presentation.

For last year's competition, 104 entries came from 47 schools. The three winning inventions were a metal coating for improving combustion in power plants, improved oral delivery of insulin for diabetics, and a system for rapidly identifying closely related bacterial strains. The inventors were three doctoral students: Mark Harper of Ohio State, Robert Schilling of Purdue and James Versalovic of Baylor.

For the next competition, the application deadline is **February 16, 1993**. For an application packet contact Dr. Kathryn Shafer at the National Invention Center, 216/762-4463.

Department of Energy

University Research Instrumentation Program 1993

The Department of Energy (DOE) has announced the availability of the University Research Instrumentation (URI) Program solicitation for FY93. The purpose of this program is to strengthen university and college scientists' capability to conduct long-range research in areas of direct interest to DOE through the acquisition of specialized research instrumentation.

Program funds will be concerned primarily with capital equipment costing $100,000 or more needed for on-campus research in one of six specific energy research areas:

1. Biological and Environmental
   a. Health Effects and Life Sciences
   b. Environmental Processes and Effects
   c. Atmospheric and Climate Research
2. Chemical Sciences
3. Engineering
4. Geosciences

{Next Page}

5. Materials Science
6. Mechanistic Plant and Microbial Research
   a. Basic Plant Sciences
   b. Fermentation Microbiology

The application deadline is **December 7, 1992.** A copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. Copies of the program solicitation may be obtained from the URI Program Manager, Office of University and Science Education, OUSE/ST-511, U.S. Department of Energy, 1000 Independence Avenue SW, Washington, DC 20585; 202/586-8949

NIA/NICHD/NIMH

Women's Health Over the Lifecourse: Social and Behavioral Aspects

The National Institute on Aging (NIA), the National Institute of Child Health and Human Development (NICHD), and the National Institute of Mental Health (NIMH) invite qualified researchers to submit applications for research to investigate social and behavioral aspects of women's health during adulthood.

Research is needed to understand the natural course and consequence of the aging processes of women (e.g., healthy life expectancy) in a general population of reproductive-aged, middle-aged and older women, as well as a wide range of special women's issues (i.e., health-related behaviors, family life, role and task demands, psychological well-being, work and productivity) that may be related to health and/or aging. Special emphasis on minority women is an integral part of this solicitation.

The lifecourse of women, including the timing of family formation and child-rearing, and aging, is affected by differences in their experiences. Family situations and work patterns, including labor force participation and child-rearing, help shape the character of other experiences of women, including reproduction, menopause and aging. Conversely, the order and timing of lifecourse events, in addition to chronological age, may also determine family situations and work experiences. Women's situations are further influenced by ethnicity and cultural practices, neighborhood environments, living arrangements and socioeconomic status. Health and illness may influence, as well as be influenced by, these aspects of women's lives.

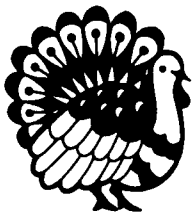
Research objectives may include, but certainly are not limited to:

- Comparisons of healthy life expectancy or mortality rates for men and women, and social and behavioral factors which account for reported differences;
- Understanding why older women have lower rates of preventive health behaviors than younger women for breast cancer and other conditions to which they are particularly vulnerable;
- Identification and examination of social and behavioral components of biological aging, such as menopause;
- Examination of underlying psychosocial and physiological processes linking health and behavior in women vs. those operating in men;
- Studies of the economic, social and health determinants and consequences for women who do not participate in the labor force, participate intermittently, or who retire early vs. late;
- Examination of how caregiving responsibilities, marital status (divorce, widowhood, single parenthood, cohabitation) and household structure affect health.

NIA has a particular interest in supporting research on the health and well-being of middle-aged and older women; NICHD is concerned with the health of women during the reproductive years; NIMH supports basic, clinical, and applied services research that examines issues relevant to mental disorders or the mental health of older women.

All NIH mechanisms of support will be available for this program.

This program is ongoing with annual deadlines of **February 1, June 1** and **October 1**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board.



Faculty Research, Training and Service Awards

This section contains statistics on proposals and awards recently processed by ORTTA. In addition, we have randomly selected awards received by faculty during preceding months. Faculty who have received awards they would like mentioned in a future *Research Review* may send the pertinent data, as exemplified below, to Phil Norcross at ORTTA.

Proposal and Award Summary

	Number	Amount
Proposals Submitted September 1992	342	$ 41,664,667
Awards Processed September 1992	325	28,117,368
Proposals Submitted July 1992 - September 1992	823	108,966,173
Awards Processed July 1992 - September 1992	903	67,410,197
Proposals Submitted July 1991 - September 1991	920	131,619,974
Awards Processed July 1991 - September 1991	638	59,303,869

Prostate, Lung and Colorectal and Ovarian (PLCO) Cancer Screening Trial: Screening Center
Jack S. Mandel, Environmental and Occupational Health
NIH, NCI
$10,279,832 - 09/92-09/2008

Cluster Evaluation of Community-Based Public Health Initiatives
Constance C. Schmitz, Center for Urban and Regional Affairs
W.K. Kellogg Foundation
$981,908 - 09/92-08/96

Twin Study of Female Alcoholism and Related Disorders
Matt McGue, Psychology
William G. Iacono, Psychology
David T. Lykken, Psychiatry
ADAMHA, NIAAA
$762,450 - 09/92-08/93

Immunology Training Program
Tucker W. LeBien, Laboratory Medicine and Pathology
NIH, NIAID
$509,603 - 08/92-07/97

7 Tesla 33 CM Bore Magnet for *In Vivo* NMR Studies
Kamil Ugurbil, Gray Freshwater Biological Institute
NIH, NCRR
$400,000 - 08/92-08/93

Upward Bound/Early Intervention Project
John Red Horse, Liberal Arts, Duluth
John E. Beaulieu, Curriculum and Instruction
U.S. Department of Education
$399,200 - 09/92-08/93

Epidemiologic Study of Alzheimer Disease in a Total Population
James A. Mortimer, Neurology
NIH, NIA
$390,897 - 09/92-08/93

Molecular Genetics of Growth and Development of Fish
Perry B. Hackett, Jr., Genetics and Cell Biology
U.S. Department of Agriculture
$250,000 - 09/92-09/95

Array Signal Processing: Estimator Design and Experiments
Mostafa Kaveh, Electrical Engineering
National Science Foundation
$246,123 - 07/92-12/95

Tillage and Manure Interactions on Subsurface Water Quality
John Moncrief, Soil Science
Satish C. Gupta, Soil Science
U.S. Department of Agriculture
$220,000 - 09/92-08/95

Center for Computation and Visualization of Geometric Structures
Albert Marden, School of Mathematics
U.S. Department of Energy
$200,000 - 08/92-08/93

Competitive Symbioses of 3 VA-Mycorrhizal Species Colonizing
Francis L. Pfleger, Plant Pathology
Mark Rosenberg, Medicine
U.S. Department of Agriculture
$183,850 - 09/92-08/95

Mapping and Isolation of Genomic Regions Controlling Maturity
Ronald L. Phillips, Agronomy and Plant Genetics
U.S. Department of Agriculture
$180,000 - 09/92-08/94

National Needs Training Grant in Biotechnology
Thomas W. Molitor, Large Animal Clinical Science
Michael P. Murtaugh, Veterinary Pathobiology
U.S. Department of Agriculture
$162,000 - 09/92-08/97

Compatibilization of Polymer Blends
Chris Macosko, Chemical Engineering and Materials Science
Frank S. Bates, Chemical Engineering and Materials Science
National Science Foundation
$160,000 - 09/92-02/94

Mechanisms of Opiate-Mediated Immunosuppression
Michael P. Murtaugh, Veterinary Pathobiology
Thomas W. Molitor, Large Animal Clinical Science
ADAMHA, NIDA
$158,567 - 08/92-07/93

Public Use Sample of the 1850 Census
Russell R. Menard, History
Steven Ruggles, History
National Science Foundation
$143,934 - 09/92-02/94

Opiate Dependence and Tolerance
Richard M. Eisenberg, Medicine, Duluth
ADAMHA, NIDA
$136,529 - 09/92-08/93

TGF-B Regulated Growth Inhibitory Genes in Cancer
Frederick T. Boyd, Laboratory Medicine and Pathology
NIH, NCI
$135,084 - 09/92-08/93

Learning to Lead..Leading to Learn
Jennifer York, Educational Psychology
Brian Abery, Educational Psychology
U.S. Department of Education
$133,732 - 07/92-06/93

A Novel Laminin Domain Promoting Endothelial Cell Adhesion
Aristidis S. Charonis, Laboratory Medicine and Pathology
American Heart Association
$132,000 - 07/92-06/95

The Implementation and Evaluation of Pharmaceutical Care in the Community Practice Setting
Linda Strand, Pharmacy
Robert J. Cipolle, Pharmacy Practice
John E. Morley, Medicine
Various Industrial Donors
$120,000 - 07/92-06/93

Algorithms and Networks for Detection, Estimation and Signal Recovery
Mostafa Kaveh, Electrical Engineering
USDOD, ONR
$120,000 - 07/92-06/95

Leadership Preparation in ECSE
Susan C. Hupp, Educational Psychology
Mary McEvoy, Educational Psychology
U.S. Department of Education
$119,635 - 09/92-08/93

Molecular Genetics of Maize Acetyl-COA Carboxylase
Burle G. Gengenbach, Agronomy & Plant Genetics
U.S. Department of Agriculture
$114,000 - 09/92-09/94

Analysis of Household Energy Use in Sweden and Minnesota
Rita J. Erickson, Anthropology
National Science Foundation
$113,506 - 09/92-02/96

Food and Agricultural Sciences National Needs Graduate Program
Francis F. Busta, Food Science and Nutrition
U.S. Department of Agriculture
$108,000 - 09/92-08/97

Fast and Accurate Parallel Solutions for Recursive Least Square Problems
Haesun Park, Computer Science
National Science Foundation
$104,405 - 08/92-01/95

Electrical Engineering Graduate Fellowships
Richard Y. Kain, Electrical Engineering
U.S. Department of Education
$101,085 - 08/92-08/93

Isolation and Characterization of Ammonia Monoxygenase of Nitrosomans
Alan B. Hooper, Genetics and Cell Biology
U.S. Department of Agriculture
$100,000 - 09/92-08/94

Expression of Maize Glutamine Synthetase Genes
D. Peter Snustad, Genetics and Cell Biology
U.S. Department of Agriculture
$100,000 - 09/92-08/94

Efficient Design of Fault-Tolerant Multiprocessors
Shantanu Dutt, Electrical Engineering
National Science Foundation
$100,000 - 09/92-02/96

Nanofabrication and Nanodevices
Stephen Y. Chou, Electrical Engineering
National Science Foundation
$100,000 - 08/92-01/94

Efficient Design of Fault-Tolerant Multiprocessors
Shantanu Dutt, Electrical Engineering
National Science Foundation
$100,000 - 09/92-02/96

Study of Dynamic Properties of Domain Walls and Domain Instability in MR Heads
Jian-Gang Zhu, Electrical Engineering
Minnesota Mining and Manufacturing (3M)
$92,120 - 06/92-05/94

Regulation of Vertebrate Development by Maternal MRNA
Joseph Yost, Cell Biology and Neuroanatomy
NIH, NIGMS
$94,838 - 08/92-07/93

Will a High K Diet Reduce Basement Membrane Thickening
Louis Tobian, Jr., Medicine
Juvenile Diabetes Foundation
$48,259 - 09/92-08/93

Immortalization of Salivary Gland Epithelial Cell Lines
David K. Ann, Pharmacology
NIH, NIDR
$34,269 - 08/92-07/93

Characterization of Human Sperm and Epididymal Antigens
Jon L. Pryor, Urologic Surgery
DHHS
$64,665 - 09/92-08/93

Lake Superior Rural Cancer Care Project
Robert W. Gibson, Behavioral Science, Duluth
Duluth Clinic, Ltd.
$12,737 - 08/92-07/93

Hubble Postdoctoral Fellowship
Evan Skillman, Astronomy
Donald R. Garnett, Astronomy
Space Telescope Science Institute
$63,080 - 09/92-08/93

Micromechanics of Interfaces in Metal Matrix Composites
William W. Gerberich, Chemical Engineering and Materials Science
David Kohlstedt, Geology and Geophysics
USDOD, Navy
$27,077 - 09/92-08/93, and
$22,923 - 09/92-08/93

Wavelength Tunable Subpicosecond Laser System
Stephen Y. Chou, Electrical Engineering
National Science Foundation
$79,333 - 09/92-02/94

Nature Study in American Schools: 1890-1930
Sally Kohlstedt, History of Science and Technology
National Science Foundation
$90,550 - 09/92-08/94

Overcoming Impediments to University Based Technology Transfer
Max Donath, Mechanical Engineering
Minnesota Technology, Inc.
$10,000 - 09/92-12/92

The Developmental Role of a Microtubule Motor Cytoplasmic Dynein
Thomas S. Hays, Genetics and Cell Biology
March of Dimes Birth Defects Foundation
$30,000 - 09/92-08/93

Frequency Domain Control Design for Flexible Systems
Kathryn E. Lenz, Mathematics and Statistics, Duluth
National Science Foundation
$80,000 - 08/92-01/95

Identification and Cloning of Genes for Plant Maps
Russell H. Goddard, Plant Biology
Susan M. Wick, Plant Biology
D. Peter Snusted, Genetics and Cell Biology
U.S. Department of Agriculture
$72,500 - 09/92-08/94

Native American Summer Science Camp
Bruce H. Munson, Instructional Science, Duluth
J.M. Kramer, Social Work, Duluth
National Science Foundation
$76,098 - 09/92-02/94

REX Program

{Continued From Page 8}

'They do experiments and the experiments are really important,' " says Netland. 'Now I can do some helpful career counseling."

And when Anderson seeks to show that agriculture includes sophisticated physics and chemistry, he is filling the pipeline. "Because fewer and fewer people are directly involved with agriculture we felt that working with the teachers is a good way to open a window to the kids in a predominantly urban populace," he says. "Hopefully, as the kids graduate from high school and go on to college they will realize there's something in agriculture for people who have a good scientific background. We hope to fill the pipeline and have students down the road."

But it's not all recruiting. A good deal of what drives Anderson's participation in REX for Teachers, and Dahlberg's, and Reed's and everyone else's, is an interest in the scientific literacy of the general populace and the body politic.

Anderson helps Carollo learn about efforts to control agricultural pollution of groundwater, and Carollo incorporates that into his school's interdisciplinary lessons on water. "The general impression seems to be that we're not looking at the environmental consequences of pesticides," says Anderson. "But we are in fact recommending changes in farm management." The REX teachers in Anderson's lab help make those recommendations public. In other words, assistants like Carollo provide Anderson with an efficient vehicle for extension education.

Dahlberg speaks directly and loudly about his desire to spread scientific literacy: "My main motivation [for taking elementary and secondary teachers into the lab] is to raise the general literacy of the populace. Society is ever more technologically complex. People have to make decisions on technologically complex problems. The only way they can vote wisely is to have a level of scientific literacy higher than what we have now."

To illustrate the need for general scientific literacy, Dahlberg describes his own fear of recombinant DNA technology and his willingness to accept nuclear power: "As an individual I'm scared of recombinant DNA. My tendency is to think we shouldn't allow it. But I realize that I'm scared of it only because I don't know much about it. I'm so ignorant I shouldn't really have an opinion, or a right to vote on the matter." On the other hand, Dahlberg does understand nuclear power. "I talk to people who are anti-nuclear power and all for burning oil, gas and coal, but those fuels have their own problems. And we don't have graphite-moderated reactors like the ones at Chernobyl. A little more literacy would help a lot."

Publishing Science Curricula

REX for Teachers is a labor-intensive route to its goals. It's not the typical summer training program that puts 50 teachers together for lectures and workshops. Miller had just two geography teachers in his lab, many faculty have just one visiting teacher, and the single-greatest concentration of REX teachers was the six people in Anderson's soil science labs last summer.

But if REX is making big investments in individuals, it is also demanding a big return on its investment. "They really hold us accountable," says Bennet. REX teachers meet for a week at the end of the summer to study curriculum development with education faculty. And through the course of a school year they meet three more times to share and evaluate their new classroom methods. Henderson's office will publish the best of their lesson plans.

Arsenault's excitement over his archaeology lesson plans shows in his determination to perfect and publish them. "I turned in a preliminary version which I thought was pretty well-done, but after actually going through it with my students there's some things I want to refine," he says. Arsenault doesn't get to teach his world history course this year. His district needs him in American history. But he went to the principal and "requested that we ask the new teacher to carry out the project and I'll work with her on it so I can finish my research." In the spring, Arsenault will present his curriculum at the conference of the Minnesota Council for the Social Studies. And world history's loss will prove American history's gain: "This fall I hope I can arrange for my American history class to dig for Native American artifacts."

Netland is not content to publish what he's learned about physics experiments. He came back to Dahlberg's lab for a second summer—he was the only REX teacher to participate in both 1991 and 1992—because he and Dahlberg want to create a seminar in 1993 where they will teach Netland's experiments to a half-dozen physics teachers at a time. On the surface, they will simply show the teachers how to equip labs and run new experiments: "If you build things yourself you can make lots of equipment for practically no budget at all," says Dahlberg, "which, as best I can tell, is all K through 12 gets—no [science] budget at all." But Dahlberg and Netland also hope "to get across some of the flavor of the work, to project Jack's [Netland's] enthusiasm about what happens here."

To hear Netland tell it, the benefits of his working in Dahlberg's physics lab were all one-sided. When he leaves, he says, "it will be like pulling my hand out of a bucket of water. There won't be any hole left to show where I've been."

But Dahlberg disagrees. The benefits are on both sides, he says, and when Netland pulls his hand out of the bucket, "The water level will visibly drop."

For more information about REX for Teachers, call Susan Henderson in Extension Classes, 625-6361.

Office of Research and Technology Transfer Administration

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UNIVERSITY OF MINNESOTA

RESEARCH REVIEW

Research and Technology Transfer Administration

December 1992

University and Industry Collaborate to Prevent Pollution

Eyeglass lenses made of polycarbonate material are thinner and lighter than other lenses, they protect people from ultraviolet rays, and they are unbreakable. A special coating protects such lenses from scratches. For the coating to stick to the lenses, and for consumers to see through the result, the lenses have to be absolutely clean. A Freon® bath does the job well; it removes dust, light fingerprints and machine oil. It takes away the static charge that attracts dust to the lenses. It leaves no residues or water spots.

David Knight, a MnTAP intern, helped a Twin Cities lens manufacturer reduce its use of Freon®.

But Freon is unpleasant stuff. It breaks down the ozone layer in the stratosphere. The Clean Air Act said no one can manufacture it after the year 2000, and the White House moved the deadline up to 1996. Next year, the price will go from about $50 per gallon to over $65 and the federal excise tax will increase to $30 per gallon.

Clearly we need an alternative to cleaning polycarbonate lenses with Freon, and to industrial uses of chlorofluorocarbons (CFCs) in general. Searching out those alternatives and helping manufacturers learn about them is one of the jobs of the Minnesota Technical Assistance Program (MnTAP). MnTAP is a group of University of Minnesota staff who help manufacturing organizations

{Continued On Page 7}

MnTAP intern Troy Pfaff spent last summer at Minnesota Valley Engineering, investigating less wasteful ways to paint cryogenic vessels.

Inside

The Staff At

ORTTA

Hopes that Each of You

have a

Happy Holiday

and a

Productive New Year

Gifts From Licensees

Teddy bears, basketballs, sweatshirts and dolls—companies that have been granted a license to use University of Minnesota trademarks on their products have again given generously to ORTTA's annual gift drive. For the fourth year in a row, the trademark licensing staff will distribute the gifts at the Variety Club Children's Hospital in mid-December, with the help of the Golden Gopher Men's Basketball Team.

RESEARCH REVIEW

Volume XXII/Number 6

December 1992

Director of Communications: Michael P. Moore

Editor: Phil Norcross

Editorial Assistant: Tove Jespersen

Associate Vice President: A. R. Potami

***Research Review* is a monthly publication of the Office of Research and Technology Transfer Administration. Its purpose is to inform faculty and administrators who are involved with sponsored research and technology transfer on procedures and policies of granting agencies, on institutional policy and other information necessary to the preparation of research proposals, and on funding opportunities.**

***Research Review* welcomes ideas and comments from all readers. Write to *Research Review* at 1100 Washington Avenue South, Suite 201, Minneapolis, MN 55415-1226, or call Phil Norcross at 625-2354 or Michael P. Moore at 624-9398.**

Indirect Cost & Fringe Benefit Rates

Indirect Cost Rates

The *provisional* rates for July 1, 1992, through June 30, 1994, are listed below. When budgeting for periods beyond 6/30/94, the 7/1/92-6/30/94 rates should be used. **The rate agreement is dated May 13, 1992.** This date should be used where required on proposal applications. **Please call Marilyn Surbey, 624-4850, or Richard Miller, 626-9895, with questions on Indirect Costs.**

	07/01/92 06/30/94
Research	
On-Campus	40.00
Off-Campus *	21.00
SAFHL	58.05
Hormel	44.00
Other Sponsored Activity	
On-Campus	20.00
Off-Campus *	10.00
Instruction	
On-Campus	52.00
Off-Campus *	16.00

* A project will be considered off-campus if more than 50% of the direct salaries and wages of personnel employed on the project are incurred at a site neither owned nor leased by the University.

Fringe Benefit Rates

If you have questions regarding fringe benefit rate development or need the breakdown of charges, call **Vivian Fickling at 624-2009**.

For proposals being submitted with start dates **after July 1, 1992**, the estimated fringe benefit rates to be budgeted are:

Faculty	31.25
Civil Service	29.50
Graduate Assistants	10.50

Estimated rates after **July 1, 1993,** are:

Faculty	28.00
Civil Service	30.50
Graduate Assistants	31.25

Rate changes will be reflected in this section.

Congressman Brown says Basic Research is Not Magic Bullet

"Not only will we, as a committee, guard against any downgrading of basic research, we will try to increase the level of funding for basic research. But there is such a thing as irrelevant basic research," said Rep. George Brown (D-CA), chair of the House Science, Space and Technology Committee (SS&T). "We do need to adequately fund those areas of science that have obvious short-term results to the benefit of society . . . invoking the 'magic name of basic research' is not going to get more funding," he said.

Brown said he foresees some funding increases for science, but "the hard scientists have been coasting along on the mystical belief that they contribute to national security. Since the cold war is ending, national security has to be redefined." Brown spoke to Washington Fax, a commercial news service, on November 2. On November 3 he was reelected to Congress.

Biological scientists, Brown said, have to become more concerned about justifying research: "The researchers have to become concerned more about the ethical distribution of the benefits of research. The cost of health care prohibits some from getting the benefits of the public expenditure for research. This cannot continue. The benefits from research will also have to be of economic value to the nation. The researchers are going to have to take responsibility for achieving both of these ends."

On the other hand, Brown also said that biology is relatively easy to justify: "It is not always clear at NIH what is basic research and what is applied research. What you discover in biology is almost always applicable. Frankly, the life science people are going to have a little easier time [than the physical sciences] in getting funds."

Regarding "physicists and other hard scientists," Brown said they are "spending more and more time applying for more and more grants for less and less money. They too are going to want longer-term grants for large amounts, but when you do that in a restrictive funding envelope, it cuts down on the number of grants that can be awarded."

Brown predicts that NSF will play a larger role in the social sciences, which he feels will become more critical in the future. Brown said he does not foresee the NSF losing its responsibility for linking basic research and education. He also does not necessarily see NSF's future linked more to technology transfer. "The real technology transfer is going to be in Defense and Energy, and the NIH role in technology transfer is likely to become larger," he predicted.

Regarding the scientific community's apparent objection to commercialization and competitiveness as parts of the scientific enterprise, Brown defended applied science: "We are going to be providing funds for science from the standpoint of commercialization in order to keep up with the world. We are going to have to achieve a better balance between basic and applied. It's going to have to be pragmatic decisions."

On the other hand, Brown also defended basic research: "If you assume that policy makers are committed to both basic and applied research, then there is no danger that one area is going to hit a bonanza over the other. Policy makers quickly learn that they have to fund basic research or they are going to run out of knowledge."

U.S. Department of Education

Bulletin Board for Grants, Contracts

With the introduction of a new electronic bulletin board, grant and contract seekers may now plug into more than $2 billion a year in competitive funding opportunities from the U.S. Department of Education (DE). Users with a computer and modem can dial DE (202/260-9950) to scan and download basic documents such as its Guide to Programs or its 1993 Combined Application Notice, the omnibus advance grant calendar DE issues every September (also available on the ORTTA bulletin board.)

Users may also call up information about current program announcements and notices of still-open competitions that have appeared recently in the *Federal Register*. Active contract notices that have appeared in *Commerce Business Daily* also are available, although notices are likely to trail official publication by a day or two.

The 24-hour bulletin board will offer information about application availability, deadlines, the range and number of awards and program contacts. Both IBM-compatible and Macintosh owners may download files or print information directly from the bulletin board. Because all the documents included are DE's own, there is no legal problem with copying and distributing material.

Callers who don't want to download data may leave word on DE's bulletin board to send the original documents. The information is also available on disk at minimal cost, but is not on magnetic tape. A user's manual, which will provide the details, is currently being prepared and will be offered electronically or in hard copy.

For further information, write to Grants and Contracts Service, Education Department, Room 3616, Seventh and D Streets, Washington, DC 20202.

U.S. Food & Drug Administration Position Paper: Animal Use in Testing FDA-Regulated Products

Current laws administered by FDA—including the Federal Food, Drug and Cosmetic (FD&C) Act—are intended to ensure product safety and effectiveness, thereby protecting consumers' health. These laws place responsibility on FDA to ensure that human and animal drugs, biologics and medical devices are safe and effective and that food products are safe and wholesome.

Animal testing by manufacturers seeking to market new products is often necessary to establish product safety. FDA supports and adheres to the provision of applicable laws, regulations and policies governing animal testing, including the Animal Welfare Act and the Public Health Service Policy on Humane Care and Use of Laboratory Animals. Moreover, in all cases where animal testing is used, FDA advocates that research and testing derive the maximum amount of useful scientific information from the minimum number of animals and employ the most humane methods available within the limits of scientific capability.

FDA advocates the use of validated non-whole animal techniques, which may include such screens and adjuncts as *in vitro* (e.g. tissue culture) methodologies and biochemical assays. As an example, FDA announced in the *Federal Register* of Feb. 19, 1988, the availability of guidelines for the Limulus Amebocyte Lysate (LAL) test as an end-product endotoxin test for human injectable drugs (including biological products), animal injectable drugs and medical devices. The guidelines inform manufacturers of acceptable methods of validating the LAL test so that it can be used as an alternative to the rabbit pyrogen test. At present many other procedures intended to refine, reduce or replace animal testing are still in the relatively early stages of development. FDA encourages all efforts to develop and implement non-animal models and believes that these procedures will ultimately result in significant reductions and refinements in animal testing.

With respect to cosmetic products, the FD&C Act does not specifically require that cosmetic manufacturers test their products for safety in the context of premarket approval by the Agency. However, the FDA strongly urges cosmetic manufacturers to conduct toxicological or other tests necessary to substantiate the safety of a particular cosmetic product. If the safety of a cosmetic product is not adequately substantiated, the product is considered misbranded and may be subject to regulatory action unless the principle display panel bears the statement, "Warning—the safety of this product has not been determined."

Much of the attention given to animal testing has focused on the LD50 test and the Draize eye and skin irritancy tests. FDA does not require LD50 test data to establish levels of toxicity, and in 1988, published a policy statement in the *Federal Register* to clarify this position.

The Draize eye and skin irritancy tests continue to be considered among the most reliable methods currently available for evaluating the safety of a substance introduced into or around the eye or placed on the skin. Non-animal tests, such as *in vitro* tests, may be useful as screening tools to indicate the relative toxicity or safety of a substance that comes into contact with the eye or skin. However, the responses and results of *in vitro* tests alone do not necessarily demonstrate the safety of a substance. The effects of a substance on a biochemical reaction or on a specific cell or tissue in culture may differ from its effect on a specific organ system in the animal as a whole.

The precise nature of testing needed to determine the safety or effectiveness of a specific product regulated by FDA depends upon the characteristics and intended use of the product. More specific guidance may be obtained through consultation with FDA scientists on a case-by-case basis.

Europe Bans Animal Tests of Cosmetics

As part of the European Community (EC) Cosmetics Directive, the Council of Ministers agreed on November 4 to ban any ingredient from cosmetic use that has been tested on animals after January 1, 1998. The Council also agreed to consider extending the 1998 deadline if validated nonanimal tests that produce equivalent safety have not been developed. The same language was earlier adopted by the EC Parliament and the EC Commission.

From the *NABR Update*

Directory of Animal Research Available

A comprehensive directory to educational materials that describe the roles animals play in biomedical research, testing and teaching is available from the National Association for Biomedical Research (NABR). According to NABR, this is the first compilation of materials from around the United States on this subject.

An expanded version of the directory will be published next year, and NABR solicits your contributions to it. For information, contact Amy Finan, Regional Director, National Association for Biomedical Research, 202/857-0540.

Committee on the Use of Human Subjects in Research

Students and Employees as Research Subjects

The Committee on the Use of Human Subjects in Research often grapples with issues of coercion. Often these issues arise during discussion of the recruitment or identification of research subjects. Since the principles of "autonomy" and "justice" need to be taken into account before a project can be approved, the Committee must ask researchers to justify the inclusion or exclusion of some subject groups in all research projects. The Committee must also ensure that the means of recruitment protect the autonomy of the subject and ensure that the subject was able to make an informed choice—free of coercion.

While it is understood that researchers do not intend to coerce naive subjects into studies which will not provide them with some benefit, there are instances of unintentional or subliminal coercion which are avoidable with some precautions and preplanning. These subtle types of coercion often come into play when a research subject is also an employee, colleague or subordinate, or when the subject is a student of the investigator.

The Committee does not prohibit research involving these subject groups, but nevertheless insists that extra justification be provided when including these groups and that extra precautions be taken to ensure that no subject is compromised.

Students as Research Subjects

If an instructor is also a researcher and, for a scientifically justified reason, wants to include his/her students as research subjects in a project, special consideration of recruitment techniques are in order. Of primary concern is the process by which subjects/students are assured that their participation will not influence class standing or grades. Students should be given an opportunity to decline participation without jeopardy. Whenever possible, researchers should avoid using their own students if another population of subjects is equally suited to the research question, e.g., another class section not taught by the researcher, recruitment by another instructor, or blinded/coded data collected by an associate so that subjects are not identified to the instructor.

Unless the research question is directly related to class material, or the study process is being used as a teaching opportunity, such as in a research methods class, the Committee frowns on the use of class time to recruit subjects or class time used to complete study instruments, etc.

The use of extra credit points as a reward for research participation should be limited to specific circumstances where the research is closely tied to the course subject matter. The number of points awarded should not be sufficient to augment a student's grade by a whole step, e.g., from *B* to *A*. This information must be supplied to the Committee to ensure that the rewards of participation are not unduly coercive. The use of financial rewards should also be limited to dollar amounts which are proportionate to the risk. Again, this information should be part of the application for approval submitted to the Committee.

Whenever possible, even if class time is not used, a teaching opportunity in the form of an "educational debriefing" should be employed. Students should know something about the review process, the rationale for the study, the process of data collection, and intent of the researcher.

The Committee hopes to distance the researchers from the exploitive images of students as "guinea pigs."

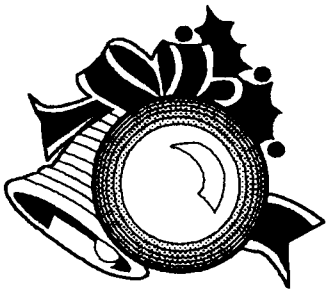
Employees as Research Subjects

The Committee is also concerned about the use of employees, either colleagues/peers or subordinates as research subjects. The issue of coercion in the recruitment process can place subjects/employees in a compromised position. Convenience should never be the sole factor for inclusion of a subject or subject group. The compromised circumstances and fear of retribution, even subtle cues of compromise, can place colleagues or subordinates in a position of involuntary participation in a research project.

Recruitment through bulletin board advertisements (screened and approved by the Committee), or recruitment through a third party unassociated in a power relationship with the employee are better strategies which allow for some control over coercion.

The Committee recognizes that researchers do not set out to structure coercive interactions with their subjects. These guidelines are meant as suggestions for structuring research protocols which are above reproach.

If you have questions on this or any other aspects of the use of human subjects in research, call Moira Keane at 624-1889.



National Science Foundation

New Application Form

As has been previously announced, the new NSF Application form *Grants for Research and Education in Science and Engineering (GRESE) 92-89* was released for use effective October 1, 1992.

If you are preparing a proposal using guidelines that reference GRESE 90-77, the previous form, you are requested to use the new version. Proposals may be rejected that contain the forms from the old GRESE, although in some cases the program office might simply request that a new cover sheet be submitted.

The new GRESE states that its requirements apply unless superseded by program solicitation or program announcement. This means that there are specific program solicitations and announcements which use their own forms, cover sheets, page restrictions, etc. These are generally solicited proposals where the program brochure contains forms and guidelines that differ from those which appear in the GRESE. Only in these specific cases do any forms supersede those in the GRESE.

U.S. Patent Office Expects 12,000 Biotech Applications

The U.S. Patent and Trademark Office expects about 12,000 new biotechnology patent applications in 1993, up about 1,000 from the estimate for 1992.

The average time that patents remain pending has decreased, from 27 months in 1988 to 25 months in 1992. A patent application is pending from the patent office's receipt of the application to granting of the patent or abandonment of the application. The waiting time between receipt of an application and the office's first action on it has also been reduced from 15 months to 9 months since 1988.

About 17,000 biotechnology patent applications are currently pending. About 170 of those are applications to patent animals and about 130 of these are for medical applications and most of the rest for agricultural applications.

Biotechnology is now the patent office's largest division. The office had only 30 biotechnology applications in 1978. In 1982 there were 3,000; in 1987 there were 6,153; and in 1991 there were 9,790.

From *Washington Fax*

USDA - Indirect Cost Recovery

The U.S. Department of Agriculture (USDA) recently announced its 1993 National Research Initiative Competitive Grants Program (NRICGP). For the past few years, legislation has limited the University's indirect costs on NRICGP projects. Again this year, the indirect costs are limited to 14% of total direct costs.

Normally, when a federal agency caps indirect costs at a rate below negotiated rates (which for research projects is currently 40%), the University is no longer required to exempt equipment and subcontracts from the direct cost base when calculating the applicable indirect costs.

Last year a number of faculty were upset when ORTTA attempted to apply that approach to NRICGP proposals. There was some justification for this since ORTTA did not clearly communicate its intent prior to the various deadlines.

This year, NRICGP deadlines begin on December 7, 1992, and continue through March 22, 1993 (see page 10). ORTTA has received approval from University Central Administration and *intends to include equipment and subcontracts in the direct cost base for calculating indirect costs on these proposals.*

ORTTA Assistant Director Rick Dunn has overall responsibility for administering USDA funds. If you have questions, he may be reached at 626-2265.

MnTAP staff helped smooth inconsistencies between state and federal regulations that govern the feeding of food scraps to livestock.

MnTAP

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solve waste and pollution problems. The State of Minnesota, Office of Waste Management, funds MnTAP; it is based in the University's Division of Environmental and Occupational Health. MnTAP staff provide industry with information about recycling industrial chemicals. They advise about proper waste disposal. And because an ounce of prevention is worth a pound of cure, they pursue "waste reduction"—less generation of waste in the course of industrial production.

David Knight, now a University senior in geological engineering, went to a Twin City lens manufacturer as a MnTAP intern in 1992. For the summer, Knight's help was free to the manufacturer; MnTAP paid his wages. His job was to improve the "vapor degreaser"—the apparatus that cleans the lenses. In the fall, the manufacturer paid Knight to test alternative cleaners that might replace Freon. By mid-October, Knight had reduced Freon losses from the degreaser by about 30 percent. "The changes we're going to implement this fall will probably lead to another 50 percent reduction," he says.

Seeking a substitute for Freon, Knight chiefly studies water- and alcohol-based alternatives. In some cases he does the testing himself; in others he sends sample lenses to the makers of the alternative cleaners. To learn which alternatives to test he got the advice of Rich Bosshardt, the engineer who coordinates internships at MnTAP. In similar work, MnTAP is conducting a two-year study, funded by the U.S. Environmental Protection Agency, of the substitution of water-based cleaners in metalworking operations that traditionally use CFCs and volatile organic compounds, like methyl ethyl ketone.

"We are working with two companies that provide us with difficult parts to test," says Robert Lundquist, leader of MnTAP's pollution prevention team, "and we get input from chemical vendors as to what cleaner will work best for a particular material. The cleaner has to be compatible with the material as well as get it clean, and every situation is different. We can't make a blanket statement that something will work in all cases."

In addition to industrial cleaning, MnTAP works on industrial painting. For example, it recently helped Minnesota Valley Engineering (MVE) learn to use less paint, less paint thinner, and less solvent for cleanup.

At its New Prague facility, MVE manufactures 150-gallon to upwards of 20,000-gallon "cryogenic vessels," industrial tanks for storing things like liquid nitrogen and liquid oxygen. MVE's painting operations use methyl ethyl ketone (MEK), both as a paint ingredient and for cleanup after painting. But MEK is an air pollutant, and the EPA and the Minnesota Pollution Control Agency want to restrict its use. So MVE asked MnTAP for an intern to investigate new paint-spraying technology.

"They're working with high-pressure paint sprayers," explains Troy Pfaff, the chemical engineering senior who interned at MVE last summer, "that have a lot of kick, 2500 pounds per square inch. Moving that fast, paint tends to bounce off the tanks and spray all over the paint booth. Approximately a third of every gallon actually gets onto the tanks." Pfaff investigated "electrostatic" paint guns that operate at relatively low pressure and give the paint an electrostatic charge. Because of the charge, the vessel attracts the paint. "The paint sort of floats toward it," says Pfaff.

MnTAP's role is not to enforce regulations; it is to help people meet regulations by reducing waste.

Pfaff also studied changes in the dimensions and ventilation of the painting booths and the use of a still to clean used MEK. Altogether, "we're talking about cutting MEK consumption in half and saving $100,000 a year," says Pfaff. "But that's a conservative estimate."

Fred Simon, Pfaff's supervisor at MVE, attributes Pfaff's success to his independence. "An intern can focus on one single project and make a lot of progress," says Simon. "We're real pleased with the help Troy gave us and the support MnTAP provided."

Pfaff attributes his success to "direct access to the people [at MnTAP] who know almost all the pollution control rules and regulations, and know where to learn the rest." In engineering classes, Pfaff says he solved problems by doing calculations. "But in real life there's company rules, fire codes, state laws, federal regulations. The solution requires give and take from a lot of people."

MnTAP is emphatically *not* a regulatory agency. Its role is not to enforce regulations; it is to help people meet them by reducing waste. After Minnesota's Toxic Pollution Prevention Act passed in 1990, MnTAP conducted 14 workshops on the required "pollution prevention plans." MnTAP representatives regularly contribute to "county coordination meetings," where enforcement officials hammer out consistent rules for the seven-county Twin Cities area. If you own gas stations in St. Paul and Minneapolis, for example, you can dispose of all your used oil filters the same way because the coordination meeting settled the differences between Hennepin and Ramsey counties.

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MnTAP

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MnTAP also helps smooth inconsistencies between state and federal regulations. Minnesota required, for example, that any waste human food be boiled for half an hour before you feed it to livestock. Federal rules, on the other hand, only require that waste *meat* products be boiled; vegetables and bakery waste can go directly from the table to the hog trough. John Polanski, MnTAP's technical assistant in charge of food waste, helped persuade the Minnesota legislature to change the state law last spring. Next spring, the state Board of Animal Health will put new rules into effect that match the federal rules.

That will be a big help to a surprisingly large trade in recycled food. "Right now, from the seven-county metro area, about 75 tons per day of food scraps go to feed swine," says Polanski. "It's food that would have gone into waste water and landfills. Now it's producing pork." The scraps come from the kitchens and tables of restaurants, airline caterers, bakeries and hospitals. For a rough estimate of their significance, figure the scraps are two-thirds water and not quite as nourishing as standard feed, so one ton of scraps will raise a pig to three-quarters of butchering size. Then each day's scraps produce roughly 10,000 pounds of pork. "Where we see this going under the new rules is large food processors feeding individual farms," says Polanski, "and other waste food coming from all around the state to some kind of central location."

"At our size it's very difficult to hire staff or consultants to study alternatives in depth. MnTAP fills that gap." — Denny Donaldson, President of Nico Plating

Polanski's job, like that of MnTAP overall, is to serve as a clearinghouse for information: Who's got scraps. Who needs them. How a bakery can arrange to wash less flour down the drain. How much money a restaurant can save by recycling. He and his colleagues at MnTAP offer about 230 printed resources and 3,000 computer references, including, for example, a list of suppliers for equipment to reclaim paint thinner, a checklist for identifying ways to reduce the use of coolant in machine shops, instructions for cleaning ink from printing presses and for disposing of antifreeze, and a case study of how IBM organized the removal of CFCs from its Rochester, Minnesota, plant. But the best sources at MnTAP are the technical assistants themselves, people like Polanski who will walk into your manufacturing plant or commercial bakery and tell you how someone else solved the problems you face.

Polanski can tell dozens of stories about small simple changes—what the pollution prevention business calls "low-hanging fruit"—that stopped a lot of pollution. For example, he tells of "the sewer commission going to a commercial bakery about the high load of sugar in its waste water. Like most bakers, they had been cleaning the floor with a water hose. The first thing they did was cover the floor drain with a metal plate and switch to cleaning with brooms. Now the sweepings go to animal feed."

Electroplating metal means using acids, solvents, heavy metals and sometimes cyanide solutions. But Nico Plating of south Minneapolis is starting to use a lot less cyanide. "The majority of metal finishers want to be environmentally conscious," says Denny Donaldson, President of Nico. "Cyanide's been in use for 90 years in the plating industry, but cyanide-based sludge and waste have to be destroyed somehow. They cannot be recycled. We're changing to a new plating process in which we can neutralize the waste stream and sell the remaining sludge for recycling." Donaldson expects to have the new plating process up and running in 1994.

Nico is a "job shop" that finishes parts for other manufacturers. "At our size it's very difficult to hire staff or consultants to study alternatives in depth," says Donaldson. "MnTAP fills that gap." Last summer, Nico hosted a MnTAP intern to test replacements for trichloroethylene as a cleaning solvent and to help Nico measure the effect its plating processes have on employees' health.

That "occupational survey" was overseen by Lisa Brosseau, an assistant professor of industrial hygiene in the University's Division of Environmental and Occupational Health, the same division that houses MnTAP. MnTAP intern Diana Tafur—she has a B.S. in chemical engineering and will soon earn another in bioprocessing—spent last summer watching and talking to Nico employees as they worked. "She did a very thorough job," says Brosseau, "Then we came up with a ranking of people, jobs and hazards, and advised Donaldson when to take samples, whose exposure to monitor and which chemicals are the most dangerous." Following up on Brosseau and Tafur's advice, Donaldson hired a consulting laboratory to sample and monitor last October.

For more information about MnTAP, or to seek its help, phone 612/627-4646.

National Science Foundation

Young Investigator Awards FY 1993

The National Science Foundation has published the guidelines for the FY93 National Young Investigator (NYI) Award Program.

These awards have the following goals:

- To recognize outstanding young faculty in science and engineering;
- To enhance the academic careers of recent Ph.D. recipients by providing flexible support for research and educational activities;
- To promote public awareness of the work of academic scientists and engineers and to foster contact and cooperation with industry and institutions that support research and education.

Approximately 150 new NYI awards will be made for up to five years, based on an annual determination of satisfactory performance and subject to the availability of funds. Each NSF Young Investigator Award consists of an annual base grant of $25,000 from NSF plus up to $37,000 of additional funds per year on a dollar-for-dollar matching basis from industrial and not-for-profit sources, resulting in total annual support of up to $100,000.

Nominations should be made at the department level; therefore the chairperson or an analogous administrative official at an institution may nominate faculty members for the awards.

Nominees must meet *all* of the following five criteria:

- Only U.S. citizens, nationals or permanent residents as of January 29, 1993 are eligible to compete for an NYI award;
- Nominees must have a Ph.D. degree or equivalent, awarded on or after January 1, 1987, but not later than January 29, 1993;
- Nominees must have a tenure-track or tenured faculty position or equivalent at their nominating institution beginning on or before January 29, 1993;
- Nominees must not have entered on a tenure-track or tenured faculty position or equivalent at any NYI eligible college or university prior to January 1, 1989.
- Nominees must be conducting research in an NSF-supported field.

The receipt date for submission of nominations is **January 29, 1993**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The announcement includes telephone numbers of the individual directorates cooperating in the program.

U.S. Department of Agriculture

Graduate Fellowship Grants Program

The U.S. Department of Agriculture (USDA), through the Cooperative State Research Service, Office of Higher Education Programs, will award competitive grants to colleges and universities for doctoral fellowships to meet national needs for the development of professional and scientific expertise in the food and agricultural sciences.

The targeted national needs for FY93 are Plant Biotechnology, Food, Forest, Biological or Agricultural; Engineering; and Water Science. Approximately one-third of the approximately $3,395,000 available will be allocated to each of these areas.

A proposal may request funding in only one national needs area, although a minimum of two and a maximum of four fellowships may be requested by each proposal. The same college or equivalent administrative unit within an institution may submit a maximum of three proposals, one in each of the three national needs areas supported.

Each institution funded will receive $54,000 for each doctoral fellowship awarded. Fellowship monies must be used to 1) support the same doctoral fellow for 3 years at $17,000 per year, and 2) provide for an institutional annual cost-of-education allowance of $1,000, not to exceed a total of $3,000 over the three-year duration of the fellowship.

The application deadline is **February 10, 1993**. For further information and for application material, contact Proposal Services Branch, Awards Management Division, Cooperative State Research Service, U.S. Department of Agriculture, Aerospace Center, Room 303, 14th and Independence Avenue SW, Washington, DC 20250-2200; 202/401-5048.

U.S. Department of Agriculture

Competitive Research Grants Program

Applications are invited for competitive grant awards in agricultural, forestry and related environmental sciences under the National Competitive Research Initiative Grants Program, administered by the Office of Grants and Program Systems, Cooperative State Research Service, US Department of Agriculture.

Research support must address, among other things, one or more of the following purposes of agricultural research and extension:

1) Continue to satisfy human food and fiber needs;

2) Enhance the long-term viability and competitiveness of the food production and agricultural system of the U.S. within the global economy;

3) Expand economic opportunities in rural America and enhance the quality of life for farmers, rural citizens and society as a whole;

4) Improve the productivity of the American agricultural system and develop new agricultural crops and new uses for agricultural commodities;

5) Develop information and systems to enhance the environment and the natural resource base upon which a sustainable agricultural economy depends; or

6) Enhance human health by fostering the availability and affordability of a safe, wholesome and nutritious food supply that meets the needs and preferences of the consumer and by assisting farmers and other rural residents in the detection and prevention of health and safety concerns.

Deadlines are listed below (all area codes are 202). A complete copy of USDA's announcement of FY93 programs is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board.

Program (Code No)	Telephone	Date
Forest/Rangeland/Crop Ecosystems (23.0)	401-5114	Dec 07
Pathology (51.1)	401-4310	Dec 07
Weed Science (51.4)	401-4310	Dec 07
Plant Genome (52.1)	401-4871	Dec 14
Human Nutrient Requirements for Optimal Health (31.0)	205-0250	Dec 21
Plant Genetic Mechanisms and Molecular Biology (52.2)	401-5042	Dec 21
Animal Molecular Genetics and Gene Mapping (43.0)	401-4399	Jan 11
Photosynthesis and Respiration (54.1)	401-6030	Jan 11
Reproductive Biology of Animals (41.0)	401-6234	Jan 19
Entomology (51.2)	401-5114	Jan 19
Nematology (51.3)	401-5114	Jan 19
Plant Responses to the Environment (22.1)	401-4871	Jan 25
Alcohol Fuels (55.0)	401-4310	Jan 25
Water Quality (21.0)	401-4082	Feb 01
Improved Utilization of Wood and Wood Fiber (24.0)	401-1952	Feb 01
Market Assessment, Competitiveness and Technology Assessment (61.0)	401-4772	Feb 08
Rural Development (62.0)	401-4425	Feb 08
Plant Growth and Development (53.0)	401-5042	Feb 16
Cellular Growth and Developmental Biology of Animals (42.0)	401-0250	Feb 22
Mechanisms of Animal Disease (44.0)	401-4399	Feb 22
Processing for Value-Added Products (71.0)	401-1952	Mar 01
Nitrogen Fixation/Metabolism (54.2)	401-6030	Mar 15
Food Safety (32.0)	401-4399	Mar 15
Research Career Enhancement Awards (80.1)	401-6234	Mar 22
Equipment Grants (80.2)	401-6234	Mar 22
Seed Grants (80.3)	401-6234	Mar 22

National Pork Producers Council

Pork Fellowship

The National Pork Fellowship, Sponsored by the National Pork Industry Foundation of the National Pork Producers Council, is a $5,000 scholarship awarded annually to a doctoral candidate researching the use of pork as a food. Any doctoral candidate using pork in research for his/her dissertation is eligible to apply for the award. Today's pork is leaner and more nutritious as a result of research; the National Pork Industry Foundation sponsors this Fellowship to encourage research leading to the further advancement of pork.

Applications must be postmarked by **December 31, 1992**. Application materials may be obtained from ORTTA by calling 624-9004 or by sending a note through the bulletin board. The agency contact is Rodney Goodwin or Pat Rigby, National Pork Fellowship, National Pork Industry Foundation, PO Box 10383, Des Moines, Iowa 50306; 515/223-2608.

U.S. Department of Agriculture

Water Quality Program

Applications are being invited by the U.S. Department of Agriculture (USDA) for competitive grant awards under the Special Research Grants, Water Quality Program for FY93.

The scope of research includes developing principles for studying and understanding the processes that underlie soil and/or water quality degradation which results from agricultural practices involving the use of certain pesticides, fertilizers and wastes. The capability to accurately and economically analyze, interpret, and predict occurrence of residual contamination of soils and water must be developed for both croplands and farmsteads. Results should be transferable to different soils, cropping areas and size scales, and should contribute to understanding the sociological and economic implications of contamination or its prevention. Ultimately, effective and economically feasible avoidance and remedial technologies are needed that, when adopted, prevent or correct agriculturally induced soil and water quality problems thereby resulting a more sustainable agriculture.

Specific Research Problem Areas (RPA) are:

100. Analytical and Assessment Methods
    - 110. Soil and Water
    - 120. Field Calibration and Validation
    - 130. Scale-up and Extrapolation
    - 140. Risk
200. Fate and Transport
    - 210. Mass Balance
    - 220. Preferential Flow
    - 230. Processes
    - 240. Integration of Processes and Scales
300. Management and Remediation Practices and Systems
    - 310. Nutrients
    - 320. Pest Control
    - 330. Water
    - 340. Waste
    - 350. Remediation
400. Sensors, Geographical Information Systems and Landscape/Watershed Scale Models
    - 410. Sensors for Application Technology
    - 420. Geographical Information Systems
    - 430. Soil-Specific and Real-Time Management
    - 440. Expert Systems
500. Social, Economic and Policy Considerations
    - 510. Acceptance, Adoption and Diffusion of New Technology
    - 520. Social and/or Economic Impact of Alternative Water Quality Enhancement Practices
    - 530. Regional Impacts of Policy Options
    - 540. Incorporating Risk into Policy Options

A total of approximately $6,000,000 will be available for this program. Maximum total funding per grant will not exceed $150,000 for a maximum proposed funding period of three years.

The application deadline is **December 21, 1992.** A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. Program related questions may be directed to any of the following: Dr. Berlie L. Schmidt, Dr. Maurice L. Horton, Dr. Alice J. Jones at 202/401-4504; fax 202/401-1706.

American Cancer Society

Institutional Research Grant

The stated goal of the American Cancer Society (ACS) is to "foster meritorious research on cancer that cannot be supported through other available types of support." The purpose of the Institutional Research Grant is to serve as "seed" money to permit the initiation of promising new projects or novel ideas by junior faculty investigators.

The University of Minnesota Institutional Research Grant has been restructured considerably. The amount of the award has been increased to $15,000 direct costs. The grant awardee must be an assistant professor or instructor *on faculty*. Applicants must not have previously received an ACS Institutional Research Grant nor have current national funding, although recipients of career development awards from NIH (K04, K08), from ACS (Junior Faculty Awards) or the Leukemia Society *are* eligible.

Cancer-related research may include analysis of developmental biology, gene regulation, or alteration of intracellular or extracellular processes which may lead to an improved understanding and/or therapy of potential or actual oncogenic events in prokaryotic or eukaryotic cells.

The deadline for receipt of applications is **March 1, 1993**. Instructions and application forms are available from the Pediatric Oncology Office, 421 Masonic Cancer Center, 626-1926.

United States Air Force

1993 Summer Research Program for Faculty and Graduate Students

The Air Force Office of Scientific Research (AFOSR), as part of its mission to fund and manage Air Force basic research activities conducted within academic institutions, private industry and Air Force laboratories, has announced a unique opportunity for academic scholars working in technical disciplines.

AFOSR is seeking scientists and engineers in a host of related fields to participate in 8 to 12 weeks of paid research this summer through its Summer Research Program (SRP). Those selected to participate will be assigned to one of eight Air Force Laboratories throughout the country where they will perform research on key technologies having a direct bearing on our national interests.

As an added incentive, AFOSR will offer selected participants an opportunity to continue their AFOSR-sponsored work at their home institutions through the award of follow-up research grants in amounts up to $20,000.

The eligibility requirements are:

- Faculty must 1) be U.S. citizens or hold permanent-resident status; 2) be members of an accredited U.S. college, university or technical institute; and c) have at least two years teaching and/or research experience.
- Graduate students must 1) be U.S. citizens; 2) hold either bachelor's or master's degrees in an appropriate technical specialty; c) be currently enrolled in an accredited graduate program; and d) be willing to be supervised either by a faculty research associate or by an Air Force laboratory scientist.

Applicants must be free to work continuously for an 8- to 12-week period from April 1 to September 20; under *exceptional* circumstances, an appointment may be made outside this period.

Compensation will be at the following rates: Faculty members, $740/week; graduate students with master's degrees, $455/week; graduate students with bachelors' degrees, $391/week. Taxes and FICA *will not* be withheld, making individuals responsible for all the income earned during the award period. A daily expense allowance of $50/day for faculty and $37/day for graduate students will be offered to those who live more than 50 miles from their research site.

Different Air Force Laboratories have different priorities. A list of the available labs and their research interests are part of the announcement brochure, available from ORTTA by calling 624-9004 or by sending a note through the bulletin board.

The application deadlines are: **January 18, 1993** (faculty); and **March 15, 1993** (graduate students). For further information write or call Research & Development Laboratories, Summer Research Program Office, 5800 Uplander Way, Culver City, CA 90230-6608; 310/410-1244 or the toll free, 24-hour number, 1-800/677-1363.

U.S. Arms Control and Disarmament Agency

Visiting Scholars Program

The U.S. Arms Control and Disarmament Agency (ACDA) will conduct a competition for selection of visiting scholars to participate in ACDA's activities during the 1993-94 academic year.

The purpose of the program will be to give specialists in the physical sciences and other disciplines relevant to the Agency's activities an opportunity for active participation in the arms control and disarmament activities of the Agency and to gain for the Agency the perspective and expertise such persons can offer.

Positions are available in the Bureau of Strategic Nuclear Affairs, the Bureau of Multilateral Affairs, the Bureau of Verification and Implementation, the Bureau of Nonproliferation Policy, the Office of the Chief Science Advisor, and the Policy Planning Group. Evaluation of applicants for appointments to these positions will focus upon the scholars' potential for providing expertise or performing services needed by ACDA, rather than on the scholars' previously displayed interest in arms control. While pursuit of the scholars' own line of research may sometimes be possible, support of such activity is not the purpose of the program.

Visiting scholars will be detailed to ACDA by their universities; the universities will be compensated for the scholars' salaries and benefits. Visiting scholars will also receive reimbursement for travel to and from Washington, D.C. for their one-year assignment and either a per diem allowance during the year or relocation costs.

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To apply, submit a letter indicating the positions of interest and the perspective and expertise offered. Include a curriculum vitae and any other materials, such as letters of reference and no more than two samples (12 copies each) of published articles.

The application deadline is **January 31, 1992**. A copy of the complete announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The agency contact is the Visiting Scholars Program, Operations Analysis, Room 5726, U.S. Arms Control and Disarmament Agency, Washington, D.C. 20451; 202/647-4695.

National Cancer Institute

Interactive Research Project Grants for Nutrition and Cancer Prevention

CA-93-04

The Division of Cancer Prevention and Control, National Cancer Institute (NCI), invites Interactive Research Project Grants (IRPGs) to encourage and facilitate formal interdisciplinary collaborations through the coordinated submission of related research project applications that share a common research focus relevant to nutrition and cancer prevention but do not require extensive shared physical resources or core functions.

A minimum of three independent investigators with related research objectives are encouraged to submit concurrent, collaborative, cross-referenced individual research grant applications (R01) that share a common research focus. Applications may be submitted from either a single institution or a consortium of institutions. Applications will be reviewed independently for scientific merit. Meritorious applications will be considered for funding both as independent awards and in the context of the overall proposed collaboration.

The objectives of this RFA are to 1) increase the investigator-initiated pool of quality applications in the area of nutrition and cancer research and 2) to stimulate an intermediate level of interdisciplinary collaborative efforts to build stronger research bridges between nutritional science and the disciplines that relate closely to basic and clinical research for the development and evaluation of new approaches to nutrition and cancer prevention research.

Several examples of research areas relevant to nutrition and cancer prevention in which the IRPG concept may be applied are:

- Metabolic effectors of dietary origin. Basic science projects may be combined that integrate multiple aspects of dietary factors that modulate signal transduction, DNA repair, antioxidants, hormonal regulation and gene regulation.
- Interaction of diet and dietary components with drugs, hormones, metabolites and genes—synergistic and antagonistic effects.
- Development of new and better methods to quantify dietary intake in individuals.
- Further identification and evaluation of overall dietary patterns, foods and food constituents that alter cancer risk and elucidation of their mechanisms of action.
- Social behavioral research to identify motivation and factors and barriers to changing food habits.

Approximately $2.5 million in total costs per year for up to five years will be committed to specifically fund applications that respond to this RFA. It is anticipated that six to nine awards will be made.

The application deadline is **January 19, 1993**. A copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The agency contact is Carolyn K. Clifford, Ph.D., Program Director, Diet and Cancer Branch, Division of Cancer Prevention and Control, NCI, Executive Plaza North, Suite 212, Bethesda, MD 20892-6130; 301/496-8573; Fax 301/402-0553.

National Center for Research Resources

Small Grants for Innovative Technology

The Biomedical Research Technology (BRT) Program, offered by the National Center for Research Resources (NCRR), identifies and develops advanced technologies needed in biomedical research. Through grants and contracts, it supports an extremely broad and innovative array of technologies. Areas of emphasis in the program are biomedical computing, biomedical engineering, and technologies for the study of biomolecular and cellular structure and function. The BRT Program supports a small grant award for pilot studies in relevant biomedical technologies.

This is a one-year, non-renewable award for a pilot project in a high technology area in engineering, instrumentation, physics or computer science related to biomedical research. The project should involve a feasibility study of an innovative or high risk idea in a high technology. Innovative means unusually imaginative or drastically different approachs to a problem. High risk means having uncertain chances for success because no historical base exists for the proposed technological approach. High technology is defined here as working at the frontier (limits of understanding) of a technology. The project should be oriented towards new instrumental or methodological approaches and provide a basis for more extended research in the relevant technology.

The purposes of the small grants program are:

1. Provide an opportunity to test new ideas in a high technology that would lead to an expanded research project or implementation of the technology in a working environment; or

2. Develop significant changes in an existing high technology important to biomedical research; or

3. Translate scientific notions into a basis for a future technology.

The award *may not* be used to supplement support for an ongoing project. Because of the high risk, feasibility-testing nature of the program, support of salaries for student employees working on a dissertation is discouraged.

Annual application deadlines are **February 1** and **October 1**. Guidelines are available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The agency contact is Dr. Houston Baker, Biomedical Research Technology Program, National Center for Research Resources, Westwood Building Room 8A15, Rockville, MD 20892; 301/496-5411.

Department of Commerce

Ocean Resources Conservation and Assessment

For fiscal year 1993, the National Oceanic and Atmospheric Administration, Office of Ocean Resources Conservation and Assessment, intends to carry out research projects addressing aspects of the National Status and Trend (NS&T) Program. Particular interest is in the study of the historical contamination of the coastal U.S. using sediment cores.

The aim of the NS&T Program is to quantify the concentrations of key contaminants in the nation's coastal and estuarine environments and to measure their biological effects. The data, acquired using a nationally uniform set of sampling and measurement techniques, are used to determine temporal changes and spatial patterns in marine environmental quality. Obtaining such information about pollution will aid coastal states, fishermen and the nation in general in their effort to improve marine environmental quality.

For this year, priority will be given to one coastal area—the Gulf of Mexico. Interest is in identifying contamination trends in sediments since the early 1900's and even since the 1800's for the trace metals; therefore, the cores have to be undisturbed and collected in areas where sedimentation rates are sufficiently high to give a reliable dating for the last 100 years.

The work will be funded through Cooperative Agreements. The NS&T Program anticipates having up to $300,000 total for this research. No matching funds are required.

The initial step in the review and selection process is the preparation and submission of a pre-proposal. Pre-proposals are limited to two pages of single-spaced text plus a cover page. Pre-proposals are due no later than **January 8, 1993**; each investigator will be notified by January 26 if s/he may submit a full proposal.

Full proposals will be requested and are due by **February 26, 1993**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. For further information and application materials contact Dr. Nathalie J. Valette-Silver, NOAA, N/ORCA 21, 6001 Executive Boulevard, Room 312, Rockville, MD 20852; 301/443-8655; fax, 301/231-5764.

UCLA

Center for 17th- and 18th-Century Studies

The Center for 17th- and 18th-Century Studies, a research unit of the University of California, provides a forum for the discussion of central issues in the study of the 17th and 18th centuries, facilitates research and publication, supports scholarship, and encourages the creation of interdisciplinary, cross-cultural programs that advance the understanding of this important period. The William Andrews Clark Memorial Library, which is administered by the Center, is known for its collections on 17th-and 18th-Century Britain, Oscar Wilde and the 1890s, the history of printing and certain aspects of Western Americana.

Fellowship programs for 1993-94 are:

Ahmanson and Getty Postdoctoral Fellowships. Theme-based resident fellowships, awarded for a minimum of two and a maximum of three academic quarters, for participation in the Center/Clark's interdisciplinary, cross-cultural programs. Theme for 1993-94: The American West. Stipend: $9,200 per quarter.

Clark Short-Term Fellowships. Resident fellowships, awarded for periods of one to three months, for research relevant to the Library's holdings. Applicants must hold a Ph.D. degree or the equivalent. Stipend: $1,500 per month.

ASECS/Clark Fellowship. One-month resident fellowships, available to postdoctoral scholars with projects in the Restoration or the eighteenth century. Fellowship holders must be members in good standing of the American Society for Eighteenth-Century Studies. Stipend: $1,500 for the month.

Predoctoral Fellowships. Three-month resident fellowships, awarded to advanced doctoral candidates whose dissertation concerns any area represented in the Clark's collections or is linked to Center/Clark programs supported by these collections or by others at UCLA. Stipend: $4,500 for the three-month period.

The application deadline is **March 15, 1993**. Inquiries and application materials may be obtained for the Ahmanson and Getty fellowships from Fellowships Coordinator, Center for 17th- and 18th-Century Studies, 1100 Glendon Avenue, Suite 1548, Los Angeles, California 90024-1404; 310/206-8552; fax 310/206-8577. For all other fellowships, contact Ms. Beverly Onley, Fellowship Coordinator, William Andrews Clark Memorial Library, 2520 Cimarron Street, Los Angeles, California 90018-2098; 213/735-7605; fax 213/731-8617.

McDonnell-Pew

Program in Cognitive Neuroscience

The McDonnell-Pew Program in Cognitive Neuroscience has been created jointly by the James S. McDonnell Foundation and the Pew Charitable Trusts to promote the development of cognitive neuroscience.

Cognitive neuroscience attempts to understand human mental events by specifying how neural tissue carries out computations. Work in cognitive neuroscience is interdisciplinary in character, drawing on developments in clinical and basic neuroscience, computer science, psychology, linguistics and philosophy. Cognitive neuroscience *excludes* descriptions of psychological function that do not address the underlying brain mechanisms and neuroscientific descriptions that do not speak to psychological function.

The program has three components:

1. **Institution grants** (which have already been awarded) for the purpose of creating centers where cognitive scientists and neuroscientists can work together.

2. **Small Grants-in-aid** (presently being awarded) for individual research projects to encourage Ph.D. and M.D. investigators in cognitive neuroscience. Applications are sought for projects of exceptional merit that are not currently fundable through other channels and from investigators who are not at institutions already funded by an institutional grant from the program. Preference will be given to projects that are interdisciplinary in nature. Grant support is limited to $30,000 per year for two years.

3. **Small grants-in-aid** (presently being awarded) for individual training projects to encourage Ph.D. and M.D. investigators to acquire skills for interdisciplinary research. The goals of the program are to encourage broad participation in the development of the field and to facilitate the participation of investigators outside the major centers of cognitive neuroscience. Some postdoctoral awards will be available with stipends limited to $30,000 per year for up to three years.

The application deadline for both programs is **February 1, 1993**. Brochures are available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. For further information please contact the McDonnell-Pew Program in Cognitive Neuroscience, Green Hall 1-N-6, Princeton University, Princeton, New Jersey 08544-1010; 609/258-5014; fax 609/258-3031; email cns@clarity.princeton.edu

Faculty Research, Training and Service Awards

This section contains statistics on proposals and awards recently processed by ORTTA. In addition, we have randomly selected awards received by faculty during preceding months. Faculty who have received awards they would like mentioned in a future *Research Review* may send the pertinent data, as exemplified below, to Phil Norcross at ORTTA, 625-2354.

Proposal and Award Summary

	Number	Amount
Proposals Submitted October 1992	340	47,640,177
Awards Processed October 1992	332	27,392,110
Proposals Submitted July 1992 - October 1992	1,163	156,606,350
Awards Processed July 1992 - October 1992	1,235	94,802,307
Proposals Submitted July 1991 - October 1991	1,311	219,574,079
Awards Processed July 1991 - October 1991	1,076	87,467,859

IV-E Child Welfare Training
Esther F. Wattenberg, Social Work
Jean K. Quam, Social Work
St of MN, Dept of Human Services
$728,779 - 10/92-09/93

Evaluation of the Utah Prepaid Mental Health Plan
Jon Christianson, Public Health
NIH, NIMH
$445,413 - 09/92-08/93

University of Minnesota Rural Health Research Center
Ira S. Moscovice, Health Services Research and Policy
Jon Christianson, Health Services Research and Policy
HRSA
$298,501 - 09/92-09/93

Improving Child Health Services: Removing Categorical Barrier Initiative
Stephen C. Joseph, Human Development and Nutrition
Robert Wood Johnson Foundation
$271,243 - 11/92-10/93

Studies of Two-Phase Flows of Solids and Liquids
Daniel D. Joseph, Aerospace Engineering
Thomas S. Lundgren, Aerospace Engineering
NSF
$261,400 - 09/92-02/96

University of Minnesota Indians Into Medicine
Gerald L. Hill, Medicine, Duluth
DHHS
$200,000 - 09/92-08/93

Multicenter Studies of Diet and Lipoproteins in Humans
Patricia Elmer, Epidemiology
NIH, NHLBI
$200,000 - 09/92-09/96

Structural Physiology, Pathology of Platelets in Alzheimer's Disease
James G. White, Pediatrics
NIH, NHLBI
$193,922 - 09/92-09/93

Patricia Roberts Harris Graduate and Professional Fellowship
Walter V. Weyhmann, Physics and Astronomy
U.S. Department of Education
$160,000 - 09/92-09/93

Japan Long-Term Visit: Melt Coupling of Immiscible Polymers
Chris Macosko, Chemical Engineering
NSF
$154,804 - 09/92-10/94

Distance Learning Modules for Forestry Research Management
Hans M. Gregersen, Forest Resources
Allen L. Lundgren, Forest Resources
Int'l Union of Forestry Research Organizations
$154,000 - 09/92-09/93

University PCR-Based Detection System for Plant Badnaviruses
Neil E. Olszewski, Plant Biology
Benham E. Lockhart, Plant Pathology
USDS, AID
$149,969 - 08/92-08/97

Genetic Functions of a Conjugative Streptococcal R Factor
Gary Dunny, Biological Process Technology Institute
NIH, NIGMS
$149,800 - 09/92-08/93

Predicting the Survival and Effects of Introduced Microorganisms
Lyle Shannon, Biology, UMD
Randall E. Hicks, Biology, UMD
EPA
$149,035 - 09/92-09/93

The Function of SNRNP Proteins in Splicing
Paul G. Siliciano, Biochemistry (MS)
NIH, NIGMS
$138,298 - 09/92-08/93

Automated Cartographic Information Center
Brent Allison, Libraries
U.S. Department of Education
$133,058 - 10/92-09/93

Replacement of Transmission Electron Microscope
Richard J. Zeyen, Plant Pathology
NSF
$125,480 - 09/92-02/95

Immunological Investigations of SIRS
Michael P. Murtaugh, Veterinary Pathobiology
Thomas W. Molitor, Clinical and Population Sciences
Robert Morrison, Clinical and Population Sciences
Boehringer Ingelheim, Ltd.
$250,000 - 07/92-07/93

Affiliation between University of Minnesota and Lund University, Sweden
Michael F. Metcalf, Institute of International Studies
U.S. Information Agency
$123,111 - 09/92-08/95

Improved Bioartificial Liver Function in Hepatic Failure
Frank B. Cerra, Surgery
Wei-Shou Hu, Chemical Engineering
Rory P. Remmel, Medicinal Chemistry
NIH, NIDDK
$122,608 - 09/92-09/93

Mechanisms of Eye-Hand Coordination
Apostolos P. Georgopoulos, Physiology
USDOD, Navy
$121,410 - 07/92-07/93

Structural Determinants of Glomerular Permeability
Barbara Daniels, Medicine
Thomas Hostetter, Medicine
NIH, NIDDK
$111,788 - 09/92-09/93

Validation and Extension of Models to Project Climate Change Impacts on Lake and Stream Environments
Heinz Stefan, St. Anthony Falls Hydraulic Lab
Margaret Davis, Ecology, Evolution and Behavior
EPA
$105,900 - 09/92-09/94

Plastic Deformation of Deep Mantle Minerals
Shun-Ichiro Karato, Geology and Geophysics
NSF
$104,401 - 09/92-03/94

Preparing Physicians and Other Health Care Professionals To Work with Special Educators to Improve Services to Young People with Disabilities in Transition to Adult Roles
Robert W. Blum, School of Public Health
U.S. Department of Education
$100,693 - 10/92-09/93

Aging and Wound Healing Angiogenesis
Gregg D. Phillips, Surgery
NIH, NIGMS
$100,000 - 09/92-09/94

Training of Asian Youth Services Workers
Amos D. Deinard, Hospital and Clinic
St of MN, Department of Human Services
$100,000 - 07/92-06/93

Newborn Iron Deficiency in Infants of Diabetic Mothers
Michael Georgieff, Pediatrics
Dana E. Johnson, Pediatrics
Susan A. Berry, Pediatrics
NIH, NICHD
$100,000 - 09/92-09/94

Nature of a Testicular Germ Cell Tumor-Associated Retrovirus
Anthony J. Faras, Institute of Human Genetics
Leukemia Task Force
$23,900 - 07/92-06/93

Reconstructive Neurosurgery for Experimental Cerebral Palsy
Walter Low, Neurosurgery
United Cerebral Palsy Research and Development Fdn
$97,452 - 11/92-10/94

Control of Extracellular Matrix Changes in Steptozotocin
Alfred J. Fish, Pediatrics
Juvenile Diabetes Foundation
$47,801 - 09/92-08/93

Islet and Islet/Kidney Allotransplantation
David E. Sutherland, Surgery
Juvenile Diabetes Foundation
$48,070 - 09/92-08/93

Improving Child Health Services
Stephen C. Joseph, Human Development and Nutrition
Robert Wood Johnson Foundation
$31,200 - 11/92-10/93

DWI Education for Southeast Asian Refugees
Amos S. Deinard, Hospital and Clinic
St of MN, Department of Human Services
$62,000 - 10/92-09/93

Hot Coal Gas Desulfurization: MN-Based Regenerable Sorbent
Malcolm Hepworth, Civil and Mineral Engineering
DOE
$82,000 - 09/92-09/94

Dedicated VLSI Digital Signal and Image Processors
Keshab K. Parhi, Electrical Engineering
NSF
$25,000 - 09/92-02/94

Postdoctorates in Industrial Mathematics
Avner Friedman, Institute for Math and Its Applications
Willard Miller, Jr., Institute for Math and Its Applications
Ford Motor Company
$25,000 - 09/92-12/94

Effects of Silicon on Corrosion of Stainless Steels
J. Woods Halley, Physics and Astronomy
Sumitomo Metal Industries, Ltd.
$30,000 - 09/92-08/93

Development of a Generalized Framework for Identifying and Studying Scale Invariant Relationships in Remotely Sensed Rainfall
Efi Foufoula, St. Anthony Falls Hydraulic Lab
NASA
$85,450 - 10/92-10/93

U.S. Human Rights Policy in Historical and Comparative Perspective
Kathryn Sikkink, Political Science
Social Science Research Council
$45,306 - 09/92-08/94

Role of Causal Attributions in Postrape Recovery
Patricia A. Frazier, Psychology
NIH, NIMH
$76,063 - 09/92-08/93

Detecting Activity of Substances that Influence Rooting Potential in Using *in vitro* Rooting Assays and Expression of a Specific Gene
Wesley P. Hackett, Horticultural Science
Anath Das, Biochemistry (CBS)
Binational Agricultural Research and Development Fdn
$98,910 - 09/92-08/95

Application of Genetic Engineering for Constructing Superior Nitrogen-Fixing Clover Rhizobia
Michael J. Sadowsky, Soil Science
USDA
$66,391 - 10/92-09/94

Design of a Preservice Training Program for Special Education
Richard F. Weatherman, Educational Psychology
U.S. Department of Education
$93,849 - 10/92-09/93

Enhancing Transitions for Students with Mild/Moderate Disabilities
James M. Brown, Vo-Tech Ed
David R. Johnson, Educational Psychology
George Wardlow, Vo-Tech Ed
U.S. Department of Education
$89,841 - 10/92-09/93

Reactivity Based Hazard Assessment for Electrophilic Mutagens
Robert M. Carlson, Chemistry, Duluth
EPA
$81,732 - 09/92-08/93

Population Model and Economic Analysis of Wolf Recovery
David Mladenoff, Center for Water and Environment, Duluth
USDA
$25,000 - 09/92-12/93

Workers' Compensation Medical Cost Containment
Edward Drury, CURA
St of MN, Department of Labor and Industry
$3,034 - 09/92-06/93

The Sponsored Project Information Network (SPIN) is a computerized locator system for funding opportunities (federal, nonfederal and corporate) for faculty and institutional research, development and education program support. It is available free of charge to University faculty and staff through ORTTA.

Based on a description of your research areas and / or the type of support sought, faculty and staff can search the SPIN Keyword Index to identify sources within specific areas of interest. The Keyword Index, a taxonomy developed by SPIN to catalog funding sources, is divided into the following ten major classifications:

- **Agriculture / Food / Forestry**
- **Arts / Culture / Humanities / Communications**
- **Business / Economics / Management**
- **Education**
- **Health / Medical Sciences**
- **International Affairs / Area Studies**
- **Miscellaneous / Other**
- **Science / Technology**
- **Social / Behavioral Sciences**
- **Social Welfare / Public Affairs**

The result of a search is a set of profiles of applicable funding sources that provides: 1) the sponsor's name, 2) the sponsor's contact address and telephone number, 3) deadline dates, 4) program titles, 5) objectives or interest areas of the sponsor, and 6) restrictions that would affect the submission of a proposal. This set of profiles is sent to the requestor.

Effective September 1990, the SPIN indexes became available for on-line review through ORTTA's electronic bulletin board (See the September, 1990 *Research Review* for information on Bulletin Board contents and access instructions—or call 624-9004 for a copy of the instructions.) The Bulletin Board contains a section devoted to SPIN and offers users the opportunity to review the Keyword Index alphabetically or within the topics shown above.

Since the Bulletin Board is accessible at any time, faculty and staff can browse the indexes at their convenience and find *keyword codes* of interest to them. From within the Bulletin Board they can forward a note to the Bulletin Board Editor requesting a SPIN search based on the chosen keyword codes (limit, 20 keywords).

Additional **Specialty Codes** used by SPIN that may help in choosing key words appropriate to the project for which funding is sought are:

- **International Travel:** Opportunities to travel to other countries or to study their cultures.
- **Opportunities Abroad:** Support to travel identified by country, region or continent.
- **Equipment/Facility Support:** Use code that relates to project, not what is being purchased.
- **Professional Development:** Largely postdoctoral opportunities.
- **Student Support:** For students seeking external funding support.
- **Foreign Scholar Support:** For bringing foreign scholars to this country or seeking programs in the U.S. for which they are eligible.
- **Conference Support:** Funding to hold or conduct a conference, symposium or workshop.
- **Publication Support:** Support to prepare or complete a work or for actual cost of publishing a completed work.
- **Sabbatical Support:** To undertake or supplement sabbatical leaves.

For further information regarding the SPIN system, please contact ORTTA at 624-9004.

SPIN searches are also available through the Research and Development Office in the College of Liberal Arts, the Agricultural Experiment Station, and the Grants Development Office at Morris.

ORTTA TELEPHONE NUMBERS

A Quick Reference Guide

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RESEARCH REVIEW

Research and Technology Transfer Administration

January 1993

University-Industry Research:

A Report on the Conference

Some 300 people—faculty, administrators, regents, executives, entrepreneurs, legislators, reporters—met at the University's Hubert H. Humphrey Center last November 19 to discuss collaboration between university and industry. They asked how a land-grant university can balance its public responsibilities with alliances to commercial industry, and why it would want to do so. Answers came chiefly from the meeting's 10 guest speakers: An associate director of technology licensing at MIT told how that university markets technology licenses and how it avoids conflicts of interest in start-up ventures. A Minneapolis attorney with long experience helping faculty contribute to industry described what the faculty-entrepreneur must prepare for in the way of suspicion and scrutiny. Arthur Caplan, Director of the University of Minnesota Center for Biomedical Ethics, presented a list of ethical principles for biomedicine. Erich Bloch, former Director of NSF, spoke, as did NSF and NIH officials who have been revising those agencies' conflict of interest rules.

Many people have asked for an account of the conference proceedings. ORTTA responds in two ways:

First, with this issue of *Research Review* we begin a series of reports on the conference. This issue features four presentations from early in the meeting: Vice President Petersen's and President Hasselmo's opening remarks; Lita Nelsen's description of technology licensing at the Massachusetts Institute of Technology; and Erich Bloch's luncheon address regarding the future of relations among universities, government and industry. Later issues of *Research Review* will report on the remaining presentations.

Second, audio cassettes and videotapes of the conference are available at cost. A set of five audiotapes is $15; a set of four videotapes is $50. To order tapes, call Phil Norcross at 625-2354 or Mike Moore at 624-9398.

A Special Issue On

University-Industry Research:

Balancing Public and Private Trusts

Inside

Helpful Hints for Proposal Delivery

Proposals hand-carried or sent by courier to ORTTA Proposal Receiving will reach the proper destination and allow ORTTA time for review if they are submitted reasonably well in advance of proposal deadlines.

Proposals sent to ORTTA via campus mail or U.S. Mail must be sent particularly early to ensure timely receipt and processing. Since there is no guarantee of timely delivery, however, ORTTA *does not* recommend use of campus mail or U.S. Mail for proposals, especially those with urgent deadlines.

However, if a proposal *is* sent via campus mail, it should be in a separate envelope addressed to **ORTTA Proposal Receiving**. Upon receipt it will be sorted and processed. Proposals *should not* be mailed in an envelope with CUFS expense documents or other materials since this may delay processing.

The ORTTA mailroom does not open any envelope marked "personal" or "confidential." For that reason, sending a proposal so addressed directly to a grant administrator risks missing a deadline if the recipient is out of the office or does not open mail immediately. If you wish to direct a proposal directly to a particular grant administrator, attach a note *inside* the envelope.

Please keep these suggestions in mind when sending proposals to ORTTA and make them known to any others in your department responsible for submitting proposals.

RESEARCH REVIEW

Volume XXII/Number 7

January 1993

Director of Communications: Michael P. Moore

Editor: Phil Norcross

Editorial Assistant: Tove Jespersen

Associate Vice President: A. R. Potami

***Research Review* is a monthly publication of the Office of Research and Technology Transfer Administration. Its purpose is to inform faculty and administrators who are involved with sponsored research and technology transfer on procedures and policies of granting agencies, on institutional policy and other information necessary to the preparation of research proposals, and on funding opportunities.**

***Research Review* welcomes ideas and comments from all readers. Write to *Research Review* at 1100 Washington Avenue South, Suite 201, Minneapolis, MN 55415-1226, or call Phil Norcross at 625-2354 or Michael P. Moore at 624-9398.**

Indirect Cost & Fringe Benefit Rates

Indirect Cost Rates

The *provisional* rates for July 1, 1992, through June 30, 1994, are listed below. When budgeting for periods beyond 6/30/94, the 7/1/92-6/30/94 rates should be used. **The rate agreement is dated May 13, 1992**. This date should be used where required on proposal applications. **Please call Marilyn Surbey, 624-4850, or Richard Miller, 626-9895, with questions on Indirect Costs.**

	07/01/92 06/30/94
Research	
On-Campus	40.00
Off-Campus *	21.00
SAFHL	58.05
Hormel	44.00
Other Sponsored Activity	
On-Campus	20.00
Off-Campus *	10.00
Instruction	
On-Campus	52.00
Off-Campus *	16.00

* A project will be considered off-campus if more than 50% of the direct salaries and wages of personnel employed on the project are incurred at a site neither owned nor leased by the University.

Fringe Benefit Rates

If you have questions regarding fringe benefit rate development or need the breakdown of charges, call **Vivian Fickling at 624-2009**.

Due to a change in policy, new rates must now be approved by DHHS before they can be implemented. Even though the university has released new rates for FY93, they have not been approved by DHHS and the rates below must continue to be used when preparing proposals.

For proposals being submitted with start dates **after July 1, 1992**, the estimated fringe benefit rates to be budgeted are:

Faculty	31.25
Civil Service	29.50
Graduate Assistants	10.50

Estimated rates after **July 1, 1993,** are:

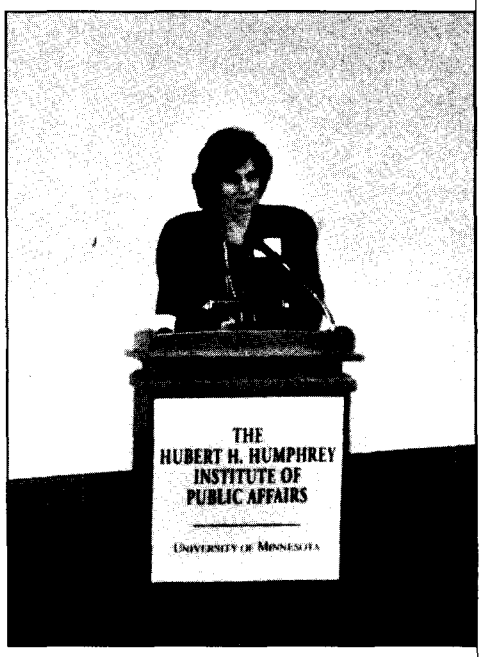
Faculty	28.00
Civil Service	30.50
Graduate Assistants	31.25

Rate changes will be reflected in this section.

Address by Anne Petersen, Vice President for Research, Dean of Graduate School

Given November 19, 1992, at the conference, *University-Industry Research: Balancing Public and Private Trusts*

University-industry research collaborations are not new to the University of Minnesota; indeed, we have a very rich tradition in this area emanating from our land-grant mission. Some of our units have been counting the number of companies started by our graduates or from discoveries by University faculty. As I tried to estimate based on what's been counted so far, it looks like the number could in fact be close to 1,000 companies. For example, we played a role in the birth of companies such as Medtronic and Rosemount.



Our faculty have been involved in the enhancement of many agricultural products as well as the taconite process, which brought millions of tax dollars to the state and provided employment for many citizens. Our faculty have been involved with the development of heart valves, implantable pumps, and other life-saving medical therapies. We've developed significant new centers with industry collaborations at their core, such as the Center for Interfacial Engineering, the Biomedical Engineering Center, the Natural Resources Research Institute, the Dental Research Institute, and the Bioprocess Technology Institute.

Our tradition in working with large companies in Minnesota, such as 3M, Honeywell, and Medtronic, as well as small firms like Biometric Systems, American Biosystems, and Spinal Designs International, has been important to both the University and these companies. We need these collaborations in order to provide important economic and human benefits to the state and beyond.

With this tradition of success, you might be wondering why we need to have a conference to discuss the issues involved. Briefly, there are two reasons: First, we want to extend our knowledge and technology to all Minnesota companies that seek this expertise, and to learn better how we can address the needs of industry in the state. Second, we need to ensure that, while we pursue collaborations with industry, we also protect the central missions of the University: to develop and transmit knowledge; or, in more familiar terms, to learn and to teach. We need to focus on what we do best and not be drawn into areas more appropriately placed in industry.

It was awareness of both the opportunities and the risks of collaborations with industry that led us to begin planning this conference, soon after my arrival at the University early last spring. President Hasselmo emphasized in his recent State of the University address that we must make certain that our policies and practices ensure accountability to the many constituents of the University. He has supported our multi-faceted collaborations with industry, including the commercialization of technology from University laboratories, industry participation in our research centers, industry funding of research of mutual interest to faculty and industry, and student support through scholarships and fellowships, as well as hiring our graduates.

Some of our collaborations with industry have not been as they should, as dramatically described in the Twin Cities media. Although we do not agree with all the charges made by the media, President Hasselmo and others of us in the administration have moved forcefully to address problems. Problems have included actions of individuals as well as weaknesses in institutional policies and practices. I have appointed an internal committee to review our policies and practices related to academic integrity, including scientific misconduct and conflict of interest, and to recommend changes where needed. This committee has already presented one set of changes. President Hasselmo is appointing an external task force to examine the principles underlying our public-private partnerships. We hope that these efforts will increase our capacity to provide the accountability that President Hasselmo has said we must attain, while still permitting responsible collaborations with industry.

The commercialization of University research was transformed at the national level with a series of congressional acts in the early 1980s. The laws enacted by Congress created financial incentives for inventors, a factor that dramatically influenced the research enterprise. Financial incentives alone, however, are not sufficient to create a smooth transition from discovery to commercial product. The cultural barriers between the university and the corporation have created impediments to easy technology transfer, and we acknowledge that some of these barriers reside in the attitudes of those of us in the university.

Especially because the commercialization of research discoveries is relatively new compared to our traditional

{Continued On Page 5}

Address by University of Minnesota President Nils Hasselmo

Given November 19, 1992, at the conference, *University-Industry Research: Balancing Public and Private Trusts*

American research and land grant universities are being called upon with increasing intensity to establish improved collaborative relationships with industry. In the name of technological development, competitiveness and economic development, faculty researchers are asked to engage in the transfer of knowledge, expertise and inventions to private corporations. Bridging these two rather different worlds and balancing the public and the private trusts involved is not easy, but it is certainly vitally important. We are here today to hear about and discuss ways we can meet our public and private obligations, and balance our public and private trusts.

The University of Minnesota is no stranger of course to technology transfer and the economic development that results from the application of innovation in the University. I have become quite accustomed to citing this record as I go about the hustings of the University of Minnesota. We have technology and knowledge transfer going back to the very idea of the Agricultural Extension Service serving the economy as it was in the late 19th century. We have our Agricultural, Horticultural, Mining, and Forestry Experiment Stations that have provided research that has been transferred in a very direct way into the economy. We have transfer of technology in health care that has occurred over many years.

University of Minnesota faculty researchers have contributed many world-significant inventions, including things such as the mass spectrometer, synthetic rubber, the taconite process (which has generated a billion dollars in tax revenues for the State of Minnesota), a host of crop and livestock improvements, the "Black Box" flight recorder (which I think about every time I get on an airplane), the retractable seat belt (which I think about every time I get into my car), the blood oxygenator that made open-heart surgery possible, the wearable heart pacemaker that led to Medtronic's implantable pacemaker, the gas temperature probe that led to another local billion-dollar corporation called Rosemount, the implantable drug infusion pump, and bretylium, the heart drug first used in an emergency to revive former President Eisenhower and that has saved thousands of lives ever since.

This is an impressive record of technology transfer. If I had time I could go on to list many more historical innovations that have come out of the University of Minnesota, and I could start to list the more than 100 inventions the University of Minnesota now has licensed to more than 140 different companies. Among these we hope will be similar success stories for the 1990s and beyond, and I would love it if we could have another invention that would generate another billion dollars in tax revenues for Minnesota.

While ours is a long tradition of public-private partnerships, our populist Midwestern culture, so well captured by Garrison Keillor, remains skeptical of large and presumably powerful institutions, public and private. And doubly so, of course, when such organizations work directly together. It is one thing when the University works with a private business called the family farm; it is quite another when the University strikes up a relationship with a private business called a multinational corporation. This is simply Minnesota culture. Those who are skeptical are suspicious of faculty sharing royalties or any form of income from intellectual property, and of institutions somehow abandoning their public mission in the search for private dollars.

I have said publicly and I will continue to say that the University of Minnesota needs to make no apology for affiliations with private industry. This is part of our mission, always has been. It has a key impact on the Minnesota and national economies and on our quality of life. The benefits of our $273 million-a-year research program have been significant in both human and economic terms, creating at least 10,000 jobs in the short term and creating knowledge that will result in inestimable economic impact in the long term. Much the same can be said of our extra efforts to transfer the benefits of innovation from the laboratory to industry. But it is important to keep industry funding in perspective. Industry-funded research accounts for only six and one-half percent of our $273 million research program.

The University of Minnesota needs to make no apology for affiliations with private industry. This is part of our mission, always has been.

As those of you know who have been involved with negotiating, administering or carrying out university-industry collaborations, all are complex and each is probably unique. Some are brand spanking new, involving interactions that were not even imagined when policies were put into effect. Many safeguards are needed to protect the integrity of a public institution's research and industry's legitimate proprietary interests. Today's sessions will discuss those safeguards, especially the disclosures and the oversight needed to ensure that conflicts of interest do not interfere with the integrity of the research process and the fair dissemination of results.

{Next Page}

The University of Minnesota has strengthened its policies in this area, as recently as last spring adopting a policy through the University Senate on academic misconduct. We are committed to updating these policies and procedures, these safeguards, as we learn more. This is, as I have said, truly a journey of discovery in which we are involved. We have to learn here how to nurture and protect the vital interests of our mission.

Before I close, I want to put university-industry collaborations into the overall perspective of the University of Minnesota's mission. When a student comes to the University, she or he is presented with a wide range of learning opportunities and programs. As a leading research university, we present to students the very latest in scholarly thinking, knowledge and technology in the arts, sciences and the professions. Through their direct contact with professors and with other students in the classroom, in the laboratory, in archives and libraries, and in field work, students can contribute to this search for new knowledge, adding excitement and relevance to their own growing understanding of our world.

It is simplistic and misleading to pit research against teaching, or to pit private interests against public good.

As part of their research efforts many of our faculty members serve the public through collaborations, consulting and other outreach efforts that involve schools, not-for-profit corporations, and private industry. In so doing, faculty members acquire first-hand experience with the state of the art in their fields of expertise and also learn about the human and technological challenges addressed in the workplace. These faculty members can then help to advance their own field through research and technology transfer, while also making sure their students are inspired and prepared to succeed in their chosen careers.

In other words, it is simplistic and misleading to pit research against teaching, or to pit private interests against public good. In a time of scarce resources we must continually strive to balance the many demands of our mission and to assure that the public's investment in research, teaching, outreach and public service, and economic development is well protected, and that the public's interest is well served.

I want to thank the speakers and participants in the conference today; this is an important conference. I thank you for helping us achieve the practices and the policies needed to protect and enhance the public and private interests that have been entrusted to our research university. I welcome you and I wish you a happy conference. Thank you very much.

ORTTA Bulletin Board Available Through Gopher

ORTTA has established an experimental gopher server available 24 hours a day to supply research information, deadlines, telephone numbers, and links to other useful information systems.

The Internet Gopher is a U of M-developed product which provides very flexible distributed information delivery, combining articles, searches and seamless links to other gopher servers throughout the world. Users can review information on screen or easily copy items to their computers for other purposes. ORTTA's gopher can be found directly at gopher.ortta.umn.edu or in the "Department and College Information" section of the CIS gopher server (gopher.tc.umn.edu, or item 12 on the AIS public access service).

In addition to the information currently available on ORTTA's AIS public access bulletin board, the new gopher server provides links to gopher servers at NIH and NSF and a telnet link to the NSF STIS system.

Over the next few months, the gopher server will become more streamlined as we link users directly to source data rather than reprinting articles. Search capabilities on our gopher are currently unavailable but will be added shortly.

For more information on the gopher system or information on accessing the campus computer network, please call the Microcomputer Help Line at 626-4276. Please e-mail your comments and suggestions about this new service to gopher@ortta.umn.edu

—Dan Cummings

Petersen {Continued From Page 3}

teaching and research missions, it's timely for us to be considering these issues with our invited participants, recognized nationally for their expertise on these matters. We acknowledge that these issues are complex and cannot be resolved now for all time. Instead, we consider this conference as the beginning of the process of considering these matters within the University, and with our colleagues in industry and other sectors. We are grateful to our eminent participants for their contributions to our deliberations.

President Hasselmo said in an editorial last June that a healthy working relationship between the University of Minnesota and private industry is vital to all Minnesotans. It's my pleasure now to introduce to you President Nils Hasselmo, who will describe his view of university-industry relationships and set the stage for this conference.

Licensing University Technology to Industry

Presentation by Lita Nelsen

Associate Director of Technology Licensing, Massachusetts Institute of Technology

Given November 19, 1992, at the conference, *University-Industry Research: Balancing Public and Private Trusts*

Lita Nelsen's primary responsibility at MIT is licensing biomedical inventions. She has marketed and negotiated more than 100 licenses and the start-up of more than a dozen biotechnology companies. Nelsen earned a B.S. and an M.S. in chemical engineering, and an M.S. in management, all from MIT. She spent 20 years in industry, and is widely published in the fields of membrane separation and technology transfer. She is currently president of the Association of University Technology Managers (AUTM). She has also served on commercialization and technology transfer panels for the National Academy of Sciences and the U.S. Office of Technology Assessment.

This report of Nelsen's presentation reorganizes it into two parts, the first focusing on ethics and conflict of interest, the second on how to market licenses and create start-up companies.

Part I: Ethics and Conflict of Interest

Lita Nelsen presented 11 rules for avoiding conflicts of interest and for safe-guarding the university's mission in the course of its collaborations with industry. Then she summed up her rules thus:

"Every deal is different, and there are going to be a million gray areas that you can't possibly imagine when you set up your conflict of interest rules. If you try to imagine them you are going to have a bureaucratic nightmare. . . . What you need is a clear place within the university where gray areas get faced up to, decisions get made, and they get enforced." She recommended that we assume people's honesty and good intentions, and have clear, routine, nonaccusatory oversight procedures.

Nelsen further explained that conflict of interest rules will not prevent unethical people from abusing privilege, but they will help honest people stay honest. "Set a written policy that tells honest people what they can and cannot do. . . . prevent your honest people from getting into gray, uncomfortable areas."

Some of the emphasis on misconduct, especially misconduct by institutions rather than individuals, was diluted by Nelsen's account of the riches to be gained. Nelsen asserted that income is not the chief motive behind technology licensing by universities. "The university cannot really be expected to make much money out of this," she said. "A realistic objective is maybe a couple of percent of your research budget, perhaps in the long range five percent." Nelsen said that MIT's royalty income is about $6 million per year, about two percent of its research budget. "If we were in it for the money, there's a lot easier ways to bring in $6 million."

The Motives Behind Technology Licensing and Development

Universities entered the technology licensing business chiefly because of the Bayh-Dole Act of 1980 (PL 96-517), said Nelsen, which gave universities title to inventions arising out of federally funded research. The law's intent was to encourage technology transfer and development, which tend not to occur unless the required investments of time and money are protected by patents and licenses.

As a result, said Nelsen, "There's been a rapid growth in the number of U.S. patents granted to universities." Nelsen displayed data indicating that about 380 U.S. patents were granted to universities in 1980, compared to 1,346 in 1991. Of the 1991 total, 105 patents went to MIT and 31 to the University of Minnesota, making UM tenth-ranked in the nation. (The data were compiled for AUTM by Kathleen Terry and Ronald Coslick.) MIT now has 350 active patent licensing agreements; the University of Minnesota has 172.

Nelsen listed five reasons why universities patent and license technology: 1) to serve the public good, 2) to attract research funding from industry, 3) to motivate faculty, 4) to educate faculty and students about industrial problems, and 5) last and least, to bring income to the university.

Nelsen discounted the profit motive, both for MIT the institution and for its faculty. "Does it [licensing] make money?" asked Nelsen. "Not yet. Our objective is not to lose money while doing all these other good things." For faculty, "there is very low probability that much [money] will come out of it." There are, however, consulting opportunities, employment prospects for students, and the chance for faculty to see their ideas become realities.

Nelsen did not completely disregard the profits of licensing. They are "the best type of money—discretionary money." One-third of patent royalties at MIT [and the University of Minnesota] go to the inventor. [At UM an additional quarter goes to the inventor's research.] And MIT's current royalty income of $6 million per year will likely grow. "The average license agreement [at MIT] is only about three and a half years old," said Nelsen. "If 10 percent succeed, we should be in pretty good shape in a few years."

Nelsen cautioned, however, not to judge the value of patent royalties according to a few rare "blockbusters," like the Co-

{Continued On Page 12}

A Realist's Vision for the Future

Keynote Address by Erich Bloch

Distinguished Fellow, Council on Competitiveness; former director of NSF

Given November 19, 1992, at the conference *University-Industry Research: Balancing Public and Private Trusts*

Before joining the Council on Competitiveness—a private, not-for-profit organization seeking to improve the United States' competitiveness in the global market—Erich Bloch spent six years, 1984-1990, as director of the National Science Foundation. Prior to that he served as a vice president at IBM Corporation and as chairman of the Semiconductor Research Cooperative. Bloch joined IBM as an electrical engineer in 1952 and was elected a vice president in 1981. For his role in developing the IBM/360 computer, former President Reagan awarded Bloch the National Medal of Technology in 1985. Bloch has honorary doctorate degrees from nine colleges and universities, including the University of Notre Dame, Rensselaer Polytechnic Institute, and George Washington University.

The following is a transcript from audiotape of Bloch's address.

I'm not going to talk much about university-industry research, because I think you have heard quite a bit about it this morning and you'll hear more about it this afternoon. I thought I would focus on the changes that we as a country, many of our institutions, and most of our industry sectors and companies are experiencing and will be experiencing. And now with the elections, the administration will be on the go. Let me suggest to you that this will even affect academic institutions. So what I want to talk first essentially is about some of the structural changes around us; how they destroy old relationships, old rationale, and old paradigms.

I don't have to remind you that for the last 45 years the fundamental organizing principle of this country and that of our allies was containment; containment of an expansionary Soviet Union and the communist world. This organizing principle ties not only our foreign policy as we obviously realize, but more than we probably thought, also our domestic policy, our trade policy and certainly our science policy. Containment is no longer a valid concept on which to base the strategies of the country and that of our allies, or that of our science policy. As a consequence, many of the strategies that we have evolved in response to this concept of containment and this necessity of containment are under scrutiny and subject to fundamental change.

One of these strategies we have to rethink are the science policies which originated with Vannevar Bush. (By the way, before the elections I always named my talk "From Bush to Bush," but we have to move with the times so that's an old joke). Let me just remind you that in 1945 Vannevar Bush wrote "Science, The Endless Frontier," [New York, Arno Press, 1980 reprint of 1945 ed.] and laid the groundwork for our first federal science policy. In this report Bush was very clear what the reason was for our science policy: "new products, new industry, and more jobs require continued addition to knowledge of the laws of nature and the application of that knowledge to practical purposes, and that the impetus for that can come promptly only from the government, since basic research is essentially noncommercial in nature." Bush was also very explicit in relating the goals of science policy with national goals, quite in contrast with some of our colleagues today. For Bush, the purpose for government-funded basic research was "for military preparedness and to achieve our goal of full employment." Five years later, as you know, that particular report was an act that laid the foundation for the National Science Foundation (NSF) and other things.

Our science policy has brought us many benefits over the years, and I don't have to tell you what they were. They certainly made us a world leader in science, made our university education and research systems the best in the world. It allowed us to supply not only ourselves, but many other countries, with well-trained scientists, researchers, and engineers, on and on. However, we did not perceive the need for government-supported technology policy. In fact, Bush in the same document made short shrift of that, and I quote again: "Industry will fully rise to the challenge of applying new knowledge to new products, so commercial incentives can be relied on for that."

The fallout from our defense expenditures and the self-sufficiency of the private sector obviated the need for the government to support technology policy, or even to have a well-spelled-out technology policy. After all, many of the defense applications preceded applications in the civilian product sector. Also, the U.S. was ahead of other countries in capabilities and investment, and our companies—many of our companies—were able to capture spin-offs from defense and basic research sufficiently to keep themselves ahead.

Today we are faced with new realities. Leading edge technologies find the first application in the civilian sector, no longer in defense. The resources needed to develop new technologies are far greater than individual companies or even a single industry sector can afford, and that's why you see many companies getting together and funding some of these very expensive kind of undertakings. The increased competition around the world obviously is leading to shorter and shorter-lived product cycles, which presses on

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Committee on the Use of Human Subjects in Research

Use of Ionizing Radiation on Human Subjects

To facilitate the review of applications for research involving radiation exposure to human subjects, the Committee on the Use of Human Subjects in Research (CUHSR) and the Human Use Subcommittee (HUS) of the All University Radiation Protection Advisory Committee (AURPAC) have developed revised guidelines for applications to both committees. The intent of the new guidelines is to streamline the application process and to allow for CUHSR approval of low-risk radiation exposure. New application sheets for approval from the HUS-AURPAC are being developed for use in early 1993. The new application will serve as an appendix to the Committee on the Use of Human Subjects in Research (CUHSR) application form. It is hoped that the new system will limit paperwork and give both committees appropriate information for approval purposes.

General

Under the new guidelines, additional review by the HUS-AURPAC will not be necessary if the Committee on the Use of Human Subjects in Research (CUHSR) approves a project when the study involves low-level radiation exposure or routine clinical care (see *A* below). However, exposure of vulnerable subjects, even in low-risk situations, will require review by the HUS-AURPAC (see *B* below).

Specific Examples

A. The following are examples of circumstances where separate review by the HUS-AURPAC is *not* required:

1. Single plane-film radiographic procedures that *do not* involve cineradiography, fluoroscopy, or any form of tomography, such as
   a. Chest PA and lateral films,
   b. Abdominal and pelvic PA films,
   c. Peripheral skeletal films,
   d. Skull series (up to two views),
   e. Dental panoramic radiograph and bite wing.
2. Nuclear medicine protocols involving less than 5 mCi of ^{99m}Tc-labelled material, such as
   a. ^{99m}Tc-DTPA studies of GFR (1 mCi each),
   b. ^{99m}Tc-DTPA aerosol lung studies (1-2 mCi each).
3. Photon absorptiometry bone mineral analysis, as long as it is not done in conjunction with any other procedures involving ionizing radiation.
4. Cancer therapy studies that follow a protocol which has already been reviewed by a national study group (e.g., RTOG, CALGB), *provided* the study group's review criteria have been approved by the HUS-AURPAC. To ensure that the criteria used by each study group are acceptable, the study group's criteria will be reviewed the first time an application involving one of its protocols is submitted; investigators and the CUHSR will be notified of its acceptability for that and future applications.
5. Cancer therapy studies where the radiation to be given follows a standard, clinically approved treatment protocol, but which include additional procedures that could potentially render tissues more sensitive to radiation, e.g. hyperthermia, chemotherapy. Those risks will be evaluated by the CUHSR in consultation with the HUS-AURPAC.

B. All applications involving vulnerable subjects require review by the HUS-AURPAC. Review is required if:

1. The subject is pregnant. Exposure of pregnant women to ionizing radiation for research purposes is generally not allowed. The investigator must take steps to ensure that female subjects are not pregnant at the start of the study and are informed of the risks and the reasons for exclusion should they become pregnant during the study.
2. The subject is breast-feeding. The use of radionuclides on breast-feeding women is generally not allowed. However, the use of X-rays, as in specific examples *A.1* and *A.3* above, would be allowed, and such applications need not be sent for review.
3. The subject is under the age of 18. Exposure of minors to ionizing radiation solely for research purposes is generally not allowed.
4. Any subject who will be exposed to multiple research procedures involving ionizing radiation such that the total whole-body radiation dose received *in those research procedures* will exceed 500 mRem/year. It is the responsibility of the investigator to screen all subjects to determine whether they have had any ionizing radiation exposure from research procedures in the past 12 months. If the total annual radiation dose from research studies will not exceed 500 mRem, separate review by the HUS-AURPAC will not be required. Radiation exposure received from medically indicated procedures or natural background radiation should not be included in calculating the *total research dose*.

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National Institutes of Health

NRSA Requirements for Instruction in the Responsible Conduct of Research

Since July 1990, the National Institutes of Health has required that all applications for Institutional National Research Service Award (NRSA) Research Training Grants (T32, T34) include a description of a program to provide instruction in the responsible conduct of research.

NIH has updated this commitment to ensure that all NRSA supported trainees are provided an opportunity for training in the responsible conduct of research. Plans for instruction in the responsible conduct of research will continue to be required in all applications for institutional NRSA research training grants. However, beginning with applications received on or after January 10, 1993, the requirements will be modified as follows:

- Applications without plans for instruction in the responsible conduct of research will be considered incomplete and will be returned to the applicant without review.
- Every predoctoral and postdoctoral NRSA trainee supported by a T32 or T34 institutional research training grant must receive instruction in the responsible conduct of research.
- Plans that incorporate instruction in the responsible conduct of research for all graduate students and postdoctorates in a training program or department, regardless of the source of support, are particularly encouraged.
- Although NIH will not establish specific curriculum or format requirements, all programs are strongly encouraged to consider instruction in the following areas: conflict of interest, responsible authorship, policies for handling misconduct, policies regarding the use of human and animal subjects and data management.
- Plans must address: the subject matter of the instruction, the format of the instruction, the degree of faculty participation, trainee attendance and the frequency of instruction. A rationale for the proposed plan of instruction must be provided.
- Progress reports on the type of instruction provided, topics covered, and other relevant information such as attendance by trainees and faculty participation must be included in future competing and noncompeting applications.

The procedures for the review of the plans for instruction in the responsible conduct of research will be as follows:

- At initial review, one or more reviewer(s) will be assigned to evaluate the plan for providing training in the responsible conduct of research.
- The plan will be discussed after the overall determination of merit so that the quality of the plan will not be a factor in the determination of the priority score.
- The assessment of the plan will include consideration of the appropriateness of the topics, the format, the amount and nature of faculty participation, and the frequency and duration of instruction. Plans will be judged either acceptable or unacceptable.
- The plan and its acceptability will be described in an administrative note in the summary statement.
- Regardless of the priority score, applications with unacceptable plans will not be funded until a revised, acceptable plan is provided by the applicant. The acceptability of the revised plan will be judged by staff within the awarding component at NIH.

The contact for general information about this policy is Dr. Walter T. Schaffer, Director, Research Training and Special Programs Office, NIH, Building 31, Room 5B44, Bethesda, MD 20892; 301/496-9743. Questions regarding a specific training program or grant application should be directed to the appropriate NIH Institute.

Human Subjects Committee

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It should be noted that the guidelines do not represent a change in the requirements for review; they represent a shift in authority for the review. The shift to the CUHSR from the HUS-AURPAC should result in more streamlined review and fewer delays. The Committee on the Use of Human Subjects in Research asks for your patience as we begin our new role. We will continue to consult with the HUS-AURPAC in any case where risk is in question.

Research conducted at another site will require review and approval by the equivalent radiation review committee at that site. Documentation of that review should be provided for CUHSR records.

The Committee thanks the HUS-AURPAC, especially Douglas Wangensteen and Jerry Staiger, for developing these guidelines and for their continued assistance in ensuring that the rights and welfare of subjects are protected.

Questions regarding this or any other policy or procedure involving human subjects should be directed to Moira Keane at 624-1889.

Commission Recommends Basic and Applied Science for NSF

The Commission on the Future of the National Science Foundation presented its report, "A Foundation for the 21st Century," to the National Science Board (NSB) on November 20, 1992. The 11-page report supports both continued funding of basic research, and increased cooperation between science and industry.

At the meeting where the report was released, NSF Director Walter Massey said his current budget is not sufficient to carry out the duties outlined in the report.

NSB created the 15-member Commission on the Future last August, at Massey's request. The NSB is NSF's policy-making body. Massey's request grew out of Congress' pressure for NSF to participate more actively in industrial application of basic science.

The Commission on the Future was cochaired by William Danforth, Chancellor of Washington University, St. Louis, and Robert Galvin, Chair of the Executive Committee of Motorola, Inc. It held three public meetings and solicited written comment. It received about 800 letters.

Two prominent news reports emphasize the conservativism, with a touch of ambivalence, of the commission's report.

Science said that "The report is therefore likely to be widely read as a rebuff to Massey's suggestion that NSF broaden its scope to include more activities of direct relevance to industry. . . . But neither is the report likely to satisfy those who argue that NSF's research portfolio should be determined solely by whatever scientists themselves think are the hottest fields."*

The *Chronicle of Higher Education* summarized the commission's words thus: "The National Science Foundation should stick to research and education and not try to develop technologies for industry. . . . However, the commission said, the foundation should continue to encourage research partnerships between business and academe."*

On the rise of university-industry research partnerships, the report said that "Led and attracted by the visibility of a better-integrated and more adequately funded government-university partnership, we see promise of a more willing contributing partner from among the progressive businesses of all sizes."

During discussions about the best means of technology transfer, Danforth remarked that "The best way to transfer ideas is to transfer people." In that vein, the commission recommended cross-disciplinary collaboration; exchange of people among universities, industry and government; research with active industrial participation; and circulating scientific discoveries more effectively through publication, conferences and networking.

In other parts of the report, the commission explained how NSF already contributes to industrial technology: "Commercial technology is to a significant degree the result of the work of NSF. NSF and its research and education programs do have much to do with making possible new technologies." "Failures in the marketplace have not been the result of slow transfer of academic science to industry. In fact, American firms have been the first to commercialize virtually all innovative products, but have lost market share to competitors with shorter product cycles, lower costs, and superior quality."

Drawing a connection between applied research and education, the commission wrote "We endorse graduate fellowship and traineeships. Students are quite responsive to perceived national needs in their selection of fields of research."

Drawing a similar connection between applied research and public relations, the commission wrote "The foundation should more aggressively lead in communicating the 'case' for science and engineering, which deserve a high priority in the mind of public officials and citizens alike. There is a widespread lack of appreciation of the complex interconnected processes by which new knowledge eventually leads to societal benefits. This exists in the university and scientific communities as well as in the halls of government."

Asked what will come of the report, the chair of the NSB, James Duderstadt, said "The first order of business is to circulate the commission report as broadly as possible. It is going to be the major point of discussion at the board meetings for the next months, and we will begin to hold a series of regional meetings to get the community's views. This is just the first effort to deal with these issues." Duderstadt is president of the University of Michigan.

To get a copy of the report by the Commission on the Future, phone NSF at 202/357-9763 or Phil Norcross at 625-2354.

* *Compiled from the* Washington Fax*; from Colleen Cordes, "Panel Says NSF Should Maintain focus on Research and Education,"* Chronicle of Higher Education 39 *(2 Dec. 1992):A32; and from Colin Norman, "Commission Sees NSF's Future in Its Past,"* Science 258 *(27 Nov. 1992): 1434.*

The "General Recommendations" of the Commission on the Future of the National Science Foundation

1. The United States should have a stronger and more coherent policy wherein science and engineering can contribute more fully to America's strength. The [National Science] Board is encouraged to work with the President, his science advisor, and the Federal Coordinating Council on Science, Engineering and Technology (FCCSET) to assess the health of science and engineering broadly and to generate a stronger policy into which the NSF mission fits.

2. Society's voice is welcome and needed. Society's support for NSF and for university research is based on the confident expectation that the generation of new knowledge and the education of a skilled work force are necessary (though not sufficient) investments to achieve our national goals of a high quality of life in a productive and growing economy. In accepting society's support, the scientific community naturally assumes an obligation to be responsive to national needs voiced by society as well as the intellectual priorities solely initiated by the scientist or engineer.

   Concern over technology application and competitiveness sometimes conjures a choice that budgeting is decided on either the criteria to please the scientists or to serve the public need. In reality these criteria and interests are congruent.

   The history of science and its uses suggests that NSF should have two goals in the allocation of its resources. One is to support first-rate research at many points on the frontiers of knowledge, identified and defined by the best researchers. The second goal is a balanced allocation of resources in strategic research areas in response to scientific opportunities to meet national goals.

   It is in the national interest to pursue both goals with vigor and in a balanced way. The allocation of resources should be reviewed regularly with these two goals in mind. Positive responses to both will enhance the standing of science.

3. The Commission strongly supports the initiation of proposals by investigators and selection of those to be funded by merit review carried out by experts. This method has proved to be the best way of tapping into the creativity of research scientists and engineers.

4. NSB, NSF, and the science and engineering community must better come to grips with the reality that many fields not covered by traditional disciplines offer challenges for new knowledge and opportunities for creative, investigative research worthy of the most gifted scholar. These fields should be valid candidates for support.

5. Since the private sector plays the major role in the translation of knowledge into new products and services, and since the speed and efficiency of this process is an important factor in a productive and growing economy, it is appropriate that the NSB involve the private sector more fully than heretofore in the decisions which affect the classes of research allocation as well as some evaluation of the effectiveness of the expenditures. It is more than incidentally significant that scientific advances are as likely to be driven by advances in technology as the reverse and the interplay between parties who are conversant in both fields holds promise of synergy.

From *A Foundation for the 21st Century: A Progressive Framework for the National Science Foundation.* A Report of the National Science Board Commission on the Future of the National Science Foundation. November 20, 1992. William H. Danforth, Robert Galvin, cochairpersons. Prepublication Copy.

Commenting on its recommendation that the size of NSF grants be examined, the Commission on the Future of the National Science Foundation wrote, "many believe that on average, NSF individual research grants are too small."

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hen-Boyer patent—the original gene splicing patent—for Stanford and the University of California, the vitamin D patent for the University of Wisconsin, and Gatorade® for the University of Florida.

Problematic Issues in University Licensing

When it licenses technology or creates start-up companies, "the university must preserve its freedom to disseminate knowledge [and] to continue (and fund) its basic mission of discovery 'wherever science leads.'" Thus Nelsen summed up the university's mission.

Nelsen sees little room for compromise on the issue of keeping research in confidence: "The companies will explain to us eloquently how important confidentiality of data is. And we do understand. Most of us came out of industry. [But] the answer is no. It's impossible to allow confidentiality of research and data in an open university whose major mission is discovery and dissemination of knowledge."

Nelsen said MIT will sometimes allow an industrial sponsor a 30-day to 60-day delay of publication for the purpose of filing patent applications, but not in "a very hot field" where delay is risky. MIT will keep a licensee's identity and progress reports in confidence and will restrict distribution of biological materials to industry. But it will not restrict distribution of biological materials to other nonprofit researchers, nor will it restrict the transfer of unwritten knowledge or "know-how," like "the fact that you stir counter-clockwise with your left thumb to make it work," said Nelsen.

Nelsen pointed out that companies usually want exclusive rights to a patent, but that can present problems for the university. If the patent is too broad, the company's exclusive rights will inhibit university research. "The compromise is that generally we will grant full exclusivity although we may limit it by fields of use," said Nelsen. "If this is, say, a gene-jockeying invention that will go in plants, animals and humans, and if the company is only in human pharmaceuticals, we reserve the agricultural and veterinary fields."

Regarding "improvements" to a licensed patent, Nelsen said, "we will generally give some options to future improvements," but only under strict conditions. The improvements must be dominated by the existing patent, must come out of the original PI's lab, must be licensed within two to five years of the original license, are subject to future sponsors' rights, and are subject to additional expenditure and performance requirements.

Start-Up Companies, Equity Ownership and Conflicts of Interest

The creation of start-up companies and equity ownership of companies by universities and faculty are "the sexiest areas in university licensing," said Nelsen. "But it's probably given more attention than it deserves." Nonetheless, Nelsen detailed the risks of equity ownership and MIT's safeguards against the conflicts of interest it may present.

"What really happens with equity ownership is visions of sugar plums. Major increases in wealth can happen prior to real testing of the product," said Nelsen. "You can still be in the development phase, [and] based on a little data here, a news release there, the stock prices can change." The temptation of sudden wealth can lead, said Nelsen, "to concealing knowledge from colleagues, changing the direction of the research towards development rather than peer reviewed research, deflection of faculty focus and interests, and the misuse of resources and graduate students."

Nelson presented 11 rules that help MIT avoid conflicts of interest [see box, page 13].

Part II: Patent and License Marketing

The first issue in patent licensing, said Nelsen, is who owns the intellectual property? Federal law says universities own the results of federally funded research. But for private sponsors, said Nelsen, "the policy varies widely. Most universities insist that they still retain title to the property, with the industrial sponsor getting perhaps an automatic nonexclusive license and an option to an exclusive license." MIT also takes title to inventions resulting from "significant use of our facilities."

When MIT seeks licensees to develop and commercialize its technology, it looks, said Nelsen, "*not* to get the most [money] that we can up front, but instead [to get] the *maximum exploitation of the technology*." She added that "unofficially there's a strong preference to license to those organizations with which the inventor is interested in working enthusiastically. And if the inventor wants to get his own company off the ground, within our conflict of interest guidelines, the preference will be that way."

In pursuit of maximum exploitation, MIT prefers "license maintenance fees" to high up-front fees for a license. Low up-front fees encourage development work to begin; maintenance fees encourage it to continue. If a licensee loses interest in an invention, said Nelsen, "we can call them up and say 'You've got a $25,000 fee due next January 21st. How would you like to give it [the license] back?'"

The chief impediment to marketing university-patented technology, said Nelsen, is that the technology is usually "embryonic." Inventors cannot define its utility, there is seldom a prototype, and no one is sure it will work. "So it involves very high risk to the licensee," said Nelsen. It is a point she stressed often.

To lower that risk, Nelsen and her colleagues stress the importance of international patent protection: "It's a world-wide world, and you need a world-wide patent," as Nelsen put it. But in order to get international protection,

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applications must be filed *before any publication* about the invention. [Applications for U.S. patents may be filed up to a year after publication.] Thus international protection requires that inventors come to Nelsen's office before they publish. "Preferably a couple months before. But if it's 48 hours before, we'll file the patent."

To sell licenses, Nelsen and her colleagues also stress what they call "rifle-shot" marketing—marketing directed at specific targets, rather than widely spread in a shotgun approach. "The usual things you think of—lists, technology fairs—don't work," said Nelsen. Embryonic inventions are "only going to interest companies that understand and are already working in that area."

When and How to Create Start-Up Companies

"We look at start-ups when we've got a broad new patent that might form a business, not just a product," said Nelsen. Start-up companies are for early-stage, high-risk technology with multiple applications and no existing industry. Of the about 170 patents Nelsen's office applies for in a year, she said six or eight might merit start-up companies—"if the faculty member is very interested."

Nelsen listed the following advantages to a start-up company: It is committed to the technology in question. The company may go on to bigger and better things—the "upside potential." And multiple products can be developed simultaneously through alliances with multiple other companies—the "hub and spoke" concept. Through such alliances, the start-up company conserves cash and the larger partners contribute development funds in return for marketing and manufacturing rights. As the start-up company grows, it becomes able to develop products itself.

Nelsen also listed the following disadvantages to start-ups: "Little companies go broke. Little companies are highly dependent on the economic climate. They are extremely dependent on individual personalities and competence; and of course [there is] the conflict of interest, real and perceived."

Nelsen described how a start-up company gets capitalized. Usually, a company goes looking for capital when it is at "zero-stage"—it has a new technology, a business plan, and a management team. But the university has only the new technology, hence it is at the "minus-two stage." A minus-two idea can be either sold or built up.

To build up from the minus-two stage, a university might invest its own funds, write the business plan, and/or assemble the management team. ("Although I don't believe that most university people are good executive recruiters," said Nelsen.) A university might set up its own incubator facilities, development companies, or capital venture funds.

Nelsen said that technology can be successfully licensed at the minus-two stage, without further development by the

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MIT Conflict of Interest Rules, Official and *Ad Hoc*

To avoid conflicts of interest, MIT uses the following 11 rules, some of them official, some *ad hoc*, said Lita Nelsen, Associate Director of Technology Licensing at MIT.

1. A faculty member may consult, but not be a line officer in any company. "They can consult one day a week, but they do not have people reporting to them in the company."

2. Equity deals in license agreements are subject to departmental overview.

3. Faculty must distinguish, in writing, to the satisfaction of their department heads, research at the university from responsibilities at a company in which they own equity.

4. If the faculty or the university own equity in a company, we will not accept sponsored research from that company in the field of the license. This item, said Nelsen, is "extremely important, and different from what most universities are doing."

5. No confidentiality of research results is allowed; 30 to 90 days is the maximum delay of publication.

6. Only patents, copyrights, and tangible property can be licensed, not know-how.

7. Consulting cannot be part of a licensing deal. "If the professor wants to consult, fine. If they want to hire him as a consultant, fine. But we won't tie it in [with the license]."

8. There is an affirmative obligation within Nelsen's office to prevent "pipelining" of new inventions to any company that is not the best company to exploit the technology. Commitments regarding future inventions are minimized and new inventions must "shop around" for licensees.

9. Faculty who hold equity must sign a "conflict avoidance statement" with which they promise not to accept research support from that company, not to suppress research findings, and not to use students on company-related work. "It [the statement] is one page, written in English."

10. Faculty's outside interests are reviewed annually by departments.

11. Use common sense: Emphasize the spirit, not just the letter, of the rules, and administer them with judgment and authority. "We are not interested in clever schemes for getting around the letter of the law."

Nelsen

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university, if the technology is clearly world-class, the intellectual property is secure, the given technical field is "hot," the university has clear policies and efficient processes for licensing, and the inventor is enthusiastic.

"Secrets" of Successful University Licensing

Nelsen closed her presentation by listing several "secrets" to success:

"Most important is clear policy," said Nelsen. "The university decides what is allowed, what isn't allowed, what its primary objectives are and how those primary objectives will take preference over secondary objectives, such that you can then give autonomy to people at the front line. In our office people can commit at the [negotiating] table so that we get the deals done.

"Second, stay close to the inventor. You're selling as much the inventor's knowledge and enthusiasm as you are the technology."

Third, said Nelsen, use "flexible licensing terms" that recognize the investment required, that share the risk and the reward, and that are shaped to match the business.

"[The] last secret—wish we could make it scientific—is people, people, people," said Nelsen. "We've now been at this long enough with enough people to have run retrospective controlled experiments. [There were] areas which never sold and we decided maybe we shouldn't file patents on. But we didn't stop filing patents. Instead we changed the people. And suddenly those are hot areas. You need people who understand technology, who are cross-cultural—industry and academia are as much two cultures as the U.S. and Japan—who are flexible, smart, and trustworthy. What you need is people with built in sleaze detectors so that they have a good feeling for what is reasonable, what is not, what really lies within the spirit of what the university does.

"If you get those people," said Nelsen, "give them autonomy, and I guarantee you they will have the most fun they've ever had in their lives."

By Phil Norcross

Lumina Going Down January 16-18

Do not depend on Lumina to help you finish last-minute grant proposals in mid-January. Lumina, the libraries' on-line catalog, will be down from Saturday, January 16, through Monday, January 18. Lumina will be down because Administrative Information Services (AIS), on whose mainframe Lumina resides, is moving from its present quarters at 1919 University Avenue, to the FMC building near the West Bank.

Bloch

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resources. Competitors succeed not by besting us in basic research, but by focusing their attention on technology areas for commercial relevance and getting to market sooner and with higher quality products.

Today knowledge by itself is a new strategic raw material . . . it is universities around which all industries develop.

I would assert that the basic changes, the containment that I just mentioned, were not acted on soon enough. Only now are we concerned with the creation of technology policy to augment, not to replace, our science policy. Let me just make the point what is happening in this area. We have lost much of our lead in dynamic memory areas, we lost our lead in VCRs a long time ago, in silicon wafers, in robotics, in many of the machine tool areas. Some of these losses are reflected in our economic indicators. The investment in plants and equipment in the United States is about 10 percent of GNP, and 20 percent in Japan. Our manufacturing export as a percent again of GDP or GNP is the lowest of all G-7 nations. It is 6 percent for the U.S. and 23 percent for Germany for instance. In all of this the question of what we export is of extreme importance, and we are not in the high-value-added export area as much as we were at one time.

Another major change is the role of knowledge, and I don't have to tell this audience how knowledge is the foundation for many of these industries that have sprung up over the last 40 to 50 years, and that has far-reaching effect obviously on our national economy. It is true that science and technology for the last 200 years have played a formidable role in the development of nations and societies. By pairing science and technology together with natural resources, they resulted in comparative advantages to a nation, a region, or a continent far in excess of what either one would have produced. You only have to think of mining, agriculture, water power, coal or oil around which all industries developed.

That time has passed. Today knowledge by itself is a new strategic raw material, and together with technology and systems management at the enterprises, at the national level, for that matter, at the global level, represents a new comparative advantage. It's universities around which all industries develop. And it's nations like Japan and Taiwan or Korea that have no natural resources but take advantage of new knowledge to create their own industries and become world leaders in these industries. That is a new development, and that is a new environment.

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The new technologies themselves are responsible for major changes within the technologies and within the industry and the economy itself. Just think of what computers, telecommunications networks, electronic controls, imaging display devices, e-mail and databases have done to accelerate the pace of development. That's why we see a massive acceleration of new products, new ideas and new industries coming to the forefront. That's why it is more critical than ever to make sure that R&D investment is commensurate with our future needs.

Our R&D expenditure in the U.S. is significant—150 billion dollars at least a year, but we are not spending it well. We are spending too much on defense still, even though over the last few years that has come down from a high of about 67 percent of the federal R&D budget to about 60 percent today. It probably should be much closer to 50 percent. We are not spending enough on civilian R&D, in other words. If you take five nations—Japan, Germany, France, UK and Italy—they are spending civilian R&D which equaled ours in 1972, and today it's about 30 percent higher than ours. Secondly, our R&D spending is diluted by big projects: space stations (which, by the way, has nothing to do with R&D, but is still counted as part of our R&D and distorts as a consequence when we compare ourselves to other nations); and the SSC [Superconducting Super-Collider], which is certainly a scientific R&D tool, but nevertheless being a big portion of our expenditures and distorts also what we are spending elsewhere. You can add your own favorite big project to the list that I just gave you.

We don't set priorities; we try to do everything. We also are deficient in the industrial sector R&D. In fact, if you look at the real growth in that particular sector, in industry R&D, it has been zero since 1987. We have not increased our industrial R&D expenditure.

These changes to a knowledge-driven economy is the main point why we cannot afford less than the best education system. I won't discuss the subject, even though I probably should, but I will come to it maybe later for one second. You know more about it than I do, and you can make a case a lot better. But it is also the reason why we see a globalization of the marketplace. This globalization of the marketplace is essentially a new reality that has been enhanced and that has been furthered by knowledge-driven industries and knowledge-driven technologies that make it easy to utilize resources that are elsewhere than in your own neighborhood or backyard. We also have seen a lot closer relationships developing from industry-to-industry and between industry and academia in many of the sectors, but not throughout our economy. We also have seen cooperation developing between companies that are essentially competitors in the marketplace. In fact this cooperation and competition have been two sides of the same coin. To some it is a new revelation, even though it has become commonplace, especially in Japan. And again, it means a new kind of signal to universities as well as to the government.

We must take on a responsibility for the enabling technologies and enabling institutions that can make use of new insights of research.

If anything, in this new world the importance of the university is increasing.

All this leads us to the inevitable conclusion that U.S. policy must change from one that for 40 years focused on science and research as a separate role of government and industry, that fostered antagonism between industry and government, that looked suspiciously at academic-industry or industry-to-industry cooperation, to one that focuses on closer linkages and recognizes that collaboration—not separation—leads to economic growth and national security.

Let me move now to the effect these changes I have been discussing have on our paradigms and policies. Let me talk about this organizing principle once more. From containment I would suggest that we move to economic competitiveness as the underlying issue that drives our policies. For government policy to focus only on basic research, on basic knowledge generation, is no longer acceptable. It must take on a responsibility for the enabling technologies and enabling institutions that can make use of new insights of research. It has done so in the past, when its direct mission such as health and defense were affected. Economic competitiveness, creating jobs and enhancing our standard of living is a government mission as well.

The Council on Competitiveness (which is the correct one by the way, I wouldn't quote the other one) is explicit about what such a policy should contain, and let me just relate it to you. It calls for leadership at the highest level—the Presidential level—to declare that as a national goal U.S. leadership in science and technology must be an integral part of science and technology policy—must be an integral part of our domestic and foreign policies, not a grudging appendix to the White House. Rebalancing of the R&D budget, especially between civilian and defense expenditures, and setting priorities between prestige projects and those that build a base for basic science and engineering, is the second proposal that we have. Focus on education across the whole spectrum of educational activities, from kindergarten to vocational training and continuing education of our work force. Invest in strategic engineering technologies that underly the growth sectors of our econ-

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omy. Not all technologies and sciences are created equal; some are more important than others at a particular point in time. We not only have in mind government-funded R&D, but collaborative efforts like Sematech or the battery consortium between government, government-industry, and the academic institutions.

Is this selecting winners and losers, as it has been many times stated? Why not? We do it every day. We need to enhance collaboration between industry companies, industry and academia, and industry and government. By the way, also between us and other nations. We must utilize our resources better, for instance, remissioning government laboratories that absorb about $25 billion, or one-third of the federal R&D budget every year. This is something that we can hardly afford today, especially since many of these laboratories really no longer have a mission, or don't have a mission that is commensurate with their spending.

While research might be an unquestionable public good in the mind of researchers, it is not necessarily that in the public mind.

These are some of the provisions that we think are important. We have to recognize that this shift from natural resources to knowledge as a resource demands that we have a technical infrastructure in place second to none. There's a lot of talk about the 21st century infrastructure but very little action. But you know quite well—we all know quite well—it will be dominated by information technology as fundamental to all other infrastructure embodiments, and there are many examples to make that particular point.

Why have I related all of that? Because of the involvement of academia and effect of academia. If anything in this new world, the importance of the university is increasing. It is already doing 60 percent of the basic research that is being done in the United States. As industry down-sizes and therefore reduces R&D, you know quite well what goes first, mainly basic research. So I'm pretty sure that after the next five years, if you look back, you will see that academia will have done more on a percentage basis of the basic research for this country than it has done to date. The decline in defense with increasing focus on competitiveness and on innovation, on environment, and on health, I think plays to the strengths of the universities compared to the world of containment where there were many frictions between the role of the university and the government's needs. This adds to the fact that from the perspective of research these are the most exciting times. New fields, new tools, excellent progress, the "golden age of knowledge," as somebody has put it, I think is here with us and should make universities more excited about the future rather than less.

The decade that's just behind us, the 1980s, that saw major federal support increases of research in universities that rival the 1950s and 1960s, should make academia really optimistic and forward-looking, and one would surmise that an atmosphere of optimism would pervade the academic community. However, that is not the case. There are complaints that individual disciplines are being under-funded. Competition for resources is fiercer than ever. New initiatives in science and engineering and education, quite clearly a sign of intellectual and programmatic vitality, are frequently viewed as threats rather than opportunities by two existing fields. The cost of equipment and instrumentation keeps going up, and one cannot keep up with it.

More than ever before, researchers feel that they have been singled out for scrutiny by a public that does not understand either the content or the process of research. We have heard many stories that focus on single cases of fraud, plagiarism, conflict of interest, misuse of indirect costs, and many more things—even antitrust violations are sometimes mentioned and put at the foot of academia.

What is the basis of this negative atmosphere pervading much of academia? I think it's not what I just said, it's more basic than even that. I think that there is an inherent unwillingness to understand that the society's problems and issues are directly affecting universities. That our budgetary insolvency will affect universities is not admitted to, even though it is recognized. While research might be an unquestionable public good in the mind of researchers, it is not necessarily that in the public mind. The unrealistic assumption that the expansionary mode of university R&D enterprises in the United States will continue unabated, I think is one of the great assumptions that has no reflection in reality, and then when it does not happen leads to disenchantment and worse.

One can only conclude one thing—we are living today beyond our means.

The 1993 budget is a warning shot about this particular issue. There are false priorities as far as the academic mission is concerned. What is that mission? Why it's education, basic research, knowledge transfer, and last but not least a strategic listening post and consultancy to industry and government alike. I would suggest that universities have not always lived up to that mission. If I had to rate universities (and I'm not talking about you by the way, I always exclude that university in which I speak; it causes fewer problems for me), in education I would give a C-, in basic research an

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A+, in knowledge transfer a D, and as a strategic listening post probably a B or a C.

Now is this a harsh judgment, especially the first one, education? Let me read to you just one particular example, and by the way it comes from Professor Martin Anderson, a fellow at the Hoover Institution who just wrote a book **Impostors in the Temple**, which I recommend for your enjoyment, for your disgust, or for both. He makes the following point: In academe's upside-down world, teaching is low man on the totem pole of academic prestige, and that should not be, because if anything, education should be higher than research on a list of priorities.

Put all of this together with the fact that the last decade has seen an unparalleled growth in federal R&D funding, as I said before, but it was still not enough to meet the demands of the universities. One can only conclude one thing, to put it bluntly: we are living today beyond our means. I think this is borne out by the fact that the number of researchers and faculty that today populate the academic research community has been increasing and is still increasing at a very rapid rate. There is increase in the institutions that participate in research. There is an increase in the number of departments that get federal grants. There are increases in the direct cost of doing research, and that's natural. But running any large organization for any length of time becomes more expensive because it builds up a self-sustaining bureaucracy, and that also has happened. We have to face up to long deferred costs, such as modernizing existing facilities, and that adds to the cost at a point in time when that cost has increased at a much more rapid rate than inflation has. So those are all the reasons why I make the point that we are living beyond our means.

But there's more to be said about this. The NIH strategic plan and the NSF commission set up by my successor, Dr. Massey, are reflections of a concern by Congress that academic research has wandered off the reservation. Let me read to you, for instance, from one particular committee, the Senate Committee on Appropriations, that oversees NSF: "While recognizing the role the Foundation has played in establishing U.S. leadership in basic research over the past 40 years, the Committee believes that the new world order requires the Foundation to take a more activist role in transferring the result of basic research from the academic community into the marketplace," on and on.

Let me read you another excerpt from a report by the House Committee on Science and Technology. George Brown, who understands research and academic institutions, and who, over the years, has been a friend of all of us, has been telling scientists they must prepare for a new era, and I quote: "To consider a fundamental reformulation of science policy principles. The aims of reports should be to exploit research as a tool designed to achieve national goals, rather than as a black box into which federal funds are deposited." By the way, let me remind you that this is the same Congress that is concerned about conflict of interest rules, and that makes laws that make it more difficult to jointly work with industry. I can only conclude one thing: consistency is not a prerequisite to getting elected. But these are realities.

What should you do? First of all, heed the Congressional warnings and ask anew what is the mission of the universities and what are the priorities in universities. The same as heretofore is not an acceptable answer. Bring your own house in order. Ask how well undergraduate teaching is done here in your university; I was talking about undergraduate teaching when I made my remark about C-, obviously. Focus some bureaucracy in the cost structure, because it will be with us for a long time. Have an institutional plan and a strategy, not only on conflicts of interest, which are very important, but on the future of the enterprise.

Without such a plan, how can you live with all the changes that will come down the road? Have a monitoring mechanism in place—how well you are doing in terms of strategy and your plan. Your strategy must include cooperation and linkages with industry, with government laboratories, and with the public. By the way, I stress the public because I think we all are doing a bad job selling our story. That's why we have many of these exaggerations that are playing on the front pages of the *New York Times*. Not that selling our story better would eliminate those, but I think it would give it a more proper balance.

Above all, I would suggest that we all be realistic—you, we, the Country—we all are involved in a sea change in the near future.

National Science Foundation

Revisions to New Application Form

The National Science Foundation (NSF) has made many small changes to its application form dated October 1, 1992, the "Grants for Research and Education in Science and Engineering" (GRESE).

NSF's most recent copy has the words "2nd Printing" on the cover. ORTTA will be doing a mailing of this current version of the GRESE to administrators in departments having active NSF awards.

Please discard all copies of the GRESE that do not say "2nd Printing" on the cover. If you need a current copy prior to ORTTA's distribution, please send an e-mail note to kim@ortta.umn.edu or call 624-9004.

J. Roderick MacArthur Foundation

The primary aims of the J. Roderick MacArthur Foundation are to aid those who are inequitably or unjustly treated by established institutions. The foundation seeks to foster discussion about, and needed changes in, these institutions by protecting and encouraging freedom of expression, human rights, civil liberties, and social justice; and by eliminating political, economic, social, religious, and cultural oppression.

The foundation supports efforts and projects throughout the world, including, but not limited to, high-impact litigation, media documentaries, human rights monitoring, publications and investigations, in order to:

1. Eliminate censorship and protect freedom of expression, including the freedom to hold and express opinions in all media of communication, both within and between all nations;

2. Foster human rights, including political, social, economic and cultural rights;

3. Protect and foster civil liberties in the United States (including constitutional rights) and to encourage their eventual observance in the rest of the world; and

4. Foster social justice and the elimination of political, economic, social, religious and cultural oppression.

Grants are generally confined to a maximum of $20,000 per year. In 1991, the foundation awarded 94 grants for a total of more than $2 million.

Applications may be submitted **at any time**. For further information contact Lance E. Lindblom, President, J. Roderick MacArthur Foundation, 9333 North Milwaukee Avenue, Niles, IL 60648; 708/966-0143; fax 708/966-3121.

Combined Agency Biodiversity Program

A unique new biodiversity program has been created to encourage the preservation of disappearing ecosystems and development of new drugs from natural products. The effort, called the International Cooperative Biodiversity Groups (ICBG) Program, is co-sponsored by the National Science Foundation, the U.S. Agency for International Development, and the National Institutes of Health.

The agencies will combine their resources to award grants to international consortia to inventory and collect plants and other organisms from endangered ecosystems such as rain forests, coral reefs and deserts. The goal is to isolate compounds with potential pharmaceutical value to produce new and more effective drugs for a variety of uses, including combating cancer. The awards will also support developing nations' efforts to conserve diverse species and to enhance research capabilities. First year funding is $1.5 million.

Additional information on the program may be obtained from Kenneth Bridbord, Chief, International Studies Branch, Fogarty International Center, National Institutes of Health, Building 31, Room B2C32, Bethesda, MD 20892; 301/ 496-2515.

Fogarty International Center

Research Collaboration Award Program

The Fogarty International Center provides small grants, —Fogarty International Research Collaboration Awards (FIRCAs)—to U.S. grantee institutions. The main objective of the program is to facilitate collaborative research efforts between U.S. and foreign scientists that will expand and enhance the NIH-supported research program of the U.S. Principal Investigator, while at the same time benefiting the scientific interests of the collaborating foreign scientist.

Eligible applicants are Principal Investigators of NIH research project grants (R or P series, or U01s) that will be active and funded during the proposed grant award period. Grants will be made for work conducted in cooperation with scientists only in countries located in regions commonly known as Central and Eastern Europe (including the former USSR and the Baltic Republics), Latin America, the non-U.S. Caribbean, and for cancer related research, Sub-Saharan Africa. The foreign collaborator must hold a position at a public or private non-profit institution that will allow him or her adequate time and provide appropriate facilities to conduct the proposed research.

The small grants (R03) will provide up to $20,000 per year for up to three years in direct costs. Funds may be used for materials, supplies, and equipment for the foreign scientist's research laboratory and for travel expenses for the Principal Investigator and/or the foreign collaborator and their research associates, as justified by the scientific needs of the project. No salaries or stipends will be offered under these awards.

This is an on-going program with annual deadline dates of **February 1, June 1** and **October 1**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. Inquiries may be directed to Dr. Mirilee Pearl, International Research and Awards Branch, Fogarty International Center, Building 31, Room B2C21, Bethesda, MD 20892; 301/496-1653; fax, 301/402-0779.

National Science Foundation

Engineering Research Equipment Grants

The National Science Foundation (NSF) has announced the annual Engineering Research Equipment Grants Program. The objective of these grants is to improve the quality or broaden the scope of the research and education that will be conducted at the proposing institution. The announcement describes the procedures for submitting proposals to NSF's Engineering Directorate that are exclusively for research. Proposals will be accepted from U.S. academic institutions that confer degrees in research areas supported by the programs of the Engineering Directorate.

The terms of an equipment grant require that the equipment a) be essential but not reasonably available and accessible to the project(s) and b) will be subject to reasonable inventory control, maintenance procedures, and organizational policies that will enhance its shared use on other projects if this will not interfere with the work on project(s) for which the equipment is being acquired.

Awards are for the purchase of new research equipment, or for upgrading of existing equipment. Reasonable costs for the assembly and/or fabrication will be considered in cases where it is not possible to purchase "off the shelf" items that are needed for the research. Costs for normal installation, including hookup to utilities, are the responsibility of the institution and are not allowable costs. Local computing equipment (including workstations, specialized processors, superminis, local area networks) may be supported under this program; general-purpose office equipment may not.

While there are not specified minimum/maximum amounts for Engineering Research Equipment Grants, awards typically range between $20,000 and $200,000.

Each proposal must include a paragraph indicating the institutional support proposed. If the proposal receives favorable review, cost- sharing may be negotiated on a case-by-case basis. Institutions must contribute at least one-third of the total cost of the equipment. Institutional support may not be expressed in terms of existing or irrelevant equipment, personnel, site preparation or installation costs.

Research in areas supported by the Computer and Information Science and Engineering Directorate (CISE) is also available. Contact the Office of Cross-Disciplinary Activities, CISE Instrumentation Program, 202/357-7349.

The application deadline is **February 1, 1993**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board.

National Science Foundation

Two equipment grants

The Division of Biological Instrumentation and Resources supports instrumentation activities to aid the research efforts covered by the NSF Directorate for Biological Sciences. Work must fall within the scope of the Division of Molecular and Cellular Biosciences, Integrative Biology and Neuroscience, or Environmental Biology.

Multi-User Biological Equipment and Instrumentation

This program provides support for the purchase of major items of instrumentation in the range from $20,000 to $400,000, that will be shared by a number of funded investigators. The program will support:

- the purchase of single items of biological equipment, or
- the establishment of instrumentation resources consisting of several items of equipment with a related purpose.

General inquiries should be made to the Multi-user Biological Equipment Program, Program Director, Room 312, NSF, 1800 G Street NW, Washington, DC 20550; 202/357-7652; e-mail: biriid@nsf.gov.

Instrument Development for Biological Research

This program provides support for:

- development of new instruments that either extend current sensitivity or resolution or provide new techniques for detection, quantification or observation of biological phenomena;
- improved or novel software for the operation of instruments or the analysis of data or images resulting from such instruments; and
- workshops in emerging areas of instrumentation and instrument development relevant to biological studies, particularly in the areas of Molecular and Cellular Biosciences, Integrative Biology and Neuroscience, and Environmental Biology.

There are no specific limits on the minimum or maximum amount of funding that may be requested.

General inquiries should be made to the Program for Instrument Development for Biological Research, Program Director, Room 312, NSF, 1800 G Street NW, Washington, DC 20550; 202/357-7652; e-mail: biriid@nsf.gov.

The application deadline for both programs is **June 15, 1993**. A complete copy of the announcement describing both programs is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board.

Nuclear Regulatory Commission

Grants to Educational Institutions

The Nuclear Regulatory Commission (NRC), Office of Nuclear Regulatory Research, announces proposed availability of FY93 funds to support a limited number of research grants to educational institutions by providing funds for expansion, exchange and transfer of knowledge, ideas and concepts directed toward the NRC safety research program. The program includes, but is not limited to, support of professional meetings and conferences. In addition, NRC has a limited amount for research grants to education institutions. There are 52 research topics listed in the announcement, of which the following are a sample:

- Experiments and predictive modeling for thermal stratification, thermal striping and flow-induced vibration in plant fluid systems;
- Predictive modeling for boron transport and mixing;
- Evaluation and modeling of adding cooling water to a degraded core during various stages of a severe accident;
- Modeling and experimentation on two-phase flow, interfacial relations, and heat transfer in reactor coolant systems. Experiments in modeling of passive heat transfer in natural circulation systems.
- Methods for applying the growing pool of human performance data to nuclear power plant safety requirements.
- Developing of approaches to assure that corrosion damage has not significantly reduced the capacity of containment structures at nuclear power plants.

For FY93, NRC anticipates making a total of approximately $1,246,000 available for funding research grants to educational institutions; of this amount, approximately $730,000 will be available for new research grants. Therefore, proposed grant budgets should be restricted to about $50,000 per year, with total project funding not exceeding $100,000 over a period of two years.

Applications may be submitted continuously over the 1993 federal fiscal year, which ends September 30, 1993. Grantees are advised, however, that due to the limited funding available, proposals received after **February 8, 1993**, will be considered only to the extent practicable.

A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. The agency contact is Leslie Mills or Dennis Tarner, Nuclear Regulatory Commission, Division of Contracts and Property Management, Office of Administration, Washington, DC 20555; 301/492-7054.

American Cancer Society

Institutional Research Grant

The stated goal of the American Cancer Society (ACS) is to "foster meritorious research on cancer that cannot be supported through other available types of support." The purpose of the Institutional Research Grant is to serve as "seed" money to permit the initiation of promising new projects or novel ideas by junior faculty investigators.

The University of Minnesota Institutional Research Grant has been restructured considerably. The amount of the award has been increased to $15,000 direct costs. The grant awardee must be an Assistant Professor or Instructor *on faculty*. Applicants must not have previously received an ACS Institutional Research grant nor have current national funding, although recipients of career development awards from NIH (K04, K08), from ACS (Junior Faculty Awards) or Leukemia Society awards *are* eligible.

Cancer-related research may include analysis of developmental biology, gene regulation, or alteration of intracellular or extracellular processes which may lead to an improved understanding and/or therapy of potential or actual oncogenic events in prokaryotic or eukaryotic cells.

The deadline for receipt of applications is **March 1, 1993**. Instructions and application forms are available from the Pediatric Oncology Office, 421 Masonic Cancer Center, 626-1926.

Center for Substance Abuse Prevention

Cancellation of Program

The Center for Substance Abuse Prevention of the Substance Abuse and Mental Health Services Administration (SAMHSA) is withdrawing the grant program entitled, "Demonstration Grants for the Prevention of Alcohol and Other Drug Abuse Among High-Risk Youth," published in the Federal Register on March 1, 1991.

CSAP plans to issue a new program announcement shortly which will address the needs of high-risk youth. It is presently anticipated that applications under the new announcement will be due in May 1993. Accordingly, no applications will be accepted for the canceled program for its next scheduled receipt date of January 20, 1993.

Faculty Research, Training and Service Awards

This section contains statistics on proposals and awards recently processed by ORTTA. In addition, we have randomly selected awards received by faculty during preceding months. Faculty who have received awards they would like mentioned in a future *Research Review* may send the pertinent data, as exemplified below, to Phil Norcross at ORTTA, 625-2354.

Proposal and Award Summary

	Number	Amount
Proposals Submitted November 1992	270	$ 73,246,994
Awards Processed November 1992	180	17,616,910
Proposals Submitted July 1992 - November 1992	1,433	229,853,344
Awards Processed July 1992 - November 1992	1,415	112,419,217
Proposals Submitted July 1991 - November 1991	1,589	248,759,961
Awards Processed July 1991 - November 1991	1,495	131,740,964

POSCH: Long-Term Mortality and Morbidity
Henry Buchwald, Surgery and Biomedical Engineering
NIH, NHLBI
$2,324,081 - 12/92-12/97

Family Nutrition Program
Ellen Schuster, Minnesota Extension Service
St of MN, Department of Human Services
$816,718 - 10/92-09/93

Genetics of Asthma
Malcolm Blumenthal, Medicine
Stephen S. Rich, Laboratory Medicine and Pathology
NIH, NHLBI
$549,713 - 09/92-09/93

Packard Fellowship for Science and Engineering
Amy Alving, Aerospace Engineering
David and Lucile Packard Foundation
$500,000 - 10/92-10/97

Biodegradation of Chlorinated Solvents
Lawrence P. Wackett, Gray Freshwater Biological Institute
EPA
$498,819 - 10/92-10/95

The Minnesota Fetal Tissue Bank
Walter Low, Neurosurgery
NIH, NICHD
$366,633 - 09/92-03/93

Community Initiatives to Limit Teenage Access to Tobacco
Jean L. Forster, School of Public Health
NIH, NCI
$335,019 - 09/92-09/93

Relapse Prevention Following Prenatal Smoking Cessation
Harry A. Lando, School of Public Health
NIH, NCI
$335,019 - 09/92-09/93

Massively Parallel Algorithms for Modeling the Structure of Liquids and Liquid-Solid Interfaces
James R. Chelikowsky, Chemical Engineering
Youcef Saad, Computer Science
NSF
$285,600 - 09/92-02/96

Training of Early Intervention Service Providers Through Training of Faculty from Institutions
Mary McEvoy, Educational Psychology
Scott McConnell, Educational Psychology
U.S. Department of Education
$275,000 - 10/92-09/93

Transition Implementation Institute
David R. Johnson, Educational Psychology
Robert H. Bruininks, Educational Psychology
U.S. Department of Education
$225,000 - 10/92-09/93

Scarce Medical Services Contract - Angioplasty Services/Studies
Thomas F. Ferris, Medicine
Veterans Administration
$213,610 - 10/92-09/93

Prediction Modeling and Experimental Design of Lotic Microorganisms
Gerald Niemi, Academic Administration, Duluth
NSF
$200,000 - 04/92-03/93

Research on the Self-Determination of Individuals with Disabilities
Brian Abery, Educational Psychology
Robert H. Bruininks Educational Psychology
U.S. Department of Education
$200,000 - 10/92-09/93

Minnesota Community Traffic Safety Project
Richard A.W. Byrne, Minnesota Extension Service
St of MN, Department of Public Safety
$185,000 - 10/92-09/93

Minnesota Space Grant College Consortium
William L. Garrard, Aerospace Engineering
NASA
$170,000 - 03/92-02/93

Edward Mallinckrodt, Jr., Foundation Scholarship Award
Bruce Blazar, Pediatrics
Edward Mallinckrodt, Jr., Foundation
$165,000 - 10/92-09/95

University of Minnesota Ronald McNair Post Baccalaureate Achievement Award
Sharyn Schelske, General College
Bruce A. Schelske, General College
U.S. Department of Education
$161,848 - 10/92-09/93

Metabolic Engineering of Biodegradable Thermoplastics
David H. Sherman, Biological Process Technology Institute
Procter and Gamble Company
$150,000 - 09/92-09/95

The Physical-Chemical and Related Analytical Aspects of the Toxicological Assessment of Contaminated Freshwater Sediments
Keith B. Lodge, Natural Resources Research Institute, Duluth
EPA
$142,483 - 10/92-09/93

The Sensitivity of Minnesota's Wetlands to Climate Change
Eville Gorham, Ecology, Evolution and Behavior
Jan Janssens, Ecology, Evolution and Behavior
DOE
$130,000 - 07/92-06/93

Collagen Models for Study of Diabetes Mellitus
Gregg B. Fields, Laboratory Medicine and Pathology
NIH, NIDDK
$121,044 - 09/92-09/93

Mechanisms By Which Heat Stress Disrupts Maize Endosperm Development
Robert J. Jones, Agronomy and Plant Genetics
USDA
$120,000 - 07/92-07/94

The Influence of Inorganic Sediment on Stream Ecosystem
Michael C. Swift, Forest Resources
EPA
$119,732 - 10/92-03/94

Hormone Replacement Study for Coronary Disease
Donald B. Hunninghake, Pharmacology
June Lavalleur, Obstetrics and Gynecology
Wyeth-Ayerst Research
$108,869 - 09/92-12/92

Activin as a FHS-Releasing Hormone
Jonathan E. Wheaton, Animal Science
NIH, NICHD
$98,493 - 08/92-07/94

Hormonal Signals Associated with Litter Size in Sows
Jonathan E. Wheaton, Animal Science
Randal L. Meyer, Animal Science
Gary D. Dial, Clinical and Population Sciences
Minnesota Pork Producers Association
$13,453 - 07/92-06/93

Hemophilia—Title V Special Initiative
J. Roger Edson, Laboratory Medicine and Pathology
Roxanna Boelsen, Hemophilia Center
HRSA
$50,040 - 10/92-09/93

Peripheral Arterial Disease
Donald B. Hunninghake, Medicine
Richard Grimm, Jr., Medicine
NIH, NHLBI
$91,950 - 09/92-03/93

Rhdnase in CF Patients with Acute Pulmonary Exacerbation
Warren E. Regelmann, Pediatrics
C. Carlyle Clawson, Pediatrics
Warren J. Warwick, Pediatrics
Genentech, Inc.
$13,395 - 08/92-11/93

Cooperative Clinical Trial in Transplantation
Nancy L. Reinsmoen, Surgery
Arthur Matas, Surgery
Emmes Corporation
$78,300 - 09/92-09/93

Children's Responses to Dietary Recommendations
Leslie Lytle, Epidemiology
St of MN, Department of Education
$29,860 - 09/92-06/93

Influence of Crystal Modification on Tableting Performance
David J.W. Grant, Pharmaceutics
Pfizer Pharmaceutical Company
$17,000 - 09/92-12/93

Measurements of Crack Tip and Microstructural Strains in Single Crystals
Thomas W. Shield, Aerospace Engineering
Mobil Oil Corporation
$15,000 - 07/92-06/93

Novel Beaded Supports for Peptide Library Procedures
George Barany, Chemistry
Selectide Corporation
$87,500 - 10/92-09/93

An Internal Bone Lengthening Device
Arthur G. Erdman, Mechanical Engineering
Smith and Nephew Richards, Inc.
$36,798 - 08/92-07/93

Organic and Inorganic Contaminants in the Sediments and Water
Deborah L. Swackhamer, Gray Freshwater Biological Institute
EPA
$50,105 - 10/92-09/93

International Competitiveness in Food Marketing
Jean D. Kinsey, Agricultural and Applied Economics
Jerome W. Hammond, Agricultural and Applied Economics
USDA
$54,000 - 09/92-08/97

The Use of Ozone-Treatment Dicotyledonous Lignocellulose As a Silage Additive: Nutritional Studies
Marshall D. Stern, Animal Science
Binational Agricultural Research and Development Fund
$85,000 - 10/92-08/95

Petiole Sap Nitrate Test for Irrigated Potatoes
Carl J. Rosen, Soil Science
Clive Reece, Soil Science
USDA
$32,313 - 09/92-09/93

Management of a Suburban Deer Population in North Oaks
Peter A. Jordan, Fisheries and Wildlife
City of North Oaks
22,025 - 11/92-06/93

Analysis of Forest Value Systems
Hans M. Gregersen, Forest Resources
Zhi Xu, Forest Resources
USDA/North Central Forest Experiment Station
$40,000 - 09/92-09/93

Volume Growth of Minnesota Quaking Aspen Trees
Thomas E. Burk, Forest Resources
USDA
$15,000 - 09/92-09/93

Generalization Tactics for Increased Social Behavior
Scott McConnell, Educational Psychology
Mary McEvoy, Educational Psychology
U.S. Department of Education
$75,000 - 10/92-03/94

Training Persons of Color to Serve Low-Incidence Disabilities
Susan Rose, Educational Psychology
Sallye McKee, Educational Psychology
Marie Knowlton, Educational Psychology
U.S. Department of Education
$94,191 - 10/92-09/93

Doctoral Level Training in Therapeutic Recreation
Stuart Schleien, Kinesiology/Leisure Studies
U.S. Department of Education
$80,893 - 10/92-09/93

Reactivity Based Hazard Assessment for Electrophilic Mutagen
Robert M. Carlson, Chemistry, Duluth
EPA
$81,732 - 09/92-08/93

To Sample and Test Taconite Pellets
Rodney L. Bleifuss, Natural Resources Research Institute, Duluth
Harlan B. Niles, Natural Resources Research Institute, Duluth
St of MN, Department of Revenue
$60,000 - 11/92-11/97

Improving Environmental Science Education Among K-6 Teachers
Judith Kuechle Olson, Elementary and Secondary Education
St of MN, Higher Education Coordinating Board
$28,728 - 11/92-02/94

Mathematics Teacher Renewal Project
Clark Hoffman, Mathematics, Morris
St of MN, Higher Education Coordinating Board
$39,543 - 10/92-02/94

ORTTA TELEPHONE NUMBERS

A Quick Reference Guide

Office of Research and Technology Transfer Administration

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DHHS, Cities/Counties, Colleges/Universities, St of MN	Susan Stensland	625-3515	stensland@ortta.umn.edu
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RESEARCH REVIEW

Research and Technology Transfer Administration

February 1993

UMR Provides Faculty with Sophisticated Video Services

Two or three times a year University Media Resources (UMR) sends a video crew into an operating room. The crew delivers live pictures to a conference room across the street, where visiting surgeons watch on large-screen TV so that they can learn new procedures. Live audio hookup lets them hear the operating surgeon's commentary and lets them ask questions as the surgeon works.

Photo by Nancy Johnson, UMR

UMR videographers feed video of surgery to a Continuing Medical Education conference. An accompanying audio link allows surgeon and conferees to speak with one another.

"We could develop carefully edited videotape that showed a procedure in perfect detail, but there's something special about seeing it live," says Bart Galle, Ph.D., Director of Continuing Medical Education. "Maybe the surgeon runs into something unanticipated and has to deal with it. The participants in the course see the real world."

The visiting surgeons get a remarkably good view. Along with an overall view of the operating room, their screen might be split and half given to the same x-ray image the operating surgeon is working from. If an endoscope is involved, the projection might switch back and forth between the x-ray and the endoscopic image. "If it's a procedure to endoscopically remove a kidney stone," says Galle, "they would see inside the kidney."

Running cameras in the operating room is no doubt one of UMR's more complicated assignments. "They need to get good pictures without being overly obtrusive," says Galle, "and the cameras must stay out of the sterile field." But the 12-member television staff seems prepared for the job. They claim 420 years of experience all told. "The directors have a good sense of when to go in for a close up, when to go through the 'scope, when to show the x-ray," says Galle. "They gathered that from experience."

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University-Industry Research: Balancing Public and Private Trusts

Inside

National Institutes of Health

Change in Fellowship Receipt Dates

Effective April 1, 1993, there will be a change in receipt dates for applications to the Public Health Service for individual National Research Service Awards (NRSAs—fellowships, the F-series awards).

This change was made subsequent to the merger of the former Alcohol, Drug Abuse and Mental Health Administration (ADAMHA) research institutes with NIH.

The new receipt dates will apply to all individual fellowship applications (F-series) to NIH institutes and centers as well as to the Agency for Health Care Policy and Research.

The new receipt dates will be:

- April 5 (instead of May 10)
- August 5 (instead of September 10)
- December 5 (instead of January 10)

NOTE: Implementation of the new receipt date schedule will begin with the **April 5, 1993**, receipt date. Institutional Training Grant (T32) applications are not affected. Their receipt dates remain January 10, May 10 and September 10.

RESEARCH REVIEW

Volume XXII/Number 8

February 1993

Director of Communications: Michael P. Moore

Editor: Phil Norcross

Editorial Assistant: Tove Jespersen

Associate Vice President: A. R. Potami

***Research Review* is a monthly publication of the Office of Research and Technology Transfer Administration. Its purpose is to inform faculty and administrators who are involved with sponsored research and technology transfer on procedures and policies of granting agencies, on institutional policy and other information necessary to the preparation of research proposals, and on funding opportunities.**

***Research Review* welcomes ideas and comments from all readers. Write to *Research Review* at 1100 Washington Avenue South, Suite 201, Minneapolis, MN 55415-1226, or call Phil Norcross at 625-2354 or Michael P. Moore at 624-9398.**

Indirect Cost & Fringe Benefit Rates

Indirect Cost Rates

The *provisional* rates for July 1, 1992, through June 30, 1994, are listed below. When budgeting for periods beyond 6/30/94, the 7/1/92-6/30/94 rates should be used. **The rate agreement is dated May 13, 1992.** This date should be used where required on proposal applications. **Please call Marilyn Surbey, 624-4850, or Richard Miller, 626-9895, with questions on indirect costs.**

	07/01/92 06/30/94
Research	
On-Campus	40.00
Off-Campus *	21.00
SAFHL	58.05
Hormel	44.00
Other Sponsored Activity	
On-Campus	20.00
Off-Campus *	10.00
Instruction	
On-Campus	52.00
Off-Campus *	16.00

* A project will be considered off-campus if more than 50% of the direct salaries and wages of personnel employed on the project are incurred at a site neither owned nor leased by the University.

Fringe Benefit Rates

If you have questions regarding fringe benefit rate development or need the breakdown of charges, call **Vivian Fickling at 624-2009**.

Due to a change in policy, new rates must now be approved by DHHS before they can be implemented. Even though the university has released new rates for FY93, they have not been approved by DHHS and the rates below must continue to be used when preparing proposals

For proposals being submitted with start dates **after July 1, 1992**, the estimated fringe benefit rates to be budgeted are:

Faculty	31.25
Civil Service	29.50
Graduate Assistants	10.50

Estimated rates after **July 1, 1993,** are:

Faculty	28.00
Civil Service	30.50
Graduate Assistants	31.25

Rate changes will be reflected in this section.

New Innovation Fund Supports U of M Inventors

Minnesota's North Star Research Foundation has awarded a three-year, $300,000 matching grant to the University of Minnesota to support the development and testing of technologies with commercial potential. The University matched the first year of the grant and is seeking support for the second and third years from organizations and institutions interested in supporting the transfer of technology from universities to industry. The North Star Research Foundation Innovation Fund will be administered by the University's Office of Research and Technology Transfer, which is requesting proposals from faculty researchers who have developed technologies or made discoveries that need a limited amount of development and testing before being patented or licensed to industry (see page 18).

"This fund will increase our ability to help faculty inventors prove the value of their new technologies," said Tony Potami, associate vice president for research and technology transfer. "The University appreciates the foresight of the North Star Research Foundation Board of Directors in recognizing that this Innovation Fund can speed the commercialization of new products for the benefit of the public and the state of Minnesota's economy."

Potami said his office will use the $200,000 available annually to support projects that appear to have significant commercial potential, but that need further development or testing before they can be licensed to an existing company. The fund will also support development of technologies around which new companies can be formed. He explained that this type of funding is difficult to obtain, because the federal government, which provides about 75 percent of the University's research support, seldom funds projects to develop commercial products.

At the end of each year of the Innovation Fund, the North Star Research Foundation will review the progress of sponsored projects and the University's ability to match the award, and will then decide whether to release funding for the next year.

The University of Minnesota currently has more than 180 license agreements with about 130 companies—53 in Minnesota. In return for royalty payments to the University and the inventors, the agreements give companies either exclusive or non-exclusive rights to develop and market inventions that have come out of faculty research projects. These inventions include medical devices and medications, biological compounds, engineering developments, horticultural and agricultural products and computer software. Each year the Office of Research and Technology Transfer receives about 150 disclosures of new developments made by faculty, staff and student scientists and engineers.

Ethical Prophylaxis: Research Design, Conduct and Dissemination

Address by Arthur L. Caplan, Ph.D.

Director, University of Minnesota Center for Biomedical Ethics, Professor of Surgery, Professor of Philosophy

Given November 19, 1992, at the conference, *University-Industry Research: Balancing Public and Private Trusts*

Arthur Caplan came to the University in 1987, after serving as Associate Director of the Hastings Center for Bioethical Research. He has also served on the faculties of the University of Pittsburgh and Columbia University. Dr. Caplan earned a B.A. at Brandeis University; and an M.A., M.Phil. and Ph.D. at Columbia. He has published several books on medical ethics and more than 300 articles in philosophy, medicine, health policy and biological science. He has served as consultant and advisor to the U.S. Office of Technology Assessment, Minnesota Department of Health, National Institutes of Health and National Academy of Sciences, among others. His weekly column, "A Question of Ethics," appears in the St. Paul Pioneer Press *and 30 other North American newspapers.*

Arthur Caplan presented to the University-Industry Research conference a tentative set of ethical principles [see page 10] to guide biomedicine in its collaborations with industry.

Ethical crises in university-industry relations are epidemic, said Caplan, especially with regard to conflicts of interest in biomedical research. Seeking prevention, rather than crisis management, Caplan examined specific cases of questionable practice by medical researchers and drew his guiding principles from them.

"The values of objectivity, accountability, methodological precision, openness, advocacy, independence and collegiality cannot be sacrificed in forming university-industry ties," concluded Caplan. By examining cases, he said, "you can draw out, as I've tried to do for you today, some lessons about what principles and values exist that should form the core of university-based research ethics."

Caplan particularly stressed that disclosure and divestment are not sufficient prophylaxis against conflicts of interest. "The cases and their characteristics make it clear," he said, "that certain moral principles must be followed, certain values must be adhered to by those who work in university settings in biomedical research—*divesting or disclosing will not always suffice.*"

Caplan also stressed that his list of principals was tentative, a "first cut," as he put it. "I hope to get something on the table that we can think about, maybe modify," he said.

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Benefits of University-Industry Collaborations: The Industry Perspective

Address by Paul Citron

Vice President of Science and Technology, Medtronic, Inc.

Given November 19, 1992, at the conference *University-Industry Research: Balancing Public and Private Trusts*

Paul Citron was named Vice President of Science and Technology at Medtronic, Inc., Minneapolis, in 1988. He has responsibility for corporate-wide assessment and coordination of technology and for the establishment and prioritization of corporate research. At Medtronic he has held the positions of Vice President, Ventures Technology (1985-88); Vice President, Applied Concepts Research (1982-85); Director, Applied Concepts Research (1979-82); and design and staff engineer and project and program manager (1972-79). He joined Medtronic in 1972, coming from the University of Minnesota, where he was a Research Fellow in the Department of Neurology.

Mr. Citron earned a B.S. in Electrical Engineering from Drexel University in Philadelphia and an M.S. in Electrical Engineering from the University of Minnesota in 1972. He has twice won the American College of Cardiology Governor's Award for Excellence and in 1980 was inducted as a Fellow of the Bakken Society. He has authored many publications and holds several medical device pacing-related patents. In 1980 he was given Medtronic's "Invention of Distinction" award for his role as co-inventor of the tined pacing lead.

Mr. Citron serves on the Anoka County Seed Capital Corporation's Technical Advisory Committee, on the University of Minnesota Biomedical Engineering Center Advisory Committee, and the University of Minnesota Technology Evaluation Council, which assists the Office of Patents & Licensing in evaluating inventions disclosed by University researchers.

Paul Citron began his presentation by saying that he could be very brief in describing the benefits of university-industry collaborations as "many, vital, mostly obvious, and obviously self-evident."

Adding a bit more description, Citron said that "It can be argued that the very existence of many high technology companies and industries in the United States is a direct result of the seeds planted at research universities. Many of the paradigm-shifting inventions that we all enjoy and benefit from are the result of the continual process of discovery and implementation which the alliance between university and industry has produced."

Despite—and also because of—the obviousness of these benefits, Citron said that it is critical that we reflect on the collaborations that produce them, and that individuals in universities and industries understand their roles and obligations and their mutual responsibilities to work together to successfully carry out these collaborations.

"We are not merely talking about the benefits to industry, but rather about the benefits to our society. We are talking about the engine that powers our position among the economies of the world, creates jobs, sets our standard of living, and improves the quality of our lives."

Citron said that because of the importance of university-industry collaboration, he is concerned by "what I sense to be an undercurrent opinion that there is something unholy about an alliance between the university and industry. After all, the very formation of the University of Minnesota, as well as its many counterparts across the nation, was based on the recognition that the university had, as one key aspect of its mission, the obligation to create knowledge, which was to be applied by industry, for the benefit of society."

Citron provided a brief history of the Morrill Land Grant Act of 1862 and the follow-on Act of 1890, which he said in effect institutionalized the transfer of technology by subsidizing the development of curricula in the applied sciences, engineering, agriculture and mechanic arts, all of which were seen to have broad application to the needs of society. "So the intertwined relationship between industry and the University is no accident; it was well intentioned and in many ways a visionary design. What has been taking place over the last hundred years at progressive institutions, land-grant or not, is an evolution of this symbiotic relationship. It has not always been without its problems, but on balance this relationship has proven to be a model for the rest of the industrial world."

The potential for conflicts of interest will always exist in university-industry collaborations, Citron said, but they can be recognized and mechanisms enacted to protect the integrity of the research without inhibiting the transfer of technology.

As examples of the implications of doing such collaborations right, Citron cited the Route 128 high-tech corridor brought about in Massachusetts by MIT and Harvard. "The innovations and breakthroughs discovered in these laboratories have flowed out of the institutions with predictable ease, consistency and frequency. It is part of the tradition and culture of these institutions to link activities with industry in order to transfer technology, expertise and know-how." Although this region is currently undergoing economic setbacks as a result of the simultaneous recession and cutbacks in defense spending, it has the "intellectual

{Continued On Page 21}

Professional, Ethical and Legal Challenges of University-Based Entrepreneurs

Address by Nelson G. Dong

Partner, Dorsey & Whitney, Minneapolis

Given November 19, 1992, at the conference, *University-Industry Research: Balancing Public and Private Trusts*

Nelson Dong is a special partner, corporate, in the law firm of Dorsey & Whitney. He specializes in representation of emerging high-technology companies, has substantial experience in computer and biomedical fields, and has published on international licensing and U.S. export control. Mr. Dong earned an A.B. in Economics at Stanford and a J.D. at Yale. He has more than 10 years' experience counseling entrepreneurs and venture capitalists in California's Silicon Valley, as well as experience negotiating university patent licenses and working with university faculty as founders of companies.

Nelson G. Dong

When faculty consider commercializing an invention, said Nelson Dong, they also need to consider the dissent of students, the suspicion of collaborators, the envy of colleagues, the retreat of funding agencies, the scrutiny of administrators, and the attentions of the press.

Nonetheless, Dong affirmed that "I've been privileged to stand by scholars who have really stayed the course, who have seen their companies come to fruition and seen technologies enhance the quality of life and help save people's lives. . . . And so the professional standing of scholars and of the university itself can be enhanced if the thing is done right."

Drawing on his experience as counsel to venture capital funds, start-up companies and "academically based entrepreneurs at such diverse research universities as Columbia, Case Western, Vanderbilt, MIT, Stanford, and the University of California," Dong presented a vivid list of issues that confront a faculty member with an opportunity to become an entrepreneur.

Dong opened with brief general comments about the complexity of a faculty job in a public university:

"Even without entrepreneurship," said Dong, "academic scholars today face a daunting series of challenges, because of their multiple and conflicting roles as mentors, as researchers, as scholars in many different ways. But if they become entrepreneurs, then it's quite pragmatic and realistic to tell those entrepreneurs that they're going to face additional questions and increased scrutiny."

"We have tended," Dong also said, "in this country, to place far more civil- and even criminal-law restrictions on the conduct of academicians in the public research university environment, to ensure that public and nonprofit funding isn't subverted for private gain and to ensure that the process of academic research still continues to result in unbiased and open publication of results."

A Case Study of A Start-up Company

Then Dong turned to illustrating faculty entrepreneurship by means of a hypothetical case study. He described the work and opportunity of a fictional "Dr. Jane Webster, a tenured associate professor of biomedical engineering." Webster is "a composite of a number of scholars that I've worked with over the years," said Dong. "I assure you this does not reflect any single person here or anywhere else in the country."

Webster and people who work in her lab have invented a synthetic material that would make a more durable and comfortable contact lens, and that may have other biomedical uses as well. The research was funded by Webster's department, by NIH and by "assorted private and foundation grants."

"Now I've stretched the facts here," said Dong. "I've gone ahead and said this compound is clearly identifiable as capable of patent protection, with a great deal of potential for returns in the commercial arena, at least in the tens of millions of dollars."

As Dong described it, venture capitalists have offered $5 million to commercialize Webster's invention through the creation of "NuTech, Inc." Also, at least one existing optical manufacturer would like to help finance NuTech in return for a license to the material—"an illustration of the hub-and-spoke model," said Dong.

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Committee on the Use of Human Subjects in Research

Local IRB Review of Multicenter Clinical Trials

The Committee on the Use of Human Subjects in Research has received a new directive from the Office for Protection from Research Risks (OPRR). The acting directors of OPRR wrote a "Dear Colleague" letter (OPRR Report Number 93-01), regarding human subjects protection in multicenter clinical trials. The letter was forwarded to all institutional officials (Moira Keane at the University of Minnesota) and IRB chairpersons throughout the country.

Quoting from the November 9, 1992, letter:

- The purpose of the letter is to clarify procedures for local IRB review of National Institutes of Health (NIH) multicenter clinical trial protocols *that include NIH-approved sample informed-consent documents* [emphasis added]. The procedures complement the requirements for informed consent in the federal regulations.
- OPRR now requires that each local IRB receive a copy of the NIH-approved sample consent document and the full NIH-approved protocol as a condition for review and approval of local consent documents.
- Any deletion or substantive modification of information concerning risks or alternative procedures contained in the sample consent document must be justified in writing by the investigator and approved by the IRB.
- The justification for and approval of such deletions or modifications must be reflected in the IRB minutes.
- For trials sponsored by the National Cancer Institute (NCI), investigators must forward copies of such IRB-approved changes, with their justification, to the appropriate cooperative group headquarters.
- This policy should be implemented immediately for the initial, local IRB review of any multicenter clinical trial protocol with an NIH-approved sample informed-consent document. For trials that are currently in progress, the policy should be implemented at the next scheduled continuing IRB review.
- This policy does not reflect any change in OPRR's policy concerning the importance of local IRB review or the local IRB's profound responsibility for protecting human subjects. Only the local IRB is familiar with the particular circumstances of its research setting and is in a position to weigh critical considerations such as state and local laws, professional and community standards, institutional policies and the needs of differing patient or subject populations. Thus the local IRB is in the best position to ensure that persons deciding whether or not to enroll in research have the high level of accurate information necessary to make that decision. Each IRB must continue to review all protocol and informed-consent documents with the greatest of care, regardless of any prior review at the national level.

What does this mean locally?

Researchers who conduct NIH or NCI, sponsored multicenter clinical trials should continue to submit the full protocol with their application forms to the Committee. The packet submitted should include a copy of the NIH/NCI-approved consent documents identified as having been approved by a national IRB. The Committee will then review the material as it would any other submission. If the Committee chooses to make *"any deletion or substantive modification of information concerning risks or alternative procedures contained in the sample consent document,"* the Committee on the Use of Human Subjects in Research will be required to justify those changes and the changes should be brought to the attention of the national group at the initiation of the investigator. Any "deletion or substantive changes" made by the investigator should be identified and justified to the Committee for their review and concurrence.

It is unlikely that the Committee on the Use of Human Subjects in Research will routinely make "substantive modifications" in the material provided by the national group. The Committee is more likely to make language changes that reflect local standards and make additions of "boilerplate" language required by the University of Minnesota. Changes for style and compliance with local standards and laws do not require review and approval at the federal level. The Committee will continue to insist that *research risks* be distinguished from risks of treatment.

To facilitate the process, the investigators should continue to prepare a consent form that conforms to current institutional standards and submit that form along with the "nationally-approved" documents.

In discussion of the implications of the "Dear Colleague" letter with OPRR, it appears that some institutions were intimidated by the "national stamp of approval" on the consent documents. Some of these institutions were reluctant to make changes in any aspect of the consent document even when local standards were not met; some were deleting vital information from consent documents.

The overriding goal is consistency in general standards for the conduct of research to ensure that subjects across the country participating in the same clinical trial will receive similar relevant information.

Questions regarding this or any other policy or procedure involving human subjects should be directed to Moira Keane at 624-1889.

Benefits of University-Industry Collaborations: The University Perspective

Address by Edward L. MacCordy

Retired Vice Chancellor for Research
Washington University

Given November 19, 1992, at the conference *University-Industry Research: Balancing Public and Private Trusts*

Edward MacCordy was, until his recent retirement, the Associate Vice Chancellor for Research at Washington University in St. Louis. His office was responsible for the coordinated functions of research administration and technology transfer. During his service at Washington University, a $100 million cooperative research program with the Monsanto Company was initiated and a unique multi-university supported start-up company formed in cooperation with the Mayfield Venture Capital Fund.

Mr. MacCordy received a B.S. in Civil Engineering from Tufts University, an M.S. in Management and Industrial Engineering from Rensselaer Polytechnic Institute, and pursued doctoral studies in Business Administration at George Washington University. He served as a Naval Officer in the Civil Engineer Corps from 1948-67, and as Administrative Officer in the Computer Systems Laboratory and Biomedical Computer Laboratory at Washington University from 1967-1976, before being named the Associate Vice Chancellor for Research in 1976.

Mr. MacCordy is a past president of the National Council of University Research Administrators and also of the Association of University Technology Managers (AUTM). As a representative of AUTM he served on the Secretary of Commerce's Advisory Commission on Patent Law Reform in 1991-92. In 1983 he served on the Clearinghouse on University/Industry Relations Advisory Committee of the American Association of Universities.

Edward MacCordy began his presentation by stating that "It is especially pertinent that we consider whether the results of these productive and valuable collaborations will continue to flow for the benefit of the public and the national economy under proposed regulations directed at assuring the integrity of research by placing institutional constraints on the personal activities of the academic scientists, engineers and their families."

The university-industry collaboration is not primarily about patents and financial interests, MacCordy said, but "about benefits to society, the regional economy, federal research agencies, companies, universities and their scientists and students." He pointed out that without the ability and willingness of industry to invest in the development and marketing of new technologies, those advances would die in the notebooks and journal articles of academic scientists.

Despite the nation's major investment in academic research over the past 40 years, it was not until the early 1980s that changes in federal law made it more attractive for industry to seek exclusive licenses to university inventions developed with public funding, and to sponsor academic research. "For the first time, an industrial sponsor of university research could confidently negotiate for exclusive rights to a technology without fear of intervention or restrictions by the government," MacCordy said. Increased technology transfer and university-industry collaborations resulted, with added stimulus from recent emphases on regional economic development and international competitiveness.

However, "government remains the dominant funding source for university research, and these projects are the primary base from [which] opportunities for industry-sponsored projects arise." The interaction of the basic research base with applied research and development goals of industry not only brings new products to market, MacCordy said, but also opens new and expanded avenues of research for academic scientists and enables them to pursue useful new technologies based on their fundamental research.

"When dramatic technological changes descend on industry, the university is a resource to assist companies to rapidly adapt, and a source of skilled manpower to apply and further develop evolving technologies." Biotechnology is a dramatic example of universities' role as a fount of new technology and expertise, MacCordy said. This will likely continue for decades as the Human Genome Program provides medical researchers with knowledge on which new diagnostics and therapies can be developed.

As to whether this increased interaction with industry will move academic scientists from basic to applied research, MacCordy asserted that "Such collaborations need not endanger the balance among the university objectives of education, research and public service. . . . Even in the strongholds of fundamental research, change will likely involve the addition of applied research efforts to explore ideas for applications of fundamental research results. . . . Realistically, medical scientists, biologists, physicists and engineers frequently consider applied objectives in the performance of their fundamental research. . . . But the scope, limited funding and time authorized for their fundamental work does not allow for pursuit of applications; supplementary sponsorship by industry does.

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Conflict of Interest Issues: The Federal Perspective

Address by George Galasso and Miriam Leder

Associate Director, NIH; Assistant General Counsel, NSF

Given November 19, 1992, at the conference, *University-Industry Research: Balancing Public and Private Trusts*

Dr. Galasso's responsibilities at NIH include development and implementation of policy on grants and contracts and management of extramural programs. Galasso received a Ph.D. in microbiology, specializing in virology, from Manhattan College. He joined NIH in 1968 through the Grants Associates Program, following four years as associate professor of microbiology at the University of Virginia School of Medicine. He then joined the National Institute of Allergy and Infectious Diseases (NIAID), where he initiated the Antiviral Substances Program. He later became Chief of the Development and Applications Branch of NIAID, with responsibility for research on control of infectious diseases through both vaccine and antiviral agent development and clinical efficacy testing. In 1983, Galasso was appointed to his present position.

While with NIH, Galasso has organized the Third International Conference on AIDS, held in 1987 in Washington, D.C. He serves as director of the World Health Organization (WHO) Collaborating Center for Interferon Reference and Research, is on the WHO Expert Panel on Viral Diseases, and played a leadership role in the establishment of the International Society of Antiviral Research, of which he is President-Elect, and the International AIDS Society.

George Galasso began his presentation by noting that conflict of interest is not a new concern for federal sponsors of research. "It was part of [NIH] grants regulations when we first started an extramural program in the late '40s, but basically it said there shall be no conflict of interest." That's all it had to say, he noted, because back then there was a clear separation of the kind of research done in academia and that done in industry, and nearly all academic research was sponsored by public agencies.

Quoting Vannevar Bush as saying "Applied research drives out the pure," Galasso emphasized that there was no question of the objectivity of academic research, and any involvement with industry or industrial scientists was seen as damaging to the academician's career and research. As recently as 1982, Yale University President Bartlett Giametti said, "The academic imperative is to seek knowledge objectively and share it openly and freely; the industrial imperative is to garner a profit, which creates incentives to treat knowledge as a private property."

Over the years this has changed, and today industry support for academic research and other collaborations with industry are actually sought after. For example, the new industry of biotechnology came out of university laboratories funded mostly by PHS. "Biotechnology has improved the nation's health—not only the public's health, but the economic health of the nation—and it is clear now that the results of PHS-supported research can be transferred for financial gain," Galasso said.

The federal government has been active in supporting increased interactions, not just between university scientists and industry, but between federal researchers and industry as well. The Technology Transfer Act of 1986 gave scientists in federal agencies the right to benefit from royalties on patents of their discoveries, and to participate with companies in projects supported by Collaborative Research and Development Awards (CRADAs). In 1992 Congress increased the percentage of the budget required to be set aside by federal agencies to support Small Business Innovation Research awards, and a new type of set-aside fund, the Small Business Technology Transfer Research award, was established to support R&D collaborations involving small companies and university researchers.

"The atmosphere has changed considerably," Galasso said, because of the perceived need "to improve and facilitate movement of financial and intellectual capital between the government, industry and academia. The cross-fertilization of industry by academia is terribly important, but all of these inducements and changes are certainly creating a new and challenging climate in terms of our role in government as stewards of public funds which we provide for research in academia."

Galasso said that a major responsibility for federal agencies is to make sure that the results of the research they sponsor not be compromised in any way. "We are charged with protecting the objectivity of the research. If there is economic gain, that's fine, there's nothing wrong with that, just so long as it doesn't have any impact on the integrity of the research. Making money is no longer anathema as it was 10 to 20 years ago."

All of this change would not be so problematic if it weren't for the rapidity of the growth and advances in biotechnology and biomedical fields, Galasso asserted. For example, he stated that annual patent applications in biotechnology have increased from 30 in 1978, to 3,000 in 1982, to 6,153 in 1987, and it is estimated that in 1993 there will be over 12,000.

Also a factor is that since the late 1970s, biotechnology companies have invested over $10 billion in R&D, most of it targeted at the same academic researchers that are the target of the Public Health Service. In 1991 the biotech industry invested $3.2 billion dollars in R&D, and across the

industry 47 percent of income generated is reinvested in R&D, compared to 14 percent in the pharmaceutical industry, Galasso said. The President's Council on Competitiveness estimated that the biotechnology industry will have $50 billion in profits by the year 2000. "If you use the 47 percent formula, it means that they will be investing over $20 billion in R&D. The NIH budget currently is just over $10 billion, and if we are lucky it will grow to $15 billion by 2000, which means there will be more money available for R&D from industry than there will be from NIH."

Galasso stated that not only do universities need the R&D money from industry, they also need and are actively seeking income from royalties on patents. There may be only a few universities earning significant royalties at this point, "but the fact is that universities get about $80 million a year in profits from patents generated with PHS research support, and this is just 10 years after universities began applying for patents on PHS-funded discoveries."

The relationship of academic investigators to industry has changed drastically, Galasso noted. Today, a PHS-supported researcher may be the owner or an officer of a company, a stockholder, or in many cases a consultant. "The most important thing as far as the PHS's concerns is to make sure that people become aware of a potential [conflict of interest] problem before it becomes a crisis. Most scientists want to retain and maintain their intellectual freedom and credibility, and they don't want to become beholden to any master of any sort. However, expedient and ignorant decisions about financial relationships may inadvertently lead to loss of freedom unless we are very careful about the relationships that are developed."

It is the rapidity of the changes taking place and the complexity of the relationships being developed that has led Congress and NIH to explore the need for changes in conflict of interest policies, Galasso said. He acknowledged the great interest among university scientists in what the eventual policy will say, but stated that "I can honestly say that I don't know. I know that you have a version that became available last May, but I can guarantee you that that's not the version that is in the assistant secretary [of health and human services]'s office being reviewed. There have been a number of revisions," Galasso said.

Galasso traced NIH's interest in a conflict of interest policy back to an institute directors meeting in 1988. One subject discussed was a 20-author paper in the *New England Journal of Medicine* that reported the effectiveness of a new drug. "This was a very important paper and a very important finding, but there was a footnote in the paper that said about 60 percent of the authors had stock in the company that produced that drug. Well, how does that play in Peoria?" Galasso asked. "The general physician is going to say 'I'll wait until someone else substantiates those results before I start prescribing it for my patients.'"

This raised two issues, Galasso said: First, regarding stewardship of public funds, were the millions of dollars the NIH had invested in the study wasted? Second, was the public being kept from having a useful drug simply because of the credibility factor raised by the footnote?

At this same time, Congress was holding hearings regarding what NIH was doing to ensure that results of research were proper and that there is no conflict of interest. NIH held an open meeting on the subject in June of 1988 and "It was recognized that this was something academia should be concerned about and something should be done about it, and that most of the institutions would go back and start developing their own policies. But it was also understood that the government would develop a set of guidelines in terms of where are we, where should we be going, what the concerns were, and what we recommend that institutions do."

The result was a set of guidelines, (not rules, Galasso emphasized) which recommended prohibiting "investigators, key employees, consultants, and other persons with primary research, management, advisory, supervisory or purchase authorization responsibilities, or their spouses, dependent children or other dependents, from having personal equity holdings or options in any company that would be affected by the outcome of the research, or that produces a product or equipment being evaluated in the research project. Receipt of honoraria, as well as sharing of information and/or research products with these sources prior to publication of the research results is also prohibited."

Galasso said that a few people agreed with these recommendations, but he acknowledged that "The vast majority did not, and basically all hell broke loose. We received 740 letters, many criticizing the statement as being too broad, some saying we were changing the face of biomedical research or destroying biomedical research, that the proposed prohibition on equity would disproportionately affect small companies, and I would agree with that. But some said that there was no problem with financial incentives and this was good and it should be encouraged. All you needed to do was manage it. Many felt that all you need to do is put [in] a footnote and let the reader make his own determination of whether to believe it or not. Well, we don't think that's proper stewardship of funds."

Based on the generally negative feedback, Secretary of Health and Human Services Louis Sullivan rescinded the proposed guidelines on December 29, 1989. He also indicated that NIH would instead develop rules and publish them for review according to the federal procedure of proposed rule making. Before drafting the regulation, NIH held another conference to gather input from universities, industry, government and students. Expecting a full day of heated debate, NIH got only a half day of general agreement that the existence or perception of conflicts of interest in re-

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Caplan

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The Problem

Caplan introduced his case studies by making four points: First, he called for *prevention* of ethical problems in university-industry relations. "Much as contemporary health-care is overly focused on acute illness, emergency care and rescuing the sick from the brink of death, the ethical focus on university-industry relationships to date has been almost exclusively on the acute administrative care of crisis situations, spin management of miserable situations, and heroic committee efforts to salvage critical situations. . . . But those of us in bioethics must try to contribute to the discussion of university-industry ties not only by proposing ways to deal with crises, but by thinking about values and principles that can prevent them."

Second, Caplan called conflict of interest the "heart" of the university-industry problem. "It poses the greatest challenge to public trust of and support for universities. And I think it's the greatest challenge to administrators within universities who are trying to balance the mission of a university against the demands of industry and private-sector collaboration."

Third, he suggested why the problem is particularly severe in biomedicine. "The fiscal stakes are high. Venture capitalists, corporations and nations around the world see biomedicine as a lucrative industry where big money can be made fast. . . . The field is seen as huge with the potential to grow bigger."

Fourth, searching the literature showed Caplan that "neither bioethics nor biomedicine nor medicine has a widely recognized definition or body of knowledge about conflict of interest." In particular, said Caplan, "I can find no explicit address of financial conflict of interest in codes of ethics in the field of biomedicine prior to 1980. . . . As far as I know, Congress first enacted restrictions on conflict of interest through the rules it wrote about self-referral for Medicare patients and clinical labs—that is, not allowing doctors to refer their patients to labs that they own . . . Those regulations were implemented this year."

For those four reasons, Caplan sought specific cases that illustrate conflicts of interest in biomedicine and sought to induce ethical principles from them. "Here's some cases," he said, "where people agree that there have been conflicts of interest."

Case Studies

"Some of you recall many years ago the Humana Corporation offered Dr. Bill DeVries an opportunity to come to Louisville to their headquarters hospital to do research on his Jarvik heart implant," said Caplan. He went on to list the conflicts of interest in the case:

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Arthur Caplan's Ethical Principles to Guide Biomedical Research

To prevent unethical conflicts of interest in the course of university-industry collaborations in biomedicine, Arthur Caplan, Director of the University's Center for Biomedical Ethics, offered the following eight principles, with the qualification that they are tentative and meant as a starting point for discussion.

"The need to protect the interest of subjects or patients can never be subjugated to the interests of research or corporate interests. Period, It's a rule. You can't do it. . . . It's not enough to disclose it. You can't do it.

"Corporate ties are no excuse for abdicating the duties and responsibilities you have as a health-care professional. You cannot be in a position where you hurt subjects or cause harm to others, no matter what you are doing.

"Information must be publicly available if it is likely to affect the health or safety or welfare of others. And I don't mean [available] just to colleagues. I mean to anybody who needs to have it.

"Deception, manipulation or coercion are never ethical, regardless of contracts and obligations entered into by researchers. Universities must prohibit them. You cannot allow people to withhold information about corporate ties on an informed consent form. It can't happen. That is a principle that ought not be broken.

"It is wrong to be in a position to make profits by insider knowledge or manipulating markets. That is not a situation that you're going to handle just by disclosing. If it exists, you ought not be doing it.

"Those doing research with financial stakes should never be the sole source of interpretation for their findings. This is a principle that is very tough to apply, but it is one we ought to be thinking about. If you're the only person who can say it works, or it's successful. . . . That's an abdication of what everybody recognizes is the scientific method. . . . It is an unacceptable conflict of interest.

"Corporate ties cannot weaken your duties to colleagues and peers about disclosing your methods, original data or application of new techniques. I can add in some things about the relationships as a teacher and role model with students, but I think that's pretty self-evident."

"Corporate ties should not permit weakening the methods used to acquire new knowledge as defined by one's discipline and peers. [If a researcher moves to an institution] where he has no peer review, where he is not subjecting his protocols to critical assessment that would be demanded by his discipline, that is an unacceptable conflict of interest and ought not be engaged in."

One, DeVries' patron had a vested interest in his results. "The research was sponsored by a corporate entity that stood to profit from positive outcomes," said Caplan.

Two, one of the patron's motives was free publicity. "In fact," said Caplan, "no one remembers anymore exactly what the outcome of the implants were more or less, but everybody remembers Humana. They did pretty well."

Three, DeVries operated under looser rules at Humana. "The setting weakened oversight of subject welfare and diminished chances of obtaining useful findings," said Caplan. "I remember talking to Dr. DeVries personally, and he said to me 'I'm leaving the red tape and the administrative hurdles of the University of Utah behind, and I'm going to be able to move much faster.' Caplan said he and others see that move as "shopping for a better regulatory [and] administrative environment in order to, in fact perhaps, not do as well by your subjects."


Arthur Caplan, Ph.D.

Next, Caplan explored the case he titled, "John Moore's Spleen and the University of California." When Moore sought treatment for leukemia, researchers found him not nearly so sick as they would expect. Wondering why, the researchers kept cells from Moore's spleen in culture and isolated an anti-cancer substance from them. "They got into a very lucrative arrangement with a private company to make and manufacture this substance from a cloned cell line of Mr. Moore's tissues. . . . But they didn't tell Mr. Moore." In fact, because the researchers needed a control on the cell line, they periodically brought Moore back for further "treatment."

Thus "Researchers used Moore to advance their own interests and the university's interests," said Caplan. "They manipulated him."

Third, Caplan spoke of Sheffer Tseng, a Harvard researcher who experimented with artificial tears. Tseng had equity in a public corporation that was developing the tears as a commercial product. But shortly before he published negative research results about the product, Tseng sold his stock.

"That is agreed to be a conflict of interest," said Caplan, "because he's using insider information to make a profit, and he's actually timing the release of his own publication to do insider trading. He deceived the public, allowed that information to be used to manipulate stock. And he may have actually jeopardized the health of patients by holding back negative findings long enough so that he could unload his stock. That is, he was inconveniencing them and maybe even hurting them."

Fourth, Caplan described a current case involving Beaumont Hospital in Detroit. "It's not clear exactly what's going on here," said Caplan. "There's more to come on this case." Allegedly, researchers under contract to a manufacturer of artificial valves for human hearts are testing a technique for learning whether valves now in use are cracking. And allegedly the researchers have agreed to keep their results confidential.

"The conflict is, number one, should anyone be allowed in a university setting to put restrictions like that on their contracts?" asked Caplan. "And number two, are they violating their duty to patients by not informing them quickly if they [the researchers] see a crack in their [the patients'] valves?"

In the last case that Caplan discussed, researchers used a pig's liver to keep a woman alive until a human liver became available for transplant. "What did not get reported," said Caplan, "was the fact that the Cedars-Sinai Hospital [where the researchers worked] has an arrangement with a private company to breed genetically altered pigs." The alteration was intended to make the pig liver more acceptable to a human body. The operation was questionable, Caplan explained, because the timing was suspicious, the patient and her family were not informed of the commercial ties, and the breeder, Xenogen, used the occasion to solicit venture capital. "The company immediately began sending out faxes the next day to promote its attachment to Cedars," Caplan said.

Caplan briefly mentioned two widely publicized cases involving University of Minnesota medical faculty—the David Knighton case and the ALG case. Knighton developed a substance, called Procuren, that appears to help wounds heal. "The alleged problem," said Caplan, "is the possibility of [deceptive or premature] favorable reporting due to [Knighton's] equity holding." In the ALG case, said Caplan, "there's an alleged failure to follow federal regulations in order to make and sell profitable drugs."

Cases Yield Four Categories of Offense

From the cases he described, Caplan abstracted four categories of conflict of interest, as follows:

The first he labeled "distorted and/or misplaced loyalties," which means putting private interests before public interests, deceiving subjects for the sake of personal income or agreeing to put corporate interests over the patients' interests. "Those things all stand as problems of loyalty," said Caplan.

The second category he labeled "undeserved or unfair financial gain." That includes using inside information to

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Caplan

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manipulate markets, reporting incomplete data, and sidestepping regulations. In other words "using your position at a nonprofit university to make profits that aren't due you," said Caplan.

Caplan's third category, "violating duties to patients or subjects," refers chiefly to the moral obligations of a physician. "If you know someone's very sick and you don't tell that person because you're silenced by contract, . . . you have failed to honor your moral duty as a physician or a researcher," explained Caplan. The same judgment applies to the use of inadequately tested treatments.

With the last category, "violating duties to peers and to the profession," Caplan referred to undermining colleagues by failing to disclose information, and to weakening the chance of getting useful findings. "If you move to a place where it's less likely that good methodology, or good techniques or good peer feedback is going to be available," said Caplan, "then I think you've undermined something very important—the prospects for getting findings."

Disclosing and Divesting Is Not Enough

Having categorized unethical responses to conflicts of interest in biomedicine, Caplan turned to principles for avoiding them.

First, he warned against over-reliance on disclosure and divestiture of conflicting interests.

"Many have argued that if biomedical researchers and others would only disclose what their cross-arrangements are, that would be enough," said Caplan. "Others, and I've done this myself, have said no that's not enough. You ought to divest totally and not have any conflict of interest potential. Appropriately, many people have responded to that position, as I have advocated it, by saying . . . 'You're going to take all the incentives that people have to use university research as an engine of technology development and transfer. You can't go that route. That undercuts what you expect to some extent to come from research.' . . . So to the extent to which I've been a proponent in different settings of simply using divestment as the answer to the problem of conflict of interest, I take it back.

"I think divestment is appropriate sometimes. I think disclosure is appropriate more of the time," Caplan concluded. "But I don't think they're enough."

Caplan ended his presentation by offering eight ethical principles for the conference's consideration [see sidebar, next page]. In short, they say that patients come before research, profits, contracts or trade secrets; that research and teaching require openness, peer review and honest pursuit of knowledge; and that using inside information to manipulate markets is wrong.

By Phil Norcross

National Institute of Dental Research

Revised Page Limitations for Small Grants

The purpose of this notice is to modify the National Institute of Dental Research Small Grant Announcement (PA-91-36). Changes in the reporting requirements for "Other Support" in form PHS 398 (Revised 9/91) have rendered the 25-page limitation for small grant applications impractical.

Effective with the April 3, 1993, receipt date, the Research Plan (Specific Aims, Background and Significance, Preliminary Studies, and Research Design and Methods) may not exceed 10 pages. No appendix, including reprints or manuscripts, may be submitted. Graphs, diagrams, tables, charts and photographs must be included in the body of the application. Original glossy photographs should be included in the original application sent to the Division of Research Grants, NIH, and in the two copies sent to the Scientific Review Office, NIDR. The introduction included in revised applications may not exceed one page.

Applicants are reminded that the type size limitations specified in the PHS 398 form must be observed.

All other instructions in Program Announcement-91-36 remain in effect. Applications not conforming to the revised instructions will be returned to the applicant without review.

Inquiries may be directed to the appropriate ORTTA Grant Administrator, or to Director, Extramural Program, National Institute of Dental Research, Westwood Building, Room 503, Bethesda, MD 20892-4500. The telephone number is 301/496-7723; effective April 1, 1993, it will be 301/594-7723.

UMR

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UMR's television and video staff seem able to get sight and sound *from* just about anywhere, *to* just about anywhere. By projecting onto a single screen images taped with two cameras ten miles apart, they helped physicist John R. Winckler create three-dimensional moving pictures of the aurora borealis. For faculty in the Building Research Center, they videotaped the air moving through an office building, which is a little like having seen the wind. To bring students and teachers together or to create teleconferences, they communicate via satellite with Duluth or a dozen other places. In its multi-media lab, UMR helped Professor Caroline Czarnecki put images from her microscope onto CD-ROM. And from a Coast Guard cutter on Lake Superior in September, UMR shot award-winning video despite the pitching and rolling of the deck.

UMR, a part of Continuing Education and Extension, provides University of Minnesota faculty and staff with all kinds of media services—video production and television connections; teleconferences & interactive video; still photography and photo-lab work; art for posters and publications; equipment operation, repair and purchase advice. UMR's chief job is to provide those services for classroom teaching, but it also serves grant-funded research and extension programs.

The video and television branch of UMR is particularly anxious to make its services known to research faculty. "The use of video in grant work is increasing," says Rich Reardon, UMR's program developer. "More and more you find that research reporting includes some form of videotape, or even interactive video. We want to collaborate with faculty in order to make their work more attractive to granting agencies. Any project that has a media component we will help with in any way we can, from very basic work that comes in and out the door in one day, to projects for which we do almost everything, from concept to final editing. We'll also help research funding sources for an idea."

The Camera Can See What the Eye Cannot

Probably the simplest video service UMR provides is use of its machinery for editing and duplicating videotape. "We can loan faculty use of a VHS editing booth for about $6 an hour," says Reardon. "One of our people will show them how to operate it, and they can edit tapes together for a presentation." But like most jobs that sound simple, there are complex variations. "We can edit three-quarter-inch, betacam, or one-inch tape. Those formats usually require professional editors and gear, though," says Reardon. "We can also transfer video among any of these formats, or to either of the foreign television formats—PAL and SECAM." UMR can add file footage from its library. It can also add music, titles, graphics and closed-captioning.

One of the more complicated editing jobs UMR has had a role in was work by professor emeritus of physics John R. Winckler. "I make measurements of the aurora borealis and research its origins," he says. "I've done a lot of video editing over there at Rarig." UMR's studios are on the West Bank, in the Rarig Center. "The most unusual and interesting project was stereoscopic images of the aurora." In that case Winckler brought videotape and a custom-built piece of electronic hardware; UMR provided a recording engineer and a lot more hardware.

In 1991, Winckler shot videotape of the aurora borealis through two cameras simultaneously—one at the O'Brien Observatory at Marine on St. Croix, Minnesota; the other about 10 miles away near Hugo, Minnesota. (They weren't ordinary cameras; they were "image-intensified charge-coupled devices," a million times more sensitive than an ordinary camera.)

At UMR's studios, Winckler and UMR engineer Jerome Sexton combined those two sets of tape into a third tape that alternates, frame by frame, between the O'Brien and Hugo images. "The device that sequences the two images we built here in physics," says Winckler. "At UMR we used an editing console and a couple other advanced digital devices for moving the frames around with respect to one another and getting the stars lined up, which is quite a trick."

The resulting image looks three-dimensional when viewed through Winckler's special electronic glasses. "Actually they're Nintendo glasses, the same ones they use for video games" says Winckler. "Liquid crystal shutters have you look at the screen through one eye, then the other, synchronized with the tape. So with your right eye you see the view from Marine; with your left eye you see the view from Hugo." The switching is fast enough that you think you see a single, three-dimensional image.

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Photo by Nancy Johnson, UMR

Caroline Czarnecki, a professor in veterinary pathobiology, prepares a CD-ROM program that displays images from her microscope. With her are graduate assistants Steve Malikowski and Tim Kochery (standing).

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That is an entirely new view of the aurora. To the unaided eye, the aurora appears to move like a curtain in the sky, "But the aurora has depth," says Winckler. "It stretches across Canada and down over the U.S. quite a ways. You can't see the depth with your own eyes; it's too far away. But this system brings the aurora down as if it were right in the room with you. So many puzzling details unravel when you see them in stereo, standing out from one another instead of overlapping on a flat screen."

In another collaboration to videotape what usually can't be seen, UMR helped Tom Kuehn and colleagues at the Building Research Center videotape air moving through office buildings. "They had a grant which included creating a video for instructional and public information purposes," says UMR's Reardon. "They used a fog machine to create an air we could see, then they set up an extensive set of circumstances regarding ventilation intake and return, and walls and furniture, in order to see how air flows can be made more or less effective."

"That was a technology transfer project sponsored by the State of Minnesota, Petroleum Violation Escrow Fund," says Kuehn, a professor of mechanical engineering. "We worked with Susan Tade at UMR." Tade was the project's producer-director.

"We taped in an environmental chamber here in the mechanical engineering department and did some field work in other University buildings and in downtown Minneapolis," says Kuehn. "We used our own camera to show UMR roughly what we wanted. Then UMR gave us some advice about what colors to paint the chamber and sent its videographers to make the tape. I wrote the script for the voice-over; UMR added the music and credits and so on. I worked with Tade on the final editing.

"Videotape is a good vehicle for technology transfer, for getting information out to professionals in the field," says Kuehn. "In this case it shows what happens to ventilation if a designer installs diffusers in the ceiling or changes the configuration of partitions. For example, one side of a partition may be full of fog, indicating good ventilation; the other side may have no fog at all. With the video you can see turbulence and motion you wouldn't get from a still photo."

Teleconferences, Interactive Video and Multi-Media

UMR is the organization that supplies us with the "distance education classroom" or "two-way interactive classroom," meaning students on the Duluth or Crookston campuses can see and speak with teachers on the West Bank, for example. UMR now serves such classes "routinely, a couple times a day," says Reardon.

UMR also produces public service announcements, training programs and full-length television shows. For the hundredth anniversary of the College of Pharmacy it created a half-hour documentary on the history of the corner drug store. The show aired on KTCA, channel 2, in the Twin Cities, and on a dozen other public stations in the Upper-Midwest. For six years UMR has produced a weekly call-in show, "Health Talk and You," that airs live on Tuesday evenings on KTCI, channel 17.

Reardon and his colleagues have made videos at various levels of collaboration with faculty. "Sometimes the faculty-client does the writing. Sometimes the client serves as advisor while we do the writing," he says. Sometimes UMR advises faculty about proposals or teaches the use of video equipment. Sometimes it writes, tapes and produces the entire show.

When a proposal includes video work, UMR will help faculty prepare the budget. "Investigators often underestimate how much video costs, or don't include the range of things you need in a video budget," says Reardon. A sophisticated television documentary can cost as much as $1500 a minute to produce. "That tends to boggle the minds of people on campus," he says. "But a grantor who sees television budgets all the time won't bat an eye."

If you have a grant to run a teleconference, Reardon and his colleagues will provide "everything from staging, to buying satellite time, to helping you arrange the downlink at the sites you want," he says. They can also advise about promotion and supply "roll-ins," cuts of videotape that punctuate a conference, particularly at the beginning and end. "If you're smart, when you create the roll-ins you plan for a market beyond the single teleconference," says Reardon. "For example, roll-ins produced for a teleconference on emotional stress among teenagers we later re-edited into a half-hour documentary."

Along with putting sights and sounds on tape and TV, UMR can have them put on disk—videodisk or CD-ROM. In UMR's studios, images and sounds are stored on videotape or removable hard drives. The tapes or drives then go to 3M, where a videodisc or CD-ROM is "pressed."

Caroline Czarnecki has begun to develop a CD-ROM supplement to microscopes and prepared slides for teaching veterinary science. "We study tubular organs in domestic mammalian and avian species," she says. "But the slide collection is getting old. Eventually this system will supplement the current lab study."

First, UMR helped Czarnecki videotape her slides through the microscope in her lab. In UMR's lab, then, Czarnecki is digitizing the videotape for recording on CD-ROM. "I'm also using a scanner to digitize color transparencies," she

says. "Thousands of images fit on one CD. I can include text with the images. I can include tutorial questions for students. I might also arrange a random access of images for testing purposes."

This winter UMR has begun running workshops on the creation of multi-media presentations like Czarnecki's. "Rick Peifer and Steve Fifield in General Biology created the multi-media presentation software called MacPresents™ They were bombarded with so many requests from people wanting to learn how to use it that we got a grant from Continuing Education and Extension to build a multi-media station here," says Reardon. "As the first step in a much broader multi-media initiative, we're setting up to provide training."

MacPresents is a hypercard system that allows the user, a university lecturer for example, to display images from all kinds of sources—slides, animation, videotape, text files, video and ROM disks, images scanned from paper. "It incorporates images that used to require a half-dozen pieces of equipment," says Reardon. The images can be presented in a predetermined sequence, or drawn on at will to answer questions.

Videodisk is particularly suited to interactive video. A collection of images is stored on disk and an instructional computer program displays those images on the screen at appropriate times. "We've created about six 'level three' interactive disks," says Reardon. "One teaches pesticide management. Another one, for a social science team in Duluth, dramatizes crisis intervention as part of an instructional package for school counselors."

The crisis-intervention program opens with a teacher, principal, student and counselor meeting for the first time. Whenever someone speaks to the counselor, the speaker looks directly at the camera, and so appears to speak directly to the observer outside the screen. Thus the observer is drawn into the role of counselor. Periodically through the program the observer-counselor is asked to choose from a list of questions or statements. Then actors on the screen role-play their likely response to that choice. It's the videodisk that makes it possible for the computer to select the right responses at the right time.

Hypothermia: The Cold Facts

Sometimes a client will simply ask UMR to make a show, and then turn it loose to do its job. That was the case with the Minnesota Sea Grant's video regarding prevention and treatment of hypothermia. The result is an award-winning piece of documentary and instruction.

"Hypothermia: The Cold Facts" opens with the cry of a boy who has fallen into a Twin Cities' lake in winter and is barely hanging onto the ice with his slippery mittens. He pleads with rescuers, "Hurry, people! Hurry!" His voice is desperate and terrifying; it haunts you for weeks after you hear it. The tape goes on to show how the boy was saved and to describe cold-water safety. It interviews victims of hypothermia, designers of safety gear, and research and medical personnel. The chief spokespeople are Robert Pozos and Lorentz Wittmers, of the UMD School of Medicine. (Pozos has since left the University.)

"Sea Grant had been supporting research on hypothermia for about 10 years and had done a lot of work to educate scientific and professional audiences," says Alice Tibbetts, the communications coordinator at Sea Grant. "But we felt like there was a big gap in what the general public knew. So we got a grant to do something for public broadcast. Rich [Reardon] was the producer.

"It was a great way to do a project," says Tibbetts. "I gave Rich the background and some technical information and told him who to interview. He took it from there. I reviewed the script and several cuts of tape, but Rich was really on his own for everything else."

Reardon describes "Hypothermia" as "the toughest shoot of my career." Although the opening footage of the boy in the Minneapolis lake was donated by the news department of KMSP-TV, channel 9, in Edina, Reardon and his crew had to shoot other parts of the tape from the deck of a Coast Guard cutter on Lake Superior. "Lake Superior in September is not very cooperative," he remembers. "We tried a lens designed to dampen the vibration of taping from a car or truck. But it couldn't handle the constant pitching and rolling of the ship. We ended up relying on the steady hand of the videographer. He did outstanding work under extremely adverse conditions."

Reardon and UMR earned four awards with "Hypothermia." They came from the British Medical Association, the Council on International Non-theatrical Events (CINE), and the Council for Advancement and Support of Education (CASE). Tibbetts distributed the tape through PBS stations, through a group that serves divers and rescue professionals, and through a library and education distributor. "About a hundred PBS stations picked it up," she says, "and a lot of them probably air it several times a year.

"I'm working on a grant for another video project now, to persuade the public not to press for planting every lake with hatchery game fish, to encourage the protection of wild fish populations," says Tibbetts. "UMR helped me do the budget for the proposal.

"It's nice to work with an outfit," Tibbetts says of Media Resources, "that knows what it's doing."

For more information about UMR's video services, phone Rich Reardon at 625-3486.

By Phil Norcross

Licenses Negotiated

October-December, 1992

1. **Title:** **Diagnosing Malignant Hyperthermia Susceptibility by Detection of Abnormal Proteolytic Enzyme Digestion Fragments of the Ryanodine Receptor**

   Purpose: Development of test to evaluate susceptibility of anesthesia patients to malignant hyperthermia reaction.

   Licensee: Genzyme Corp., Cambridge, Massachusetts - Exclusive License

   Inventors: Charles F. Louis, Veterinary Pathobiology, and James R. Mickelson, Veterinary Biology; and Kevin P. Campbell, Michael C. Knudson, and Steven D. Kahl, University of Iowa

2. **Title:** **Alleviation of Tobacco Withdrawal Syndrome**

   Purpose: Use of a non-nicotinic compound as the active agent in tobacco cessation products.

   Licensee: LecTec Corp., Minnetonka, Minnesota - Exclusive License

   Inventors: Dorothy K. Hatsukami, Psychiatry, and Robert M. Keenan, formerly Psychiatry, now at National Institute of Drug Abuse

3. **Title:** **Honeycrisp™ Apple Tree**

   Purpose: New variety of cold-hardy apple tree that produces fruit with exceptionally crisp and juicy texture, mildly aromatic flavor, even ripening and excellent storage life.

   Licensee: ProTree Nurseries, Brentwood, California - Non-exclusive License

   Inventors: James J. Luby and David S. Bedford, Horticultural Science

4. **Title:** **Drug Therapy for Cardiopulmonary Resuscitation**

   Purpose: Methods and pharmaceutical compositions to improve the effectiveness of CPR.

   Licensee: Ambu International, Glostrup, Denmark - Exclusive Option to License

   Inventors: Keith G. Lurie, Medicine; Barbara S. Gold, Anesthesiology

5. **Title:** **DNA and Amino Acid Sequence Specific for Natural Killer Cells**

   Purpose: Genetic information necessary to stimulate production of type of white blood cell to aid in fighting cancers.

   Licensee: Sandoz Pharma, Ltd., Basle, Switzerland - Exclusive License

   Inventors: Fritz H. Bach, formerly Laboratory Medicine & Pathology; Jeffrey P. Houchins and Toshio Yabe, Laboratory Medicine & Pathology; Cynthia M. McSherry, Surgery

6. **Title:** **Honeycrisp™ Apple Tree**

   Purpose: New variety of cold-hardy apple tree that produces fruit with exceptionally crisp and juicy texture, mildly aromatic flavor, even ripening and excellent storage life.

   Licensee: Stark Brothers Nurseries, Louisiana, Missouri - Non-exclusive License

   Inventors: James J. Luby and David S. Bedford, Horticultural Science

7. **Title:** **Antiviral Combination Comprising Nucleoside Analogs**

   Purpose: Development of antiviral medications using compounds called Carbovir.

   Licensee: Burroughs Wellcome Co., Research Triangle Park, North Carolina - Exclusive License

   Inventors: Robert Vince, Medicinal Chemistry; William M. Shannon, Southern Research Institute, Birmingham, Alabama

8. **Title:** **Joint Movement Tracking Measurement System**

   Purpose: Method and instrumentation for quantifying functional motor performance and changes as a result of physical training or rehabilitation.

   Licensee: Cedaron Medical, Inc., Davis, California - Exclusive License

   Inventor: James R. Carey, formerly Physical Medicine & Rehabilitation, now Mayo Clinic

U.S. Patents Issued

October - December, 1992

1. Title: **Prosthetic Devices Coated with a Polypeptide with Type IV Collagen Activity**

Purpose: To promote cellular adhesion and bind heparin so as to increase growth on cell culture substrates and improve the biocompatibility of implanted devices.

Inventor: Photini-Effie C. Tsilibary, Laboratory Medicine & Pathology

2. Title: **Immunodominant Acetylcholine Receptor Peptides Useful for T-Helper Cell Sensitization**

Purpose: To develop therapies against myasthenia gravis.

Inventors: Bianca M. Conti-Tronconi, Maria P. Protti, Biochemistry, College of Biological Sciences

3. Title: **Corn Plants Tolerant to Sethoxydim and Haloxyfop Herbicides**

Purpose: To enable corn growers to apply post-emergent grass weed herbicides that are more environmentally safe and can be used in smaller quantities for spot-treating problem areas rather than treating the whole field with pre-emergent herbicides currently used.

Inventors: Burle G. Gengenbach, David A. Somers, Donald L. Wyse, John W. Gronwald, and William B. Parker, Agronomy & Plant Genetics

4. Title: **Polypeptides with Fibronectin Activity**

Purpose: Coating of prosthetic devices such as vascular grafts, intraocular contact lenses, heart valves, hip replacement implants, and catheters to prevent clotting, promote cellular adhesion, and encourage neurite outgrowth, all of which increase the acceptance of the implanted device by body tissues and improve its effectiveness.

Inventors: Leo T. Furcht, James B. McCarthy, Laboratory Medicine & Pathology

5. Title: **Intermediates for the Preparation of Dideoxycarbocyclic Nucleosides**

Purpose: Compounds named Carbovir that could serve as the active antiviral agent or co-agent to protect cells from infection by viruses such as HIV.

Inventors: Robert Vince, Medicinal Chemistry; Mei Hua, formerly Medicinal Chemistry, now Beijing, China

6. Title: **Improved Hypercube Topology for Multiprocessor Computer Systems**

Purpose: To improve the performance of massively parallel computer processing systems.

Inventors: Renben Shu, David H.C. Du, Computer Science

MacCordy

{Continued From Page 7}

"University-industry collaborations, properly structured and conducted, have widespread potential benefit for the academic scientists and engineers, the university and its students, industry, the regional and national economies, federal research agencies, and most notably, the general public. These collaborations provide the essential conduit to convey the material results of university research through the channels of commerce to the public. This is the same public that for decades has provided the principal support for continuous expansion of the scientific knowledge base with the expectation that this process would result in new technology that produces growth for industry, employment for the workforce, and a constantly improving standard of living for American citizens."

The role of federal funding has been, and likely will continue to be, the expansion of the knowledge base and the training of new scientists and engineers, MacCordy said. Industry funding complements the federal role in several ways that are beneficial to universities and their scientists and students. "Sponsorship by industry can lead to stimulating interactions with industrial scientists and engineers, valuable staffing support for academic laboratories, and access to state-of-the-art equipment and unique R&D assistance not available in the university." Also, the nature of technological challenges presented by interactions with industry can lead to increased interdisciplinary research among university faculty who had been working in isolation from one another, MacCordy said.

The main and overriding factors driving the decision of a faculty member to collaborate with industry are professional advancement and a desire to benefit society, MacCordy asserted. "Much has been made of the potential influence of possible personal financial gain on the scien-

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North Star Research Foundation Innovation Fund

The Office of Research and Technology Transfer encourages faculty researchers to submit proposals for research awards available through a recently established North Star Research Foundation Innovation Fund. The Innovation Fund was established with a grant from the North Star Research Foundation and matching funds from the University of Minnesota. Awards will be targeted to support projects designed to develop and test technologies with commercial potential.

Proposals can be for the development and testing of projects in any field, and may include the development of computer software. The Innovation Fund is intended to stimulate the development of innovative technologies to make them more attractive for licensing to an existing company or to form the basis for a new company. It is not the purpose of the fund to support basic research, but rather to provide support for the development and testing of ideas and/or prototypes based on previous research by the investigator.

The investigator should clearly outline the scope of the project, the current state of development of the technology, the steps necessary to prove its technical and practical feasibility, and its commercial potential. In addition, proposals must include a list of other funding used to bring the technology to its current state of development, companies that might be interested in the results of the project, and additional support that might be required to make the technology ready for commercialization. Proposals must also state if any inventions from the project have been disclosed to the University's Office of Patents and Licensing, and if any patents have been filed on the technology that is proposed for further development.

Proposals may be a maximum of five pages in length and may request a maximum of $100,000. However, proposals are more likely to be funded at the level of $25,000 to $50,000. Proposals must include a budget, which may include the purchase of small equipment, materials and supplies, as well as salary and fringe benefit support for research assistants. Faculty salary support may be requested but will be limited to a maximum of 10 percent of the investigator's salary over the course of the project. Funds will not be made available for the purchase or maintenance of capital equipment, clerical support or travel to scientific meetings. Funding for travel needed to directly support the project will be considered.

February 26, 1993, is the deadline for submission of proposals for the first round of funding. Later announcements will report the availability of funds for additional projects.

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Questions regarding the North Star Research Foundation Innovation Fund, including requests for application forms, should be directed to James A. Severson, Ph.D., Office of Patents and Licensing, 624-0262; fax 624-4843; e-mail JIMS@ORTTA.UMN.EDU.

University of Minnesota

Center for Interdisciplinary Studies of Writing

The Center for Interdisciplinary Studies of Writing is dedicated to promoting the improvement of writing at the University of Minnesota by sponsoring research into six key areas:

- The status of writing ability during the college years
- Characteristics of writing across the curriculum
- Connections between writing and learning in all fields
- Characteristics of writing beyond the academy
- Effects of ethnicity, class and gender on writing
- Curricular reform through writing

The Center is interested in funding scholars in all fields at the University of Minnesota in both applied and basic research. Grants have supported faculty members attempting to integrate more writing into their classes, or to change the type of writing they use, or to alter the way they respond to the writing.

In these cases, a Center grant might support both the curricular change and the evaluation of the effects of that change. Grants from the Center may be used to fund faculty release time, research assistants (but not teaching assistants), and other research-related expenses. They do not fund costs related to providing instruction.

The deadline for informal proposals for the 1993-94 academic year is **April 23, 1993**. To receive further information about the Center's grants, contact Lillian Bridwell-Bowles, Director, 626-7579.

National Science Foundation

Collaborative Research in Geosciences, Geography and Mathematical Sciences

The National Science Foundation is soliciting proposals for Opportunities for Planning and Initiation of Collaborative Research in the Geosciences, Geography and Mathematical Sciences. The goal of the program is to generate new interdisciplinary research collaborations for geosciences, geography and the mathematical sciences. Funded collaborations will expand fundamental knowledge in the geosciences and geography as well as identify important research directions for mathematical science. Proposals are solicited for developmental projects that include interdisciplinary training and research enhancement for faculty participants.

Teams should be comprised of two or more investigators in two or more of the targeted disciplines, to include at least one investigator from each of the following two groups:

1) **Geosciences and Geography**
   Atmospheric Sciences
   Earth Sciences
   Geography and Regional Science
   Oceanography
   Polar Science
2) **Mathematical Sciences**
   Statistics
   Probability
   Computational Mathematics
   Applied Mathematics

It is suggested that investigators seek out colleagues with complementary expertise from the target disciplines, with whom an interdisciplinary research plan will be developed. It is not anticipated that each individual investigator be expert in all facets of the joint research. It is the goal of this program to provide for the interdisciplinary learning necessary to develop new collaborative research.

Before sending a formal proposal, investigators are advised to contact NSF with a brief description of the proposed activities. Contact should be made by e-mail to geomath@nsf.gov (Internet) or via a brief letter to Dr. H. Jean Thiebaux, DMS Room 339, National Science Foundation, 1800 G Street NW, Washington, DC 20550. The description should provide a basis for feedback on the development of a full proposal. It should identify the substantive focus of the collaboration and should indicate potential contributions to the disciplines of the investigators. The relevant backgrounds and any prior joint research experiences of the investigators should be described. An NSF program officer will respond within three weeks.

Proposals should expand on the topics addressed in the original contact. They should define the focus for the collaboration and describe the relevant research experience of each faculty collaborator. The following should be addressed explicitly:

1) Both scientific and mathematical foci;
2) Personnel, and the nature and length of the existing collaboration;
3) For each collaborator, recent research interests and specific role in the proposed research;
4) Eventual impact on science and mathematics.

In addition to the normal NSF review criteria described in GRESE, reviewers will be asked to comment on the following:

1) Appropriateness of the plan for mutual development of new expertise;
2) Importance of proposed topics for research;
3) Likelihood of a successful new, long-term collaboration.

NSF will use interdisciplinary panels to review these proposals. Awards are generally made for twenty-four months at levels up to $100,000. Higher awards will be considered for large group efforts. It is anticipated that four or five awards will be made each year.

These are faculty training and enhancement awards and are not renewable. Subsequent collaborative research proposals will be handled as unsolicited interdisciplinay proposals.

The proposal target date is **June 1, 1993**, with anticipated award in January. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board.

U.S. Arms Control and Disarmament Agency

Humphrey Fellowships in Arms Control/Disarmament

The U.S. Arms Control and Disarmament Agency (ACDA) sponsors the Hubert H. Humphrey Fellowships in Arms Control and Disarmament, designed to encourage specialized training and research in the arms control field. The fellowships are intended for the support of advanced graduate students who have completed all their doctoral requirements except for the dissertation.

Students across the range of academic disciplines, including, but not limited to, political science, economics, law, sociology, psychology, physics, chemistry, biology, engineering, philosophy, public policy, and operations research, may apply. Research proposals should be designed to contribute to a better understanding of current and future arms control and disarmament issues. Although special attention will be paid to research with direct policy or technical implications, innovative theoretical or empirical efforts will also be considered. Historical, quantitative and policy analyses are all appropriate for this program. The relevance of the research to arms control issues and policy is an essential criterion. Specific areas of interest include:

- Strategic arms control
- Nuclear nonproliferation
- Multilateral and regional arms control
- Weapons development and acquisition
- Conventional arms sales and technology transfers
- Verification and compliance
- Economics of arms production and sales
- The public and arms control
- Arms control and security policy
- Conventional Force Reductions
- Analytical methodology for evaluation of arms control proposals.

The Fellowships will be for the 12-month period starting in September, 1993, or January, 1994. Each fellow will receive a stipend of $5,000. In addition, ACDA will pay any applicable tuition and fees for one year, up to a maximum of $3,400 to the institution in which the fellow is enrolled.

The application deadline is **March 15, 1993**. A copy of the brochure describing this program is available from ORTTA and may be requested by calling 624-9004 or by sending a note through the bulletin board. For further information write or call the Hubert H. Humphrey Doctoral Fellowship Program, Operations Analysis, Room 5726, U.S. Arms Control and Disarmament Agency, 320 21st Street NW, Washington, DC 20451; 202/647-4695.

American Cancer Society

Institutional Research Grant

The stated goal of the American Cancer Society (ACS) is to "foster meritorious research on cancer that cannot be supported through other available types of support." The purpose of the Institutional Research Grant is to serve as "seed" money to permit the initiation of promising new projects or novel ideas by junior faculty investigators.

The University of Minnesota Institutional Research Grant has been restructured considerably. The amount of the award has been increased to $15,000 direct costs. The grant awardee must be an assistant professor or instructor *on faculty*. Applicants must not have previously received an ACS Institutional Research Grant nor have current national funding, although recipients of career development awards from NIH (K04, K08), or ACS (Junior Faculty Awards), or awards from the Leukemia Society *are* eligible.

Cancer-related research may include analysis of developmental biology, gene regulation, or alteration of intracellular or extracellular processes which may lead to an improved understanding and/or therapy of potential or actual oncogenic events in prokaryotic or eukaryotic cells.

The deadline for receipt of applications is **March 1, 1993**. Instructions and application forms are available from the Pediatric Oncology Office, 421 Masonic Cancer Center, 626-1926.

Federal Demands Hurt State Education Budgets

Unfunded federal mandates—federal requirements that states must pay for—cause states to cut their discretionary spending. Public colleges and universities are prominent targets for those discretionary cuts, said Newton Cattell, director of the Midwestern Universities Alliance. Cattell also chairs the state issues group of the National Association of State Universities and Land Grant Colleges (NASULGC).

The cost to states of just seven pieces of federal legislation will be $1.6 billion in fiscal 1992, said a 1991 survey by the National Conference of State Legislatures (NCSL). And 24 percent of Maryland's general-fund spending is dictated by federal legislation, regulation and judicial actions, said Chris Wnuk, a fiscal policy associate at the NCSL.

Wnuk and Cattell's organizations would like to reduce the federal mandates and require that the cost to states be provided to Congress before the mandates are enacted.

From *Washington Fac*

Citron

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horsepower to reinvent itself" and is now doing so, especially in the area of biotechnology, Citron said.

Harvard is "serving as a change agent" in this economic revitalization by implementing innovative ways to move inventions out of its laboratories and into industry. For example, two years ago Harvard Medical School formed a limited partnership with outside investors who provide seed capital and business-formation guidance to convert discoveries into products. Thus far, about 10 new companies have been started, and several of them appear to have great potential, Citron said.

"The very clear impact of the university-industry dynamic is evident in other parts of the country also. We have seen it in Silicon Valley, with its connection to Stanford, as well as in the Research Triangle Park of the Raleigh-Durham area. Our own Medical Alley is a progeny of the University of Minnesota. In a recent *Business Week* article [October 19, 1992], several newer technology 'Hot Spots' were identified. They included such euphemistically named places as Silicon Hills in Austin, Texas; Optics Valley in Tucson; Biomed Mountains near Salt Lake City; and Medical Mile in the Princeton corridor of the Philadelphia-Princeton, New Jersey region. In each of these high-growth regions, the presence of a local research university which encourages close relations with industry is viewed as a critical factor responsible for the formation of these industries. Availability of a highly skilled labor force, also associated with local research institutions, is another factor behind the site selection for new and established R&D-driven companies. These newer hot spots have seen the formation of nearly 1,500 companies employing over 360,000 people.

"Our own Medical Alley is estimated to consist of about 500 companies with over 40,000 relatively high-paying jobs. The average annual wage in technology industries runs about 50 percent higher than those in the general private sector, which brings me to another key point: The types of industry we are describing tend to be product-development and manufacturing in nature; that is, they create tangible product. As a result, they become part of a broader stream of international commerce, so necessary for the United States to sustain its position in the global economy."

Citron then commented on the importance to industry of having a steady stream of well-trained graduates from a local research university. "We look for universities to give their students the platform of knowledge which makes them competent in their profession. We expect them to be given the theoretical background they will need to make sound designs and innovations. We expect their training to give them the capacity to approach unique problems, and solve them. Beyond this, we also expect that they will bring with them new perspectives, new methods and new ways of doing things. In this way, recent graduates from the better programs are agents of change for industry; they can refresh and reenergize the organization.

"A shortcoming, however, of the typical new graduate is inexperience. He or she may have the theoretical knowledge, but lacks the expertise in issues relevant to the employer. Following employment, a period of low productivity typically exists, while the recent graduate learns the design rules and the specialized aspects of the job. There are ways to do this better. We have found, as have other companies, that collaborating with the university on student projects can be a highly rewarding experience for us, the student and the university. For the student it provides the challenges, satisfaction and practical aspects of solving real-world problems. Student projects provide the faculty with insight into where industry is headed and what our needs are. We in industry get to observe and evaluate the capabilities of prospective employees and make better hiring choices. We also get an employee who has had some related experience, thereby improving initial productivity. They all tie together."

In terms of the transfer of knowledge from universities to industry, Citron said that it is important to recognize that there have been subtle changes over recent decades that have changed the nature of the academia-industry relationship. The flow of new knowledge and know-how used to be unidirectional, from the campus outward, and professors were relatively independent, able to develop and test their theories in modestly equipped laboratories.

"This is no longer the case in many areas related to technology. The sophistication and specialization of many of today's technologies has led to a new reality. While the university continues to propose and lay the groundwork for new concepts, it often lacks the enabling technologies to independently move the concepts beyond the hypothetical. For example, in our industry, therapeutic medical devices, it is very difficult for the medical researcher or scientist to evaluate a new treatment regimen on a chronic basis in patients with the limited hardware capabilities available on campus. It is simply not realistic for the academic center to be able to build an implantable cardiac pacemaker of its own design, for example, in order to study a new concept or feature. The complexity of the underlying technology and its velocity of change make it virtually impossible for the researcher to be self-sufficient and independent. Progress requires an interaction with industry in such cases."

Citron emphasized, however, that "We in industry are by no means self-sufficient either. We rely on academic centers for basic research results and new ideas which we can apply to our products. We also rely on academia to expand knowledge related to the underlying principles to take us from the realm of empiricism to one of scientific rigor."

In terms of the new ideas generated by academia, Citron suggested that they could be classified into two basic catego-

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ries: those that are new to the world, or "revolutionary," and those that are improvements to what already exists, or "evolutionary." Those in the first category tend to represent "paradigm shifts, which lead to the formation of new fields," he said.

The development of the first cardiac pacemaker at the University of Minnesota in the late 1950s is an excellent example of a revolutionary technology arising from a need experienced by academic surgeons who were pioneering the field of open-heart surgery. The need for a DC to AC converter to make it possible for automobile batteries to supply back-up power to the electrically powered pacemakers during power outages, explained by Dr. C. Walton Lillehei to Earl Bakken, a graduate of the University of Minnesota Department of Electrical Engineering and founder of Medtronic, Inc., led to the creation of the cardiac pacemaker industry, which in turn created the implantable therapeutic device industry in Minnesota, Citron said.

The creation of these new industries occurred through a paradigm shift in technology development, involving a combination of the expertise and vision of the academic researcher with the vision and expertise of the industrial engineer. "Rather than build the power converter, Earl Bakken expanded the idea through his understanding of the capabilities made possible by a totally different emerging technology area, that of solid-state microelectronics. Recall that the transistor had recently been invented, and the first versions were just then becoming available for general use. The engineer's understanding of what was technologically possible resulted in the world's first transistorized, miniaturized cardiac pacemaker. The rest is history.

"This milestone would not have occurred, or at least would have been delayed and perhaps would have taken place elsewhere, were it not for the informal idea exchange and dialogue which took place between Lillehei and Bakken." As examples of other paradigm-shifting technologies developed at the University of Minnesota, Citron cited the pioneering work in oxygenators and blood pumps which made open-heart surgery commonplace, novel prosthetic heart valves, the world's first implantable drug pump, and leading work in cystic fibrosis detection and treatment.

"The University has set the direction for others to follow. The role of the University as a source of new discoveries and open idea exchange is at the core of its tradition. This continues to be a crucial role and for the sake of progress must be preserved," Citron said.

Regarding the category of ideas that are evolutionary extensions of technologies that already exist, Citron said that "While some in industry would like to believe that they can be self-sufficient relative to the evolutionary advancements in their core technology, this is not the reality...especially if you are involved in a high technology area which is rapidly evolving through the fruits of basic and applied research. Individual companies simply do not have the resources to address all of the relevant areas needed to improve their products or processes. Industry has a tendency to disproportionately fund development over research. Research, after all, tends to have a risk profile and a long time line which make it considerably less attractive to managements when funding allocations are made. In any event, the appetite for revenue-producing new products drawn from readily available existing capabilities often consumes the available R&D budget. Industry tends to harvest and process, not plant seeds."

Industry focuses on development even though there is an intellectual appreciation for the importance of research, Citron said. "Depending on your definition of research, few companies do basic research, and many do not even perform applied research." He cited a recent survey of mid-size electronic companies which found that these high-tech companies seldom delineated research from development in their budgets, and that research was typically conducted as an informal responsibility of department R&D managers with bootleg funding rather than with a formal budget.

"Research simply is not part of the culture or environment of many companies," Citron said. "Research of course is the domain of the university. Many industry sectors depend on it for advancements; we rely on university research to continually broaden our technological foundations."

Research by Medtronic and other companies is often performed in collaboration with universities through sponsorship of specific research projects. "When we do this, we have determined that either we don't have the level of expertise or infrastructure to effectively do it within the company, or we looked for ways to complement our capabilities." As examples of such initiatives, Citron cited studies of surface interactions between implanted devices and body tissues and cells, which have led to ways to prevent rejection and prolong performance of biomaterials; and research on heart rhythms to develop ways to detect and respond to pathological rhythms, which has resulted in the new class of cardiac pacemakers that can adapt to the person's changing cardiac needs. "The motivation for such sponsored research collaborations is the search for underlying mechanisms, principles and added understanding needed to move technology forward."

Citron said that through increased sponsorship of university research, industry scientists and engineers have increased their collaborative relationships—and professional standing—among academic scientists. "Twenty years ago it was virtually impossible for someone in industry to coauthor a paper in the peer-reviewed literature. . . Today, industry participation [in the pages of leading journals] is commonplace, I believe reflective of the originality and clearly the quality of the work."

Another way in which industry benefits from and participates in university research is through the licensing of inventions made by academic scientists and engineers. "We long ago learned that invention takes place in unplanned ways, and nobody has a lock on the process. We are therefore open to the evaluation of such intellectual property, and if it fits with our technological directions we will negotiate rights appropriate to the circumstance. Since an invention of interest to us invariably is an offshoot of an [academic] research thrust of interest to the company, we often form a collaborative relationship which goes beyond the mere licensing of the invention."

Consulting with academic scientists is another area in which industry benefits from collaborations with research universities, Citron said. "You need to go to the experts, the consultants, who have the in-depth knowledge and perspective we may lack in a specific area."

Industry also takes advantage of the unique analytical capabilities which often exist in university laboratories. Citron said that Medtronic and other affiliated companies of the University's Center for Interfacial Engineering have gained considerable insight into surface characteristics of materials through the use of sophisticated and in some cases unique instrumentation and expertise at the Center. "This alliance permits an accelerated transfer of technology, increases understanding of what happens at the interface between the body and the device, improves product performance, adds relevance to the work on campus, and provides incremental support for the University's efforts."

The health care industry in particular derives important benefits from industry-academia relationships, Citron said. "We in industry simply do not have access to the physiological models and patients which are required to properly evaluate the safety and effectiveness of new technologies. We typically rely on university-affiliated clinical research centers to conduct such studies. These sponsored clinical studies adhere to carefully constructed protocols, which have the scientific grounding to evaluate the suitability of the new technology for its intended purpose. We expect—and believe we indeed do get—unbiased data as to the actual performance against anticipated performance.

"The university derives benefit as well through the insights its researchers obtain on new, innovative ways to better treat patients. Invariably each study identifies new questions which need answers, and in this way new research thrusts are surfaced. The data obtained, by their very nature, represent new knowledge which becomes the subject of scholarly articles and further fulfills the university's mission to disclose, debate, grow, and spread knowledge. These important contributions also serve to increase the prestige of the university as a center of excellence."

In summary, Citron highlighted the following messages:

1. "Research universities, especially land-grant universities, have an inherent mission to proactively transfer technology.

2. "There are select examples of universities which have developed a culture for forging highly effective alliances with industry. These relationships have contributed to the growth and prosperity of their communities."

3. "Technology transfer is no longer unidirectional from the campus outward. The nature of technology has changed so that challenges now facing us—the unanswered questions—require interdisciplinary approaches within the university as well as interaction with industry to find solutions. In many ways the days of the independent academic scientist operating in an ivory tower are limited, at least as it relates to new technology."

4. "University-industry alliances have considerable benefits for both parties. These benefits extend to society as well."

5. "There are distinct skills and capabilities at universities which industry depends on for its growth and progress. At the same time, the university is strengthened by these relationships. Constructive interactions between industry and universities are vital for progress, our society's well-being, and our competitive position in a global economy."

By Michael Moore

Lack of Pesticides May Weaken Disease Control

According to an Institute of Medicine (IOM) study, a diminishing of the supply of pesticides may hamper control of infectious diseases transmitted by arthropods. The IOM study, "Emerging Infections: Microbial Threats to Health in the United States," suggested that the EPA create new licensing procedures to expedite pesticide use in infectious-disease emergencies.

Outbreaks of such diseases as encephalitis, carried by mosquitos, or Lyme disease, carried by ticks, could be handled more quickly if the EPA follows IOM's suggestions, which would also allow stockpiling of designated pesticides.

The EPA restricts the use of many pesticides within the habitats of endangered species. Although EPA currently maintains an emergency exemption procedure for licensing certain pesticides in these areas, IOM says the current procedure is "extremely cumbersome and time-consuming," and emergency approval would likely come after the critical period for preventing an outbreak.

From *Washington Fax*

Dong

{Continued From Page 5}

If the university patents and licenses the material, Webster could earn royalties "without lifting a finger," said Dong. But the venture capitalists are offering to make her founder, president and CEO of NuTech, "so that she would have the potential of realizing millions," said Dong. The students and technicians who helped Webster with the invention would also get consulting and stock opportunities, "but only if they signed confidentiality agreements."

Substantial income will also come to the university as royalties and indirect costs of sponsored research.

Ethical and Professional Issues

Webster is "intrigued" by the opportunity, said Dong, and she asks him about the legal, ethical and professional issues.

Dong explained that this presentation covers ethical and professional issues at five levels—the personal, professional, laboratory, department and university levels. Legal and financial issues are not directly addressed here. Dong framed the issues in the form of questions to Dr. Webster and her university.

First, "does she really want to become an entrepreneur?" asked Dong. As a "passive inventor," he pointed out, she would get one-third of the royalty income.

Second, "I'd ask her to consider," said Dong, "how she's going to deal with the inevitable—I say *inevitable*—envy, jealousy [and] misunderstanding that will attend her desire to become an entrepreneur—despite her best intentions, despite her every effort to communicate that her standards haven't changed, that her desire to do fine research, to be a mentor and to be a teacher haven't changed. It's a rare, rare case that the perception remains unchanged. And so I urge her to consider these kinds of issues long before we get down to the dollar and cents issues."

At the professional level, are Webster's colleagues "going to suspect the quality or the quantity of her research publications?" asked Dong. "Are they going to think that she's pulling her punches when she writes papers in this field, that she's holding back data that she's sending off to the company?"

Regarding research funding from public agencies, Dong pointed out that "If they have the *hint* that their money is somehow being drained or siphoned into a private enterprise . . . that may chill grant applications. I had one [client] once in California that suffered that fate."

Webster will have to "reconsider" her position on the editorial board of an optics engineering journal, said Dong, especially with respect to papers from a competing lab. "She should, at the very least, in my judgment, disclose her interest to the editor of the journal." Webster should likewise reconsider her work as a reviewer of grant applications for NIH.

Dong suggested that Webster's credibility as a collaborator might suffer: "How is this going to alter the willingness of either Dr. Webster to work with others or others to work with her? If people know that some of the things they're telling her, advising her on, may not be for her academic lab but may be for the benefit of NuTech, how is that going to change people's perception?"

In the laboratory, what will be the effect on Webster's relations with her assistants, Dong wondered. Webster supervised development of the compound and herself perfected the last few steps, but she had important help from one post-doctoral fellow, one graduate student and two technicians.

The graduate student wants to publish so that he can get a faculty position somewhere. "The university and the professor need to deal very quickly with the primary mission of the university, which is to allow the publication and dissemination of information, but in a manner that will not imperil the intellectual property," said Dong.

Webster's post-doc, on the other hand, wants out; the project "deviates sharply from his own intended field of research and has already caused him to lose touch with developments and potential collaborators in that field," said Dong. But, he added, NuTech might try to change the post-doc's mind.

A second post-doc and a second graduate student work with Webster but had nothing to do with the lens material. "What about the hard feelings and discord?" Dong asked.

In her department, should Webster remain chair of the committee that is reallocating space? How will income to the department be allocated? What will be the effect on recruitment for the department? How will university and public perceptions of the department change? "Is this something we pass out a press release about, or is this something that we quietly let lie in the background?"

Lastly, Dong defined a number of issues that Webster's university would have to consider:

He asked whether the proper invention disclosures have been made by Dr. Webster to the university's technology transfer office. The university needs both U.S. and international patent protection. And "Have we then made the appropriate notifications to the funding agencies, such as NIH," Dong continued, "in order to retain that [intellectual property] title within the university?"

If Webster gets equity in NuTech, and if the university does sponsored research for NuTech, "Have those agreements been negotiated in sufficient detail to protect the integrity of the university's primary mission as well as the intellectual

property rights that will flow from that sponsored research?" If Webster's lab is going to produce and test contact lenses, Dong also pointed out, she will need the FDA's approval.

The accounting will become complicated, Dong reminded his audience: "If you're managing money at this level—far more money than would ordinarily be coming in and out because of just NIH funding or other grants—then it's all the more imperative that the channels and accounts be kept straight and [that] you can answer any inquiry that comes in at a later time, [and] that the books and records will always be ready for examination."

On the other hand, NuTech "is not necessary at all" said Dong. "Any number of factors might lead the university to conclude it's actually better off taking it to a major established optical company or maybe a chemical engineering company—maybe a Du Pont or a 3M—and saying 'Here, we'll give you this technology. You license it; you develop it. We trust you more.' That's a major decision for the university, entirely apart from whatever Dr. Webster wants."

Warning and Encouragement for Faculty

Dong concluded his presentation with both warning and encouragement:

"This is the fire and brimstone," he said: "If you ignore or disregard what can happen to you, I think scholars today can face at least professional and personal embarrassment and humiliation. They can certainly face loss of funding. In the worst case they're going to come up against loss of employment and professional standing. And unfortunately some scholars have come up against criminal and civil litigation in recent times.

"And I think it's very important," Dong continued, "if you're going to go do this kind of entrepreneurial activity, that you have consciously in mind what the public relations aspects are going to be."

Despite those warnings, Dong affirmed the public service that faculty-entrepreneurs provide. And he encouraged faculty not to think the task too difficult. "If the scholar-entrepreneurs have the proper guidance, have the information in hand," said Dong, "since they were bright enough to come up with the invention in the first place, they should be bright enough to follow the procedures that will keep them out of trouble, . . . and also to deal with what I contend are sometimes the most difficult issues—the altered working relationships that occur when you try to combine an entrepreneurial undertaking with the standard research mission of a university lab."

By Phil Norcross

MacCordy {Continued From Page 17}

tist's conduct of collaborative research with industry, including clinical trials and presentation of results. While the prospect of extra income to a professor may be quite pleasing. . . the ethical code of the typical academic scientist will not permit him or her to engage in such compromise. The university is not in danger of corrupting its faculty by encouraging collaboration with industrial sponsors, even though such collaborations often will offer the prospect of personal as well as university financial gain, if commercially viable technology results from the collaboration.

"The principal benefit to the university of these collaborations is, in the end, an enhanced ability to maintain and improve its educational, research and public service programs. These programs require a major infrastructure of personnel, equipment, facilities and support services," MacCordy said. He cited the collaboration between the Monsanto Company and Washington University Medical School as an example of these benefits. This 12-year agreement provides $67 million for the direct costs of competitive research grants, as well as $33 million for indirect costs. "This monstrously large, long-term Monsanto research agreement really is simply the aggregation of hundreds of modest individual research grants distributed over the entire Medical School and supported by a single company under one umbrella agreement."

Collaborations with industry provide opportunities for a university to demonstrate that it is a good citizen, contributing to the community, the region and the nation, MacCordy said. The university gains recognition by assisting local companies and assisting in the start-up of new ones, and by helping to develop products that improve the human condition.

Many industry-supported projects will reap both internal and external benefits, MacCordy said. "For example, a project sponsored by industry, aimed at making better use of a physician's limited time, as well as allowing the physician to make well-informed decisions, has brought together computer scientists, communications engineers, and electrical engineers, with radiologists and other medical specialists, to create a physician's workstation. The workstation instantly brings to an attending physician all relevant current information on a patient, including high-resolution images from CAT, NMR, and PET scans, as well as regular X-rays, test results from clinical labs, and hospital and office medical records. Such internal interdisciplinary efforts are stimulating and productive, and they bring external recognition and admiration to the university and its faculty from important groups, in this case from the medical profession, the hospital and communications industries and the community at large."

To companies capable of searching out and accessing needed academic expertise, universities represent a $12 billion annual research enterprise employing 40,000 doctorate-level scientists and engineers, MacCordy said. A company may choose

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MacCordy

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from two strategies in using this resource: It can wait for the results of research sponsored by federal agencies or other companies to be published and possibly patented, and then attempt to apply the knowledge and technology that has been generated. Or, it can become actively involved in finding an academic researcher with appropriate expertise and sponsoring research that has good prospects for producing technology that is of specific importance to its product line. With the first strategy, the company may be one of many interested in licensing the technology. The benefit of the second strategy, MacCordy said, is that the sponsoring company usually has an agreement with the university that grants the company first rights to an exclusive license to any technology that results from the research.

"However a company elects to proceed, whether following the first or the second strategy, if it is successful it is then in a position to establish a continuing and preferential and productive relationship with the university and its investigators. Such a relationship can aid the company in keeping up as the state-of-the-art changes, as well as providing the company with a good source of well-trained employees," MacCordy said.

University-industry relationships also work to the benefit of federal agencies, MacCordy said. "Federal research agencies are stewards of public funds with which they sponsor university research. What better evidence of good stewardship, than to be able to point to the fact that federally supported research results were essential to the subsequent creation of technology that reached and benefitted the public? This is the realization of the vision Vannevar Bush had after World War II, when he proposed public funding of university research."

MacCordy closed by addressing the fairly recent expansion of the mission of universities to include economic development. "When regional development programs became the rage not too many years ago, almost invariably there was an expectation that a region's universities would play an important role. This has proven to be quite true. A primary means for a university to contribute to economic development has been its technology-based collaborations with industry. More than ever before, the university, especially the state university, has realized its obligation as a corporate citizen of the regional community to take reasonable actions that do not compromise its traditional values and objectives, to contribute to the health and growth of the regional economy.

"By encouraging and supporting knowledgeable and skilled faculty in their collaborations with industry, universities have been successful in helping companies, both big and small, to create new products and develop improved processes. And in working with entrepreneurs and venture capital organizations, universities have been successful in utilizing inventions as a base for new start-up companies. It is well established that the presence of a research university is a major role in decisions of technology-based companies to move to a community, or for existing companies to establish expanded operations or simply to stay there."

Collaboration with industry is not without risks, MacCordy acknowledged, but he asserted that with careful thought and planning, universities can avoid—or at least minimize—the risks in most cases. "Controlled risks are well worth taking, when the full benefits of these collaborations are considered."

After describing President-Elect Clinton's proposals for converting significant amounts of defense R&D funding to the development and application of critical commercial technologies, and the established national policy of supporting basic research while leaving the development of new technologies entirely to industry, MacCordy said: "I leave you to ponder whether university research will continue to operate primarily on this 'trickle down technology' basis (President-Elect Clinton's words, not mine), or will today's modest university-industry collaborations indicate to the new administration that universities are willing and able to play a significant role in this national program."

By Michael Moore

Galasso and Leder

{Continued From Page 9}

search was indeed a problem for academic scientists and the government, Galasso said.

"The climate had changed over the past year, partly because of some celebrated cases that were mentioned earlier today. The importance of coming out with [a conflict of interest policy] was recognized, and people were resigned to having such a policy, provided that institutions would have a major role in this policy. They realized that if [NIH] didn't come out with something that was reasonable, then Congress was prepared to come out with something that we would all have to deal with, and we might not be quite as happy with that."

A draft of the NIH conflict of interest policy was ready for public review by February 1991, but when Dr. Bernadine Healy was approved as the new director it was held back for her approval, Galasso said. Healy's review and the revisions she requested delayed the draft until May of 1992, when it was distributed in confidentiality to NIH institute directors and members of Healy's advisory committee. Galasso said that he had hoped to avoid public distribution of the unfinished document, but it got out, and the comments and subsequent revisions led to more delays and reviews. If approved by the assistant secretary of HHS it would then go to the secretary of HHS and then to the Office of Management and Budget for comments and possible revisions, before a Notice of Proposed Rule Making can be published in the Federal Register. There will be a 60- to 90-day public comment period after its publication.

Galasso said that unlike the proposed NSF policy, NIH does not want to receive conflict of interest disclosure statements

with proposals. "We have tried to put the responsibility at the institution to assure us that there is no conflict of interest. Many of the institutions have instituted their own policies, and you have the policy of this institution that was given out."

In concluding, Galasso said that the term 'conflict of interest' is usually referred to in a derogatory fashion, and that isn't how we see it. There is nothing wrong with financial incentives, and sometimes conflicts of interest may be good. All we're concerned about is the objectivity of the research, and that's what we have to guard very vigorously. We've all learned a great deal about conflicts of interest, and we're still learning."

Miriam Leder

Miriam Leder is the Assistant General Counsel at the National Science Foundation. She received her J.D. from the University of Pennsylvania Law School. Before joining NSF in 1990, she was in private practice in Washington, D.C. Leder works on a variety of issues at NSF, including those related to investigator conflicts of interest, misconduct in science, and domestic and international environmental law. She is currently working with NSF General Counsel Charles H. Herz on the proposed NSF Policy on Investigator Financial Disclosure.

In her presentation, Miriam Leder explained why the National Science Foundation (NSF) felt it was necessary to develop the Policy on Investigator Financial Interest Disclosure, which is what it calls its conflict of interest policy, and what the policy is likely to include when it is implemented.

"We've all heard about the increasing interactions between academic researchers and industry, and we all probably agree that these interactions are basically a good thing. They facilitate technology transfer; they allow knowledge and expertise that have been developed in universities to be transferred to the private sector where industry can develop real products and services that benefit everyone. But the increasing involvement of university faculty with industry also increases the risk of conflict of interest. Researchers' financial ties might affect the objectivity of their research, or their willingness to share and publish research results."

Leder reiterated the reasons for concern about conflicts of interest, but she said most case studies or scenarios focus on clinical trials. NSF doesn't fund clinical trials, but "We do have situations that come up that can create the potential for conflicts of interest. For example, an NSF grantee might plan on using grant funds to purchase goods or services from a company which he or she owns or has some kind of financial interest in. An investigator might apply for a grant to evaluate a product that he or she developed. Or, the investigator might own stock in a business that would benefit from advance access to research results.

"We at NSF believe that all of these situations should be looked at before a grant is made and before the research is conducted, so that if safeguards are appropriate and if there are conditions that should be attached to the research, we know about that up front and we can impose those conditions."

NSF published its proposed policy in July 1992 and the comment period ended in September 1992. As NSF officials were reviewing the many public comments received, the House Committee on Government Operations issued a report that Leder said stated, "HHS and NSF should promulgate investigator conflicts regulations. They should require grant applicants and contractors to provide financial disclosures to the government when they are applying for grant funds. And that if HHS and NSF couldn't get their acts together to do this, then Congress should legislate it."

Leder said that NSF's proposed policy has two main features: First, it calls on grantee institutions to develop conflict of interest policies, and it spells out certain minimum requirements for those policies. Second, it requires that along with each grant proposal submitted to NSF, certain financial disclosures are made.

One of NSF's minimum requirements for university conflict of interest policies is that universities get financial disclosures from faculty members, professional employees who are involved in NSF-funded research, and also from their immediate family members and close business associates. The types of financial disclosures these individuals would have to make to the university include all off-campus entrepreneurial ventures or businesses in which they are principals, relevant consulting arrangements or outside employment that they have or expect to have, significant financial ties that they have with firms that supply or are likely to supply goods and services to the lab, significant financial ties with firms that market or produce a commercial product that the research is going to evaluate, and "a catch-all category of anything else that seems to create a conflict of interest," Leder said.

Universities would also have to designate the people at the institution who were going to be reviewing financial disclosures and resolving any actual or potential conflicts of interest by deciding if any conditions should be placed on the investigator. University policies would have to include enforcement mechanisms that would ensure that the required faculty disclosures were being made, as well as mechanisms for informing research sponsors of problems that come up and how those problems were resolved, Leder said.

NSF's proposed policy, in its present form, requires that grant proposals be accompanied by certifications from the universities that the appropriate financial disclosures had been made, "in other words that they had implemented a

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conflicts policy and had gotten the disclosures from investigators and professional employees. Then, if there were financial interests disclosed to the university, they would have to disclose those interests to NSF if they created actual or potential conflicts of interest," Leder said. "They would also have to describe whatever arrangements they'd made to safeguard against problems that might come up because of these conflicts."

Leder explained that the financial interest disclosures would be kept in a sealed envelope which NSF would not open unless and until a grant proposal had been recommended for funding following peer and agency scientific review. "At that point someone at NSF, unfortunately probably me, is going to have to take a look at the financial interests and the way the university has decided to resolve any problems that come up, and decide whether to go forward with funding, and whether any conditions would be imposed."

One situation NSF would pay particular attention to under its proposed policy involves research on public policy issues, Leder said. "For example, if you've got an economist who consults heavily for the Generic Drug Manufacturers Association, and that economist proposes to examine the market for prescription drugs to determine whether there are any impediments or barriers to competition, and how they affect prices for name brand versus generic drugs, that arrangement would have to be disclosed."

Another situation cited by Leder is when a researcher forms a company to produce and/or distribute training or education materials, or software programs that were developed or tested under federal funding. If the researcher applies for additional funding to do further research on the basis for the materials or the software, that would have to be disclosed to the university and the NSF.

Financial ties that would not require disclosure include "routine small holdings of common stock, such as $5,000 or $10,000 worth of stock in a mid-size company that may be supplying equipment to the lab. We don't expect disclosure there, because it just isn't going to make any difference in the work that he does or the company that he chooses to purchase equipment from. Another non-disclosure situation might be a university researcher who wants to study sources of acid rain, and that researcher is vice president of an environmental group like the Sierra Club. You know that those groups are going to be interested in the research but it would not have to be disclosed because it's not a financial tie and we would not view it as significant."

Leder acknowledged, however, that there are going to be many gray areas where investigators, universities and NSF officials are going to have to make judgment calls. She referred to the newspaper headline test mentioned by an earlier speaker as a practical guideline: if you would not be embarrassed to have your research and financial ties stated in a headline of a major newspaper,then there is probably not a significant actual conflict of interest.

Leder said that NSF does not mean to imply through its publication of the proposed financial disclosure policy that it considers conflicts necessarily improper. "And we certainly don't want to discourage technology transfer or these increasing ties between university researchers and industry."

She also reiterated that disclosures sent to NSF will not be opened until after a proposal has been recommended for funding, and that they will always be kept confidential. "Peer reviewers are never going to see the financial disclosures. We intend to keep them confidential, and we believe they are protected by the privacy act, and we also think that we couldn't be forced to disclose them under the Freedom of Information Act."

Leder stated that NSF intends to rely heavily on the arrangements proposed by universities to handle specific conflict of interest situations. "We do not anticipate overruling those decisions very often, if ever."

In commenting on the 70 to 80 responses she received to the publication of the two-page NSF policy in the Federal Register, Leder said that many people had trouble with the use of general, undefined statements such as "significant financial ties" and "significant conflicts of interest." The reason for that general phrasing was to give universities flexibility to develop policies relevant to their own institutions, she said. Most of the comments came from research institutions, and most felt that NSF went too far in the policy, especially in calling for submission of the financial disclosure statements with proposals. "We didn't get any comments from public interest groups or the [Capitol] Hill, but I know for a fact from talking with staffers that [some congressional representatives] don't think we went far enough."

Many of the comments expressed concern that the NIH and NSF policies would require different and possibly conflicting types of disclosure, and that it would be very desirable for the federal government to come out with one policy on conflict of interest. "I don't think you'll [find] anyone who would disagree with that," Leder said, "but the question is, can the government get a unified policy together, at least before the turn of the century? We're going to try, and I can tell you that we are going to work hard with NIH to make sure that if we don't have one policy, we at least have consistent policies that can be complied with under one university system."

Leder said that NSF will carefully consider all the comments it received and work closely with NIH "to try to come up with something that balances these competing interests. On the one hand we want to encourage tech transfer; on the other hand we want to make sure that conflicts of interest are appropriately managed."

Faculty Research, Training and Service Awards

This section contains statistics on proposals and awards recently processed by ORTTA. In addition, we have randomly selected awards received by faculty during preceding months. Faculty who have received awards they would like mentioned in a future *Research Review* may send the pertinent data, as exemplified below, to Phil Norcross at ORTTA, 625-2354.

Proposal and Award Summary

	Number	Amount
Proposals Submitted December 1992	400	$ 49,601,618
Awards Processed December 1992	194	17,461,245
Proposals Submitted July 1992 - December 1992	1,833	279,454,962
Awards Processed July 1992 - December 1992	1,609	129,880,462
Proposals Submitted July 1991 - December 1991	1,874	286,353,171
Awards Processed July 1991 - December 1991	1,676	148,035,670

Teaching Opportunity Program for Doctoral Students

Carol Carrier, Curriculum and Instruction
Mark L. Brenner, Horticultural Science

Bush Foundation
$470,345 - 11/92-06/94

Production of Lightweight Aggregate with Papermill Sludge

Harold E. Goetzman, Natural Resources Research Inst, Duluth
Rodney Bleifuss, Natural Resources Research Inst, Duluth

Greengrove Corporation
$200,000 - 10/92-12/93

Educational and Research Infrastructure Development in Microelectromechanical Systems

William P. Robbins, Electrical Engineering
Arthur G. Erdman, Mechanical Engineering
Lorraine Francis, Chemical Engineering and Materials Science

NSF
$223,410 - 08/92-02/96

Dennis L. Polla, Electrical Engineering

$87,574 - 08/92-02/96

MN/Road Field Materials Characterization and Pavement Instrumentation

David E. Newcomb, Civil and Mineral Engineering
Roberto Leon, Civil and Mineral Engineering

St of MN - Department of Transportation
$138,287 - 11/92-10/93

Intertemporal Equilibrium: Theoretical Innovations and Applications

Timothy Kehoe, Economics

NSF
$103,671 - 11/92-04/95

Mechanisms of Maternal Dorsal MRNA Localization

Jeffrey Boore, Cell Biology and Neuroanatomy
Joseph Yost, Cell Biology and Neuroanatomy

NIH, NICHD
$21,600 - 12/92-11/93

Optipress Optimization—Blood Extractor Project

J. Jeffrey McCullough, Laboratory Medicine and Pathology
Mary Clay, Laboratory Medicine and Pathology

Baxter Healthcare Corporation
$78,484 - 06/92-06/95

Developing and Improving Institutional Animal Resources

Patrick J. Manning, Medical School

NIH, NCRR
$63,926 - 09/92-09/93

Youth and AIDS Project

Gary Remafedi, Pediatrics

St of MN - Department of Health
$25,000 - 11/92-03/93

Effect of Morphine on HIV Replication

Marilyn C. Olson, Pharmacology
S. Ramakrishnan, Pharmacology

NIH, NIDA
$11,800 - 10/92-09/93

Sampling Based Approaches for Biostatistical Inference

Bradley P. Carlin, Biostatistics

NIH, NIAID
$76,602 - 12/92-11/93

Drug Information Service

Barbara Green, Pharmacy
Gail Weinberg, Pharmacy

St of MN - Department of Human Services
$57,849 - 10/92-09/93

Amino Acid Transporters: Sequencing and Characterization

Lester R. Drewes, Biochemistry and Molecular Biology, Duluth

American Diabetes Association - MN Affiliate
$10,000 - 12/92-11/93

Role of the Complement System in Occupational Asthma

Jean F. Regal, Pharmacology, Duluth

Minnesota Medical Foundation
$7,500 - 12/92-11/93

Polyolefin Phase Behavior

Frank S. Bates, Chemical Engineering and Materials Science

Martin Marietta Energy Systems
$63,150 - 10/92-09/93

Predicting and Assuring the Performance of Container

Robert W. Staehle, Chemical Engineering and Materials Science

TRW, Inc.
$48,022 - 10/92-01/93

Spectroscopic Studies of Transition Metal Clusters

Doreen G. Leopold, Chemistry

Exxon Education Foundation
$15,000 - 10/92-07/93

Enhancement of the Kronos Simulation Package

Panos G. Michalopoulos, Civil and Mineral Engineering
Eil Kwon, Civil and Mineral Engineering

St of MN - Department of Transportation
$50,000 - 12/92-04/94

Phyllosilicate Fabric in the Proterozoic Thompson Formation

Peter J. Hudleston, Geology and Geophysics
Michael J. Jackson, Geology and Geophysics
Weiwei Sun, Geology and Geophysics

NSF
$77,262 - 01/93-06/95

Geometry Electronic Bulletin Board

Albert Marden, Geometry Center

Subcontract from Swarthmore College, NSF Prime
$47,458 - 09/92-06/95

Holistic System for Mathematical Computation

Albert Marden, Geometry Center

NSF
$48,400 - 11/92-04/94

Postdoctorates in Industrial Mathematics

Avner Friedman, Inst for Mathematics and Its Applications
Willard Miller, Jr., Inst for Mathematics and Its Applications

Paramax
$30,000 - 10/92-12/94

Autonomous Vehicle Guidance Evaluation
Max Donath, Mechanical Engineering
St of MN - Department of Transportation
$74,993 - 11/92-10/93

Scientist-In-Residence
Earl Peterson, Physics and Astronomy
Argonne National Laboratory
$27,016 - 01/93-07/93

Non-Vibratory Methods of Compaction for Urban Utility Project
Raymond L. Sterling, Underground Space Center
St of MN - Department of Transportation
$19,220 - 11/92-10/93

Installation and Repair of Utility Systems Beneath Streets
Raymond L. Sterling, Underground Space Center
St of MN - Department of Transportation
$32,000 - 11/92-10/93

Mussel Survey of Upper Mississippi River
Robert C. Bright, Bell Museum of Natural History
St of MN - Department of Natural Resources
$12,000 - 07/92-06/93

Translation of the Anonymous Laws of St. Louis
Frank R. Akehurst, French and Italian
National Endowment for the Humanities
$44,872 - 12/92-09/93

Commercial Building Lighting Standards Education Project
Mary Guzowski, Architecture
Delores A. Ginthner, Design, Housing and Apparel
St of MN - Department of Public Service
$39,782 - 11/92-06/93

Analysis of Probable Change in Former USSR's Demand for Grain
Jerry E. Fruin, Agricultural and Applied Economics
St of MN - Department of Administration
$17,038 - 07/92-06/93

Individual Grant: E.H. Elbasha
Terry Roe, Agricultural and Applied Economics
Ford Foundation
$14,790 - 09/92-09/93

New Opportunities for Molecular Mapping and Chromosome-Mediated Gene Transfer
Howard W. Rines, Agronomy and Plant Genetics
Ronald L. Phillips, Agronomy and Plant Genetics
Pioneer Hi-Bred International
$40,000 - 10/92-10/94

Lysine Requirement of the Lactating Sow
Gerald Shurson, Animal Science
Dean D. Koehler, Animal Science
Sayed M. El-Kandelgy, Animal Science
National Pork Producers Council
$18,000 - 07/92-06/93

Community Learning Centers
Joe Nathan, Humphrey Institute
Public School Incentives, Inc.
$76,630 - 09/92-05/93

Biotechnology Safety Regulations
David Andow, Entomology
Anne R.D. Kapuscinski, Fisheries and Wildlife
Philip J. Regal, Bell Museum of Natural History
Joyce Foundation
$68,425 - 12/92-11/93

Factors Controlling Lake Superior Bald Eagle Productivity
David E. Andersen, Fisheries and Wildlife
Great Lakes Protection Fund
$26,202 - 05/92-02/94

Quadrula Fragosa in the Lower St. Croix River
Nels Troelstrup, Forest Resources
James A. Perry, Forest Resources
USDI, National Park Service
$42,500 - 09/92-09/93

Biological Control of Purple Loosestrife
Robert F. Nyvall, Agricultural Experiment Station, Grand Rapids
St of MN - Department of Natural Resources
$7,000 - 10/92-06/93

Yes I Can, A Community Based Program to Empower Youth with Disabilities
Jennifer York, Educational Psychology
Brian Abery, Educational Psychology
Mitsubishi Electric America Foundation
$74,000 - 11/92-10/94

Software Representation to Support Change
Paul E. Johnson, Information and Decision Sciences
Wei-Tek Tsai, Computer Science
Fujitsu Laboratories
$29,663 - 10/92-09/93

Florence Crittenton Records Processing Project
David Klaassen, Libraries, Collections and Preservation
National Florence Crittenton Mission
$12,785 - 01/93-12/93

Lab and Field Investigation of On-Line Moisture Analyses
Rodney L. Bleifuss, Natural Resources Research Institute, Duluth
Harold E. Goetzman, Natural Resources Research Institute, Duluth
St of MN - Department of Natural Resources
$21,250 - 12/92-09/93

Optimization of Column Flotation
Rodney L. Bleifuss, Natural Resources Research Institute, Duluth
Blair R. Benner, Natural Resources Research Institute, Duluth
St of MN - Department of Natural Resources
$30,000 - 12/92-06/93

Application of Vertimill Grinding Systems to Fine Grinding
Rodney L. Bleifuss, Natural Resources Research Institute, Duluth
Blair R. Benner, Natural Resources Research Institute, Duluth
St of MN - Department of Natural Resources
$24,250 - 11/92-12/92

Hydrochloric Acid Leaching of Ilmenite Concentrates
Rodney L. Bleifuss, Natural Resources Research Institute, Duluth
Blair R. Benner, Natural Resources Research Institute, Duluth
Iron Range Resources and Rehabilitation Board
$20,000 - 11/92-12/95

Evaluation of Uses for Deinking Sludges
Thomas Malterer, Natural Resources Research Institute, Duluth
Kurt W. Johnson, Natural Resources Research Institute, Duluth
St of MN - Office of Waste Management
$94,683 - 11/92-04/94

Commercial Aquaculture: Implications for Water Quality in Minnesota
Richard Axler, Natural Resources Research Institute, Duluth
Michael E. McDonald, Chemical Engineering, Duluth
Iron Range Resources and Rehabilitation Board
$25,000 - 11/92-12/95

Correction from January issue:

Measurements of Crack Tip and Microstructural Strains in Single Crystals
Thomas W. Shield, Aerospace Engineering
NSF
$25,000 - 09/92-02/94

ORTTA TELEPHONE NUMBERS

A Quick Reference Guide

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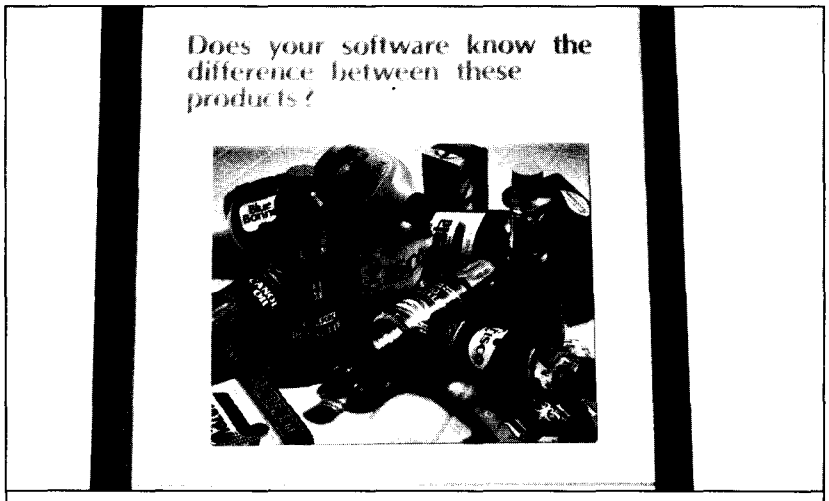
RESEARCH REVIEW

Research and Technology Transfer Administration

March 1993

Nutrition Center Creates Standard for Research

Marilyn Buzzard, director of the University's Nutrition Coordinating Center, wants to make it possible for nutritionists and epidemiologists all over the world to compare apples with apples. "The nutrient values given for apples in another country might differ from those recorded here," she says. "Now are those apples really different? Or aren't they? And who decides? Our next challenge is an international database." Standardized measures of nutrition allow comparison, and comparing people's nutrition correlates diet with health. It was data from seven countries, for example, that first showed epidemiologist Ancel Keys of the University of Minnesota the connection between eating fat and dying of heart disease.



Software from the Minnesota Nutrition Coordinating Center records the quantity of 93 individual nutrients in 16,000 foods and 6,000 brand-name products. For the sake of precise research, it specifies, for example, the nutrient content of 350 different brands of margarine.

The international database is Buzzard's *next* challenge because the Minnesota Nutrition Data System, maintained by the Nutrition Center, is already a U.S. standard. There is ready testimony to that effect:

The National Institutes of Health have called the Minnesota Nutrition Coordinating Center a "unique national resource that provides the most reliable and complete nutrient database in the world."

The single largest survey of nutrition in the United States, the "NHANES III" conducted by the National Center for Health Statistics, uses a version of the Minnesota System that the Nutrition Center custom built for it. "NHANES looked at everything available, rejected what had been used in the past, and came to us," says Buzzard, "because we were the only ones even close to doing the kind of work they needed." NHANES is surveying 30,000 people over six years.

"We think very highly of the system," says Abby Ershow, Ph.D., of the National Heart Lung and Blood Institute

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Inside

National Institutes of Health

Minority Training

The National Institutes of Health is considering asking institutions to show progress in recruitment of minority students into research training programs. If adopted, the new policy could take effect with new applications for institutional research training grants submitted at the September 10, 1993, deadline.

The minority recruitment policy which NIH issued in 1986 requires that institutions submit minority recruitment plans with their grant applications. A follow-up notice in 1989 reiterated the policy and set forth possible elements of an acceptable recruitment plan. The new policy would require current training grantees who are submitting new applications to assess and improve their efforts to recruit minority trainees. Failure to comply would risk rejection of their new training grant applications.

NIH would allow first-time applicants under the new policy to file a minority recruitment plan; for grantees having had five years to implement their plan, the emphasis would be on action.

NIH would not judge institutions on numbers alone, but would look at their success in recruiting predoctoral and postdoctoral trainees, considering the number of students available. Mitigating factors, for example, might be the dearth of candidates in a particular scientific field or geo-

{Continued On page 11}

RESEARCH REVIEW

Volume XXII/Number 9

March 1993

Director of Communications: Michael P. Moore

Editor: Phil Norcross

Editorial Assistant: Tove Jespersen

Associate Vice President: A. R. Potami

***Research Review* is a monthly publication of the Office of Research and Technology Transfer Administration. Its purpose is to inform faculty and administrators who are involved with sponsored research and technology transfer on procedures and policies of granting agencies, on institutional policy and other information necessary to the preparation of research proposals, and on funding opportunities.**

***Research Review* welcomes ideas and comments from all readers. Write to *Research Review* at 1100 Washington Avenue South, Suite 201, Minneapolis, MN 55415-1226, or call Phil Norcross at 625-2354 or Michael P. Moore at 624-9398.**

Indirect Cost & Fringe Benefit Rates

Indirect Cost Rates

The *provisional* rates for July 1, 1992, through June 30, 1994, are listed below. When budgeting for periods beyond 6/30/94, the 7/1/92-6/30/94 rates should be used. **The rate agreement is dated May 13, 1992**. This date should be used where required on proposal applications. In rare cases, particular grant programs have maximum rates that are lower than the rates below. **Please call Marilyn Surbey, 624-4850, or Richard Miller, 626-9895, with questions on indirect costs.**

	07/01/92 06/30/94
Research	
On-Campus	40.00
Off-Campus *	21.00
SAFHL	58.05
Hormel	44.00
Other Sponsored Activity	
On-Campus	20.00
Off-Campus *	10.00
Instruction	
On-Campus	52.00
Off-Campus *	16.00

* A project will be considered off-campus if more than 50% of the direct salaries and wages of personnel employed on the project are incurred at a site neither owned nor leased by the University.

Fringe Benefit Rates

If you have questions regarding fringe benefit rate development or need the breakdown of charges, call **Vivian Fickling at 624-2009**.

Due to a change in policy, new rates must now be approved by DHHS before they can be implemented. Even though the university has released new rates for FY93, they have not been approved by DHHS and the rates below must continue to be used when preparing proposals

For proposals being submitted with start dates **after July 1, 1992**, the estimated fringe benefit rates to be budgeted are:

Faculty	31.25
Civil Service	29.50
Graduate Assistants	10.50

Estimated rates after **July 1, 1993,** are:

Faculty	28.00
Civil Service	30.50
Graduate Assistants	31.25

Rate changes will be reflected in this section.

Gibbons, Massey and Battelle on the Peace Dividend

John Gibbons told the U.S. Senate that the shift of funds from the Department of Defense to civilian R&D will have to take place over several years. The traditional proportions of federal R&D, 70 percent defense and 30 percent civilian, will gradually tend toward a 50-50 mix, he said. Gibbons spoke during confirmation hearings regarding his appointment as director of the Office of Science and Technology Policy.

Gibbons also said that funding for the approximately 700 national laboratories should be subject to peer review and competition with universities and other institutions.

The National Science Foundation reports that, of the nation's R&D spending from all sources during 1992, 25 percent went for military purposes. That's down from 30 percent in 1985. Those numbers come from a recent NSF document, "National Patterns of R&D Resources: 1992."

NSF Director Walter Massey said that NSF, through its Manufacturing Engineering Education Program, will devote particular attention to working closely with the Department of Defense on conversion from military to civilian industry. The comment is from the 1993 budget plan that Massey gave to Rep. George Brown and his House Committee on Science, Space and Technology.

The Battelle Institute, in its annual forecast of U.S. R&D spending, says that defense R&D will decrease, but not suffer a "major retrenchment." The defense industry is realigning, cutting personnel and working toward new markets, under conditions similar to the early 1970s, says the forecast.

The Battelle forecast predicts that 52.2 percent of the 1993 federal R&D budget will go for military work, down from 65.2 percent in 1987.

Human Genome Program to be Revised

The National Center for Human Genome Research plans to revise its program announcement in spring 1993. The revision, says the NCHGR, should result in a more flexible and broadly defined "centers" program encompassing mapping, sequencing and technology development.

The revision will allow about six months for proposal preparation. The first set of large awards are scheduled for competition on October 1, 1993.

The Minnesota Delegation to the 103rd Congress

Congressperson	Comittees
Paul Wellstone (DFL) 612/645-0323 202/224-5641	Energy and Natural Resources Labor and Human Resources Small Business Indian Affairs
David Durenberger (IR) 612/370-3382 202/224-3244	Environment and Public Works Finance Labor and Human Resources Aging
Rod Grams (IR) 612/427-9269 202/225-2271	Banking, Finance and Urban Affairs Science, Space and Technology Technology, Environment and Aviation Subcommittee
David Minge (DFL) 202/225-2331 612/448-6567	Agriculture Science, Space and Technology Science Subcommittee Technology, Environment and Aviation Subcommittee
James Oberstar (DFL) 218/727-7474 202/225-6211	Public Works and Transportation Foreign Affairs
Timothy J. Penny (DFL) 507/281-8053, -6025 202/225-2472	Agriculture Veterans Affairs Select Committee on Hunger*
Collin Peterson (DFL) 218/847-3481, -5056 202/225-2165	Agriculture Government Operations
Jim Ramstad (IR) 612/881-4600 202/225-2871	Judiciary Small Business Select Committee on Narcotics*
Martin Olav Sabo (DFL) 612/348-1649 202/225-4755	Appropriations Defense Subcommittee Transportation Subcommittee Treasury-Postal Subcommittee Chair, Budget Committee Select Committee on Intelligence*
Bruce Vento (DFL) 612/224-4503 202/225-6631	Banking, Finance and Urban Affairs Interior and Insular Affairs Chair, Subcommittee on National Parks and Public Lands Select Committee on Aging*

*Continuation of the select committees depends on congressional votes this month.

The Impact of Academic Ties with Industry

Address by Jules B. LaPidus, Ph.D.

President, Council of Graduate Schools

Given November 19, 1992, at the conference, *University-Industry Research: Balancing Public and Private Trusts.*

Jules LaPidus has been President of the Council of Graduate Schools since 1984. Prior to that, he earned an M.S. and a Ph.D. at the University of Wisconsin, joined the faculty of Ohio State University in 1958, and in 1974 became Ohio State's Dean of the Graduate School and Vice Provost for Research. LaPidus has authored or co-authored more than 40 papers in medicinal chemistry and pharmacology and has served on advisory committees for the National Institutes of Health, National Science Foundation, National Academy of Sciences and American Association for the Advancement of Science.

Assessing the history of university-industry relations led Jules LaPidus to three conclusions: The results of university research should be public knowledge. Universities should do research rather than development work. Research should be tied to teaching.

LaPidus "reminisced" about the years 1974 to 1984, when he was Vice Provost for Research at Ohio State University. During that period, he said, "there was a great increase in interest in university-industry relationships."

Significant Changes in University-Industry Relations

As LaPidus described it, university-industry collaboration underwent significant change and growth in the 1970s and '80s. "It was almost," he said, "as if you had two people who had been going together for a long time, and perhaps even going steady, beginning to talk about getting married. The conversation escalated to a different level."

The significant changes, according to LaPidus, were of three kinds.

The first change, said LaPidus, "we might define as very large, multi-million-dollar, multi-year initiatives involving research universities and very large companies." LaPidus emphasized that these relationships involved "very strong universities and very strong companies"—like MIT and Exxon, and Washington University and Monsanto—and that they involved *programs*, not *projects*.

Second, said LaPidus, faculty became more entrepreneurial. "Many colleagues of mine really felt caught in a box," he said. "Federal support was declining, and the one thing they wanted above all was to maintain the continuity of their research and their laboratories. Industrial support began to look very good." Universities encouraged faculty entrepreneurs through their policies regarding patents and start-up companies. "University policies began to change, particularly in areas like patenting, in order to provide more incentives to faculty," said LaPidus, and "this was the age of the great romance of universities with the idea of the research park."

The third change that LaPidus defined was the collaboration of universities, industries and states in economic development. LaPidus described those efforts as "local arrangements between universities and local industry, tied together by funding from state government, to produce results in a fairly short period of time." As examples he named the Thomas Edison and Benjamin Franklin programs in Ohio and Pennsylvania.

University Research Should be Public

LaPidus described academic and industrial approaches to research as antithetical from the outset: Universities sought integrity in research, he said, and believed that knowledge, to be useful, must be public. Industry sought return on research investments, and believed that knowledge, to be useful, must be proprietary.

Large, powerful corporations and universities, LaPidus suggested, could work together despite that difference. From a 1982 work by Erich Bloch, LaPidus drew the following description of IBM's view of university research: "We [IBM] are willing to have the information find its way into the public record. This means we are selective on the content of the work we have universities do for us." But LaPidus cautioned that that was the approach of institutions with sufficient resources and confidence for long-range programs.

Universities believe that knowledge, to be useful, must be public.

Industry believes that knowledge, to be useful, must be proprietary.

In other institutions, he said, there was more pressure to keep secrets: "Many scientists were eager to accept this kind of [industrial] support virtually without any consideration of the restrictions that went with it—very often restrictions on publication."

For an argument against that kind of secrecy on the part of academics, LaPidus turned to Dorothy Nelkin. In *Science as Intellectual Property* (1984) Nelkin acknowledged that

{Continued On page 17}

University and Government Approaches to Fostering Research Integrity

Address by Nicholas H. Steneck, Ph.D.

Director, Historical Center for the Health Sciences, University of Michigan

Given November 19, 1992, at the conference, *University-Industry Research: Balancing Public and Private Trusts*

Nicholas Steneck studies science policy, values and attitudes; research integrity and professional ethics; and the history of science and health sciences in the Midwest. For the U.S. Public Health Service, he chairs the Advisory Committee on Research Integrity. For the University of Michigan, he chaired the task force that wrote one of the earliest university policies on research integrity; he now serves on the Research Policies Committee. He also chairs the board of directors of Student Pugwash USA, a student organization dedicated to responsible use of science and technology. Steneck is a professor of history and has previously served the University of Michigan as director of the Medieval and Renaissance Collegium and the Collegiate Institute for Values and Science. He earned a Ph.D. in history and history of science at the University of Wisconsin, Madison.

Rather than speaking directly of university-industry collaboration and conflicts of interest, Nicholas Steneck focused on preserving the integrity of academic research, regardless of industrial and commercial ties.

Steneck argued that the current approach to safeguarding the integrity of academic science is inefficient, maybe even dangerous to the scientific enterprise, because it is a misdirection of resources that would be better spent on more serious problems.

Current approaches to improving the integrity of research may in fact be "killing the patient."

The current approach is to detect, investigate, report and punish major episodes of deliberate misconduct, said Steneck. He compared that approach to the old medical practice of phlebotomy, or blood-letting, which seemed right at the time, but did not help patients. "Current approaches to improving the integrity of research may in fact be doing little more than making the doctors—government and universities—feel better," he said, "while at the same time killing the patient, which for present purposes I take to be research and science."

Scientific integrity would be better served, Steneck argued, if government and academe devoted less energy to attacking deliberate misconduct, and more energy to correcting "sloppy" research and reforming peer review.

"I want to state very clearly that I am not advocating the abandonment of the policies, rules, and procedures that have been adopted over the last decade," Steneck affirmed. "Misconduct in research cannot be ignored. It must be investigated fairly and efficiently. However, given the fact that major misconduct probably has little impact on the content of science, every effort must be made to reduce the energy and resources spent on misconduct."

To that end, Steneck recommended that universities take more responsibility for the integrity of research and that government adopt a single set of clearly defined regulations, and compensate universities for the cost of complying with them.

Current Regulation of Scientific Conduct

"At the present time government and universities are focusing most of their attention on detecting and prosecuting outright misconduct, which is usually limited to falsification, fabrication and plagiarism," said Steneck. "This focus, I would argue, has largely been determined by historical circumstances, rather than by a rational analysis of the problems that need to be addressed."

Steneck described two sets of circumstances that shaped current policy: First, in the 1970s there were widely publicized episodes of scientific misconduct. "One researcher was discovered to have falsified the results of skin grafts on mice, by painting on the results with a magic marker. Another plagiarized a large number of publications. Another fabricated the results of clinical trials," said Steneck. Second, public confidence in science and government was eroded by such circumstances as the Vietnam War, environmental problems, the energy crisis, and the Watergate scandal. "By the 1970s, science and technology were as often seen as the cause of problems [rather than] as the means to solutions.

"The end result, as I'm sure each of you knows, has been increased regulation and micromanagement of research on the part of the federal government," said Steneck, who went on to list examples: "Concern about the possible abuse of the new recombinant DNA technology in the mid-1970s led to review committees, reporting requirements and regulations. Concern about the possible abuses of human subjects in research led to more review committees, more reporting requirements and more regulations. Concern about the pos-

{Continued On Page 19}

National Institutes of Health

Budgets of Selected Institutes by Budget Mechanism

(Dollars in Thousands—Includes AIDS)

National Cancer Institute

	FY92 Actual		FY93 Appropriation	
	Number	Amount	Number	Amount
Research Grants	4,033	$ 1,133,609	4,090	$ 1,175,947
Training	1,491	37,143	1,461	37,285
Other	397	776,819	355	768,119
Total NCI		$ 1,947,571		$ 1,981,351

Center for Human Genome Research

	FY92 Actual		FY93 Appropriation	
	Number	Amount	Number	Amount
Research Grants	242	$ 94,440	249	$ 95,413
Training	171	4,109	171	4,109
Other	59	6,207	59	6,717
Total NCHGR		$ 104,756		$ 106,239

Heart Lung and Blood Institute

	FY92 Actual		FY93 Appropriation	
	Number	Amount	Number	Amount
Research Grants	3,422	$ 880,398	3,359	$ 897,595
Training	1,640	46,733	1,527	44,382
Other	183	262,939	223	272,816
Total NHLBI		$ 1,190,070		$ 1,214,793

From *Washington Fax*

Army Will Solicit Breast Cancer Research

The U.S. Army Research and Development Command will solicit extramural research this spring for its $210 million Breast Cancer Research Project. When Congress earmarked the Army money for breast cancer research, it intended that the program would be administered by the National Institutes of Health (NIH) and the National Cancer Institute (NCI).

Major General Richard Travis, chief of the Army Medical Research and Development Command, instead awarded a contract to the Institute of Medicine (IOM) to appoint a blue-ribbon panel to provide the Army with advice about the project.

The Army was approached by NIH Director Bernadine Healy and NCI Director Samuel Broder with a suggestion to delegate the grant-awarding to NIH. The Army refused that request, as well as another suggestion to use some of the $210 million to convert an old army anthrax lab at Fort Detrick into a new cancer lab for NIH.

The Army does not yet know what funding mechanisms will be available, nor what method will be used to solicit proposals from extramural sources.

Institutions or investigators wishing to receive solicitation mailings from the Army should write to Acquisition Office Commander, U.S. Army Medical Research and Development Command, ATTN: SGRD—ACQ—BA, Fort Detrick, Frederick, MD 21702-5012; 301/619-7216.

From *Washington Fax*

National Institutes of Health

Budget by Budget Mechanism

(Dollars in Thousands—Includes AIDS)

	FY92 Actual		FY93 Appropriation	
	Number	Amount	Number	Amount
Research Grants				
Research Project Grants				
Noncompeting	17,265	$ 3,912,322	17,931	$ 4,342,379
Competing	6,768	1,490,662	5,634	1,282,786
Admin. Supplements	(961)	56,391	(593)	27,284
Subtotal, RPGs	24,033	5,459,375	23,565	5,652,449
Research Centers				
Spec. / Comp.	623	647,063	625	655,706
GCRC (a)	75	125,320	72	124,587
Biotech	62	37,175	63	38,732
CM / BMM (b)	47	55,941	47	56,689
RCMI (c)	18	26,273	18	25,857
Subtotal, Centers	825	891,772	825	901,571
Other Research				
Careers	1,830	152,455	2,004	161,315
Clinical Education	83	8,109	73	8,546
Coop. Clinical	371	136,624	452	140,741
BRS (d)	143	22,938	46	17,658
MBRS (e)	98	45,272	98	45,677
Other	1,885	196,002	1,638	176,463
Subtotal, Other	4,410	561,400	4,311	550,400
Total, Research Grants	29,268	6,912,547	28,701	7,104,420
Training				
Individual	2,241	54,394	2,223	55,588
Institutional	12,001	293,624	11,785	293,198
Total, Training	14,242	348,018	14,008	348,786
R&D Contracts	1,371	706,507	1,380	694,998
Intramural Research		1,132,166		1,166,216
Management/Support		483,641		496,868
Cancer Control		107,569		105,019
Construction		12,000		7,602
Total, ICDs (f)		9,702,448		9,923,909
Library of Medicine		102,937		103,639
Office of the Director		143,542		190,325
Buildings and Facilities		61,441		108,731
Total, NIH		$ 10,010,368		$ 10,326,604

(a) General Clinical Research Centers
(b) Cooperative Medicine/Biomedical Models and Materials
(c) Research Centers at Minority Institutions
(d) Biomedical Research Support
(e) Minority Biomedical Research Support
(f) Institutes, Centers and Divisions

From *Washington Fax*

National Science Foundation

NSF Budget Favors Strategic Initiatives

The National Science Foundation (NSF) has budgeted funds from its fiscal 1993 appropriation, working out internal distributions that favor strategic, cross-directorate initiatives over directorates' regular core research activities.

Funding increases will range from 9.3 percent for biotechnology to 18.7 percent for manufacturing studies and education, areas pushed by White House science advisors and a recent commission on NSF.

Meanwhile, support for many core programs will decrease or rise only slightly above 1992 spending. For example, 1993 funding will drop $2 million (to $271.3 million) for the biological sciences; and about $3 million (to $619.9 million) for mathematical and physical sciences.

NSF will increase 1993 spending $4 million (to $89.5 million) for social, behavioral and economic sciences; $3 million (to $261 million) for engineering; and about $3 million (to $215 million) for computer and information sciences. But even those increases don't mean gains for base programs, NSF says, since extra funds may go to special activities.

Funding Shortfall

Congress gave NSF $2.7 billion for this year, up from $2.5 billion, but it decreased funds in key areas. It provided only $1.8 billion for research and related activities, a $14 million drop from 1992. And, although appropriators increased funds for education and human resources programs from $465 million in 1992 to $487 million in 1993, they failed to provide money for the second year of a graduate traineeship program they instructed NSF to continue. That shortfall alone forced NSF to find $5 million in other areas to fund new traineeships this year, budget officials said.

Painful Priorities

"Setting priorities . . . has been painful," said NSF Director Walter Massey, but he said the plan tries to balance needs for investigator-initiated research with pressures for more research focused on national concerns.

In setting priorities, NSF closely heeded the report of an independent commission on the agency's future, Massey said. The panel urged more emphasis on programs that link science research to critical technologies.

The commission also recommended bigger grants for NSF investigators. Massey said NSF will try to increase the average size of research awards, which currently is about $60,000 for a regular competitive grant.

Following are other elements of NSF's current plan:

- NSF will direct special emphasis in 1993 to manufacturing research and education, up 18.7 percent from 1992 (to $104.4 million); advanced materials and processing, up 14.2 percent (to $303.6 million); biotechnology, up 9.3 percent (to 190.2 million); high performance computing and communications, up 12.5 percent (to $225.1 million); and global change, up 15.2 percent (to $125 million).
- NSF will increase its 1993 math and science education initiative by $20 million (to about $540 million), including education activities outside the education and human resources directorate. Not all science education programs will do well, however. Funds will drop from $197 million to $188 million for elementary, secondary and informal education programs, while almost doubling from $44.5 million to $85.7 million for systemic reform programs.
- NSF will use increases mandated by congressional changes in the small business innovation research program to support proposals in strategic research areas. SBIR funding will total almost $29 million.
- NSF will fund the academic facilities and instrumentation program at the $50 million level provided by Congress, with $37.5 million allocated for facilities and $12.5 million for equipment.

From *Federal Grants and Contracts Weekly*.

Healy Resigns

On February 26, Bernadine Healy resigned her position as director of the National Institutes of Health, effective June 30, 1993.

"I am deeply honored to have served as director of this great institution," said Healy. "Most of my professional life has been nurtured by the NIH . . . The NIH claims a piece of my soul and will always have a place in my heart."

Healy said she announced her decision in February to ensure time for an orderly transition at NIH. Secretary of Health and Human Services Donna Shalala said no new director has been named for NIH, and Healy will devote her remaining time at NIH to completing the NIH strategic plan, a process Healy initiated.

The FY93 NSF Budget Plan

(Dollars in Millions)

	FY92 Plan	FY93 Request	FY93 Current Plan
Program Activity			
Research and Related Activities			
Biological Sciences	$ 273.98	$ 320.62	$ 271.33
Computer and Informational Sciences and Engineering	212.44	272.22	215.22
Engineering	258.16	312.52	261.10
Geosciences	402.10	472.38	401.88
Mathematical and Physical Sciences	622.56	725.96	619.94
Social, Behavioral and Economic Sciences	85.87	107.79	89.53
EPSCoR (a)	18.00	0.00	0.00
Subtotal	1,873.11	2,211.49	1,859.00
Education and Human Resources	465.00	479.50	487.50
Academic Research Facilities and Infrastructure	33.00	33.00	50.00
U.S. Antarctic Research	78.00	93.00	158.00
U.S. Antarctic Logistic Support	10.00	70.00	63.36
Salaries/Expenses	109.00	135.00	111.00
Critical Technologies Institute	0.00	1.00	1.00
Office of the Inspector General	3.50	4.00	3.69
Total	$ 2,571.61	$ 3,026.99	$ 2,733.55

(a) The Experimental Program to Stimulate Competitive Research

From *Washington Fax*

National Science Foundation

NSF to Increase Audit Activities

The National Science Foundation recently reported to Congress its plans for increased auditing of grant recipients. The NSF says the plans come "as a result" of its budget increase from $1.6 billion in fiscal 1989 to $2.7 billion in fiscal 1993.

Four programs are singled out for auditing: NSF funding at universities where other federal agencies conduct university-wide audits, Science and Engineering Education programs, Science and Technology Centers, and the Antarctic program.

At the request of the U.S. Senate and the U.S. General Accounting Office, the NSF is more aggressively auditing its awards to universities where it does not have "cognizance," meaning universities where other federal agencies are responsible for auditing all federal work. The Department of Health and Human Services has cognizance over the University of Minnesota.

The Science and Engineering Education programs are a "significant potential risk" to NSF because many of the grant recipients are new to NSF and because the budget has grown rapidly—from $171 million in 1989 to $487 million for 1993.

The Science and Technology Centers are more difficult to audit than awards to individual investigators, but the average center award was $1.9 million in 1992, while individual investigator awards averaged less than $500,000, so the NSF plans to increase audits of its STCs. The University's Geometry Center is one such STC, but the auditing plans do not single out specific STCs for auditing.

The Antarctic program has about $160 million to spend in 1993. But because its work is so remote, the Antarctic program is not routinely audited, which "increases the risk of financial loss and program mismanagement."

NSF Reports on U.S. R&D Trends

The National Science Foundation recently reported on trends in U.S. R&D activity. In a January 26 news release, the NSF published excerpts from its "National Patterns of R&D Resources: 1992" as follows:

The federal government spent $68 billion on R&D in 1992, 43 percent of total U.S. R&D spending.

U.S. expenditures from all sources for R&D totalled $157 billion in 1992, about $62 billion for research and $95 billion for development. That figure is an increase of 1 percent over 1991, after adjustments for inflation. For 1990 and 1991, the corresponding growth figure indicated a decrease of less than 1 percent.

The 1992 growth figure fits the trend since the mid-1980s. Over the past seven years, the total after-inflation increase in U.S. R&D spending has been 8 percent. For the seven years before that, 1978 to 1985, it was 50 percent.

The portion of R&D money going for military purposes has decreased. In 1992, 25 percent of the nation's R&D spending, or 2.6 percent of the gross domestic product, went to military work. In 1985, those figures were 30 percent and 2.8 percent.

Japan spent 3.1 percent of its gross domestic product on R&D in 1990; West Germany spent 2.8 percent. The U.S. figure is the lowest of the three—2.7 percent.

Industry performed 70 percent of the R&D work done in the U.S. in 1992, or $110 billion worth. Academe did 12 percent, or $19 billion worth, and the federal government did 11 percent, $18 billion worth. Academe's share is a 53 percent increase over its share in 1985. All other sources combined increased the amount of work performed by 4 percent over the same period. Those growth figures are after adjustments for inflation.

"National Patterns of R&D Resources: 1992" (publication no. NSF 92-330) is available from the NSF free of charge. Phone 202/634-4300.

Battelle's Annual Forecast of U.S. R&D

In its annual forecast of R&D in the United States, the Battelle Institute urges vigorous growth in R&D, but predicts that the growth rate will in fact continue to slow.

"In order to meet future challenges in many other areas, we must invest in R&D, and in the capacity to utilize the results of research," says Battelle. "The economy shows signs of an upswing, but not enough to stimulate a strong growth in R&D investment."

On the other hand, the "tenor" of the 1993 federal budget and the pro-technology attitude of the Clinton Administration give Battelle reason for "cautious optimism" regarding the growth of R&D in the near future.

Battelle also expects state governments will expand their support of technology-based economic development.

Battelle expects industry will be the dominant source of R&D funds in 1993, as has been the case since 1980. The trend toward slower growth in industrial R&D may be stabilizing, it says, and support for research will continue to grow in fields related to electronics, communication, sensors, advanced machinery, and energy efficiency. The internationalizing of markets will tend to increase industrial R&D, as U.S. industry accommodates itself to foreign regulations and consumers.

Industry now works harder to evaluate R&D, says Battelle. "It's a balancing act for managers to define what is the right blend of R&D for an individual company." Industry will increase its interest in collaborative research programs, says Battelle, partly because it anticipates federal encouragement for public-private partnerships, permanent R&D tax credits, and new R&D roles for the federal laboratories.

From *Washington Fax*

Biodiversity Program to Make Awards

The International Cooperative Biodiversity Groups Program expects to make three or four awards in April 1993, after receiving 33 grant applications. The program is administered by the NIH Fogarty International Center, and has a $1.5 million budget for fiscal 1993, its first year.

The awards will go to international consortia for inventory, collection and study of bioactive organisms from endangered ecosystems. The goal is to isolate compounds with pharmaceutical value.

Battelle Institute's Forecast of 1993 U.S. R&D Budgets					
	Expenditures			R&D to be Performed	
	Amount (billions)	Percent of total	Increase over 1992	Amount (billions)	Percent of total
Industry	$83.0	51.2%	2.4%	$112.7	69.6%
Federal	70.1	43.3	2.8	18.2	11.2
Academic	5.7	3.5	--	25.5	15.7
Other	3.2	2.0	--	5.6	3.5
Total	$162.0		1.0*	$162.0	

*After about 2% inflation. The average increase for 1982-1992 is 3.1% per year.

From *Washington Fax*

Battelle Institute's Forecast of 1993 Federal R&D Funds Distribution				
By Sector		By Agency		
Sector	Percent of total, 1993	Agency	Percent of total, 1993	Percent of total, 1987
Industry	45%	Defense	52.2%	65.2%
Federal labs	25	Health, Human Services	11.4	9.2
Academic	25	NASA	10.3	6.1
Other	5	Dept. of Energy	15.0	9.8

From *Washington Fax*

Minority Plan

{Continued From Page 2}

graphic location. Numbers *would* count if, as evidence of a good-faith effort, an institution demonstrated its roster of minority trainees had increased. If an institution appeared to have disregarded the policy, failing to recruit minorities when they were available, NIH might withhold funds.

Judging an applicant's track record would still be up to individual institutes, officials say. Currently, review panels consider recruitment plans when evaluating new applications, but their assessments are not included in the priority score—a key factor in funding decisions. Instead, institute staff could determine if a plan passes or fails and withhold funds if the plan is not consistent with policy. However—if the minority plan were part of the score—a program deemed highly meritorious on scientific and educational grounds could still win funding despite a flawed recruitment component.

There are positive signs the overall policy is having some effect. However, the real measure of its effectiveness will be increased numbers of underrepresented minority researchers acting as principal investigators on NIH research grants. Those numbers are currently abysmal, officials say. An NIH survey of 1991 research project grant applicants showed only 0.9 percent were black and they won only 0.5 percent of the awards; American Indians accounted for 0.3 percent of the applicants and 0.2 percent of the awards; Hispanic investigators comprised 1.8 percent of the applicants and 1.6 of the grantees; and Asian researchers made up 9.4 percent of the applicants and won 8 percent of the grants.

For further information, contact Walter Schaffer, Office of Special Programs, National Institutes of Health, Building 31, Room 5B44, Bethesda, MD 20892; 301/496-9743.

From *Federal Grants and Contracts Weekly*

{Continued From Page 1}

(NHLBI). Ershow is the project officer who administers the Nutrition Center's principal grant support. She acknowledges that the Minnesota System is too detailed and expensive for simple purposes, like recipe calculations that clinical dietitians make, but for nutrition work that requires precision and detail, "There's just nothing to touch it," she says.

"It's the only validated, up-to-date system for nutrient analysis in the entire country,"
— Phyllis Bowen, University of Illinois at Chicago.

"It's the only validated and up-to-date system for nutrient analysis in the entire country," says Phyllis Bowen, Ph.D., a nutrition researcher at the University of Illinois at Chicago. A proposal to survey nutrition with some other system would be "real problematic," she says. "If I were on the peer review committee I'd chuck it back." Some journals would publish the results, "but not nutrition journals. The work would be suspect." Bowen has been using the Minnesota System for five years.

About 50 people work in the University's Nutrition Coordinating Center (NCC), most of them nutritionists, computer programmers and data entry workers, in rented office space at the eastern fringe of the Minneapolis campus. Buzzard, its director, is an assistant professor in the Division of Epidemiology.

The NCC created and maintains The Minnesota Nutrition Data System (NDS), a software and database package. When researchers seek correlations between nutrition and health, the NDS helps in two ways: It prompts them to ask unbiased, consistent and sufficiently detailed questions about what their subjects eat. And from the answers it calculates the subjects' "nutrient intake." The NCC does several kinds of work besides the software package—training, publishing, arranging the First International Conference on Dietary Assessment Methods, for some examples. But the Nutrition Data System is the center of its work.

Researchers in nutrition and epidemiology rely on the NDS because it is precise, complete and up-to-date. Precision was the goal that started the NCC in 1974. "In the '60s and early '70s, the nutrient databases weren't very good," says Buzzard. "There was a hypothesis that dietary cholesterol was related to heart disease, but the early studies weren't able to show it. No database was specific enough."

Nor, until the NCC, was there agreement in the profession about which database to use. In the early '70s the National Heart, Lung and Blood Institute simultaneously began two large studies that both needed good nutrition data—the Multiple Risk Factor Intervention Trial and the Lipid Research Clinics' Coronary Primary Prevention Trial. "Those two studies came out of different branches of the Institute and were designed independent of each other," remembers Barbara Dennis, who worked for NHLBI at the time. She is now an associate professor of nutrition at the University of North Carolina. "The director put everybody in a room and said 'You guys ought to be using the same method to assess diet, so that there will be comparability.' That was the beginning."

So the NCC was created and began building its nutrient database. Until 1988, the database stayed on a University of Minnesota mainframe computer and the NCC worked largely as a service bureau for researchers. They would record on paper what their subjects ate, then send the paper to the NCC, which would process the data. The NCC has handled about 300,000 records that way, for more than 150 research studies. It has also trained and certified more than 700 dietary interviewers.

The NCC continues to provide those services, says Mary Stevens, who directs the NCC Service Center. But more often, now that everyone has a desktop computer, it sends the database to clients rather than clients sending data to it. And rather than train interviewers to record data on paper, the NCC now provides software for the task, and trains clients to use it.

The NCC's database records the quantity of 93 individual nutrients in 16,000 foods and 6,000 brand-name products. The software prompts interviewers to ask the right questions, records the answers, and uses the database to calculate the results.

Suppose you had tuna sandwiches for lunch yesterday, and now a nutritionist with a laptop computer is interviewing you, taking what's called a "24-hour recall." The first questions are general: "How many meals did you eat yesterday, and what were the main courses?" Depending on your answer, the computer then prompts the interviewer to probe for details: How many pieces of bread? Wheat, white or rye? Was the tuna packed in water or oil? Did you drain it? What's your brand of mayonnaise? You drank what with your lunch? Whole or 2%?

The NCC's database records the quantity of 93 individual nutrients in 16,000 foods and 6,000 brand-name products.

The nutritionist types in your answers. Then the software calculates the nutrient value of your lunch: Those two tuna sandwiches had 888 milligrams of sodium, for example.

{Next Page}

Had you used a different brand of mayonnaise, the NDS would give a different result. Had the sandwiches been store-bought, the NDS would supply nutrient values for a standard recipe.

The NDS can distinguish macaroni and cheese made with skim milk from macaroni and cheese made with whole milk. It knows the nutrient content of 350 different brands of margarine. If you tell it what went into the quiche last evening, it can estimate the proportions of the ingredients and calculate the nutrient value of the whole. The final print-out can specify daily totals for each of the 93 nutrients. Or it can point out those amounts which are less than 75 percent of recommended dietary allowances. Or it can list, in order, the top sources of fat in your diet.

In order for different research programs and different interviewers to yield comparable results and commensurate data, all the interviewers must remember to ask whether the tuna was canned in water or oil, and all must agree that two tablespoons of *Brand X* mayonnaise have 157 milligrams of sodium. That's why a standard software and database package is so important to nutrition surveys—without it, researchers would have to compare apples to oranges.

With good data, a researcher might document that high fat intake leads to heart disease, or correlate salt intake to hypertension, and a clinician might counsel you to eat less mayonnaise and more bread. Research, however, is the strong suit of the NDS. "Many software packages on the market are user friendly and suitable for ordinary counseling," says Dennis, "but they really don't have the specificity that you need for research."

"From other software packages, you're lucky if you get 6,000 foods, let alone 6,000 brand-name foods," says Keren Price, a nutritionist at NCC. "If you eat quiche, you're lucky to get two choices—maybe quiche Lorraine and vegetarian quiche. You can't specify anything about how it was prepared."

Getting data is the largest part of the NCC's daily work. About 1,000 new brand-name foods reach the U.S. market every month. The NCC needs a large portion of them in its database. It also needs to keep track of old products that change to new recipes, or "formulations" as they're called. So NCC's database nutritionists, headed by Sally Schakel, spend a lot of time and energy collecting information from manufacturers, and then filling in the information that manufacturers won't give them.

About 1,000 new brand-name foods reach the U.S. market every month. The NCC needs a large portion of them in its database.

"A lot of naive people think that managing a database is something that one person can do part time," says Dennis. "That's not true at all."

"The NCC makes huge efforts to fill in the gaps," says Ershow.

The core of the nutrient database comes from the USDA as computer records on tape. The USDA compiles them from scientific literature and laboratory analysis. The result, the USDA's nutrient data tapes, will list the nutrient values of cheese and eggs, but doesn't include fat-free *Brand X* cheddar.

If you really want to know what the nutrient content of a food is, you've got to know what brand it is.

The NCC adds to the USDA nutrient data by combing the literature for the results of lab analyses, and by using information from manufacturers to *impute* the nutrient content of their products.

To nutritionists and epidemiologists, brand names are crucial. "In the old days you had standards, like mayonnaise, that had official ingredients that had to be there or you couldn't call it mayonnaise," says Dennis. "That's changing now. We're moving more and more toward brand-specific products. If you really want to know what the nutrient content of a food is, you've got to know what brand it is."

Brand names, however, are not entirely reliable. The formulation can change overnight, even though the name of the product does not. "Coconut oil used to be used quite a lot; now they're not using it so much," says Ershow. "So the Pepperidge Farm cookies you buy today have a different lipid composition than the ones you bought six or seven years ago. That may seem like a small point, but if you apply it to a lot of different foods, it affects how accurate your calculations come out."

Buzzard figures that about 300 manufacturers produce more than 90 percent of the brand-name products on the U.S. market. "We contact every major manufacturer at least once a year and ask for everything they have," she says. By comparing the new data with old, NCC can recognize when an old brand name has a new formulation and correct the database. In between those routine requests for information, NCC makes plenty of special requests. "When we see a new product, we send an *ad hoc* request to the manufacturer."

{Continued On Page 16}

Committee on the Use of Human Subjects in Research

Tips for Improving Consent Forms

Researchers are counseled by the Committee to develop consent forms that can be understood by the average lay person with a reading ability at the eighth-grade level. Delays in approval of a project often center around required changes in the style and language of the consent form. While the Committee recognizes that the consent form is intended to support the subject/researcher dialogue, not replace it, the tone and language of the form must be understandable by the subject.

Technical language and jargon terms must be defined, and complicated sentence structure should be changed to simple declarative sentences.

Prior to submitting a consent form for review, the Committee suggests that researchers ask a lay person unaffiliated with the study to read and decipher the consent form. Often a reader with no vested interest in the project either as a subject or as a researcher can assist in identifying problems in the text.

Researchers are asked to describe blood-draw amounts in either teaspoons or tablespoons; most lay readers do not know how much blood is in 10 ccs. If biopsies are performed for research purposes, it is helpful to have a referent size for the scope of the biopsy sample. For instance, a punch biopsy should not be described solely in millimeters but should be equated with a commonly recognized item. A picture drawn into the text of the consent form is also a helpful means of communicating relative size.

Commonly used technical terms and possible lay explanations follow:

Acute	New, recent, sudden
Adverse Effect	Side effect
Assay	Lab test
Benign	Not malignant, usually without serious consequences
Bolus	An amount given all at once
Carcinogenic	Capable of causing cancer
Catheter	A tube for withdrawing or introducing fluids
Chronic	Continuing for a long time
Clinical Trial	An experiment in patients
Controlled Trial	Study in which the experimental treatment procedures are compared to a standard (control) treatment or procedure
Culture	Test for infection or organisms that could cause infection
Double Blind	Study in which neither investigators nor subjects know what drug the subject is receiving
Dysplasia	Abnormal cells
Edema	Increased fluid
Efficacy	Effectiveness
Extravasate	To leak outside of a blood vessel
Hematoma	A bruise, a black and blue mark
Heparin Lock	Needle placed in the arm with blood thinner to keep the blood from clotting
Monitor	Check on; keep track of; watch carefully
Morbidity	Undesired result or complication
Mortality	Death or death rate
Necrosis	Death of tissue
Oncology	The study of tumors or cancer
Percutaneous	Through the skin
Placebo	A substance of no medical value; an inactive substance
PRN	As needed
Protocol	Plan of study
Random	By chance, like the flip of a coin
Relapse	The return of a disease
Retrospective Study	Study looking back over past experience

If you have any questions, please call Moira Keane at 612/624-1889.

Top Institutions in Research and Development Spending Fiscal 1991

Total R&D Funds Each Institution

	Institution's total R&D	Rank in fiscal 1990
1. Johns Hopkins University	$710,095,000*	1
2. University of Michigan	363,582,000	3
3. University of Minnesota	*331,471,000***	*7*
4. University of Wisconsin, Madison	326,489,000	4
5. Massachusetts Institute Technology	318,901,000	2
6. Stanford University	310,429,000	5
7. Cornell University	309,535,000	6
8. Texas A&M University	288,005,000	8
9. University of Washington	274,423,000	>10
10. University of California, San Francisco	268,700,000	>10

Federal R&D Funds Each Institution

	Institution's federal R&D	Rank in fiscal 1990
1. Johns Hopkins University	$641,239,000*	1
2. Stanford University	242,340,000	2
3. Massachusetts Institute Technology	237,667,000	3
4. University of Washington	221,124,000	>10
5. University of Michigan	206,276,000	6
6. University of California, San Diego	200,451,000	>10
7. University of California, San Francisco	190,936,000	>10
8. University of Wisconsin, Madison	183,652,000	7
9. Cornell University	173,478,000	9
10. University of California, Los Angeles	167,885,000	10
11. University of Minnesota	*164,887,000*	*14*

Source: National Science Foundation; total funds include amounts for science and engineering, from federal and state governments, industry, the institution itself and other sources.

*Includes the Applied Physics Laboratory with $430 million in federal funds and $439 million total R&D funds.

**This total is higher than the University's figure of $241 million because the NSF includes types of spending that the University does not.

{Continued From Page 13}

But just because the NCC has, in Buzzard's words, "pretty good rapport" with food manufacturers, doesn't mean the manufacturers reveal their secret recipes to the NCC. They give the NCC little more than the list of ingredients and handful of nutrient values that they put on their labels. The

Just because the NCC has "pretty good rapport" with food manufacturers doesn't mean the manufacturers reveal their secret recipes.

NCC estimates from there, by imputing the missing values. "We juggle the proportions of the ingredients until we get what we think is the formulation," says Price, "because it matches that handful of known nutrient values." It's a laborious trial-and-error task that NCC nutritionist and programmer Brian Westrich is now trying to automate as a part of his doctoral dissertation.

The NCC's determination to impute missing values is one of the things that sets it apart. Dennis warns that other nutrient databases may record "zero" where they mean "unknown." In the NCC, however, "they don't tolerate zeros unless they're sure the nutrient is not in the food," says Dennis.

Along with complete brand-name records, Buzzard wants data that are comparable across time and space. That way, nutritionists and epidemiologists will be able to confidently compare 1993 data with 2003 data, in order to identify trends, for example. And they will be able to confidently compare Asian data with European data with African data.

Trends can be difficult to define accurately. In the late 1970s, a USDA survey showed that the average diet in the United States was about 40 percent fat. In the late '80s, another USDA survey showed 37 percent fat. "If you look at those figures you say 'Wow. We're headed in the right direction,'" says Buzzard. "However, in the '80s they used better, more specific nutrient values, and they started asking people what they had never asked before: 'Do you trim your meat?' That in itself might be enough to account for the 3 percent difference in fat intake."

The Minnesota NDS is designed to avoid that kind of error. Ten years from now, researchers will be able to come back to your steak, or quiche or tuna sandwich in order to fine-tune values or add values for other nutrients. "That is one of the biggest contributions that NCC has made to the scientific community," says Buzzard. "We have developed a time-related database-maintenance system. When we get new data for a food item, that new data can be used to reanalyze people's diets."

Regarding international data, the NCC wants to steer a middle course between too much detail and not enough. "We try not to clutter the system with a lot of regional foods," says Buzzard. "If regional foods are what people are eating, we figure out how to match them with entries we already have."

For example, Bowen reports that "One of our subjects was Chinese and had eaten tiger lily pods. So we called the NCC and said 'OK, what's the code we need for tiger lily pods?'" The NCC didn't give Bowen the nutrient content of lily pods in particular, but it did know which food in the database the pods are most similar to. That was the code number Bowen needed.

A graduate student at the NCC is now adapting the database for use in India, her native land, and nutritionists in Berlin are translating it into German. "We're trying to establish guidelines so that we can assist any other country in modifying the NDS to account for foods and preparation methods that are unique to that country," says Laurie McBane, who coordinates the international projects.

For epidemiology, international data means a larger sample population with greater variability. Suppose, for example, you want to study whether eating a lot of fish oil prevents heart disease. "You would hope that your population would have a wide range of intake of fish oil," says Buzzard. "If

What's the nutrient value of tiger lily pods?

everybody has low intake you're not going to answer your question. You want a broad distribution. That's where international studies come in; within one country the diets are often too homogenous."

"We're moving toward that kind of international nutrient database," Buzzard continues. "We've done some consulting for a seven-country study now going on in Europe; it has to do with cancer epidemiology. And we recently applied for a grant to develop a database for a 32-country study called 'Intermap.' It's coordinated by Northwestern University and the London School of Hygiene and Tropical Medicine; NCC would work with those 32 countries to develop systematic collection of food-intake data."

This is the final year in a long string of NHLBI grants and contracts that have supported the NCC. "It was decided to see if the group could launch a self-sustaining research program," says Ershow. The copyright to the NDS belongs to the University, and the NCC is learning to support itself by

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collecting fees from those who use the system. The NHANES contract, for example, has brought in about a million dollars. Other examples of NCC clients include the National Cancer Institute, the Johns Hopkins University, the U.S. Food and Drug Administration, and the Quaker Oats Company. Marketing nutritionist Sue Narayan is seeking a wider range of clients, so the NCC recently began to offer two versions of the database: the $8,000 edition, which gives nutrient values for the full 93 nutrients; and the $1,600 edition, with 32 nutrients. For teaching purposes, the NDS is available at a nominal cost.

The copyright to the NDS belongs to the University, and the NCC is learning to support itself by collecting fees from those who use the system.

Gary Beecher, Ph.D., is the chief of the USDA's Nutrient Composition Laboratory. He calls the USDA's nutrient database "rudimentary" and "not as up to date" as the NCC's. The NCC's database, on the other hand, is "really very good, no question about it." Beecher works with Buzzard to validate the NCC database—double-checking the numbers via laboratory analysis. Their chief question right now is how widely to sample foods. They need to buy a can of sweet corn, for example, in how many places in order to get a reliable sample?

Beecher assesses the NCC's funding position this way: "In the last five years Marilyn [Buzzard]'s database has found wider and wider acceptance in the nutrition community and the epidemiology community." But still "a lot of people don't understand this business of data quality. It's awfully difficult to be competitive if people don't really understand the importance of data quality."

By Phil Norcross

LaPidus

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scientists have always maintained some secrecy, particularly as a defense against plagiarism, said LaPidus. "But she makes the point that the economic incentives now at stake have upset the traditional equilibrium . . .[and] that the imposition of secrecy on scientific research for whatever reason—national security, strategic advantage, technological competition or proprietary interests—threatens both science and the public interest."

Do Research Rather Than Development

According to LaPidus, smaller universities and state universities felt most of the political pressure to contribute to economic development. However, "there was also, particularly in public universities, a real concern about promising more than could be delivered," he said, "particularly [to] the state legislatures, which had been convinced that by the allocation of a given amount of money things were going to happen in a relatively short time."

The imposition of secrecy on scientific research threatens both science and the public interest

LaPidus cited early assessments that confirm universities' hesitancy regarding economic development. He referred to a 1982 work in which Erich Bloch wrote that development work in universities was plagued by inflated expectations on both sides: universities expected enough money to solve all their problems; industry, often confused, spoke of research when it really meant development.

And in a 1984 letter to *Chemical Engineering News*, LaPidus himself wrote that "A new relationship between universities and industries with respect to research will be beneficial to both parties and consistent with the national interest as long as that relationship is motivated by development of research and not by the development of products."

Development work in universities was plagued by inflated expectations.

More recent assessments, according to LaPidus, have also shown that economic development is not the strength of universities. LaPidus quoted Irwin Feller, director of the Institute for Policy Research at Penn State University: "Absent sizable levels of sustained targeted funding and the establishment of faculty with dedicated missions toward techno-

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LaPidus

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logical innovation, in short, the replication for manu- facturing of the state agricultural experiment station-cooperative extension service, there is little evidence to suggest that universities can serve as other than episodic sources of commercially significant technological innovation."

Finally, LaPidus pointed out that U.S. universities continue to do world-class research that draws science and engineering students from all over the world, and that industries in other nations seem to succeed in transferring technology from U.S. universities, while U.S. industries do not. LaPidus suggested that the reason for the discrepancy lies within industry: "Many feel that foreign countries, particularly the Japanese, are willing to take a much broader and longer view of what they expect to get from universities in return for their investments."

Research Should be Tied to Teaching

While LaPidus recommended research over development work, he also recommended that research must be related to teaching. "There is a major concern, *a major national concern*," he said, "about the quality of teaching and learning in our universities. And this is usually related to the perception that the research activities of the faculty are interfering with the teaching programs of the university rather than augmenting them."

The Japanese take a much broader and longer view of what they expect from universities.

LaPidus spoke at length about increasing numbers of university research personnel who are neither teachers nor students. In the mid- '70s, he said, a new federal rule made the tuition of graduate assistants a direct, rather than indirect, cost of research; thus technicians and post-doctoral researchers became cheaper than graduate assistants. "That was to cause many faculty members to stop using graduate students on research grants," said LaPidus. That rule, contained in "OMB Circular A21," is now being discussed again, and LaPidus reported that universities are again saying that it causes "a decrease in the number of graduate students supported on research grants, and an increase in the number of post-docs and technicians."

As further evidence of the general concern about university teaching, LaPidus reported events in Virginia and at NSF: "Last week the higher education board in the state of Virginia made a number of recommendations about the public universities in that state which included, among other things, . . . de-emphasizing faculty research to make more time for faculty to be involved in undergraduate teaching.

"NSF," said LaPidus, "has recently published the results of a meeting of presidential young investigators, called 'America's Academic Future,' where these young scientists in academic institutions come down almost entirely on the side of the need to improve the educational aspects of the institution."

The education of students defines the genius of the American Research university.

Conclusion

LaPidus concluded his presentation with direct statement of his preference for research over development and for research wedded to teaching:

"My own answer to the question of how best to use universities, based on the events that I've described, is that research in universities has to be related to the development of people and ideas, and that the processes of research and scholarship, defining problems, developing ways to answer the pertinent questions and defending conclusions, when extended to the education of students, defines the genius of the American research university. I think in many ways we may have lost sight of that.

"I believe that the public supports universities as educational institutions, not as research or development laboratories," said LaPidus, "and that if universities try to act like industrial or commercial labs, they will not be competitive. They will lose that natural advantage that they have, and in addition they will further erode public confidence and trust.

"In order to regain that trust and support without losing the vitality of the academic research establishment," said LaPidus, "I think universities will have to demonstrate that the research and scholarly activities of the faculty are a direct and integral part of the teaching and education of students, and that the major products we produce in universities for industry, for the public at large, and for the national well-being are knowledge and people."

By Phil Norcross

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sible inhumane treatment of animals has led to even more review committees, more reporting requirements and rules for setting up and monitoring research facilities down to the size of cages for rabbits. The same is true for the use of hazardous and radioactive chemicals, and, most recently, for the management of indirect-cost funds."

The Cost of Regulation

Steneck measured the cost of regulating scientific conduct in terms of research projects lost. The federal government "may be spending as much as $10 million annually" on misconduct regulation, he said, and for universities the "estimates run upwards of $100,000 per investigation.

"In other words," Steneck summed up, "it is probably costing, *at a minimum*, the equivalent of 200 new research projects annually to implement the federal research integrity regulations. And I will leave it to your imaginations and best evidence to add to this figure the cost of complying with human- and animal-use regulations, hazardous chemical regulations, and the proposed conflict of interest regulations, and on, and on and on."

It is probably costing, at a minimum, the equivalent of 200 new research projects annually to implement the federal research integrity regulations.

Other, More Serious Problems

Despite their expense, the current regulations fail to protect the integrity of science, according to Steneck. "The more we learn about research integrity, or the lack thereof, the less certain it becomes that we have understood the real nature of the problem we are treating or [that we are] administering the right cure," he said. "There are many other more-troubling problems affecting the quality of research today that I believe ought to be addressed."

Steneck argued that deliberate misconduct is not a significant threat to science because it is rare and because it does not change the content of science. Major misconduct occurs once in every 10,000 to 100,000 cases, he said, and many cases—cases of plagiarism for example—have little or no effect on the content of science.

"It is therefore unlikely," said Steneck, "that the major episodes of misconduct that have played such a major role in shaping policy-making on both government and university levels have much to do with the actual health of the patient."

As more-serious threats to the integrity of science, Steneck cited the failure to correct errors and the inadequacy of peer review. "Scientific research is not nearly as self-correcting as is often claimed," he said. "Erroneous studies continue to be cited long after they have been retracted, even in major journals," and "journals are often reluctant to publish retractions."

Regarding the weaknesses of peer review, Steneck reported that "one random audit of citations discovered that nearly half had mistakes, and one in ten had serious errors. . . . Another study showed that nearly nine of every ten papers submitted to a major medical journal had significant statistical errors. . . . A third review of the efficiency of peer review found that review practices and operations were routinely missing a significant number of important errors. Finally, several studies have demonstrated that peer review is far from an objective process and introduces bias into science."

These individually small problems of correction and review, Steneck argued, are cumulatively a more serious problem than deliberate misconduct. First, they account "for more error and bias than the blatantly fraudulent actions of a few individuals." Second, they are passed on from teachers to students: "It is unlikely that future researchers will model their behavior on the actions of a few bad actors. They *will* model behavior on what they perceive to be the community norms. If these norms are in some ways flawed, which seems to be the case, then we may be training a generation of scientists whose integrity will be no better than their mentors', and perhaps a little worse if influences such as increased pressure to publish or increased competition for research grants continue."

Recommendations

"Again, the conclusion that can be drawn is that small but widespread compromises in integrity will in the long run probably have the greatest influence on science," said Steneck. "Given this assessment, how should our approach to research integrity be changed?

Universities must take much more responsibility for promoting integrity.

"Government could help by a) replacing the current *multi*-agency regulations with a single set of *inter*agency regulations; . . . b) clearly defining the government's interest in misconduct and then restricting government action to these interests; c) granting to universities and professional societies more responsibility for and autonomy over professional integrity, with accompanying understanding that the failure to act responsibility will be dealt with accordingly; and d) taking steps to recognize and compensate universi-

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Violence Research:

Pharmaceuticals and Oversight

Last November, the National Research Council (NRC) recommended the search for new pharmaceuticals that would reduce violent behavior without the debilitating side-effects of "chemical restraint."

At roughly the same time, a panel appointed by the Department of Health and Human Services (HHS) was reviewing allegations that HHS research targeted solely African-American boys in studies of pharmaceutical control of behavior. The panel reported finding no specific evidence to support the allegations, but expressed concern that deadlines and confidentiality prevented a detailed review. The panel also found no evidence that HHS research sought genetic correlations between race and violent behavior.

The NRC's report, "Understanding and Preventing Violence," came from its Committee on Law and Justice. The HHS report was published last January; its authors were appointed by then HSS secretary Louis Sullivan and chaired by Franklyn Jenifer, president of Howard University.

Both reports recommended the directions that research should take; the HHS panel specified certain kinds of oversight for the research:

The NRC said researchers should study the physiological processes that underlie violence and the developmental and psychosocial factors that lead to an individual's potential for violent behavior. Social and demographic studies of children in a variety of communities should seek to discover why some children exhibit aggressive behavior at an early age and why only a small portion of them go on to commit violent crimes as adults. Statistical investigations should expand and modify databases about violent events, so that emerging patterns and problems can be discovered more quickly.

The HHS panel said the U.S. Public Health Service (PHS) should encourage more interdisciplinary research that considers the roles of racism, poverty, role models, firearms, unemployment and white-collar crime. The National Institutes of Health (NIH) should study the influence of media, entertainment and popular culture on the incidence of violence.

Research into violence should be overseen by an HHS advisory committee representing the minority community, said the HHS panel. NIH should ensure adequate minority representation on review boards and study sections in order to resolve ethical, legal, political and social issues. HHS should explore ways to increase the participation of minority researchers, practitioners, organizations and community leaders.

Both reports recommended increased funding for violence research and intervention. The NRC pointed out that support for such work in fiscal 1989, $20.2 million, was well below that for research into other threats to life. The HHS panel recommended that up to $1 billion be authorized for interdepartmental work coordinated by HHS and its Centers for Disease Control.

Compiled from the *Washington Fax*

Steneck {Continued From Previous Page}

ties for the burden increased regulation has placed on research budgets—steps such as increasing, rather than decreasing, indirect cost reimbursements.

"Second, universities must take much more responsibility for promoting integrity, above and beyond the visible and heroic step of policing misconduct. Would you give your hard-earned tax dollars to individuals and organizations that seemingly have shown little interest in integrity? Universities must do more, and they would, I believe, be advised to do more on their own initiative, so that they can set the course for the future. If they do not, rest assured that the government will.

"Third and finally, to preserve the integrity of research, we must clearly distinguish between research as an academic or intellectual activity and research in its various economic, social and political contexts. If we do not, the intellectual aspects of research, which are presumably the most important to universities, will be put at risk. The risk is the overburdening of academic research with the problems and increasingly complex rules governing economic, social and political life. These rules are stifling academic freedom and independent thinking. They are also transferring the control of research outside academia and peer-reviewed circles. If this trend continues, there is, in my view, a real risk of having our patient bleed to death from the rules and policies that are designed to preserve its health."

By Phil Norcross

Environment

Many foundations and corporations are dedicated to improving and preserving the environment. Among them are:

Weyerhaeuser Company Foundation

The Weyerhaeuser Company Foundation funds environmental programs, especially with the forest products industry. The foundation prefers programs that resolve geographically oriented environmental problems; research and education that promote environmental protection and a stable economy; and innovative projects in land-resource management and public policy development.

There is no application deadline. Contact Mary Stewart Hall, President, Office of Corporate Contributions, Weyerhaeuser Company Foundation, Tacoma, WA 98477; 206/924-3159.

Public Welfare Foundation

The Public Welfare Foundation provides direct support and technical assistance to grassroots organizations that develop environmental clean-up and pollution prevention strategies and reduce health and safety threats to low-income and minority people.

The foundation is interested in local and regional projects that use regulatory, legislative and legal methods to improve the environment. The foundation prefers academic-based programs and national environmental organizations that provide technical assistance to grassroots groups, encourage efforts to stem global warming and implement pesticide protection programs for agricultural workers.

There is no application deadline. Contact Dana Alston, Program Officer, Public Welfare Foundation, 2600 Virginia Avenue NW, Suite 505, Washington, DC 20037-1977; 202/965-1800.

W. Alton Jones Foundation

The W. Alton Jones Foundation funds projects that protect the global environment through its Sustainable Society program. The program addresses the issues of climate protection; maintaining biological diversity; energy as it relates to climate change, air toxins and depletion of nonrenewable resources; and toxic contamination of human and natural systems.

Grants range of $5,000 to $500,000. Planned funding for 1993 is estimated at $7.8 million.

There is no application deadline. Contact J.P. Meyers, Director, W. Alton Jones Foundation, 232 East High Street, Charlottesville, VA 22901-5178; 804/295-2134.

National Science Foundation

Interactive Systems Program

The National Science Foundation is accepting proposals for the Interactive Systems Program. This program considers scientific and engineering research oriented toward the enhancement of human-computer communications and interactions in all modalities. These modalities include speech/language, sound, images and, in general, any single or multiple, sequential or concurrent, human-computer input, output, or action.

Research topics encompass, but are not limited to visualization and interactive computing (including scientific research on virtual environments, and manipulation with visualization), speech and language interfaces (including speech and language recognition, understanding, analysis, and synthesis), a variety of interactive communication modalities such as facial expression and physiological interfaces, gesture, stylus, sound and auditory, tactile, haptic, etc., and interfaces that adapt to the user such as intelligent adaptive and autonomous agents, intelligent information-handling interfaces, learning-, education-, and decision-environment intelligent interfaces.

This program recognizes and encourages the emergence of new approaches and the use of novel and realistic environments instrumented to capture human expression and signals in order to explore and validate hypotheses about the laws governing human-computer interactions and the principles of their use in various domain tasks. It encourages the discovery of computer models of perceptual/sensory an d cognitive human-computer interactions. Program scope includes visualization of and interaction with real or virtual, complex, high-dimensional numeric, symbolic, or pictorial knowledge in computer assisted environments, as well as measurement and evaluation of the performance of the models and of the methodologies used in human-computer interactive systems.

The objectives of the program also include upgrading the human resources and infrastructure of human-computer interaction education and research.

The proposal submission target date is **November 1** of each year, but proposals postmarked after that date will be reviewed, although they may miss a particular funding cycle. The announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through gopher. The agency contact is Dr. Oscar N. Garcia, Program Director, Division of Information, Robotics and Intelligent Systems, CISE, NSF, 1800 G Street NW, Room 310, Washington, DC 20550; 202/357-9554; fax 202/357-0320.

National Cancer Institute

Research in Public and Professional Education for the Prevention and Control of Skin Cancer

CA-93-15

The National Cancer Institute (NCI) and the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) invite applications for grants to conduct research on educational strategies for the prevention of melanoma and non-melanoma skin cancers through controlled studies in defined populations. These behavioral studies should be aimed toward reduction of high levels of exposure to natural or artificial ultraviolet light.

Skin cancer is the fastest rising and most common form of cancer in the United States, accounting for well over 600,000 new cases reported every year, or about one-third of all cancer incidence. Between 1973 and 1989, the incidence rate for melanoma increased by 80.6 percent, more than any other cancer site, and far greater than the 16.1 percent increase for all sites combined. The mortality rate during the same period for all races and both sexes was 32.1 percent for melanoma, compared to the 6.1 percent cancer mortality rate for all sites combined.

This RFA has two major research objectives related to skin-cancer prevention: 1) to study the effects of public education interventions aimed at increasing use of sunscreens and protective clothing, limiting exposure to solar radiation, avoiding artificial methods of tanning, teaching skin self-examination, and improving other behaviors related to skin cancer risk reduction; and 2) to study the effects of professional education interventions aimed at increasing caregivers' awareness of skin cancer, their ability to provide advice, and their knowledge on the importance of screening and early detection for the prevention and control of skin cancers.

Evaluations should be designed to test questions such as 1) what are the most effective educational conditions that lead to a quantifiable reduction in skin cancer risk behaviors in specific populations? and 2) what are the most effective educational conditions for increasing professional knowledge on primary prevention, screening, and early detection of skin cancer?

This RFA will use the R01 (research project grant) and R29 (FIRST award) mechanisms. The average direct costs for each award will be approximately $183,000 per year. It is anticipated that three NCI sponsored awards and one or two NIAMS sponsored awards will be made.

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An optional, nonbinding letter of intent is requested by March 15, 1993; the application deadline is **May 20, 1993**. For further information call D. Michael Anderson, Director, Skin Cancer Prevention Research, NCI, Executive Plaza North, Room 218, Bethesda, MD 20892, 301/496-8577; or Alan N. Moshell, Skin Disease Program Director, NIAMS, Westwood Building Room 405, Bethesda, MD 20892, 301/402-3342.

Charles A. Lindbergh Fund

The Charles A. Lindbergh Fund was established in 1977 as a non-profit organization to honor the memory of Charles A. Lindbergh. It is the Fund's intention to support the goals he envisioned: To seek a balance between technology and the environment, and ". . . to discern nature's essential wisdom and to combine it with our scientific knowledge . . .", before it is too late.

As a means to this end, each year the Lindbergh Fund provides grants of up to $10,580 (a symbolic amount representing the cost of the "Spirit of St. Louis" in 1927) to men and women whose individual initiative and work in a wide spectrum of disciplines furthers this balance.

Research categories include aviation/aerospace, agriculture, the arts and humanities, biomedical research, conservation of natural resources, exploration, health and population sciences, intercultural communication, oceanography, waste disposal management, water resource management, and wildlife preservation. In addition, a Jonathan Lindbergh Brown Grant may be given to a project in the above categories to support adaptive technology or biomedical research which seeks to redress imbalance between an individual and his or her human environment.

It is the policy of the board to give priority to research and educational projects which best address the issue of balance and are technically superior, regardless of category.

The application deadline is **June 15, 1993**. Further information and application materials may be obtained from Marlene K. White, Grants Coordinator, The Charles A. Lindbergh Fund, Inc., 708 South 3rd Street, Suite 110, Minneapolis, MN 55415; 612/338-1703; fax 612/338-6826.

U.S. Department of Energy

Human Genome Program

Program Notice 93-12

The U.S. Department of Energy, Office of Energy Research, is accepting proposals in support of the Human Genome Program.

This program is a coordinated, multidisciplinary, goal oriented, research effort aimed at developing creative, innovative resoures and technologies which will lead to a detailed understanding of the human genome at the molecular level. Several research goals are will be supported: 1) development and implementation of mapping resources, cross connecting distinct DNA clone libraries, mapping strategies and automated mapping instrumentation; 2) advanced DNA sequencing technologies, specifically, innovative instrumentation and automated systems that offer the potential for rapid, cost-effective, large-scale sequencing; and 3) software for use in chromosome mapping and DNA sequencing and data analysis. Such work may include information retrieval, user interfaces, including interfaces compatible with Genome Data Base (GDB), algorithms, software engineering and data management. Alro desired are improved computational resources for analyzing DNA sequences, including identification of homologies, regulatory sites and protein coding regions.

The application deadline is **July 15, 1993**. For further information contact the U.S. Department of Energy, Office of Energy Research, Environmental Research, ER-72 (GTN), Washington DC 20585, 301/903-6488.

Andy Warhol Foundation for the Visual Arts

The Andy Warhol Foundation for the Visual Arts will fund curatorial programs at museums, academies, universities and other organizations; education programs; and historic preservation and parks programs.

Curatorial projects may include exhibitions, catalogues, artist-in-residence programs and audience promotion. Historic preservation projects include preservation of historic buildings, parks and urban planning. Eligible organizations include nonprofit cultural organizations, local education associations focusing on the visual arts, and preservation organizations. The foundation gave approximately $3 million in 1991; grants range from $5,000 to $50,000.

Deadlines are **March 15** and **September 15** annually. Contact Emily Todd, Program Director, Andy Warhol Foundation for the Visual Arts, 22 East 33rd Street, New York, NY 10016; 212/683-6456.

American Nurses Foundation

1993 Nursing Research Grants Program

The purpose of the American Nurses Foundation (ANF) Nursing Research Grants Program is to encourage the research-career development of nurses through support of research conducted by beginning nurse researchers or experienced nurse researchers who are entering a new field of study.

A beginning nurse researcher is defined as someone who has had no more than three research-based publications in refereed journals and who has received, as principal investigator, no more than $3,000 in extramural funding in one particular research area. An experienced nurse researcher is one who has more than three research-based refereed journal publications and who has received more than $3,000 as principal investigator in extramural funding in one particular research area.

ANF will accept applications for master's theses or doctoral dissertations *only* if the project has been approved by the principal investigator's thesis or dissertation committee.

Principal investigators must be U.S. registered nurses with a minimum of a bachelor's degree. Approximately 25 grants of a maximum of $2,700 each are awarded annually. The majority of grants available do not have subject restrictions.

Special and restricted awards are:

Sigma Theta Tau International Award. This award is restricted to clinical nursing research. One award for a maximum of $6,000 is awarded; principal investigator must have a master's or Ph.D.

Allen and Hanburys Respiratory Institute Award. This award is restricted to asthma care and patient education research. One grant will be awarded for a maximum of $5,200.

Bristol-Myers Squibb Foundation Award. There is no research topic restriction. One grant for a maximum of $5,200 will be awarded.

The application deadline is **May 1, 1993.** However, since May 1, 1993, is on a Saturday, applications postmarked on or before the following Monday, May 3, 1993, will be accepted. For further information and grant applications, write or call the American Nurses Foundation, 600 Maryland Avenue SW, Suite 100W, Washington, DC 20024-2571; 202/554-4444, x135.

Faculty Research, Training and Service Awards

This section contains statistics on proposals and awards recently processed by ORTTA. In addition, we have randomly selected awards received by faculty during preceding months. Faculty who have received awards they would like mentioned in a future *Research Review* may send the pertinent data, as exemplified below, to Phil Norcross at ORTTA, 625-2354.

Proposal and Award Summary

	Number	Amount
Proposals Submitted January 1993	458	$ 67,307,269
Awards Processed January 1993	223	20,334,935
Proposals Submitted July 1992 - January 1993	2,291	346,762,231
Awards Processed July 1992 - January 1993	1,832	150,215,397
Proposals Submitted July 1991 - January 1992	2,364	377,659,521
Awards Processed July 1991 - January 1992	1,841	157,687,567

Ultra-High-Density Recording Heads
Jack H. Judy, Electrical Engineering
Jian-Gang Zhu, Electrical Engineering
John M. Sivertsen, Chemical Engineering and Materials Science
National Institute of Standards and Technologies
$642,513 - 08/92-07/97

Prostate, Lung, Colorectal and Ovarian Cancer Screening Trials
Jack S. Mandel, School of Public Health
NIH, NCI
$268,710 - 09/92-09/93

Assessment of Aerosol Exposure of Nickel Industry Workers
James H. Vincent, Environmental and Occupational Health
Nickel Producers Environmental Research Administration
$230,987 - 12/92-09/95

FY93 Vocational Assessment Program
Rene V. Dawis, Psychology
David J. Weiss, Psychology
St of MN, Department of Jobs and Training
$175,854 - 10/92-09/93

High-Temperature Superconducting Compounds
Allen M. Goldman, Physics and Astronomy
USDOD - Air Force
$150,000 - 12/92-11/93

Investigation of Asphalt Mixtures at MN/Road
David E. Newcomb, Civil and Mineral Engineering
Andres W. Drescher, Civil and Mineral Engineering
St of MN, Department of Transportation
$136,000 - 11/91-10/93

Cooperative Research on Kura Clover Germplasm
Nancy Jo Ehlke, Agronomy and Plant Genetics
Craig C. Sheaffer, Agronomy and Plant Genetics
Norfarm Seeds, Inc.
$125,000 - 07/92-07/97

Genetic Analysis of Flagellar Gene Expression
Paul A. Lefebvre, Genetics and Cell Biology
NIH, NIGMS
$120,142 - 12/92-11/93

Laboratory Studies of the Physics of Debris Entrainment, Transport, and Deposition at the Bed of a Temperate Glacier
Neal Iverson, Geology and Geophysics
NSF
$81,958 - 02/93-07/95

The Medical School Computational Biology Resource
David W. Hamilton, Cell Biology and Neuroanatomy
Minnesota Medical Foundation
$20,000 - 12/92-12/93

Safety and Efficacy of Rogaine Topical Solution vs. Placebo in Women with Androgenetic Alopecia
Maria K. Hordinsky, Dermatology
Upjohn Company
$75,585 - 05/92-10/93

Eastern Cooperative Oncology Group Operations Office
Brian Van Ness, Institute of Human Genetics
AMC Cancer Research Center/NIH Prime
$54,025 - 09/92-04/93

Arterial Vascular Compliance in Pre- and Post-Menopausal Women
Jay N. Cohn, Medicine
Wyeth-Ayerst Research
$29,440 - 10/92-09/93

Efficacy of Chronic Administration of Alpha Keto Acids
Karl A. Nath, Medicine
Thomas Hostetter, Medicine
Ross Laboratories
$15,000 - 12/92-12/93

Anti-Staphylococcal Activity of Streptogramin RP74501/74502
L.D. Sabath, Medicine
Rhone-Poulenc Ag Company
$30,360 - 07/92-12/93

Etiologic and Diagnostic Aspects of Venocclusive Disease
Deborah K. Freese, Pediatrics
Baxter Healthcare Corporation
$15,125 - 08/92-08/93

Selection of Hematopoietic Stem Cells by AIS Collectors
John Wagner, Pediatrics
Applied Immune Sciences, Inc.
$27,200 - 12/92-11/93

Institutional Application for Clinical Oncology Fellowships
Mark E. Nesbit, Jr., Pediatrics
American Cancer Society
$10,000 - 07/92-06/93

Microbiology Lab Support for Study Z0401G (Rhdnase in CF Patients with Acute Pulmonary Exacerbation)
Warren E. Regelmann, Pediatrics
Genentech, Inc
$20,517 - 09/92-07/93

Pilot Study of BMY-42215-1 in Refractory Renal Allograft Rejection
Arthur Matas, Surgery
John S. Najarian, Surgery
Bristol Myers Company
$11,250 - 08/92-01/93

Organ Transplantation in Animals and Man
John S. Najarian, Surgery
Arthur Matas, Surgery
NIH, NIDDK
$75,000 - 07/92-06/93

Monitoring Urinary & Serum Cytokines in Renal Transplantation
Nancy L. Reinsmoen, Surgery
Research and Development Laboratories
$38,800 - 10/92-10/93

Occupational Criteria Document for Nickel
James H. Vincent, Environmental and Occupational Health
Nickel Producers Environmental Research Administration
$21,000 - 01/93-06/94

Clinical Trial and Observational Study of the Women's Health Initiative
I. Marilyn Buzzard, Epidemiology
Fred Hutchinson Cancer Research Center
$43,044 - 09/92-09/93

Survey of Impact of Current Reimbursement Provisions
Ira S. Moscovice, Health Services Research and Policy
St of MN, Department of Health
$13,375 - 11/92-01/93

Survey of Access to Obstetrical Services in Rural Minnesota
Ira S. Moscovice, Health Services Research and Policy
St of MN, Department of Health
$31,897 - 11/92-01/93

Identification of the Intracellular Organism of Proliferative Enteritis
Connie J. Gebhart, Veterinary Pathobiology
National Pork Producers Council
$11,550 - 07/92-06/93

Structure and Mechanical Properties of Cheddar Cheese
Matthew V. Tirrell, Chemical Engineering and Materials Science
Kraft, Inc.
$50,281 - 01/93-12/93

Nonlinear Multivariable Control Methods for Chemical Processes
Prodromos Daoutidis, Chemical Engineering and Materials Science
American Chemical Society-Petroleum Research Fund
$20,000 - 01/93-08/95

Pfizer Research Awards for Synthetic Organic Chemistry
Scott Rychnovsky, Chemistry
Pfizer Pharmaceutical Company
$25,000 - 11/92-10/93

Intermetallic-Semiconductor Superlattices
Philip I Cohen, Electrical Engineering
USDOD, Air Force
$58,911 - 12/92-11/93

Rheological Controls on Fold Share and Strain Distribution
Peter J. Hudleston, Geology and Geophysics
NSF
$62,810 - 01/93-06/94

Global Change Fellowship Program: Experimental Studies of New Particle Formation in the Atmosphere
Peter H. McMurry, Mechanical Engineering
NASA
$22,000 - 09/92-08/93

Modelling of the Freezing and Thawings of Soils and Its Application
V.R. Voller, Civil and Mineral Engineering
Raymond L. Sterling, Underground Space Center
St of MN, Department of Transportation
$25,000 - 12/92-11/94

Estimation of Quantitative Genetic Parameters in Inbred Populations
Ruth G. Shaw, Ecology, Evolution and Behavior
Pioneer Hi-Bred International
$60,000 - 01/93-01/95

Political Eras and Representation
James A. Stimson, Political Science
NSF
$5,100 - 09/92-06/93

Access to Housing and Community Resources in a Chinese City
Yanjie Bian, Sociology
State University of New York/NSF Prime
$24,413 - 11/92-10/93

HABS/HAER Recording of Historic Site
Robert Mack, Architecture
Minnesota Historical Society
$3,000 - 10/92-06/93

Bicycle Planning Guide and Technology Transfer
Robert D. Sykes, Landscape Architecture
St of MN, Department of Administration
$14,500 - 11/92-09/93

Development of Decision Cases in Farming Systems Management
Steve R. Simmons, Agronomy and Plant Genetics
David W. Davis, Horticultural Science
USDA
$40,000 - 09/92-09/94

Development of Methods and Protocols for Production of Ixodes Scapularis Nymphs and Adults Infected with Borrelia Burgdorferi
Ulrike G. Munderloh, Entomology
Timothy J. Kurtti, Entomology
Solvay Animal Health, Inc.
$48,730 - 12/92-12/93

Developmental Work on New Millwork Fungicide Formulations
Elmer L. Schmidt, Forest Products
Buckman Laboratories, International
$18,020 - 10/92-10/93

Urban and Community Forestry Programs
Alan R. Ek, Forest Resources
Steven B. Laursen, Minnesota Extension Service
St of MN, Department of Natural Resources
$60,000 - 09/92-10/94

Pilot Test of Benefits-Based Management in Minnesota State Parks
Dorothy H. Anderson, Forest Resources
David Lime, Agricultural Experiment Station
St of MN, Department of Natural Resources
$30,000 - 07/92-06/94

Nutrient Intake During Lactation: Establishing the Link Between Nutrition and Reproduction
G.D. Dial, Clinical and Population Sciences
USDA
$15,000 - 07/92-06/93

Assessment Research Assistant
Frances Lawrenz, Curriculum and Instruction
Minnesota Environmental Science Foundation, Inc.
$11,721 - 12/92-09/93

Support for Senior Media Resources Producer Position
Sheldon Goldstein, Media Resources
Paul Schmitz, Media Resources, Duluth
Superior Radio Network
$27,100 - 12/92-09/93

Green Hardwood Rough Dimension
John Gephart, App'd Research and Tech Development Center, Duluth
Iron Range Resources Rehabilitation Board
$25,000 - 12/92-12/95

Red River Trade Corridor
Jerry Nagel, Chancellor's Office, Crookston
St of MN, Department of Trade and Economic Development
$80,000 - 09/92-12/93

MCSR: TCAS'92 Questions on Quality of Life and Aging
Rossana Armson, Center for Urban and Regional Affairs
Metropolitan Council of the Twin Cities
$13,440 - 10/92-02/93

Sponsored Programs Information Network (SPIN)

The Sponsored Programs Information Network (SPIN) is a computerized locator of funding opportunities (federal, nonfederal, and corporate) for faculty and institutional research, development, and education program support. It is available free of charge to University faculty and staff through ORTTA.

Based on a description of the research areas and/or the type of support sought, faculty and staff can search the Keyword Code Table and Award Type Table to identify codes for specific areas of interest. The Keyword Code Table, a taxonomy developed by SPIN to catalog funding sources, is divided into the following ten major classifications:

- **Agriculture/Food/Forestry**
- **Arts/Culture/Humanities/Communications**
- **Business/Economics/Management**
- **Education**
- **Health/Medical Sciences**
- **International Affairs/Area Studies**
- **Miscellaneous**
- **Science/Technology**
- **Social/Behavioral Sciences**
- **Social Welfare/Public Affairs**

The Award Type Table offers codes that will more specifically target the search results to the award type(s) sought. Some of the award types included in the Award Type Table are:

- **Conference**
- **Fellowship**
- **Projects Outside the U.S.**
- **Publication**
- **Seed Money/Start-Up Funds**
- **Student Support**
- **Training/Professional Development**

The result of a search is a set of profiles of applicable funding sources that provides (1) the sponsor's name; (2) the sponsor's contact address and phone number; (3) deadline dates; (4) program titles; (5) objectives or interest areas of the sponsor; and (6) restrictions that would affect the submission of a proposal. This set of profiles is sent to the requestor.

ORTTA's Gopher contains a section devoted to SPIN and offers you the opportunity to review the Keyword Code Table within the topics shown above to find keyword codes of interest. You then e-mail a note to the Gopher Editor (spin@ortta.umn.edu) requesting a SPIN search based on the chosen keyword codes (limit, 20 keywords). Be sure to provide your name, address and phone number on the message in case ORTTA staff need to contact you for clarification. If an e-mail address has been provided, the search results will be forwarded to that address if possible.

If the results of the search are not satisfactory, you may contact our office for further discussion and guidance in the selection of codes. For further information regarding the SPIN system, please contact ORTTA through e-mail (spin@ortta.umn.edu) or call 624-9004.

SPIN searches are also available through the Research and Development Office in the College of Liberal Arts and the Agricultural Experiment Station.

ORTTA TELEPHONE NUMBERS

A Quick Reference Guide

Office of Research and Technology Transfer Administration

Fax Number . . . . . (612) 624-4843

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DHHS, State of Minnesota	Todd Morrison	624-5066	todd@ortta.umn.edu
DHHS, American Cancer, American Heart, Voluntary Health	Kevin McKoskey	624-1521	kevin@ortta.umn.edu
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NSF (IT), USDA, EPA, DOE, MN Technology Inc, Business/Industry, Associations/Societies	Rick Dunn	626-2265	rdunn@ortta.umn.edu
NSF (non-IT), Misc Federal (SBA, USDA, DOJ, DOL, VA), ACS/PRF	Elizabeth Klitzke	626-7718	eklitzke@ortta.umn.edu
State of Minnesota, DOC, USDI	Amy Levine	626-7441	amy-l@ortta.umn.edu
Foundations (Local, Private, Corporate), Voluntary Health, MN Med, DHHS	Judy Krzyzek	624-2546	krzyzek@ortta.umn.edu
Business/Industry, Foreign Industry, NASA	Judy Volinkaty	624-3317	judy-v@ortta.umn.edu
DHHS, Cities/Counties, Colleges/Universities, St of MN	Susan Stensland	625-3515	stensland@ortta.umn.edu
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- **Changes and deletions should be handled by departmental staff by use of a Staff Directory Card.** (*Additions are automatic* for Assistant Professors or above, Deans, Directors and Department Heads—you don't need to ask to be *put on* the list).
- ORTTA neither generates nor controls this information.

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UNIVERSITY OF MINNESOTA

RESEARCH REVIEW

Research and Technology Transfer Administration

April 1993

What is a Writing-Intensive Course?

The inventor Thomas A. Edison left behind three and a half million pages of manuscript. Just ten percent of his writing will fill 300 reels of microfilm. "That means he wrote 200 pages every day for almost 50 years," says Art Young, a professor of both English and engineering at Clemson University. "The spelling's awful. The punctuation's awful. But he knew what he was doing. He was thinking with it. He wasn't saving it for anyone except maybe lab partners, trusted others who didn't care about his spelling, who just wanted to solve problems."

Young holds up the work of Thomas Edison, misspellings and all, as a model for how university students should learn engineering, botany, linguistics and most every other discipline. The students do far too little such writing, he says—rough, unpolished writing to invent and to explain things to themselves, "writing to learn" in the argot of the composition field. And that's why they are so notoriously poor at producing lucid, correct and readable reports and essays, or "writing to communicate."

New Blandin Foundation Technology Development Program — See page 20

Edison, on the other hand, received 1,093 U.S. patents in his lifetime, which required a lot of precise and polished writing to communicate. In one particular year, 1882, he averaged a patent application every 3.4 days. "He had lawyers and others working with him. But even so, to those of us who write grant proposals and patent applications, one every 3.4 days is quite amazing. How could he do it?" Young asks. Then he answers, "Edison already had 200 pages a day of stuff systematically worked out in his notebooks.

"Edison was not alienated from written language," Young concludes. "Our students are. Our system of rewards is set up so that they don't start writing until the night before." So to learn both writing and engineering, Young would have students write less formally and more often.

Young was in Minneapolis and describing Edison's work because of the University's Center for Interdisciplinary Studies of Writing (CISW) and because of a cadre of University faculty—ranging from soil scientists and mechanical

{Continued On Page 14}

Lillian Bridwell-Bowles, associate professor of English, directs the Center for Interdisciplinary Studies of Writing.

Inside

National Institutes of Health

Change in Fellowship Receipt Dates

— Reminder —

Effective April 1, 1993, there was a change in receipt dates for applications to the Public Health Service for individual National Research Service Awards (NRSAs—fellowships, the F-series awards).

This change was made subsequent to the merger of the former Alcohol, Drug Abuse and Mental Health Administration (ADAMHA) research institutes with NIH.

The new receipt dates will apply to all individual fellowship applications (F-series) to NIH institutes and centers as well as to the Agency for Health Care Policy and Research.

The new receipt dates will be:

- April 5 (instead of May 10)
- August 5 (instead of September 10)
- December 5 (instead of January 10)

Implementation of the new receipt date schedule will begin with the **April 5, 1993**, deadline. Institutional Training Grant (T32) applications are not affected. Their receipt dates remain January 10, May 10 and September 10.

NOTE: The most recent application form PHS 416-1 (rev 10/91) *must* be used. Applications using older forms *will be returned without review*.

RESEARCH REVIEW

Volume XXII/Number 10

April 1993

Director of Communications: Michael P. Moore

Editor: Phil Norcross

Editorial Assistant: Tove Jespersen

Associate Vice President: A. R. Potami

***Research Review* is a monthly publication of the Office of Research and Technology Transfer Administration. Its purpose is to inform faculty and administrators who are involved with sponsored research and technology transfer on procedures and policies of granting agencies, on institutional policy and other information necessary to the preparation of research proposals, and on funding opportunities.**

***Research Review* welcomes ideas and comments from all readers. Write to *Research Review* at 1100 Washington Avenue South, Suite 201, Minneapolis, MN 55415-1226, or call Phil Norcross at 625-2354 or Michael P. Moore at 624-9398.**

Indirect Cost & Fringe Benefit Rates

Indirect Cost Rates

The *provisional* rates for July 1, 1992, through June 30, 1994, are listed below. When budgeting for periods beyond 6/30/94, the 7/1/92-6/30/94 rates should be used. **The rate agreement is dated May 13, 1992**. This date should be used where required on proposal applications. In rare cases, particular grant programs have maximum rates that are lower than the rates below. **Please call Marilyn Surbey, 624-4850, or Richard Miller, 626-9895, with questions on indirect costs**.

	07/01/92 06/30/94
Research	
On-Campus	40.00
Off-Campus *	21.00
SAFHL	58.05
Hormel	44.00
Other Sponsored Activity	
On-Campus	20.00
Off-Campus *	10.00
Instruction	
On-Campus	52.00
Off-Campus *	16.00

* A project will be considered off-campus if more than 50% of the direct salaries and wages of personnel employed on the project are incurred at a site neither owned nor leased by the University.

Fringe Benefit Rates

If you have questions regarding fringe benefit rate development or need the breakdown of charges, call **Vivian Fickling at 624-2009**.

Due to a change in policy, new rates must now be approved by DHHS before they can be implemented. Even though the university has released new rates for FY93, they have not been approved by DHHS and the rates below must continue to be used when preparing proposals.

For proposals being submitted with start dates **after July 1, 1992**, the estimated fringe benefit rates to be budgeted are:

Faculty	31.25
Civil Service	29.50
Graduate Assistants	10.50

Estimated rates after **July 1, 1993,** are:

Faculty	28.00
Civil Service	30.50
Graduate Assistants	31.25

Rate changes will be reflected in this section.

University of Minnesota

1993-95 McKnight-Land Grant Professors

Amy E. Alving
Aerospace Engineering and Mechanics
B.S.E., Stanford University
Ph.D., Princeton University

Professor Alving is an experimentalist in fluid mechanics and turbulence, with particular interest in boundary-layer flows, a general class of problems which occur near solid surfaces. Her primary interest in turbulent boundary layers is in detecting and characterizing the underlying quasi-deterministic motions believed to be responsible for the self-maintenance of turbulence. Currently, the exact nature and behavior of these organized motions is unclear. A new research area examines the interaction between air flow and a thin liquid film on a solid surface.

Gary J. Balas
Aerospace Engineering and Mechanics
B.S., University of California, Irvine
Ph.D., California Institute of Technology

Professor Balas' area of research is feedback control theory and its application to control system design, using mathematical models. Due to our inability to mathematically model any physical phenomenon precisely, design models are not exact, making it necessary to design control systems whose performance is insensitive, or robust, to errors in the mathematical model used for design. Recently, a detailed mathematical theory for optimal design of robust control systems has been formulated, and Dr. Balas is contributing significantly to its implementation. Potential uses range from spacecraft to "smart" household appliances.

Andrew Elfenbein
English
B.A. and Ph.D., Yale University

According to traditional scholarship, the origins of British Romanticism were in the aesthetic, political and philosophical rebellions of the poets Blake, Wordsworth and Coleridge against earlier 18th-century literature and philosophy. Professor Elfenbein's new book on the social and economic origins of Romantic poetry will describe how these poets reacted to changes in the British book trade during the 1790s, particular its increasing conservatism in response to the French Revolution, to underscore how the Romantic movement was connected to social and economic developments in Britain.

Greg B. Fields
Laboratory Medicine and Pathology
B.S., University of Florida
Ph.D., Florida State University

Professor Fields is developing pioneering studies on the synthesis of new types of polypeptides that have desirable physical, chemical or biological attributes. In initial experimental work here, he has developed a unique solid-phase method for the synthesis of triple-helical collagen models, resulting in a synthetic peptide with 124 amino acids. This collagen has been applied to better define the mechanisms of tumor cell metastasis and could have important clinical implications.

Lorraine Falter Francis
Chemical Engineering and Materials Science
B.S., Alfred University
Ph.D., University of Illinois

Ceramic materials are used in a wide variety of demanding applications ranging from sensors that monitor the level of dangerous combustion gases to biomaterials that replace natural tissues. The effort to understand and improve the properties and performance of advanced ceramics is multifaceted. In her research program, Professor Francis focuses on processing and design as the critical stages in development of new ceramic materials and strives to understand the relationships between processing, structure and properties.

Alan Kilpatrick,
American Studies
B.A., Northeastern State University
Ph.D., University of California, Los Angeles

Professor Kilpatrick's research will challenge the conventional wisdom about Native American folk medicine, witchcraft and spirituality by introducing into the literature a new body of shamanistic thought, thus correcting a distorted and second-hand knowledge of Native peoples. He will translate and analyze an extraordinary collection of 19th-century notebooks by Cherokee medicine men, which are housed at the Bienecke Library at Yale University, and will use these native writings as the basis for a theoretical reconstruction of Cherokee shamanistic healing practices. Professor Kilpatrick is one of a small number of scholars in the field who is fluent in the Cherokee language and understands the subtleties of the highly ritualistic language in which these medico-magical texts are written.

Karin Musier-Forsyth
Chemistry
B.S., Eckerd College
Ph.D., Cornell University

The focus of Professor Musier-Forsyth's research is the investigation of protein-RNA recognition in biological systems. The specific and accurate attachment of amino acids onto transfer RNA molecules occurs in all living cells and is a critical step in protein biosynthesis. One project is aimed at understanding the structure, function

{Continued On Next Page}

McKnight

{Continued From Previous Page}

and evolution of these important enzymes and their tRNA substrates. A second project involves studying the interactions between HIV reverse transcriptase and its RNA primer.

Lisa A. Norling
History
B.A., Cornell University
Ph.D., Rutgers University

Based on a woman's account book and other local records, Professor Norling's research will recover a hidden female economy that co-existed with, but was not subsumed by, men's activities on late 18th century Nantucket. The case study that reconstructs the life, family and community context of the account book's keeper will allow the kind of community study that addresses a series of theoretical problems central to understanding the transition to industrialism and the nature of gendered identities in a broadly comparative context.

Jeffrey A. Simon
Biochemistry (CBS)
B.A. and Ph.D., Cornell University

A major goal in current biological research is to describe the molecular events that enable cells to choose specific developmental pathways. Professor Simon's work investigates the *abdominal-A* protein, which controls the development of the abdomen in fruit flies. Misexpression of the protein causes developmental defects. It has become clear that mice and humans have genes that are similar to the fly *abdominal-A* gene. Recent experiments suggest that these mammalian genes, like their fly counterparts, control the formation of specific body regions during embryogenesis.

Jian-Gang Zhu
Electrical Engineering
B.S., Huazhong University of Science & Technology
Ph.D., University of California, San Diego

The field of magnetic storage technology is progressing at an exceedingly rapid pace. Imagine a disk drive smaller (but slightly thicker) than your credit card with a storage capacity of 5 *giga bytes*. Professor Zhu's research focuses on the key magnetic aspects in developing future high-capacity magnetic data storage systems. New magnetic thin-film media and new designs of recording heads capable of storing data at densities of two orders of magnitude higher than in current hard-disk drives are being developed.

Research and Technology Transfer

New Position in Grants and Contracts

This winter, a new position was created in ORTTA's Division of Grants and Contracts, that of Grants and Contracts Administrative Assistant. The position was created to provide help to senior staff in the areas of grant proposal review, notice-of-award write-up and data-entry, document review and other miscellaneous tasks.

Four openings were created within this position, subsequently filled by Lorrie Awoyinka, Sue Conard and Linda Lorenz, formerly from ORTTA Financial Accounting, and Virginia Olson, formerly with Civil and Mineral Engineering.

The resulting chain of command in Grants and Contracts is as follows:

Mary Lou Weiss, Assistant Director
Judy Krzyzek, Senior Grant Administrator
Kevin McKoskey, Senior Grant Administrator
Lorrie Awoyinka, Grants Assistant
Sue Conard, Grants Assistant
Nancy Benson, Secretary

Todd Morrison, Assistant Director
Amy Levine, Senior Grant Administrator
Susan Stensland, Senior Grant Administrator
Virginia Olson, Grants Assistant
Gayle Pardun, Secretary

Rick Dunn, Assistant Director
Judy Volinkaty, Senior Grant Administrator
Dave Lynch, Senior Grant Administrator
Elizabeth Klitzke, Senior Grant Administrator
Eyvette Flynn, Senior Grant Administrator
Linda Lorenz, Grants Assistant
Dorothy Hogenson, Coreen Rohrberg, Secretaries

University of Minnesota

Levels and Trends in Sponsored Programs — Fiscal Year 1992

Levels and Trends in Sponsored Programs, ORTTA's annual report of funding received by the University for research, training and public service projects, will be available this month. Copies will be mailed to deans and department heads. Other copies will be mailed upon request—please phone Mary Bendtsen, 624-0583.

Redistribution of Agency Assignment

The "Other Federal" area of ORTTA Grants and Contracts, administered by Rick Dunn, has established a more equitable assignment of agencies and accounts for the grant administrators in that group.

Please note that some agency responsibilities continue to be split between two or more people (although the people involved may have changed), while other agencies have been assigned in total to a single individual.

The agency assignments listed below are the *only* agencies for which *at least some responsibilities are being changed* at this time. You can assume that any agency currently assigned that does *not* appear on the list below will remain the responsibility of the grant administrator currently assigned.

Please also note that responsibility for subcontracts under a specific agency prime will also be transferred if the prime agency is being transferred.

Split Agencies

National Science Foundation (NSF)

Rick Dunn

518	Chemical Engineering
519	Chemistry
525	Geometry Center
526	Center for Interfacial Engineering
528	Inst for Mathematics & its Applications
529	Mathematics

Linda Lorenz

436-445	College of Biological Sciences (all areas)
511-541	Institute of Technology (all areas except 518, 519, 525, 526, 528, 529)

Elizabeth Klitzke

All other areas

U.S. Department of Agriculture (USDA)

Rick Dunn

376-393	Agricultural Experiment Stations

Eyvette Flynn

348-351	HHH Institute
404	Forest Products
405	Forest Resources
408	Agricultural Engineering
409	Agronomy and Plant Genetics
411	Entomology
413	Horticultural Science
414	Plant Pathology
416	Soil Science
418	International Agriculture Programs
445	Plant Biology

Elizabeth Klitzke

All other areas

Department of Defense (DoD) (Army, Navy, Air Force, etc.)

Dave Lynch

511-541 All Institute of Technology areas

Eyvette Flynn

All other areas

Agencies Being Transferred In Total

American Chemical Society
From Rick Dunn to ***Linda Lorenz***

Corporation for Public Broadcasting (CPB)
From Eyvette Flynn to ***Elizabeth Klitzke***

National Public Radio (NPR)
From Eyvette Flynn to ***Elizabeth Klitzke***

Food Companies (Quaker Oats, Nabisco, etc.)
From Rick Dunn to ***Elizabeth Klitzke***

Minnesota Mining and Manufacturing (3M)
From Judy Volinkaty to ***Dave Lynch***

Sport Fishing Institute
From Eyvette Flynn to ***Dave Lynch***

Veterans Administration
From Rick Dunn to ***Elizabeth Klitzke***

Please contact Rick Dunn at 626-2265 if you have any questions about these reassignments.

Lab Fest '93, April 14

University Stores and Lab Services (formerly LPIS) will hold its Scientific Product Show, or "Lab Fest," at the Radisson Hotel Metrodome on Wednesday, April 14, from 10:00 to 4:30.

Participants include more than 50 scientific vendors and University departments that provide laboratory support. Beckman, Gentra, Gibco/BRL, and Scientific Instrument Services will present technical seminars.

There will be food and door prizes. A grand prize of $1,000 in lab supplies will be donated by vendors.

For more information, call Lab Services at 626-8024.

PHS Position Statement on Use of Animals in Research

Introduction

In 1990, the Assistant Secretary for Health established the Public Health Service (PHS) Coordinating Committee on Animal Research to deal more effectively with the threat to biomedical and behavioral research and testing posed by the animal activist movement. The following two statements, released by the Committee in December, 1992, represent the PHS position on these important issues:

Public Health and the Role of Animal Testing

This statement has been prepared to inform the general public about the need for animal testing to ensure that medications, vaccines, environmental chemicals and a wide variety of consumer products, including cosmetics, are safe for the public when used appropriately. The Public Health Service (PHS) is concerned that animal activist organizations are trying to convince the public incorrectly that product testing in animals is outdated and no longer necessary.

Consumers may be further confused by announcements that some companies have stopped testing their products in laboratory animals. For example, two ways in which a company can make such a claim are by using only ingredients that historically are known to be safe or that have been previously tested in animals and found to be non-toxic. When new ingredients need to meet testing and safety requirements, it is often necessary to test them in one or more animal species.

To protect the public from unexpected or unintended effects of toxic substances, some PHS agencies conduct and support toxicological testing to determine the harmful effects of commonly used products. To judge whether a product may be unhealthy, or even deadly, for humans and animals, scientists called toxicologists must know how the substance is absorbed, distributed, used, stored and released by the body. For some products, it may be necessary to identify long-term, cumulative health effects, such as the potential to cause cancer, promote birth defects, affect reproduction, or harm the nervous system. Without laboratory animals, scientists would lose a fundamental method for obtaining the data needed to make wise decisions about potential health risks.

The PHS agencies support many initiatives to develop and validate systems to reduce dependency on animal testing. Scientists have become skilled in culturing a wide variety of tissue and organ cells outside the living body (*in vitro*) and in writing computer programs that simulate human and animal systems.

{Continued On Page 8}

USDA Lab-Animal Rules Struck Down

The U.S. Department of Agriculture regulations governing treatment of laboratory animals were struck down in federal court February 25. The USDA has been directed to promulgate new regulations, subject to public notice and comment, without unnecessary delay, and had until at least late March to decide whether to appeal the decision.

"If the ruling is not appealed," says the University's Cynthia Gillett, "then stricter regulations will be put into effect, increasing the cost of research with animals." Gillett is an associate clinical specialist at Research Animal Resources.

The suit was filed in May 1991, by the Animal Legal Defense Fund, the Society for Animal Protective Legislation, and others, against the USDA, the Department of Health and Human Services, and the Office of Management and Budget.

U.S. District Judge Charles Richey's opinion does not specify sections of the Animal Welfare Standards to be revised, but it discusses only treatment of dogs and primates.

Richey said the regulations do not provide the minimum standards intended by Congress in the Animal Welfare Act and unlawfully delay compliance in some cases. They are also arbitrary and capricious because they are inconsistent with previous USDA findings regarding cage sizes and exercise requirements, he said.

Richey decided against the animal welfare activists on one point, however. The records that research facilities keep under compliance with the Animal Welfare Act are *not federal* records and so are *not governed* by the Freedom of Information Act.

The case is described in detail in *The Chronicle of Higher Education*, March 10, A30; and in *Science*, March 5, 1389.

BA-22 Needs Faculty Signature

If the principal investigator listed on an Animal Usage Form (BA-22) is not a member of the University of Minnesota faculty, the secondary investigator must be a faculty member and must also sign the BA-22. This is new policy recently made by the University Animal Care Committee.

Committee on the Use of Human Subjects in Research

Audit of Research Records and Required Notification of the Committee

University of Minnesota researchers are experiencing an increase in audit requests. To ensure our quick and appropriate response, the Committee on the Use of Human Subjects in Research requests immediate notification of any audit request which involves a study under our review.

A funding agency such as the National Institutes of Health, or a private sponsor (drug company), or a regulatory body such as the Food and Drug Administration (FDA) or Office for Protection from Research Risks (OPRR) has the right to review and audit research records. These audit rights are not restricted to funded research and are not limited to "for cause" actions.

The Committee on the Use of Human Subjects in Research should be informed, in writing, when an investigator is contacted for an audit of research records. The Committee does *not* need to be contacted if the audit consists solely of financial records review.

The Committee should be informed when an audit involves review of human subjects records since we are often called to comment on concerns or discrepancies noted in the researcher's records. It is not unusual for the Institutional Review Board (IRB) to be included in an audit meeting or exit interview. Pre-award site-visit teams also may request involvement of the IRB under some circumstances and we should be notified of these meetings also.

Any written reports pertaining to the conduct of the research provided by auditors should be copied to the Committee on the Use of Human Subjects in Research office for inclusion in the researcher's files. This material is often relevant to future studies or ongoing research projects. Of course, if there is any deficiency in documentation or procedures noted by an auditor, the Committee would choose to take immediate action to review policies or procedures to ensure full compliance with the regulations.

If you have any questions, please call Moira Keane at (612) 624-1889.

Gibbons Defends Basic Research, Industrial Collaboration

In testimony to the House Committee on Science, Space and Technology, John Gibbons said the new administration will support basic science, encourage university-industry collaborations for research, and improve technical education. Gibbons testified in the first week of March, the week following publication of President Clinton's science and technology policy.

"Our budget proposal ensures that support for basic science remains strong and that stable funding is provided for projects that require continuity," said Gibbons. "We will not allow short-term fluctuations in funding levels to destroy critical research teams that have taken years to assemble." But stable support for high-priority programs will require "improved management" and "canceling less- important projects," he said.

Gibbons acknowledged the role that basic research plays in university teaching. Because research universities also teach, he said, U.S. science and technology depends, over the long term, on adequate funding for NIH and NSF research programs.

To encourage commercial investment in research, the Clinton administration proposes to make permanent the Research and Experimentation Tax Credit. The credit would apply to expenditures by businesses for basic research in universities. "Our economic goals demand private sector investment in research," said Gibbons.

New policies would also encourage commercial industry's role in education. Gibbons said the administration's plan would encourage industry consortia and regional alliances to develop new teaching systems and provide matching funds for graduate or undergraduate programs in manufacturing engineering.

"We intend to use new technology to . . . turn schools into high-performance workplaces," he said. "Our programs will ensure that all students are well-trained in math, science and engineering, particularly students in minority communities. We will exploit our investment in defense education and training for applications in the civilian economy."

Gibbons is President Clinton's science advisor, director of the U.S. Office of Science and Technology Policy (OSTP), and a member of Clinton's National Economic Council.

Copies of the 36-page federal policy document, *Technology for America's Economic Growth, A New Direction to Build Economic Strength,* are available by calling the OSTP at 202-395-5101.

From *Washington Fax*

Position Statement

{Continued From Page 6}

Human and animal cell cultures are being used increasingly to screen toxic substances before progression to whole-animal testing. When *in vitro* studies show that a substance is toxic, testing it in animals may not be necessary. Computer models are also being used to help predict the properties of substances and their probable actions in living systems. Although computers can store and analyze enormous amounts of data, some information must come from experimental animals. These non-animal research tools have reduced our dependence on animals, but they cannot completely replace experimental animals for the foreseeable future.

Toxicologists have the responsibility to treat laboratory animals with great care and compassion. Today, all projects involving animal testing supported by funds from PHS must comply with the regulations of the Animal Welfare Act, as amended, and the Health Research Extension Act. These laws were enacted to protect research animals. An institution that uses laboratory animals for any purpose must operate a sound animal care program. PHS fosters quality control in animal care and has a high regard for the welfare of laboratory animals.

The American people want assurance that the products they use in recovery from illness and in daily living are safe; the U.S. Congress has enacted laws that require the safety of products; and the scientific community endeavors to promote the public health through animal testing. Dr. James O. Mason, Assistant Secretary for Health, has put it this way: "Whole animals are essential in research and testing because they best reflect the dynamic interactions between the various cells, tissues and organs comprising the human body."

The number of products used by society has increased greatly since animal testing began, but adverse health effects are relatively uncommon. This is, in itself, compelling evidence for the predictive value of animal testing of products for human use.

Protecting Laboratory Animals

As a result of a recent lawsuit brought by two animal protectionist organizations, a Federal court ordered the U.S. Department of Agriculture (USDA) to reconsider its exclusion of rats, mice and birds from coverage under the Animal Welfare Act. In the judge's opinion, "the USDA's decision not to regulate these species sent a message that researchers may subject these animals to cruel and inhumane conditions."

People who are familiar with the extensive system of U.S. laws, regulations, guidelines and principles that protect the welfare of laboratory animals would not necessarily agree with the judge's comment. The Public Health Service

{Continued On Page 12}

Document Review Matrix

The form at right explains what documents require review by ORTTA. It reflects two major changes.

The first change is explained in the article below. The second change is that ORTTA *no longer requires* all documents to be routed through this office. The option to do so remains, but it is *not* required.

If you have questions, please call Todd Morrison at 624-5066 or Marilyn Surbey at 624-4850.

Research and Technology Transfer

ORTTA Changes Requirements for Travel Authorization

Beginning May 1, 1993, ORTTA will no longer require the completion of the Travel Authorization (TA), form BA 1302, for out-of-state travel. The completion of the TA will be optional. Colleges will have the discretion of maintaining this requirement for their departments, however, ORTTA will not monitor for compliance to college requirements. It should be noted that travel *will not* be encumbered if a travel authorization is not completed.

If a TA is not completed, the department is responsible for designating the Travel Voucher, form BA 1303, as a TPA since ORTTA reviews only TPAs, not TPs. Undesignated documents will be returned to the department. The TPA must clearly indicate the benefit of the travel to the account charged and must itemize the total cost of the trip (even if reimbursement is not requested on the TPA). The use of the DTEX form is encouraged.

For many sponsored projects, travel is a restricted category of cost. Consequently, this change places the responsibility on the department for obtaining any necessary prior approvals required by NIH's Institutional Prior Approval System (IPAS), NSF's Organizational Prior Approval System (OPAS), other federal agency expanded authorities, or from the sponsoring agency. Requests for prior approvals to sponsoring agencies should be initiated by the principal investigator/department, but must be sent to ORTTA for institutional endorsement. ORTTA will transmit the request to the agency. "Prior" means that approval must be obtained before the travel occurs—approval after the travel but before the processing of expenditure documents is *not acceptable*. ORTTA *cannot* approve prior approval requests after the start of the trip, and the department will be required to charge the unallowable trip to a nonsponsored account. **Consequently, please *do not* transmit after-the-fact prior approval requests.**

Questions concerning this change and the new procedures should be addressed to the appropriate grant administrator.

SPONSORED-ACCOUNT DOCUMENT REVIEW/ROUTING MATRIX

This matrix identifies those accounting documents requiring ORTTA review. Documents which do *not* require ORTTA review may be sent directly to Disbursement Services. Departments have the option of sending *all* documents to ORTTA — ORTTA will sort and send those not requiring prior review directly to Disbursement Services.

When forwarding documents to ORTTA, use the following campus mail address:

ORTTA - Documents
1100 Washington Avenue

Do not include other materials in the same envelope with documents or delays may occur. If your document requires special consideration, contact the appropriate grant administrator before mailing.

Budget Documents	Review by ORTTA
EB	**ORTTA Use Only ***
ET	**All**
RB	**ORTTA Use Only**

* ORTTA will establish objects on sponsored accounts upon a written request to the appropriate grant administrator. Send via campus mail, fax or e-mail and indicate object(s) desired, amount(s) to set-up and which object(s) to be debited.

Expenditure Documents	Review by ORTTA
CR	**None**
IV	**> $500 Each Line Item**
IX	**> $500 Each Line Item**
JV	**> $500 Each Line Item**
POT	**> $500**
PV(P) +	**None**
PVA	**> $500**
VI	**None**
RX	**> $500**
RX Supplement	**All**
TPA	**All Out-of-State / > $500 In-State**
TA (Optional)	**All**
TP + (Required with TA's)	**None**

+ If Department does not check "encumbered" on the green label, the documents will be treated as a PVA or TPA.

ORTTA Gopher

MAIN MENU

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ORTTA Contacts
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- Comprehensive Alphabetical Staff List
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- Effort Certification
- Policy on Principal Investigator Eligibility
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- Use of Human Subjects in Research Policy
- Secrecy in Research Policy
- Patent and Technology Transfer Policy
- Outside Consulting Policy
- Guidelines on Interactions With Industry
- Guidelines for Research Investigators and Creative Artists
- Disclosure of Conflict of Interest
- Academic Misconduct Policies and Procedures

Rate Schedules
- Research Patient Care Rates and/or Amounts
- Research Animal Resources Per Diem Rates
- Indirect Cost Rates
- Fringe Benefit Rates
- Academic Floors, Fixed Ranges and Fixed Rates

Forms and Templates
- Standard Industrial Research Agreement
- NSF Proposal "Smart Forms"

Funding Opportunities

Sponsoring Agency Deadlines (compiled by ORTTA)
- General Deadline Information
- NIH - National Institutes of Health
- DHHS - Department of Health and Human
- SAMHSA - Substance Abuse & Mental Health Services Administration
- NSF - National Science Foundation
- ED - U.S. Department of Education
- FEDL - Other Federal Agencies
- NONFEDL - Nonfederal Agencies

Requests for Proposals (from SPIN)
- Agriculture/Food/Forestry
- Art/Culture/Humanities/Communications
- Business/Economics/Management
- Defense Technology
- Education-All Disciplines
- Energy
- Environment
- Government/Public Affairs
- Health/Medical Sciences
- International Affairs/Area Studies
- Science/Technology
- Social/Behavioral Sciences
- Social Welfare/Public Affairs
- Transportation

Sponsored Program Information Network (SPIN)
- Award Type Codes
- About Sponsored Program Information Network (SPIN)
- SPIN Keyword Code Tables

Research Publications
- NIH Guide
- NSF Bulletin

Other Useful Resources
- STIS Connection
- NSF Gopher Server
- NIH Gopher Server
- Other Research Oriented Gophers

Micro Group's Gopher Server
Find People at the U

ORTTA Gopher

ORTTA has established a Gopher server available 24 hours a day to supply research information, deadlines, telephone numbers and links to other useful information systems.

The Internet Gopher is a U of M-developed product which provides very flexible distributed information delivery, combining articles, searches and seamless links to other Gopher servers throughout the world. Users can review information on screen or easily copy items to their computers for other purposes. ORTTA's Gopher can be found in three ways:

1. directly at gopher.ortta.umn.ed;

2. on the CIS Gopher server (gopher.tc.umn.edu) under University of Minnesota Campus Information / Department and College Information / Office of Research and Technology Transfer; or

3. on the AIS public access service at item 4 (Research News/Deadlines) or item 12 (Gopher).

The new Gopher server provides links to Gopher servers at NIH and NSF and a telnet link to the NSF STIS system.

Over the next few months, our Gopher server will become more streamlined as we link users directly to source data rather than reprinting articles. Search capabilities are available on our Gopher.

While ORTTA is responsible for the content of its Gopher, user support for connection mechanisms and Gopher software capabilities is provided by Computer and Information Services (CIS). For more information on the Gopher system or information on accessing the campus computer network, please call the CIS Microcomputer Help Line, 626-4276.

To request a SPIN search, proposal application kits, additional program information, etc., make note of the items as you go through Gopher. Then send an e-mail note requesting the items of interest to spin@ortta.umn.edu, or call 624-9004.

Please e-mail your comments and suggestions about the ORTTA Gopher to gopher@ortta.umn.edu, or call ORTTA at 624-6085 or 624-2574 during normal working hours.

Contents of the ORTTA Gopher

The ORTTA Gopher contains the following information:

About This Gopher

Includes general contents information about the ORTTA Gopher.

Search Items

Provides the capability to search the ORTTA Gopher exclusively, or to search the ORTTA Gopher along with other sources such as the NIH Guide on the NIH Gopher server. For additional search information, see "About Searching" in the Search section of the ORTTA Gopher.

ORTTA Late Breaking News

Includes new and revised deadlines not yet posted to the Funding Opportunities/Deadlines section, new or significant program announcements, new University and agency research policies and procedures, and general research information. The News section is updated as items are received. Items remain posted until the application deadline date, if applicable, otherwise for one month. Relevant sections of the ORTTA Gopher are updated with the new information.

ORTTA Contacts

Includes names, phone numbers and internet addresses of ORTTA staff. Lists are arranged alphabetically by name, by ORTTA unit, or, for Grants and Contracts staff, by agency responsibility. The Contacts section is updated when staff, phone numbers or areas of responsibility change.

Policies & Guidelines

Includes University of Minnesota official policies and guidelines related to research and technology transfer.

Rate Schedules

Includes information needed when developing proposals, such as fringe benefit rates, indirect cost rates, research patient care rates, Research Animal Resources per diem rates, and academic floors, fixed ranges and fixed rates. The items in the Rate Schedules section are updated as rates change.

Forms & Templates

Includes the University of Minnesota's Standard Industrial Research Agreement. Also provided is a link to the NSF STIS server from which you can obtain NSF Proposal "Smart Forms."

Funding Opportunities

Sponsoring Agency Deadlines (compiled by ORTTA)

Includes sponsor deadlines for receipt of applications, listed by funding agency and program. This section is updated monthly as necessary. In the interim, new or changed deadlines are posted to ORTTA's Late Breaking

{Continued On Next Page}

ORTTA Gopher

{Continued From Previous Page}

News section, or are included in the *NIH Guide* or the *NSF Bulletin*.

Requests for Proposals (from SPIN)

Includes selected RFPs downloaded from the SPIN system. New RFPs are posted weekly. They remain posted until the RFP deadline, if provided, otherwise for one month.

Sponsored Program Information Network (SPIN)

Includes keyword code and award type tables for the Sponsored Program Information Network (SPIN) system. This is a data base that ORTTA uses to assist faculty searching for funding opportunities. The SPIN tables are updated monthly as new data files are received. For additional information, see "About Sponsored Program Information Network" in the SPIN section of the ORTTA Gopher.

Research Publications

Includes several issues of the weekly *NIH Guide* (full text version), as well as a link to the NIH Gopher where the *NIH Guide* articles are broken out as separate files. Also provided is a link to the monthly *NSF Bulletin* on the NSF STIS server. Program deadlines and target dates from the *NIH Guide* and the *NSF Bulletin* are incorporated monthly into the Funding/Deadline section of the ORTTA Gopher, within the individual institute/directorate. Significant new programs announced in these publications may also be highlighted in the Late Breaking News section of the ORTTA Gopher. The full text versions of the *NIH Guide* remain posted for a month.

Other Useful Resources

Includes 1) a Telnet item pointing to the NSF Science & Technology Information System (STIS) server; 2) a link to the National Science Foundation's Gopher server; and 3) a link to the National Institutes of Health Gopher server. New links will be added as we learn of other useful resources.

Micro Group's Gopher server

A link to the "main" Gopher server on the University of Minnesota campus.

Find People at the U

University on-line phone book.

Position Statement

{Continued From Page 8}

(PHS) wants to reassure the American people that other laws exist to safeguard the welfare of rats, mice and birds, species that comprise about 90 percent of research animals.

According to the Health Research Extension Act, over 1,000 institutions receiving funds from PHS to conduct animal experiments are required to comply with the provisions of the Act and to follow the recommendations in the Guide for the Humane Care and Use of Laboratory Animals. The Guide was prepared to assist researchers in maintaining high quality care for all commonly-used laboratory animals. It includes the Government principles for animal care and use adopted by all agencies and institutions that conduct federally-supported animal research. This guide also applies under another Federal law, the Good Laboratory Practices Act. Research laboratories that conduct studies using rats and mice are regulated by the Food and Drug Administration and are subject to inspections.

In addition, most institutions that do not receive PHS funding follow the Guide. For example, laboratory animal breeders, pharmaceutical manufacturers and commercial research laboratories that may not be subject to USDA and PHS regulations voluntarily participate in a national program of certification by the American Association for Accreditation of Laboratory Animal Care. This private organization monitors institutional animal care programs to be sure they maintain the standards set forth in the Guide.

Animal use is an integral component of biomedical and behavioral research and testing. The vast majority of scientists recognize that good science and good animal care go hand-in-hand and would not tolerate or condone cruelty to, or inhumane treatment of, any laboratory animal.

From the *NIH Guide*, No. 8, February 26, 1993

University Writes Software to Teach Writing

When Patrick Gleason sat down at his computer in the fall of 1991 to write a difficult "drug evaluation" for his pharmacy course—*Pathophysiology and Therapeutics in Cardiovascular Diseases, Pharmacy Practice 5500*—he needed lecture notes handy, along with primary source material. That added up to a lot of page flipping and confusion, but the task was made easier by having a computerized tutorial which guided him through the process of analyzing the sources and writing the report.

The software, called *Writing Across the Curriculum*, or *WAC*, tutored Gleason and his classmates in how to write a drug evaluation and systematically led them through the critical thinking necessary to formulate a sound recommendation. On the same screen where students wrote, the software outlined ideas for planning, drafting and revising the paper. It asked questions critical to a drug evaluation, like "How can I write an effective problem statement for the digoxin-quinidine interaction?" It urged students to extract data from drug trials and construct their own tables. When it suggested how to revise a draft, it particularly addressed pharmacological issues, like how to phrase a recommendation of hydroxyzine as an analgesic.

The result, says Assistant Professor Robert Straka, was more original and deeply studied recommendations than those from previous classes. On the whole, Straka found that "*WAC* permitted me to expect a more uniform and higher-quality report from my students."

WAC was developed by Victoria Mikelonis, a professor in the Department of Rhetoric, and Deborah Hansen, a user services specialist in agricultural engineering. Its original tutorials, based on assignments Mikelonis gave writing students, integrate textbook learning with Mikelonis's particular teaching style. Leading questions encourage students to think independently, to comment and disagree. The teacher has the opportunity to act as a coach, rather than a lecturer.

As its name suggests, *Writing Across the Curriculum* is meant to be customized for teaching writing in almost any discipline. "It's very important for all students to express themselves clearly, whether their business is writing or not," says Mikelonis. *WAC* is a shell program, designed so that other faculty, like Straka in pharmacy practice, can insert outlines, advice and questions via prompts and dialogue boxes. In fall 1991, as a pilot demonstration, Mikelonis and Straka customized *WAC* to teach the "drug evaluation," an assignment Straka had been giving his students for years.

Hansen first wrote *WAC* on a Macintosh platform, and later for a DOS Windows environment. The shell and the utility for creating new tutorials are quite compact, each requiring only about 40K of memory and less than one megabyte of RAM.

Mikelonis and the Department of Rhetoric have produced a short video, "The Nothing Book," that explains *WAC*, though Mikelonis considers word-of-mouth to be *WAC*'s greatest advertising. Besides serving the departments of rhetoric, pharmacy practice, and independent study at the University, *WAC* is being used at Totino-Grace High School in Fridley, Minnesota, for classes ranging from world religions to biology. Macmillan Publishing licensed the software from the University and now packages a version of it called *RTI Writer* with the textbook *Reporting Technical Information*.

For more information about the *Writing Across the Curriculum* software, call Victoria Mikelonis at 626-7977. To use *WAC* in University classrooms, faculty can purchase a site license from ORTTA.

By Chris Kasic

Chris Kasic is a master's student of scientific and technical communication. During winter quarter, he served ORTTA as an intern.

"Students and faculty generally agreed about what criteria to use in evaluating papers and essay examinations, although *student standards related to grammar and mechanics were a bit more stringent.*" — Harlan Hansen, professor in curriculum and instruction, and Jane Wie, research assistant, describing a survey of University faculty and students [emphasis added].

Writing

{Continued From Page 1}

engineers to speech pathologists and musicians—who investigate ways to teach their students to write. CISW funds the research, advises the researchers and publishes the results. Last February CISW sponsored the fourth annual colloquium for its grantees to share their work. They heard about Young's approach, then they described a couple dozen more.

The breadth of approaches University faculty have taken to writing instruction is suggested by the research of Assistant Professor Diane Tedick of curriculum and instruction. She found three kinds of people grading essays at the University's Minnesota English Center, which teaches English as a second language: The "relativists" are interested in the students' ideas and insights. The "absolutists" focus on the mechanics of the language—grammar, spelling, idiom. The "straddler" was the one grader who attended to both ideas and mechanics. (Tedick was assisted by research assistant Nancy Joseph-Goldfarb.)

Writing to Learn Horticulture

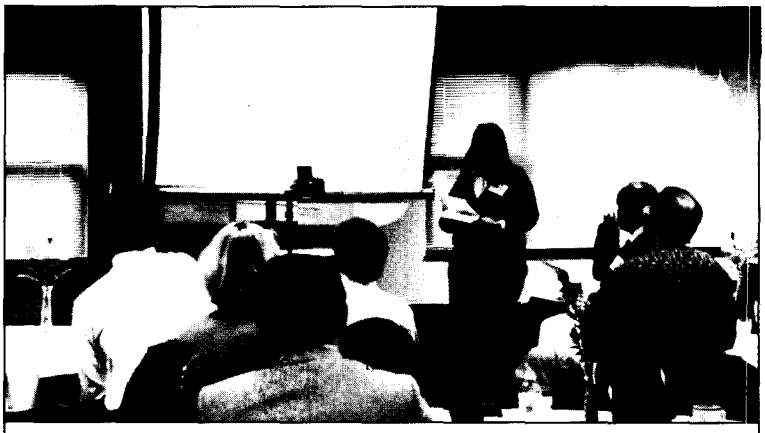
Emily Hoover, Peter Ascher and Doug Foulk would count among Tedick's relativists. They seek "ways to improve horticulture education without adding to the time required to grade written assignments." Using a strategy similar to Art Young's and Thomas Edison's, they give horticulture students informal writing assignments—ungraded, unpolished assignments meant chiefly for the students' use. In return, the students give them "lively discussions," "numerous and thoughtful questions" and "higher-level thinking." On midterm and final exams, the students perform surprisingly sophisticated "integration and synthesis" of information. "I really think students have responded exceptionally well with this kind of writing in horticulture classes," says Hoover. Hoover is an associate professor in horticulture, Ascher a professor, Foulk an RA.

"I showed my final exam to some of my faculty colleagues," says Hoover. "They all said 'You're in big trouble. Your students are going to absolutely rebel.' But my students, because they had practice doing synthesis-type writing throughout the course, basically said 'Yeah, it's kind of what we expected.' We were absolutely—*absolutely incredibly*—impressed with what kind of imagination and creativity our students could put forth."

We were absolutely—*absolutely incredibly*—impressed with what kind of imagination and creativity our students could put forth.

The Hoover, Ascher and Foulk teaching strategy goes like this: At the end of a lecture, the students are presented a question and instructed to spend the last five minutes of class writing an answer. At the start of the following lecture, small groups of students meet over their answers and gather the new questions that arise in the process. To make that strategy work, Hoover advises the following:

- Give the students thoughtful questions that sum up what you want them to know or be able to do after a lecture. "Lazy questions can be found out in about two seconds."
- Explain to students what this kind of "expressive" writing is—often lists and drawings rather than sentences. "We give explicit assurance that spelling, punctuation, organization and the content itself is not what's going to be graded. We just have to be able to read it. It's important to think of the writing process as a learning process."
- Demonstrate that the writing assignments are important. "It's imperative that the instructor stay and write with the class. When I stayed and wrote, most students stayed and wrote. When I got up and left, the majority of the class left within one minute."
- Make the writing assignments useful to the students. "Most of my students will not turn in their workbooks until after exams because they use them as a primary study tool. But if the examinations are unrelated to the type of writing assignments they're doing, the students are not going to put any effort into their writing after the midquarter."



Maria Gini, associate professor in computer science, speaks to the Fourth Annual CISW Colloquium.

Writing to Communicate Computer Science

If Hoover, Ascher and Foulk sound like relativists, Maria Gini, associate professor in computer science, tends to sound like an absolutist. She is most concerned for her students' ability to communicate. With the help of research assistant Thomas Nurkkala she undertook detailed analysis of the mistakes in the software documentation her students

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The Center for Interdisciplinary Studies of Writing

The Center for Interdisciplinary Studies of Writing (CISW) seeks to improve undergraduate writing at the University and to promote writing as a means to learning in almost every discipline.

The CISW predates the mandate that "writing-intensive courses" be created throughout the Twin Cities campus, probably by the fall of 1995. Its research, however, seeks to answer precisely the question posed by that mandate: How can writing be successfully integrated into course work all across the University curriculum? "Here we have 40 or 50 people who have done it," says CISW Director Lillian Bridwell-Bowles, referring to the investigators funded by the CISW. The University's Council on Liberal Education has not yet specified what constitutes a writing-intensive course at the University. The CISW's work suggests the broad range of strategies such a course might take.

Often, CISW grants go to interdisciplinary teams of researchers—a mechanical engineer and a linguist, for example, or a teacher of English and a teacher of dentistry. Most of the money that the CISW gives to investigators goes to support research assistants, though it can also pay for faculty release-time or other research expenses.

For this year, "we have plenty of proposals," says Bridwell-Bowles. "But we'd like to reach more of the faculty with the results of our research." To that end, Bridwell-Bowles invites suggestions from the faculty for workshops or colloquia. Presently, the CISW holds workshops to help faculty propose and conduct research and to help them apply what other people have learned from such research. It also holds workshops for teaching assistants. Last February it held its fourth annual public colloquium on "writing across the curriculum," during which 18 of its grant holders presented results and progress reports.

The CISW publishes proceedings and a newsletter. In the next six months it will add about 10 titles to its catalog of monographs and technical reports, including a volume on writing in math courses at the University. "Abstracts of CISW Grants" is a good introduction to the breadth of the CISW's work.

For 1993-94, the CISW will make about 12 research awards. It will fund assessments of how well students write, especially in courses that are not writing courses *per se*. It will fund studies of what writing is like in various disciplines and how it is assessed by teachers, along with studies of how students learn to write in the ways various disciplines demand and how that writing helps them learn the disciplines themselves. The CISW will also fund studies of writing outside of the academy, and the effects that ethnicity, race, class and gender have on writing.

The CISW began in 1989 with a million-dollar gift from the Deluxe Corporation and a matching amount from the University's Capital Campaign. Its director, Lillian Bridwell-Bowles, is an associate professor in the English department. She is also a chairperson for the College Composition and Communication Conference (the "4-Cs"), the composition field's chief professional forum.

For more information about the Center for Interdisciplinary Studies of Writing, phone 626-7579.

— JPN

Writing

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write. That tells her what to emphasize in advice to students.

Gini recognized that computer scientists' descriptions of their own work "are frequently of low quality in both *form*—grammar and diction—and *function*—the degree to which the writing achieves its intended purpose." So she assigned students in several undergraduate computer science courses—both introductory and upper-division courses—to write three- to five-page descriptions of programs they'd written. Then Gini subjected a random sample of those papers to detailed analysis.

She found that the problems are chiefly grammatical, though problems of organization play a role as well. The students' writing displays "numerous common examples of poor form in the documents, such as tense and number errors, passive voice, awkward constructions and trite phrases." Its functional problems include unstated assumptions, lack of cross-references and insufficient definition of terms.

As a result, Gini is working on guidelines and annotated examples to help her students. She is also trying to train teaching assistants to evaluate undergraduate writing. And she is trying to establish some consistency throughout the computer science department.

Writing Engineering for Whom, and Why?

Linguist Andreas Schramm, who is also a research assistant in mechanical engineering, attacked the inconsistency of departmental writing guidelines head on. "We've noticed that there are many report-writing assignments [in mechanical engineering], but there was little coordination and continu-

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Writing

{Continued From Page 15}

ity," he says. Schramm studies the "rhetorical setting" of mechanical engineering assignments. He asks about the audience students are told to write for, and the purpose they are told to serve. Scholarship suggests that the more clearly that setting is defined, the better students will write. Schramm's principal faculty collaborators are Susan Mantell and David Pui, assistant professor and professor in mechanical engineering.

Gini found that the problems are chiefly grammatical, although problems of organization play a role as well.

In the writing assignments for a measurement lab, Schramm found "a mixture of three different purposes and audiences—writing for industry, for publication and for a grade. The lectures had some references to a hypothetical company. Students were told in the manual and other places that this might be a publishable academic paper. And it was clearly going to be graded by the teaching assistants and the professor. I think a lot of confusion resulted; these are not very clear signals," says Schramm.

On the other hand, in the mechanical engineering internship program, Schramm expected to find more clarity. "I had this probably naive notion that in the industrial setting, the internship, students should come up with much better writing because they know exactly who they're writing to and why. I was in for some surprises.

"It's very, very difficult to create a non-academic setting in academia." — Andreas Schramm

"I picked up the handbook and it was talking about how this should be writing for publication," says Schramm. "I was puzzled. So I talked to some students, hoping they would tell me 'We're writing for our supervisors, and this is clearly related to work.' But they were not writing for their supervisors—'I'm getting a grade for this; I'm handing it in to the professor and TA,' they told me."

Schramm concluded that "It's very, very difficult to create a non-academic setting in academia."

In response to those discoveries, Schramm has been revising some of the student writing manuals and the teachers' grading guidelines. "We've made the measurement lab purely an academic assignment," he says. "In the internship setting I discovered two kinds of reports—a process report and a design report. We're developing materials that stress the similarities, so that students can go through the department with a sense of continuity. At the same time, they get a sense of the differences and hopefully can develop strategies to be proficient writers in situations they have not encountered before."

Schramm's advice regarding the parameters and rules that govern writing in a particular setting can be quite precise. The setting governs the choice of verb tenses, for example. Schramm and engineering faculty carefully "walked through" the report for the measurement lab and found that "depending on who you were talking to, you were going to pick different tenses in different subsections of this report," says Schramm. "If you put a given section in a different tense you're not talking to the same audience. It's not having the same effect."

Twin Cities faculty has set itself the goal of creating writing-intensive courses by the fall of 1995.

There are plenty of other examples to learn from. Michael Cherlin, associate professor in the music school, tested the hypothesis that there is a direct correlation between "successful rhetoric" and "insightful observations about the music," and that writing better will help his students think better. Geoffrey Sirc, an associate professor in the General College, is interviewing faculty, students and professionals outside the university in order to document how writing is taught and evaluated. Julie Liss, assistant professor in communication disorders, hopes to convince colleagues that writing exercises are better than rote learning of anatomy and physiology—"I've become somewhat of a zealot about this," she says.

The Twin Cities faculty has set itself the goal of creating enough writing-intensive courses by the fall of 1995 that undergraduates can take four of them by graduation. How that will happen is not yet clear, but clearly the CISW has lots of ideas to suggest.

By Phil Norcross

Clinton Defense Conversion Begins

R&D Awards Available Soon

On March 11, Secretary of Defense Les Aspin announced a $500 million Technology Reinvestment Project (TRP) *for the current fiscal year.*

Solicitations for grant proposals are scheduled for publication on May 14, 1993. The target date for proposals is July 23, 1993. Award announcements are expected before October 1, the end of the federal year.

Information conferences will be held from April 12 to 16, at various locations and times to be announced. ORTTA will post such announcements on its Gopher bulletin board.

The TRP includes grant and contract opportunities for universities, alone or in partnership with industry and/or local government.

A Defense spokesperson said, "The TRP is intended to stimulate the transition to a growing, integrated, national industrial capability which provides the most advanced, affordable military systems and competitive commercial products. The project will invest in activities to stimulate the deployment of existing technologies into commercial and military products and processes, create technologies to enable new products and processes, and integrate military and commercial research and production activities."

The TRP has 11 "focus areas" that specify fields of study, including environmental technology, information infrastructure, health-care technology, and engineering and manufacturing education.

Those focus areas are to be pursued within one of eight "project areas," which specify who will do the work and for whose benefit. In two TRP project areas institutions of higher-education will take the lead in submitting proposals, in partnership with industry and other institutions:

- **Manufacturing engineering education grant program, $49 million.** Support on a matching basis for higher-education in manufacturing engineering.
- **Manufacturing managers in the classroom, $5 million.** Support for teaching, curriculum development and other activities of manufacturing experts with practical experience in higher education.

Three project areas intend for industry to take the lead in proposals, in partnership with federal laboratories, universities and others.

- **Defense dual-use critical technology partnerships, $95 million.** Support for partnerships to develop technologies with both military and commercial applications.
- **Commercial-military integration partnerships, $48 million.** Support for partnerships to develop and mature dual-use technologies with clear commercial viability.
- **Defense advanced manufacturing technology partnerships, $23 million.** Funding for partnerships to develop new manufacturing technologies with dual-use applications, with particular emphasis on significantly reducing health, safety and environmental hazards of existing manufacturing.

And three TRP areas are meant to include industry, education and local government:

- **Manufacturing extension programs, $95 million.** Assistance to help small-scale manufacturers upgrade their ability to serve commerce and defense. Modeled after the agriculture extension system, this program will give matching funds for state and local delivery of services to small-scale manufacturers.
- **Defense dual-use assistance extension program, $95 million.** Assistance for businesses economically dependent on defense expenditures, to help them acquire dual-use capability through a variety of mechanisms.
- **Regional technology alliances assistance programs, $95 million.** Support for development and maturing of dual-use technologies in one or more focused geographic regions of the United States, implemented through eligible regional technical alliances.

The TRP is to be carried out by the Department of Defense in close cooperation with the departments of Energy and Commerce, the NSF, and NASA. Printed TRP program information is available by phoning 1-800-382-5873.

From *Washington Fax*

U.S.- Japan Management Training Program

In conjunction with its recent announcement of the Technology Reinvestment Project, the Department of Defense also announced plans for a U.S.-Japan Management Training program.

The U.S.-Japan program will provide U.S. scientists, engineers, students and managers with training in Japanese language, culture, and technology management.

Details were unavailable at press time.

Feds Take First Steps Down the Information Highway

The White House, the House of Representatives and the Senate are each making concrete plans to increase federal funding for high-performance computing and high-speed networking, otherwise known as the "information highway," the "information superhighway," or the "information infrastructure."

White House

Clinton and Gore's 36-page statement of science and technology policy, released February 22,* includes plans for the following:

- R&D work for super computing, high-speed networks, and the necessary software. The network will be privately built, says the plan, with federal help.
- Regulatory reform, led by the National Economic Council, to ease construction of the information highway.
- Matching grants to states, school districts, libraries and other nonprofits for the purchase of networking hardware and software.
- Use of the information highway for dissemination of federal information.

In pursuit of those goals, President Clinton's proposed spending plans for fiscal 1994 through 1997 include $784 million for a "crosscutting high-performance computing program." The funds are to be channelled through NASA, NSF, the National Institute of Standards and Technology (NIST), and the National Institutes of Health (NIH) (especially the NIH's National Library of Medicine (NLM)). Program coordination is to come from the Federal Coordinating Council for Science, Engineering and Technology (FCCSET), which is part of the White House Office of Science and Technology Policy (OSTP), directed by John Gibbons.

House of Representatives

For the current fiscal year, Clinton sent the House a supplemental appropriation bill that slated $47 million for the information highway.

The House passed its supplemental appropriation for 1993 (HR1335), on Friday, March 19. It gives $91.9 million to the information highway: $9.3 for work at NLM, $14.1 for NIST, $4.6 million for NASA, and $63.9 million for the National Telecommunications and Information Administration in the Department of Commerce.

The House Committee on Science, Space and Technology (SS&T) had hearings on the information highway scheduled for March 23 and 25. Minnesota has two representatives on the SS&T committee: David Minge and Rod Grams.

Senate

The Senate had expected to take up its 1993 supplemental appropriation in late March, after it finished the Senate budget resolution.

Also, Senate hearings began in mid-March for "The National Competitiveness Act of 1993," Senate Bill 4 (S4), which *authorizes* $60 million for the information highway in fiscal 1993, $120 million in 1994, and $180 million in 1995. Much of the wording in S4 comes from then-Senator Al Gore's "Information Infrastructure Technology Act" of 1992. (Note that before federal money can be spent, *authorization* must be followed by *appropriation*).

Like Clinton's plan, S4 instructs OSTP to lead an interagency effort to develop the information highway. Hearings on S4 began in mid-March in the Committee on Commerce, Science and Transportation. (Neither Minnesota senator is on that committee.)

For the National Library of Medicine, S4 authorizes $120 million over 3 years. In cooperation with NSF and others, the Library is to work at developing databases; electronic links among hospitals, clinics, and medical offices, schools and libraries; technology for visualizing anatomy and analyzing images from x-rays, CAT-scans and similar tools; and electronic simulation of surgery and other medical procedures.

For the NSF, S4 authorizes $120 million over three years for developing educational software; teacher training technology; and pilot programs that link primary and secondary education with the Internet and the National Research and Education Network.

Compiled from *Washington Fax*

* *Technology for America's Economic Growth, A New Direction to Build Economic Strength*

Correction

In the table on page 15 of the March issue, under total funds in fiscal '90, Stanford ranked 6th, Cornell 5th, U. of Wash. 11th, and UC-San Francisco 12th. In the column regarding federal funds in fiscal '90, U. of Wash. ranked 4th, UC-San Diego 5th, and UC-San Francisco 8th.

National Institutes of Health

Revising the PHS 398, 2590, 416-1 and 416-9 Grant Application Kits

A National Institutes of Health (NIH) committee, with representatives from within the Public Health Service, has begun work on revising the PHS 398, Research Grant Application (which includes the Institutional National Research Service Award); the PHS 2590, Noncompeting Continuation Research Grant Application; the PHS 416-1, Individual National Research Service Award; and the PHS 416-9, Noncompeting Continuation Individual National Research Service Award.

The Committee welcomes any suggestions or comments from the scientific community or from other interested persons regarding ways to improve the application kits. Suggestions could concern items such as the clarity of the instructions, other support, structure of the scientific proposal, biographical sketch, and personnel information.

Send suggestions or comments by **April 9, 1993** to Ms. Barbara Wassell, Project Clearance Liaison, Division of Research Grants, National Institutes of Health, Westwood Building, Room 5, Bethesda, MD 20892.

U of M Faculty, Staff Assist Young Inventors

Public is Invited to Fair on April 17

Four representatives of the University of Minnesota helped select the participants for the Annual Young Inventors Fair, to be held Saturday, April 17, from noon to 4:00 at the Science Museum of Minnesota. One hundred inventions by metro area students in grades 4 through 9 will be displayed at Museum Square, located at 10th and Wabasha in downtown St. Paul. The young inventors will be there to explain their creations to the public; admission is free.

The University representatives who served as invention evaluators were: Professor Emeritus of Electrical Engineering Otto H. Schmitt; William Hoffman, Assistant to the Director of the Biomedical Engineering Center; John Butler, Assistant Librarian at Walter Library; and Michael Moore, Director of Research Communications and Technology Marketing, ORTTA. Moore is a member of the Advisory Board to the Young Inventors Fair, which is coordinated by the Metro Educational Cooperative Service Unit.

Health Professions Education Contracts

The Health Resources and Services Administration (HRSA) will advertise this year for more than $1 million in contracts for research on health professions education. The awards, in the form of contracts, will support studies on various factors that affect the selection of careers in primary care.

Topics will fall into the following broad categories:

- The influence of federal programs and financial incentives on medical graduates selecting primary health careers;
- Direct and indirect payments for graduate medical education;
- Biomedical research funding;
- Availability of training in ambulatory settings; and
- Physician payment policies.

Awardees will include higher-education institutions and other nonprofit organizations. Most contracts will be competitive, except for those requiring unique expertise or data.

Requests for proposals could appear beginning in April, but HRSA plans to announce most contract opportunities this summer.

Questions on the new contracts may be addressed to the Bureau of Health Professions, HRSA, Room 8-55, 5600 Fishers Lane, Rockville, MD 20857; 301/443-6662.

Blandin Foundation

Technology Development Program

Request for Pre-Proposals: Deadline, April 30, 1993

The Blandin Foundation of Grand Rapids, Minn., has established a $1 million annual program to support the development of University of Minnesota technologies with potential for commercialization within the state. The Blandin Foundation Technology Development Program supports two distinct funds, each with some different objectives and funding criteria. The Minnesota New Horizons Technology Fund will support R&D projects to advance or test University of Minnesota technologies that appear to have breakthrough commercial potential. The Rural Minnesota Technology Fund will support projects with significant potential for commercial application in rural Minnesota, including collaborative R&D projects with companies outside of the seven-county Twin Cities metropolitan area.

The University's Office of Research and Technology Transfer is requesting pre-proposals for projects to develop and test technologies with commercial potential. Grants will not exceed $200,000 and are not intended for basic research. Deadline for submission of pre-proposals is April 30, 1993.

Pre-proposals should be no longer than three pages and must include the following information:

- Name of the Principal Investigator, Department, Campus mailing address and telephone number, and title of the project.
- A brief nontechnical description of the technology and its commercial application. If the technology is in collaboration with a rural Minnesota company, describe the company's existing products and resources.
- A list of all prior sources of funding previously used to develop the technology, including sponsor, account number, and amount.
- A brief description of the work that would be necessary to develop and/or test the commercial potential of the technology.
- A list of all invention disclosures, patent applications, and patents concerning the technology.
- An estimated time line and summary budget ($200,000 maximum direct and indirect costs). Include salary and fringe benefits of scientific staff involved, up to 10% of the faculty member's base salary. Include purchases of small equipment and supplies. Include 40% overhead rate. Include funds for only that travel needed to collaborate with companies that may be involved in commercializing the technology. Do not include funds for purchase and/or maintenance of major equipment, clerical support, or travel to scientific meetings.

Investigators whose pre-proposals are selected by the Blandin Foundation for further consideration will be provided with complete program guidelines and asked to submit a more detailed proposal. Deadline for submission of full proposals will be **June 30, 1993**. All awards will be made by August 31, 1993.

Submit pre-proposals to Tony Strauss, Office of Patents and Licensing, 1100 Washington Ave. S., Suite 201, Minneapolis, MN 55415.

1994-95 Fulbright Scholar Awards

The Fulbright Scholar Program for 1994-95 includes some 1,000 grants for research, combined research and lecturing, or university lecturing in nearly 135 countries. Opportunities range from two months to a full academic year. Many assignments are flexible to the needs of the grantee. Nearly one-third of the Fulbright grants are targeted towards research and many lecturing awards offer research opportunities. Multicountry research is also possible in many regions.

Virtually all disciplines and subfields participate. Specific openings exist in almost every area of the humanities, social sciences, physical sciences, the arts, and applied fields such as business, journalism and law. Many offerings throughout the program allow scholars to propose their own lecturing or research projects.

Basic eligibility requirements for a Fulbright award are U.S. citizenship and a Ph.D. or comparable professional qualifications. For certain fields such as the fine arts, the terminal degree in the field may be sufficient. For lecturing awards, university or college teaching experience is expected. Language skills are needed for some countries, but most lecturing assignments are in English.

Applications are encouraged from professionals outside academia and from independent scholars. Fulbright seeks good teachers as well as active researchers.

The application deadline for research or lecturing grants to all world areas is **August 1, 1993**. Other deadlines are in place for special programs. Contact the Council for International Exchange of Scholars, 202/686-7877, for more information. After April 1, applications will be available from the UM Office of International Programs, 624-5580.

National Science Foundation

Western European Program

The National Science Foundation (NSF), through the Division of International Programs (INT), encourages and supports U.S. participation in international science and engineering programs and activities that promise benefit to the U.S. science and engineering community, including cooperative research, projects in science and engineering education and science policy development and analysis.

Political and economic changes occurring throughout Europe are altering the environment in which research is conducted. In Western Europe, formal and informal multinational networks linking investigators are being established, and cooperation between scientists and engineers from several different institutes and in more than one country is becoming more prominent. Meanwhile, a relatively untapped pool of scientific talent has become available in Central and Eastern Europe. In response to these changes, INT will henceforth assign a high priority to proposals:

- with the potential to increase substantially the knowledge of the U.S. science and engineering communities of significant research directions at European centers of excellence;
- that provide research experience in Europe to scientists and engineers during the early stages of their careers;
- which involve cooperation with formal or ad hoc consortia comprised of more than one European research group; and
- for regional seminars and workshops involving investigators from more than one European country.

U.S. applicants for these INT-supported activities may be individual investigators or small teams associated with one or more organizations or institutions. Only U.S. investigators are supported; travel or other expenses of Western European researchers participating in joint activities are *not* supported by INT/NSF.

Three types of activities are supported:

- Cooperative Research Projects: support for long-term visits (three months or more);
- Joint Seminars and Workshops;
- State-of-the-Art Surveys.

INT will consider as eligible budget items those costs specifically and directly related to the U.S. side of the collaboration. The total multiyear request for cooperative research projects should normally not exceed $20,000; exceptions will be granted only for projects likely to advance the priority objectives described above. An administrative allowance of $250 will be given to the grantee institution in lieu of indirect costs.

Except for the U.S. France Program (annually on May 1), annual *target dates* for the receipt of proposals for cooperative research and for joint seminars and workshops are **March 1** and **September 15**. In the case of state-of-the-art surveys, these dates are *deadlines*.

A copy of the complete announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note through Gopher. For further information contact the Western European Program, National Science Foundation, 1800 G Street NW, Washington, DC 20550. You may also contact the appropriate country Program Officers at 202/653-5437.

This announcement describes cooperative science and engineering programs between the U.S. and Western European countries. A separate announcement describes analogous programs for Central and Eastern Europe. Dissertation research is supported by a program entitled "Program for Long and Medium-Term Research at Foreign Centers of Excellence" (Brochure NSF 89-112). International Post-doctoral fellowships are offered by NATO, through NSF's Education and Human Resources Directorate (Brochure NSF 90-90).

Health Resources and Services Administration

Outpatient Early Intervention for HIV

The Health Resources and Services Administration (HRSA) announces the availability of discretionary, competing and noncompeting *continuation* grants to provide outpatient early intervention services with respect to HIV. (These are for grants with September 30 start dates).

The application deadline is **June 1, 1993**. For general information and technical assistance, contact Enrique Fernandez, M.D., HIV Program Director, Division of Programs for Special Populations, Bureau of Primary Health Care (BPHC), 5600 Fishers Lane, Rockville, MD 20857; 301/443-8113.

National Institutes of Health

NHLBI: Demonstration and Education Research Program

University researchers with new ideas for applying promising disease prevention findings in the real world may apply for major funding under the National Heart, Lung and Blood Institute's "Demonstration and Education Research Program."

The program typically awards grants of $200,000 to $500,000 a year for three to five years for broad-based projects to extend or adapt health interventions to new populations or settings. But depending on scope and merit and other factors, projects may fetch far more and run much longer.

Under the program, grantees show how to broaden the use of proven education methods, behavioral techniques and environmental and organizational strategies that may promote health or prevent cardiovascular and related diseases.

NHLBI officials caution prospective applicants not be confused by the program's title. These are not social service demonstrations, they say, these are very much research projects. Program guidelines do not require randomization, but they do call for the strongest experimental design possible. What separates these projects from other investigator-initiated studies is their focus on real-life interventions. Demonstration and education studies are the final leg of the biomedical research process that starts with basic research and runs through applied research, clinical investigations and clinical trials.

For example, one D&E study looked at how to improve the treatment of hypertension in the elderly by increasing access to and interaction with health care providers. The study evaluated the effectiveness of volunteer educators in encouraging elderly participants to comply with their blood pressure treatment regimens.

Another investigation tested curricula designed to teach healthy eating to third-graders. Researchers followed students for two years, measuring food selection, preferences, nutrition knowledge and health values; observed students' cafeteria choices; and interviewed parents to obtain information about children's eating habits.

In another study, investigators assessed effects of a health education program for farm workers on reducing respiratory disease hazards resulting from raising livestock indoors. The project involved mounting an extensive education program, conducting on-site evaluation of environmental risks and hazards at more than 100 farms, prescribing ways to correct problems, and contrasting control and intervention groups.

The best applications are those that come in with a strong design, strong instrumentation and the right mix of medical, behavioral and education experts involved. Applications "get tender loving care," says NHLBI. Depending on the complexity and merit of the application, the institute may invite the applicant to explain the project in person. Even unsuccessful applicants get special attention by way of extensive feedback from reviewers. Summary comments can run to eight or ten pages, says review staff. When applicants fail, it is often because the experimental design is not sophisticated enough to match the scale and scope of the project. What applicants sometimes don't realize is "this community stuff is tough," says NHLBI.

Annual application deadlines are **February 1, June 1,** and **October 1**. For further information contact the Division of Extramural Affairs, Review Branch, NHLBI, Westwood Building, Room 548, 5333 Westbard Avenue, Bethesda, MD 20892; 301/496-7363.

Demonstration and Education Areas

- Improved methods of prevention and reduction of risk factors for heart disease;
- Promotion and maintenance of respiratory health, including studies of occupational and environmental exposure; and
- Use and safety of the blood supply, prevention and treatment of blood disorders, and ways to increase blood donation.

From *Federal Grants & Contracts Weekly*

American Health Assistance Foundation

Research Grant Programs

The American Health Assistance Foundation (AHAF) is a non-profit organization that supports research on age-related and degenerative diseases. The current research programs are Alzheimer's Disease Research, National Glaucoma Research and National Heart Foundation.

AHAF awards grants for basic research into the causes and treatment of disease. It does not provide funds for large equipment, institutional overhead costs, construction or building expenses. Proposals are reviewed on the scientific merit of the proposal, the feasibility of the proposed research, the potential of the research to lead to better

{Next Page}

understanding and treatment of the disease and the demonstrated ability of the investigator to complete the research.

Alzheimer's Disease Research

Alzheimer's Disease Research grants are awarded for up to two years and for up to $100,000 per year. Grants may be renewed through the competitive review process. The application deadline for 1994 is **November 1, 1993**.

National Glaucoma Research

National Glaucoma Research grants are awarded for up to two years and for up to $25,000. Grants may be renewed through the competitive review process. The application deadline for 1994 is **November 30, 1993**.

National Heart Foundation

(formerly Coronary Heart Disease Research)

The National Heart Foundation research grants program currently funds a small number of starter grants. These grants are intended to assist young investigators, at the level of assistant professor or equivalent, who are starting an independent research program. Supported research is on the causes and potential treatments of stroke or cardiovascular disease.

Starter Grants are awarded for one year and for up to $15,000. Grants may be renewed through the competitive review process. The application deadline for 1994 is **November 1, 1993**.

Application forms will be available beginning August 1, 1993. To receive an application form and guidelines for any of these programs, write to Research Grants Manager, American Health Assistance Foundation, 15825 Shady Grove Road, Suite 140, Rockville, MD 20850.

Breaking the Cycle of Illiteracy

The problem of illiteracy, which prevents many people from reaching their full economic and education potential, will find support from a number of funders:

Barbara Bush Foundation for Family Literacy

The Barbara Bush Foundation for Family Literacy supports projects that break the intergenerational cycle of illiteracy. The Foundation makes grants for disseminating successful literacy programs; planning community family literacy programs; training and developing the skills of teachers; offering recognition programs for volunteers, educators and students; and publishing materials that document effective literacy programs.

The foundation makes 10 to 15 awards a year of up to $50,000 each.

The application deadline is not yet established. Contact Benita Somerfield, Executive Director, Barbara Bush Foundation for Family Literacy, 1002 Wisconsin Avenue NW, Washington, DC 20007; 202/338-2006.

UPS Foundation

The UPS Foundation supports projects nationally that combat adult illiteracy. The Foundation funds projects that serve multiple communities and focus on workplace literacy, English as a second language, and community-based literacy programs.

Approximately $9.5 million in funds are available each year.

There is no application deadline. Contact Susanne Coin, Assistant Director, UPS Foundation, 400 Perimeter Center, Terraces North, Atlanta, GA 30346; 404/913-6374.

Coca-Cola Foundation

The Coca-Cola Foundation funds projects that improve literacy among adults and children. Foundation grants support projects in basic education, workplace literacy, English as a second language and intergenerational literacy.

Approximately $8.7 million is available each year for funding.

There is no application deadline. Contact Don Greene, President, Coca-Cola Foundation, PO Drawer 1734, Atlanta, GA 30301; 404/676-2568.

US West Foundation

The US West Foundation funds new or ongoing literacy projects in workplace literacy, English as a second language, adult basic education, school-to-work transition and intergenerational programs. Projects should advance equal opportunity, use volunteers and leverage grant funds with other sources of support. The Foundation encourages projects that serve rural areas.

The US West Foundation supports projects in a number of states in the central and western U.S., including Minnesota. $25 million is available annually for funding. Proposals are limited to 12 pages in length.

There is no application deadline. Contact Theresa Montoya, Program Officer, US West Foundation, 7800 East Orchard Road, Suite 300, Englewood CO 80111-2526; 303/793-6648.

Faculty Research, Training and Service Awards

This section contains statistics on proposals and awards recently processed by ORTTA. In addition, we have randomly selected awards received by faculty during preceding months. Faculty who have received awards they would like mentioned in a future *Research Review* may send the pertinent data, as exemplified below, to Phil Norcross at ORTTA, phil@ortta.umn.edu.

Proposal and Award Summary

	Number	Amount
Proposals Submitted February 1993	378	$ 51,366,886
Awards Processed February 1993	255	17,762,463
Proposals Submitted July 1992 - February 1993	2,669	398,129,117
Awards Processed July 1992 - February 1993	2,087	167,977,860
Proposals Submitted July 1991 - February 1992	2,884	470,917,967
Awards Processed July 1991 - February 1992	2,053	172,335,643

Patient Outcomes Associated with Antidepressant Drugs
Judith Garrard, Health Services Research Institute
AHCPR
$1,232,556 - 03/93-02/98

Insecticide Impact on Wetland and Upland Wildlife
David E. Andersen, Fisheries and Wildlife
Mary G. Henry, Fisheries and Wildlife
St of MN - Department of Natural Resources
$635,000 - 07/92-06/93

Genetic Engineering of Targeted Therapies for Leukemia
John Perentesis, Pediatrics
NIH, NCI
$490,000 - 03/93-02/98

Program on the Surgical Control of the Hyperlipidemias: Long-Term Mortality and Morbidity
Henry Buchwald, Surgery
Christian Campos, Surgery
NIH, NHLBI
$485,186 - 01/93-12/93

Comparative Study of Putative Angiogenesis Factors
David Knighton, Surgery
Gregg D. Phillips, Surgery
NIH, NHLBI
$233,788 - 01/93-12/93

Agent of Proliferative Enteritis: Molecular Identification
Connie J. Gebhart, Veterinary Pathobiology
Gilbert E. Ward, Veterinary Pathobiology
USDA
$195,000 - 09/92-09/95

Youth and AIDS Project (YAP)
Gary Remafedi, Pediatrics
St of MN, Department of Health
$181,958 - 01/93-12/93

Development of a Global Positioning System-Linked Airborne Video System
Carol A. Johnston, Natural Resources Research Inst, Duluth
NSF
$139,600 - 01/93-06/94

Skin Biopsy to Assess the Effect of Pancreas Transplantation
William R. Kennedy, Neurology
NIH, NINDS
$134,875 - 01/93-12/93

Cholesterolemic Effects of Modified Milkfat and Beef Tallow
Craig A. Hassel, Food Science and Nutrition (AG)
Joanne L. Slavin, Food Science and Nutrition (CHE)
Omega Source Corporation
$130,688 - 01/93-12/93

Coherent Structures and Dynamics of Geophysical and Astrophysical Turbulent Flows
Paul R. Woodward, Astronomy
University of Colorado (NSF Prime)
$130,000 - 10/92-03/94

National Institute on Environmental Health Sciences Worker Training Grant
Jeanne Ayers, School of Public Health
University of Cincinnati (NIH Prime)
$115,509 - 09/92-08/93

Computer and Information Science and Engineering Research Instrumentation
Max Donath, Mechanical Engineering
Maria L. Gini, Computer Science
Daniel L. Boley, Computer Science
NSF
$114,950 - 01/93-06/94

Role of Deformation on Melt Distribution
David Kohlstedt, Geology and Geophysics
NSF
$100,000 - 09/92-05/94

Mansex: A Sexual Health Program for Homosexually Active Men
B.R. Simon Rosser, Family Practice and Community Health
St of MN, Department of Health
$39,008 - 01/93-12/93

A Possible Transgenic Model for the Slow Channel Syndrome
Christopher Gomez, Neurology
Muscular Dystrophy Association
$41,040 - 01/93-12/93

Notch-Related Genes in Cerebellar Neurodevelopment
Margaret Elizabeth Ross, Neurology
NIH, NINDS
$90,469 - 01/93-12/93

Video: Post Traumatic Stress Disorder in Cambodians
Amos S. Deinard, Pediatrics
Abbott Northwestern / Medtronic Foundation
$36,200 - 01/93-12/93

Functional Effects of 3 Commercial Wrist Extensor Orthoses in Patients with Rheumatoid Arthritis
Erica B. Stern, Physical Medicine and Rehabilitation
Steven R. Ytterberg, Medicine
Maren Mahowald, Medicine
Gerald Mullin, Medicine
Arthritis Foundation - Minnesota Chapter
$12,972 - 01/93-12/93

Continued Analysis: Health Care Group of Arizona
Jon Christianson, Health Services Research Institute
Flinn Foundation
$45,948 - 01/93-03/94

Understanding the Consequences of Medical Underwriting
Nicole Lurie, Health Services Research Institute
Robert Wood Johnson Foundation
$48,749 - 01/93-03/94

Hot Corrosion of Separator Plate Structures
David A. Shores, Chemical Engineering
M-C Power Corporation
$70,480 - 01/93-12/93

Better Pervaporation Modules

Edward L. Cussler, Jr., Chemical Engineering and Materials Science
Michael Semmens, Civil and Mineral Engineering
Michigan Technological University
$90,449 - 06/92-05/93

Mass Transfer Behavior of Unconfined Membranes

Michael Semmens, Civil and Mineral Engineering
John S. Gulliver, Civil and Mineral Engineering
Michigan Technological University
$82,949 - 06/92-05/93

Process Air Purification by Biofiltration

Walter J. Maier, Civil and Mineral Engineering
Michael Semmens, Civil and Mineral Engineering
EPA
$62,857 - 06/92-05/93

Application of In-Situ Cross-Flow Filtration (CFF) and Thermal Ionization Mass Spectronomy (TIMS) to the Study of Ocean Particle Dynamics

Lawrence Edwards, Geology and Geophysics
NSF
$89,783 - 02/93-07/94

Control and Measurement of Diesel Exhaust Particulate Matter

Virgil A. Marple, Mechanical Engineering
Kenneth L. Rubow, Mechanical Engineering
Pennsylvania State University (USDI Prime)
$60,000 - 10/92-09/93

Differentiated Cells from a Neoplastic Genome

Robert G. McKinnell, Genetics and Cell Biology
Council for Tobacco Research
$75,000 - 01/93-12/93

Plant Biology Workshop for Elementary Teachers

Thomas Soulen, Plant Biology
Sandra Tanck, Minnesota Landscape Arboretum
St of MN, Higher Education Coordinating Board
$25,464 - 11/92-02/94

Rural Tour of the Tender Land Opera

Vern Sutton, School of Music
Blandin Foundation
$14,000 - 01/93-12/93

A Workshop on the National Organizations Study

David Knoke, Sociology
NSF
$15,409 - 02/93-07/94

Bicycle Network Planning Guide and Technology Transfer Program

Robert D. Sykes, Landscape Architecture
St of MN, Department of Transportation
$45,500 - 01/93-08/95

Analysis of Probable Changes in Former USSR Demand for Grain

Jerry Fruin, Agricultural and Applied Economics
St of MN, Department of Transportation
$24,576 - 02/93-08/94

Water Quality Program 319, FY92

James L. Anderson, Soil Science
Frederick G. Bergsrud, Agricultural Engineering
St of MN, Pollution Control Agency
$50,000 - 08/92-07/94

Selection for Improved Nutritional Quality in Corn

Ronald L. Phillips, Agronomy and Plant Genetics
Minnesota Corn and Research Promotion Council
$64,000 - 12/92-06/94

Comparison of Pilot Scale Alpha-Galactoside Extraction of Soybeans

Craig Coon, Animal Science
Minnesota Soybean Research and Promotion Council
$56,944 - 10/92-12/93

Cloning and Expression of a Lactococcal Autolysin Gene

Larry L. McKay, Food Science and Nutrition (AG)
Land O'Lakes, Inc.
$98,027 - 01/93-12/95

DNA Marker Technology in Vigna; Going from the Lab to the Field

Nevin Dale Young, Plant Pathology
Rockefeller Foundation
$60,000 - 01/93-12/95

Development of Methodology for the Field Exposures of Vegetables

Sagar V. Krupa, Plant Pathology
Clive Reece, Soil Science
Institut fur Pflanzenokologie
$85,000 - 12/92-11/93

Impact of Sedimentation and Agricultural Chemicals on Wetlands

Mary G. Henry, Fisheries and Wildlife
USDI, Fish & Wildlife Service
$17,592 - 07/92-12/93

Impact of Property Taxes on Forest Management

Melvin J. Baughman, Forest Resources
St of MN, Department of Natural Resources
$2,200 - 07/92-06/93

Unfermented and Fermented Soybeans: Phytoestrogen Metabolism

Joanne L. Slavin, Food Science and Nutrition (CHE)
Johanna Lampe, Food Science and Nutrition
Minnesota Soybean Research and Promotion Council
$31,447 - 10/92-12/93

Victim Offender Mediation and Restorative Justice

Mark Umbreit, School of Social Work
John Howard Society of Manitoba
$13,354 - 01/93-06/94

Assessment of Soil N Tests in Animal-Based Systems

Gyles Randall, Southern Experiment Station
Michael A. Schmitt, Soil Science
USDA
$29,856 - 09/92-09/93

A New Approach to Improving Utilization of Soybeans

Lee Johnston, West-Central Experiment Station
James E. Pettigrew, Jr., Animal Science
Gerald Shurson, Animal Science
Minnesota Soybean Research and Promotion Council
$15,083 - 10/92-12/93

Enhancing Ethical Leadership

Donna Rae Scheffert, MN Extension Service
W.K. Kellogg Foundation
$29,750 - 12/92-11/93

Implementing the NCTM Standards, Using Performance Assessment and Action Research

Robert E. Orton, Curriculum and Instruction
Jean King, Center for Applied Research and Education
St of MN, Higher Education Coordinating Board
$35,682 - 10/92-02/94

Mathematics Leadership

Thomas R. Post, Curriculum and Instruction
St of MN, Higher Education Coordinating Board
$33,765 - 10/92-02/94

Barriers to the Adoption of Electronic Data Collection

Fred Beier, Marketing and Logistics Management
St of MN, Department of Transportation
$21,296 - 12/92-12/93

Post-Doctoral Program in Public Policy

Samuel L. Myers, HHH Institute
Rockefeller Foundation
$78,993 - 09/92-06/94

Sponsored Programs Information Network (SPIN)

The Sponsored Programs Information Network (SPIN) is a computerized locator of funding opportunities (federal, nonfederal, and corporate) for faculty and institutional research, development, and education program support. It is available free of charge to University faculty and staff through ORTTA.

Based on a description of the research areas and/or the type of support sought, faculty and staff can search the Keyword Code Table and Award Type Table to identify codes for specific areas of interest. The Keyword Code Table, a taxonomy developed by SPIN to catalog funding sources, is divided into the following ten major classifications:

- **Agriculture/Food/Forestry**
- **Arts/Culture/Humanities/Communications**
- **Business/Economics/Management**
- **Education**
- **Health/Medical Sciences**
- **International Affairs/Area Studies**
- **Miscellaneous**
- **Science/Technology**
- **Social/Behavioral Sciences**
- **Social Welfare/Public Affairs**

The Award Type Table offers codes that will more specifically target the search results to the award type(s) sought. Some of the award types included in the Award Type Table are:

- **Conference**
- **Fellowship**
- **Projects Outside the U.S.**
- **Publication**
- **Seed Money/Start-Up Funds**
- **Student Support**
- **Training/Professional Development**

The result of a search is a set of profiles of applicable funding sources that provides (1) the sponsor's name; (2) the sponsor's contact address and phone number; (3) deadline dates; (4) program titles; (5) objectives or interest areas of the sponsor; and (6) restrictions that would affect the submission of a proposal. This set of profiles is sent to the requestor.

ORTTA's Gopher contains a section devoted to SPIN and offers you the opportunity to review the Keyword Code Table within the topics shown above to find keyword codes of interest. You then e-mail a note to the Gopher Editor (spin@ortta.umn.edu) requesting a SPIN search based on the chosen keyword codes (limit, 20 keywords). Be sure to provide your name, address and phone number on the message in case ORTTA staff need to contact you for clarification. If an e-mail address has been provided, the search results will be forwarded to that address if possible.

If the results of the search are not satisfactory, you may contact our office for further discussion and guidance in the selection of codes. For further information regarding the SPIN system, please contact ORTTA through e-mail (spin@ortta.umn.edu) or call 624-9004.

SPIN searches are also available through the Research and Development Office in the College of Liberal Arts and the Agricultural Experiment Station.

Office of Research and Technology Transfer Administration

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- ORTTA neither generates nor controls this information.

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RESEARCH REVIEW

Research and Technology Transfer Administration

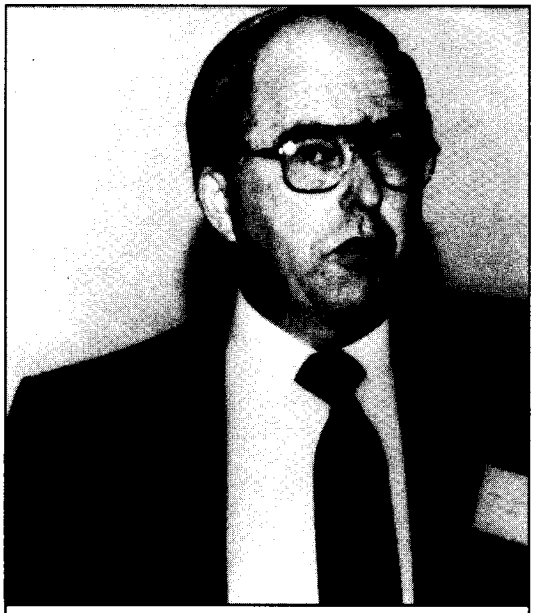
May 1993

After the Cold War, a New R&D Agenda

Defense research agency will not long survive, says University historian

"I do not believe that a civilian DARPA can work. DARPA needs consensus with its research groups. During the Cold War, the agenda of problems to be investigated was jointly agreed upon. But now the research groups—companies and universities—all have agendas of their own," says Arthur Norberg, historian of technology. "While you may say you're going to put together a new civilian DARPA, it's going to take a hell of a long time."

DARPA is the *Defense Advanced Research Projects Agency*, the federal agency that funded the R&D for the Internet, for the first computer graphics and parallel processors, and for the cruise missiles and "smart bombs" that rained on Iraq in the Desert Storm. Last February, the Clinton administration returned DARPA to its original name—*ARPA*, without the *Defense*. Then in early March, Clinton and Secretary of Defense Les Aspin announced that ARPA will chair a "Defense Technology Conversion Council," and that the Council has $500 million to award *this year*, especially to academic and industrial consortia, as grants for development of "dual-use" technologies to serve both military and commercial ends.[1]



Arthur L. Norberg, Ph.D., coauthor of *A History of the Information processing Techniques Office of the Defense Advanced Research Projects Agency*, 1992.

On the other hand, Clinton's science and technology policy also calls for new civilian R&D from agencies other than ARPA. Through 1997, about $1 billion for high-performance computing and communication (HPCC) and the "information highway" is proposed for NASA, NIH, NSF and two Department of Commerce institutes—the National Institute of Standards and Technology (NIST, formerly the Bureau of Standards) and the National Telecommunications and Information Administration (NTIA). Overall direction of the project belongs to Science Advisor John Gibbons and his Office of Science and Technology Policy (OSTP).[2] In addition to that HPCC work, the budget of the Advanced Technology Program (ATP) in the NIST, says the spending plan, will grow from $68 million for this year to $750 million for 1997.[3] Thus far, Congress has generally agreed with and supported those plans.

{DARPA, Continued On Page 8}

Inside

High-Performance Computing Bill Introduced

The High-Performance Computing and High-Speed Networking Applications Act of 1993 was introduced into the U.S. House of Representatives on April 21. The bill amends the High-Performance Computing Act of 1991 and is meant to implement the Clinton Administration's plans for an "information highway."

The bill was introduced by Rick Boucher of Virginia, who chairs the Subcommittee on Science of the Science, Space and Technology Committee (SS&T). It would authorize $1.5 billion for high-performance computing and high-speed networking over five years. The bill calls for establishment of an interagency program to develop applications for education, libraries, health care and improving access to government information.

One of his goals, said Boucher, is to create a way for medical specialists throughout the country simultaneously to evaluate CAT scans, MRI images and other diagnostic data while the patient is still in an examining room. It is also, he said, his intent to provide a means for establishing uniform formats and protocols that will provide individuals across the country access to electronically stored data in libraries.

Minnesota Representative David Minge is a member of the science subcommittee. Minnesota Representative Rod Grams is a member of the SS&T committee, though not of the science subcommittee.

From *Washingtom Fax*

RESEARCH REVIEW

Volume XXII/Number 11

May 1993

Director of Communications: Michael P. Moore

Editor: Phil Norcross

Editorial Assistant: Tove Jespersen

Associate Vice President: A. R. Potami

***Research Review* is a monthly publication of the Office of Research and Technology Transfer Administration. Its purpose is to inform faculty and administrators who are involved with sponsored research and technology transfer on procedures and policies of granting agencies, on institutional policy and other information necessary to the preparation of research proposals, and on funding opportunities.**

***Research Review* welcomes ideas and comments from all readers. Write to *Research Review* at 1100 Washington Avenue South, Suite 201, Minneapolis, MN 55415-1226, or call Phil Norcross at 625-2354 or Michael P. Moore at 624-9398.**

Indirect Cost & Fringe Benefit Rates

Indirect Cost Rates

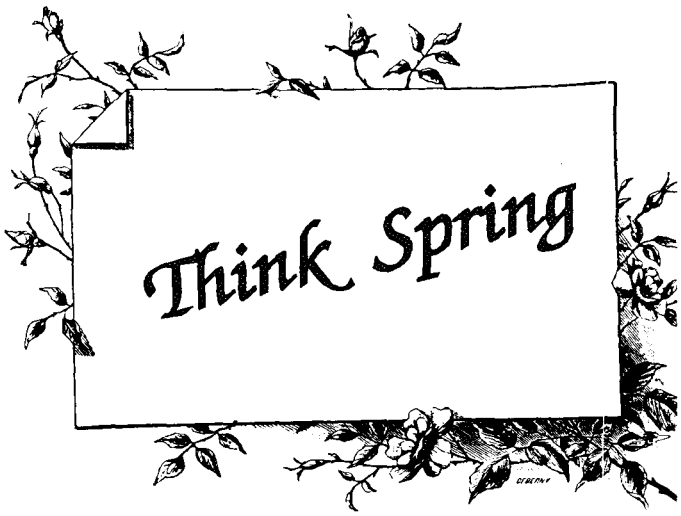
The *provisional* rates for July 1, 1992, through June 30, 1994, are listed below. When budgeting for periods beyond 6/30/94, the 7/1/92-6/30/94 rates should be used. **The rate agreement is dated May 13, 1992**. This date should be used where required on proposal applications. In rare cases, particular grant programs have maximum rates that are lower than the rates below. **Please call Marilyn Surbey, 624-4850, or Richard Miller, 626-9895, with questions on indirect costs.**

	07/01/92 06/30/94
Research	
On-Campus	40.00
Off-Campus *	21.00
SAFHL	58.05
Hormel	44.00
Other Sponsored Activity	
On-Campus	20.00
Off-Campus *	10.00
Instruction	
On-Campus	52.00
Off-Campus *	16.00

* A project will be considered off-campus if more than 50% of the direct salaries and wages of personnel employed on the project are incurred at a site neither owned nor leased by the University.

Fringe Benefit Rates

See new rates, pages 3, 4 and 5



Fringe Benefit Rates

This is the complete text of a memo sent to Chancellors, Vice Presidents, Deans, Department Heads and Directors on March 31 from Richard Pfutzenreuter, Associate Vice President for Budget and Finance.

In the 1993-94 Budget Instructions that were distributed March 9, 1993, information relating to the fringe benefit rates to be budgeted for fiscal 1994, 1995 and 1996 was included in Section VII.B. on page 9 and in Appendix H. There appears to be much confusion as to what rates are to be used for planning purposes and what rates to be used for future grant proposals, especially since the rates negotiated in 1991 with our federal audit agency, DHHS, for fiscal 1994 are much different from the rates being proposed for budget planning purposes.

After discussion with Tony Potami and Marilyn Surbey of ORTTA, the following was decided:

For future grant proposals, you can use the rates that are proposed for budget planning purposes, i.e, the rates included in the budget instructions and listed as "Applied for" in the table below.

The 1993-94 provisional rates were established in 1991 based on fiscal 1991 costs and salary bases adjusted by projected future cost increases. The 1993-94 "Applied for" rates are based on more recent information, but again with estimated cost increases built into the rate calculation.

The variation in the estimated fringe benefit rates over the four fiscal years shown in the table above reflects a combination of factors including estimated changes in the fringe benefit costs and salary bases in each of the years; a redistribution of costs from the Academic pool to a Graduate Assistant pool for tuition benefits and health care costs to reflect actual use of benefits by each group (beginning in fiscal 1994); and, usage of a cumulative overrecovery of costs as of June 30, 1993, spread out over the next three years to stabilize the fluctuation of rates from one year to the next.

The following two pages present the components of the fringe benefit rates for fiscal years 1993-94, 1994-95, and 1995-96, and general information as to eligibility, respectively. Please keep in mind that the rates reflected on the attachment are still under negotiation with DHHS and may be subject to change.

The following table reflects our present agreement on fringe benefit rates:

	Academic	Graduate Assistant	Civil Service
1992-93 (Provisional)	31.25%	10.50%	29.50%
1992-93 (Applied for)	30.25%	9.33%	26.75%
1993-94 (Provisional)	28.00%	31.25%	30.50%
1993-94 (Applied for)	24.40%	38.00%	28.40%
1994-95 (Applied for)	24.60%	39.80%	29.30%
1995-96 (Applied for)	24.75%	41.70%	30.20%

As stated in Appendix H of the budget instructions, "these rates have not yet been approved by DHHS and may be subject to change." Keeping this statement in mind, an agency receiving a grant proposal with rates that do not match the DHHS negotiated rates (the provisional rates in the table above) may choose to deny the fringe percentage request as submitted, and only allow the fringe to the extent of the rates as currently negotiated.

When submitting proposals, use either the negotiated (provisional) rates or the rates as shown in the budget instructions (applied for). You should not use rates from both sources to provide you with the "best of both worlds".

We apologize for any misunderstandings that have occurred, and will keep you informed of our provisional rate status. Thank you.

Note from ORTTA:

If you use the negotiated provisional rates, you must apply indirect costs to the amount. If you use the "applied for" rates and are receiving full overhead, you may exempt the Graduate Assistant fringe benefits.

Estimated Fringe Benefit Rates for Budgeting Purposes

Estimated rates to be used for budgeting 7/1/93 - 6/30/94

	Academic	Graduate Assistant	Civil Service
Health Plan	4.0%	9.7%	14.4%
Unemployment Compensation	0.1%	0.0%	1.1%
Worker's Compensation	0.0%	0.0%	0.8%
Tuition Benefits	0.1%	28.3%	0.7%
Group Life and Disability	0.4%	0.0%	0.0%
Retirement	12.8%	0.0%	4.2%
FICA	5.6%	0.0%	5.8%
Medicare	1.4%	0.0%	1.4%
Total	24.4%	38.0%	28.4%

Estimated rates to be used for budgeting 7/1/94 - 6/30/95

	Academic	Graduate Assistant	Civil Service
Health Plan	4.2%	10.2%	15.3%
Unemployment Compensation	0.1%	0.0%	1.1%
Worker's Compensation	0.0%	0.0%	0.8%
Tuition Benefits	0.1%	29.6%	0.8%
Group Life and Disability	0.4%	0.0%	0.0%
Retirement	12.8%	0.0%	4.2%
FICA	5.6%	0.0%	5.7%
Medicare	1.4%	0.0%	1.4%
Total	24.6%	39.8%	29.3%

Estimated rates to be used for budgeting 7/1/95 - 6/30/96

	Academic	Graduate Assistant	Civil Service
Health Plan	4.5%	10.7%	16.2%
Unemployment Compensation	0.1%	0.0%	1.1%
Worker's Compensation	0.0%	0.0%	0.8%
Tuition Benefits	0.1%	31.0%	0.8%
Group Life and Disability	0.3%	0.0%	0.0%
Retirement	12.8%	0.0%	4.2%
FICA	5.6%	0.0%	5.7%
Medicare	1.4%	0.0%	1.4%
Total	24.8%	41.7%	30.2%

Fringe Benefit General Information

Non-Students	7/1/93 to 6/30/94	Academic	7/1/93 to 6/30/94	Civil Service
0-66%	7.1%	UWFM		
0-74%			13.3%	UWRFM
67-99%	24.4%	HUWRGFM		
75-99%			28.4%	HUWTRFM
100%	24.4%	HUWRGFM	28.4%	HUWTRFM

Students - Professional Training [a]		
25-74%	28.3%	WT
75-100% [b]	32.3%	HWT
25-100% [c]	38.0%	HWT

[a] Eligible classes (for tuition benefits):

9511 Teaching Assistant

9521 Research Assistant

9531 Administrative Fellow

9538 Legal Project Assistant 1

9540 Pharmacy Associate (holding 75% or more appointment) based on academic rates for health plan (4.0%) and tuition (0.1%), total 4.1%

9546 Post-doctoral Associate (holding 75% or more appointment) based on academic rates for health plan (4.0%) and tuition (0.1%), total 4.1

9549 Veterinary Medical Associates

9553 Dental Fellow

9554 Medical Fellow (also being charged FICA and Medicare)

[b] Classes 9540, 9545, 9546, and 9548 are eligible for the State Health Plan coverage. Fringe rate will be academic health plan rate of 4.0%.

[c] Classes 9511, 9521, and 9531 are eligible for the Graduate Assistant Health Insurance benefit. Graduate Assistant Health plan rate is 9.7%.

State Officials Describe Their Role in National R&D Policy

On March 31, science and technology officials from several states testified before the House Science Subcommittee on the subject of "Renewing U.S. Science Policy: the Role of the States." Minnesota's Representative David Minge is a member of that subcommittee.

Federal policy should not treat states merely as sources of matching funds, said H. Graham Jones, executive director of the New York State Science and Technology Foundation. State programs offer local solutions through unique interactions of universities, government and industry, he said.

"Those working at the local level are best equipped to work with local researchers and entrepreneurs," said Allen Ford, chair of the trustees of Ohio's Edison Biotechnology Center. If federal awards go to "well-established state development programs and cooperative universities, new initiatives can be implemented quickly and coordinated with local resources, assuring maximum return on federal investment."

"While states have placed research universities at the center of their programs, they remain wary of academic researchers whom they believe may pursue their own research agendas rather than those that pertain to economic growth," said Irwin Feller, director of Penn State University's Institute for Policy Research.

Norman Hackerman countered by saying that what's needed is capital, not changes in the way universities do research. Technology transfer problems will not be solved by directing basic research, he said, but by supporting young technologies further downstream. Hackerman chairs the advisory committee on research programs for the Texas Advanced Research/Advanced Technology program.

Congress people and testifying officials agreed that communication among all parties is a very important but currently weak link in the technology development endeavor. "Fruitful collaboration between the states and the national government in the development and diffusion of industrial technology would require an unprecedented degree of communication and cooperation between the two levels of government, " said Jones, who went on to suggest that the Science and Technology Council of the States should be strengthened in order to further that communication.

The officials also spoke in defense of federal support for basic research, particularly the work of the NSF and NIH. "Peer reviews and competition for awards help to assure that funds are disbursed wisely and effectively," said Ford.

From *Washington Fax*

Scholarship on Science and Technology Policy is Poor

A recently published Carnegie Commission report says that scholarship in science and technology policy "resembles a cottage industry: unevenly supported, frequently isolated and experiencing formidable barriers to growth and impact."

The report particularly cites the difficulty of finding tenure-track support for studies in science and technology policy: "Although it is possible to conduct policy studies within a political science or government department, it is nearly impossible within science and engineering departments, and thus many of those most qualified to perform the studies are directed away from them."

The Commission recommends that NSF, the Office of Technology Assessment (OTA) and private foundations work to define the research agenda in the field and promote arrangements in universities and professional organizations to pursue scholarship in policy analysis.

The report is titled "Facing Toward Government: Nongovernmental Organizations and Scientific and Technical Advice." It was written by a task force of the Carnegie Commission on Science, Technology and Government and published March 1993.

From *Washington Fax*

University-Industry Research Conference

Video Tapes Available

On November 19, 1992, the University of Minnesota sponsored the conference "University-Industry Research: Balancing Public and Private Trusts." Speakers covered topics such as the issues faced in licensing university technology to industry; the professional, ethical and legal challenges of university-based entrepreneurs; prevention of ethical problems in research design, conduct and dissemination; university and government approaches to fostering research integrity; the impact of academic ties with industry; the future of university research; conflict of interest issues from the federal perspective; and benefits of university-industry collaboration from the perspective of a university research administrator and a corporate R&D director.

Videotapes of the conference can be viewed and/or borrowed from the following places:

ORTTA (call Michael Moore, 624-9398)
Wilson Library
Walter Library, Learning Resource Center
Health Sciences Public Relations, A-395 Mayo
Office of the Vice President, IAFHE, 201 Coffey Hall

Committee on the Use of Human Subjects in Research

Women in Clinical Trials

On March 24, 1993, the Food and Drug Administration (FDA) announced that it will lift its ban on including women in early drug trials. In fact, the FDA will begin to require that data submitted for New Drug Applications (NDAs) include an analysis by gender. Not yet released, the new regulations are expected sometime this spring; researchers planning to test drugs or devices in human subjects should take note.

The sixteen-year-old ban on including women in clinical trials—an obstacle to including women of "childbearing potential"—is now being lifted. Privately funded research and pharmaceutical company-funded research will now be held to the same gender balance requirements as federally funded projects. The National Institutes of Health has initiated an aggressive policy and funding agenda to demonstrate inclusion of women and minorities in clinical trials funded with federal monies. NIH will not fund a project that does not include an equitable distribution among all populations likely to be affected by study results.

The FDA and the Committee on the Use of Human Subjects in Research will require that research consent forms include statements of known risks and a statement that there may be unknown risks to the fetus if a woman becomes pregnant while participating in a clinical trial. Women must be informed if a pregnancy test is part of the research protocol and whether such tests will be repeated during the course of a research project. The consent forms should mention that use of adequate contraceptives may be required to participate in a clinical trial.

Lest we think that the federal regulatory and funding agencies are responding solely to political pressure, the FDA reminds us that there are significant differences between men and women with respect to the rate of absorption of drugs and the interaction of oral contraceptives and hormonal changes with the mechanisms of drugs in the body. These compelling differences have, in some cases, required additional testing of approved drugs to determine appropriate dosing levels for female patients.

With the advent of more reliable means of contraception, the argument that to protect the fetus, women of "childbearing potential" should not be included in drug testing will no longer be accepted as a viable argument for exclusion.

If you have questions on this or any other area involving human subjects in research, please call Moira Keane at 624-1889.

Better Funding for NIH Would Reduce Medical Costs, Congressman Says

During congressional hearings in March, NIH directors reported that they had not participated in discussions conducted by the president's task force for health-care reform. Representative John Porter of Illinois expressed surprise at that report, arguing that research leads to disease prevention, which cuts health-care costs.

One NIH director called the hearings "refreshing" because the committee showed a new appreciation for biomedical research as a means to reducing costs and as "the single most valuable aid to preventing disease."

In the same hearings, the NIH directors' "most consistent" concern was worry for the morale of the extramural scientific community, due to low success rates for grant applications in recent years.

The proposed NIH budget for 1994 calls for the number of research grants to decrease 2 percent, from 23,583 in fiscal 1993 to 23,197 in fiscal 1994, while the size of the average grant increases between 0.4 and 2 percent. Existing grants are to continue at 1993 levels, with no increases for inflation.

The total budget for NIH is proposed to increase 4 percent, from $10.3 billion in 1993 to $10.7 billion in 1994. NIH is to decrease its personnel by 319 FTE in 1994.

Alice Rivlin, deputy director of the Office of Management and Budget (OMB), said the slight increase for NIH does not reflect the President's view of NIH, and the NIH budget "needs to be revisited " in the future. Rivlin spoke to the AAAS Colloquium on Science and Technology Policy in mid-April.

The hearings were those of the House subcommittee responsible for NIH appropriations—the Labor, Health and Human Services, Education and Related Agencies Subcommittee of the Appropriations Committee. Porter is the ranking Republican of that subcommittee, which includes no Minnesota representative.

DARPA

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As the new administration's R&D policy takes shape, then, creating a civilian DARPA does not mean creating a new agency. Rather, it means reshaping old ones. "For the past seven years [then-]Senator Albert Gore and others in Congress have been agitating for the establishment of a civilian agency analogous to DARPA. Clinton advocated such a step during the campaign," says Norberg. "Now the plan is to build on existing programs, especially those in the commerce department. The idea is to spread DARPA-like programs across the government."

Creating a civilian DARPA does not mean creating a new agency. Rather, it means reshaping old ones.

Norberg speaks up regarding the future of federal R&D policy, and the future of DARPA in particular, because he has spent the last five years studying DARPA's R&D programs in computing and computer communications. Norberg holds the University's ERA Chair in History of Technology, named for Engineering Research Associates, Inc., founders of the Twin Cities' computer industry. He also directs the University's Charles Babbage Institute for History of Information Processing. His book, coauthored by Judy O'Neill and Kerry Freedman, documents the history of DARPA's Information Processing Techniques Office (IPTO), from its creation in 1960 to roughly 1988 and the end of the Cold War.[4]

Norberg did much of his DARPA research under a DARPA contract. The agency wants the historical study, he says, because it wants to better understand the people and institutions involved in its Cold War R&D, and the contributions it made to computer science and engineering. For his part, Norberg sees a third reason to study DARPA's and IPTO's history: to learn how federal technology development might work *after* the Cold War.

"This is a study in applied history," says Norberg. "What we can learn about technology development and technology transfer from such a study will allow us to understand something about how a DARPA-like organization needs to operate to be effective. A detailed knowledge of IPTO's history contributes to an understanding of the opportunities and constraints for technology development as we enter a post-Cold-War world with a new agenda and old institutions."

In other words, since the 1992 election, Norberg's study of DARPA and IPTO has become in part a search for indications of how the Clinton-Gore administration should pursue its technology policy and its conversion of military R&D to civilian R&D. That search has led him to conclude that DARPA and IPTO will not long survive the end of the Cold War, and that their success depended on qualities that will be difficult to duplicate in other agencies.

"Our study reveals that IPTO employed a dynamic, highly effective, well-respected and occasionally insightful approach to R&D funding," says Norberg. "This approach resulted from several factors: the quality of the people brought in to manage the office, the policies and practices of the Department of Defense with respect to R&D funding, the size of IPTO budgets, and the response of the research community and industry to the ambitious objectives of IPTO."

The History of DARPA and IPTO

President Eisenhower created the original ARPA in 1958, the same year he created NASA. Both were a response to *Sputnik*, which first flew in October 1957. "DARPA was organized to ease the Department of Defense through a national crisis—the seeming inability of the military services, due to interservice rivalry, to execute an efficient missile program," says Norberg. ARPA spent its first two years helping to organize NASA and military space programs. That done, it turned to "research relevant to all the military services, but the responsibility of none of the services." *ARPA* became *DARPA* in 1972, under President Nixon. Its military R&D over the years included satellites, nuclear-test detection, ballistic-missile defense, and weapons command and control systems.

But DARPA came to Clinton and Gore's attention, according to Norberg, because of its contributions to civilian, not military, technology: "The materials science and information processing programs within DARPA, by deliberate design and occasional good fortune, contributed to both military and civilian sectors. The public reputation of DARPA, the one that John Gibbons and William Clinton are using to suggest DARPA-like programs throughout the government, is for the programmatic prowess found in the materials science and information processing programs. It is those that they are using as a model."

DARPA came to Clinton and Gore's attention because of its contributions to civilian, not military technology.

IPTO, the information-processing arm of DARPA, contributed to both military and civilian computing. "Its mission was to advance the state of the art in weapons command and control systems. In 1960 that capability was very rudi-

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mentary," says Norberg. "We see the culmination of about 30 years of research sponsored by this office in the equipment used in the Gulf War."

Over those same 30 years, IPTO inventions also became essential to civilian commerce. "Networks are certainly one example. Robert E. Kahn was a key architect of the Internet while he was at IPTO," says Norberg. Also, "the graphics systems we have on our machines today are all based on early IPTO work."

For a third example, the first parallel-processing machines were sponsored by IPTO. "IPTO's interest in parallel processing came up as a result of companies' *disinterest*," says Norberg. He explains that, early on, Westinghouse proposed a machine with 64 processors, "but when the machine was designed by Daniel Slotnick, Westinghouse decided it was not going to put money into R&D, so Slotnick left for the University of Illinois." Then IPTO funded Slotnick's research and spent $29 million to have a 16-processor machine built in the late 1960s. More recently, "Thinking Machines Corporation's CMI1 machine, which came from an MIT Ph.D. dissertation, became one of the first multiple parallel processing systems. It was supported by IPTO first, done within the university and then spun off into a private company."

IPTO worked so well because it started with a "clear vision of its mission." It's research was "directed, mission-oriented and confined to a few areas of information processing."

Given IPTO's and DARPA's success at developing technology now widely used in civilian commerce, it is little surprise that Clinton and Gore would look to IPTO for a model of R&D policy. As Norberg puts it: "Regardless of how we view the problems IPTO chose to explore, we have to conclude that its programs had far-reaching implications. It helped computer science to develop and become a discipline. It created a cadre of personnel whose contributions to computing have affected all sectors of society."

IPTO's Talent for Leading R&D

IPTO worked so well during the period Norberg studied because it started with a "clear vision of its mission." Its research was "directed, mission-oriented, and confined to a few areas of information processing," he says.

That kind of discipline and focus will be hard to duplicate, Norberg predicts. "This approach is frequently impossible to use in other government funding agencies. NSF can very seldom get away with this sort of thing, even under [former director] Erich Bloch. Now that industry has a stronger voice in the initiation of government funding programs, as evidenced in HPCC, it is likely to be impossible to transfer this model of DARPA-IPTO out of the DoD and make it work."

"The second reason for DARPA's success was its management style," Norberg continues. "In most offices and programs, the agency had a lean administrative structure, extensive field contacts, fast turn-around time for proposals—something we don't get anymore—a record of supporting high-risk concepts and development projects, exceedingly capable staff in the areas in which they were specialists, a history of block grants and multiyear contracts, and a proposal-evaluation mechanism that was largely internal, rather than through peer review." IPTO program personnel, he adds, had extensive personal initiative, and traveled often to meet with their researchers and discuss what was and wasn't achievable.

Seeing those qualities in DARPA's past makes Norberg pessimistic about its future. "Practices like these suggest DARPA-like agencies across the government are not going to be very successful in managing technology development, because they don't have the ability to do this sort of thing, and won't get it either."

Norberg further describes IPTO people, including its extramural investigators, as a small, closely knit group. IPTO's practice was to fund just a few research centers: Carnegie Mellon and MIT at first; then "Stanford and Rutgers for artificial intelligence; UCLA for networking; Utah for graphics; Cal Tech for very-large-scale integration; Illinois and Berkeley for parallel processing," says Norberg. "By the end of the 1960s there were quite a number of computer science programs IPTO could choose from, but by that time they had already committed themselves to several. The others are almost frozen out until the democratization of the 1970s. And then everybody can get into the act, but not many succeed; they simply don't have the capacity. There's some 720 computer science departments around the country. DARPA supports probably two dozen."

Once IPTO had gotten started, most of its in-house directors came from those academic research labs it funded. "They were not people picked off the street through a GS job description," says Norberg, referring to normal federal hiring practices. "In almost every case they came out of a research project associated with one of the major institutions being funded by IPTO. These people possessed technology-management skills that enabled them to lead the research community. This insight came mostly as a result of their technical activities at places like MIT and Lincoln Laboratories before they came to DARPA."

Norberg emphasizes that IPTO's success resulted from consensus and cooperation among universities, companies and the federal government. The R&D community, including

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the academics, was not somehow tricked, coerced or bribed into military work, he says. "We need to keep in mind that DARPA is not a military-dominated organization. Personnel at IPTO and research groups funded by IPTO were not co-opted in any way. They were willing, anxious and often motivating partners," he says, "in a research program that they believed was far broader than the needs of the defense establishment."

The interaction of the military and civilian sectors in IPTO went like this, says Norberg: The Secretary of Defense, consulting with the Joint Chiefs and the White House, developed "very, very general specifications." Those general specifications went to DARPA and IPTO. "Then some negotiation goes on between them and the people in the Secretary of Defense's office." Norberg emphasizes that the negotiations took place on civilian grounds, in the Cabinet and not the Pentagon.

The next step belongs to that close-knit group of IPTO staffers and university and industry researchers. IPTO's in-house staff was about half military people, most of them with Ph.D.s in computer science or electrical engineering. So there was daily interchange between the civilian and military sectors. And "where the real specifications get developed is in the interaction between the [IPTO] office and the R&D groups outside," Norberg says. "With some sort of general notion about what is wanted, or some sort of general notion about what can be done, there is an interaction between these two groups that then results in a program that is funded and explored, usually in universities first and then in companies afterward. But sometimes, as you get into the 1980s, when these things are much more applied, then companies may become the primary elements in this whole exercise."

This kind of cooperation among government, academe, and industry distinguishes IPTO, in Norberg's mind, from many other vehicles for federal R&D funding: "In the case of something like the Naval Research Laboratory, that's directed research. In granting agencies like the NSF and NIH, research is undirected and not necessarily cooperative, in the sense of two groups collaborating together by design."

IPTO's administratively lean and close-knit organization earned a reputation for succeeding with high-risk programs.

IPTO's administratively lean and close-knit organization earned a reputation for succeeding with high-risk programs. Understand that the risk was not financial—IPTO judged risk and success by technical, not economic, standards.

"High risk at IPTO meant the setting of ambitious objectives for which the technology was not yet available," says Norberg. "When IPTO set out to develop a network, the prevailing technology for networking was unreliable, slow and expensive. IPTO launched out in a new direction, the result of which was a new generic technology, namely packet switching.

Understand that the risk was not financial. IPTO judged risk and success by technical, not economic standards.

"For another example, the entire history of artificial intelligence research is a case of high-risk. AI research objectives in the 1950s contained no certain path to achievement. It was only in the 1980s that it became clear that some of the objectives had been reached."

When IPTO people set out to develop a technology, then, "they assumed that a certain amount of basic research was necessary. But the basic research that's going on here is in the sense Edwin Layton [another UM historian of technology] has called engineering knowledge or technology knowledge—how to achieve certain objectives to make the technology useful. We're not talking about basic scientific research here. This is *engineering research*."

Though a lean and tightly focused organization, IPTO's results were not closed off to outsiders. Through the course of IPTO-funded engineering research, applied research, then lab and field demonstrations, "you have this indirect influence on a whole bunch of other researchers," says Norberg. "Block grants allow you to support all sorts of graduate students, post-docs, new faculty perhaps. Researchers on the outside are doing things which spun off from the [IPTO] activity. IPTO achieved some objectives and also achieved a broadening of the field."

That is DARPA and IPTO history up to 1988. Since then, the Cold War has ended. Given the DARPA and IPTO model of federal support for R&D—of commercial technology following defense technology, not leading and not proceeding on its own—how might the coming defense conversion proceed? Not through DARPA, or even *ARPA*, thinks Norberg. As an agent for R&D leadership, that agency won't work, he predicts. Agencies for civilian R&D, like NSF, are more democratic than DARPA. They submit to peer review and to industry's advice. Borrowing an image from historian Paul Kennedy, Norberg says turning DARPA from military technology to commercial technology will be like turning an oil tanker on the high seas—there's a lot of momentum to overcome.

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DARPA

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As evidence of DARPA's current weakness, Norberg offers the example of high-performance computing and communication (HPCC), a technology that has not just spun off from DARPA, but spun entirely out of its control. As the Cold War ended and the defense conversion began, the military either couldn't afford or didn't need the kind of computing R&D that IPTO supported. IPTO needed a new product and a new market, so to speak. "So DARPA came up with this new scheme—high performance computing and communication, HPCC, the backbone of Mr. Gore's present interest in networking and parallel processing," he says. "DARPA sold that idea first to the military, then to the Congress."

As soon as HPCC became a presidential initiative, DARPA's role was reduced.

But this year, new HPCC funding goes elsewhere, to NASA, NIH, NSF and the Department of Commerce. "As soon as it became a presidential initiative, DARPA's role was reduced. The management of that project is now in the Office of Science and Technology Policy, in the hands of Gibbons."

Norberg is equally pessimistic regarding ARPA's new role as chair of the Defense Technology Conversion Council, an organization that also includes NASA, NIST, NSF and Department of Energy Defense Programs. "Now there's a demand that they [ARPA] be involved with consortia with industry in order to promote the development of new products that can be sold on the commercial market," says Norberg. "ARPA will not be able to do it, is my view. The notion of simply building onto existing [DARPA] programs won't work. That's not going to establish a new program.

"I am tempted to conclude, finally, that the history of the IPTO office, an office whose work was stimulated and focused by the Cold War, is indeed bracketed by the Cold War," says Norberg. "Even though it still exists in another name, I think it's done; it's finished. There will be a lot of little things going on. But whether that contributes to a greater economic competitiveness, I would be very doubtful. So it won't work for a while, and then they'll change it, and then we won't hear much about it any more."

Maybe DARPA will die. Maybe the Clinton Administration has already chosen its heir—the Advanced Technology Program (ATP) in the National Institute of Standards and Technology (NIST). According to a report in *Science*, the ATP "issues grants for research and development of 'high-risk, precompetitive, generic technologies,'" and "the Clinton Administration apparently intends NIST's ATP to be the centerpiece of its civilian technology efforts." Clinton's science and technology budget plan, as he spelled it out in his "A Vision of Change for America," calls for the ATP to grow eleven-fold in four years.[5]

By Phil Norcross

Notes

1 See *Research Review*, April 1993, p. 17; and *Science*, 19 March 1993, p. 1690.

2 See *Research Review*, April 1993, p. 18; and Science, 26 February 1993, p. 1245. The Clinton administration's science and technology spending plan is described in "A Vision of Change for America," a document made public on February 18, 1993, and available from the Government Printing Office, phone 202/783-3238. At press time, Congressional support for the plan shows in the House supplemental appropriation for 1993, and in Senate Bill 4, "The National Competitiveness Act of 1993," and in the "High-Performance Computing and High-Speed Networking Applications Act of 1993," introduced by Representative Rick Boucher of Virginia on March 21, 1993.

3 *Science*, 26 February 1993, p. 1245; and New York Times, 8 March 1993, p. A7.

4 Arthur L. Norberg and Judy E. O'Neill, with contributions by Kerry J. Freedman, *A History of the Information Processing Techniques Office of the Defense Advanced Research Projects Agency* (Minneapolis: Charles Babbage Institute, 1992). Norberg is an associate professor in the University's History of Science and Technology Program. Judy O'Neill, Ph.D., graduated from that program in 1992 and is associate director of the Babbage Institute. Freedman is an associate professor in the Department of Curriculum and Instruction. Norberg presented his work to the March 5 meeting of the University of Minnesota Seminar in the History of Science and Technology.

5 See note 3 above.

U of M Sponsored Expenditures, Fiscal 1992, by College

College	$ millions
Medical School	$77.4
Other Health Sciences	46.0
Institute of Technology	52.6
Institute of Agriculture, Forestry, and Home Economics	17.8
College of Biological Sciences	10.2
College of Education	9.1
College of Liberal Arts	7.4
Coordinate Campuses	7.0
Other	11.6
Total	$239.1

U.S. Patents Issued

January - March 1993

1. **Title:** **Condensation-Growth Particle Scrubber**
   Purpose: To remove submicron particles from combustion flue gases or diesel exhausts.
   Inventors: Benjamin Y.H. Liu, JinJun Sun, Peter H. McMurry, Mechanical Engineering

2. **Title:** **Oil Sorption with Surface-Modified Rubber**
   Purpose: Potential product to assist in cleanup of oil spills on land and water.
   Inventors: Wilhelm J. Reindl, Civil and Mineral Engineering; Doil E. Williams, formerly Mineral Resources Research Center

3. **Title:** **Polymer-Coated Carbon-Clad Inorganic Oxide Particles**
   Purpose: For use as packing materials to improve separation capabilities of high performance liquid chromatography equipment.
   Inventors: Eric F. Funkenbusch, Peter W. Carr, Douglas A. Hanggi, Thomas P. Weber, Chemistry

4. **Title:** **Automated High-Precision Fabrication of Objects of Complex and Unique Geometry**
   Purpose: Method and apparatus for automated reproduction of three-dimensional objects.
   Inventors: Arthur G. Erdman, Barney E. Klamecki, Donald R. Riley, Jeong-Ho Ahn, Yang Zhu, Mechanical Engineering; E. Dianne Rekow, formerly Diagnostic/Surgical Science, Dentistry

5. **Title:** **Chemical Vapor Deposition of Aluminum Films Using Dimethylethylamine Alane**
   Purpose: To provide a liquid precursor for deposition of high quality aluminum films with high electrical conductivity, high reflectivity, mechanical strength and resistance to chemical attack.
   Inventors: Wayne L. Gladfelter, Everett C. Phillips, Chemistry

6. **Title:** **Rapid Degradation of Halogenated Hydrocarbons by Methanotrophic Bacteria**
   Purpose: For bioremediation of toxin-contaminated sites.
   Inventors: Richard S. Hanson, Gray Freshwater Biological Institute

7. **Title:** **Hypersensitive Acid-Labile Handle for Solid-Phase Peptide Synthesis**
   Purpose: Compounds used to anchor a protected amino acid or peptide to a support during synthesis.
   Inventors: George Barany, Chemistry; Fernando Albericio, Millipore Corporation

8. **Title:** **Method of Depositing Oxide Passivation Layers on High Temperature Superconductors**
   Purpose: To provide a stabilizing environment which protects the surface of the superconductor from the ambient atmosphere and isolates it from other devices and components.
   Inventors: John Weaver, Chemical Engineering and Materials Science; Robert K. Grasselli, David L. Nelson, Office of Naval Research; Harry M. Meyer, III, Donald M. Hill, formerly Chemical Engineering and Materials Science

Licenses Negotiated

January - March 1993

1. **Titles:** **Radiopharmaceutical Agents for the Detection of Alzheimer's Disease, and Azavesamicols**
   Purpose: Imaging agents for potential diagnosis and evaluation of Alzheimer's disease, and with other potential pharmacologic applications.
   Licensee: Nihon Medi-Physics Company, Ltd., Tokyo—Exclusive License
   Inventors: Simon Efange, Radiology; Stanley M. Parsons, University of California

2. **Title:** **Dideoxycarbocyclic Nucleosides**
   Purpose: Potential anti-HIV compounds and related technology.
   Licensee: Burroughs Wellcome Company, Research Triangle Park, NC — Exclusive License
   Inventors: Robert Vince, Mei Hua, Medicinal Chemistry

3. **Title:** **Microbiological Agent for Thistle Control**
   Purpose: Use of a natural bacterial pathogen to control Canadian thistle weeds.
   Licensee: Mycogen Corporation, San Diego, CA—Exclusive License
   Inventors: Donald L. Wyse, David R. Johnson, Agronomy and Plant Genetics

4. **Title:** **Pike Bay™ Aspen Tree**
   Purpose: A new variety exhibiting rapid growth, good tree form and aesthetic qualities, and resistance to Hypoxylon canker.
   Licensor: U.S. Department of Agriculture—Co-Invention License to University of Minnesota
   Inventors: Neil A. Anderson, Plant Pathology; Michael E. Ostry, North Central Forest Experiment Station, USDA

5. Title: **Market Tools Version 1.0 Software**

Purpose: Educational software designed to support competitive games that teach marketing of agricultural products.

Licensee: Harvest States Cooperatives, St. Paul, MN—Exclusive License

Inventors: Robert P. King, Agricultural and Applied Economics; Larry S. Lev, Oregon State University

6. Title: **Method of Increasing Egg Production in Avian Species by Active Immunization Against Vasoactive Intestinal Peptide**

Purpose: To produce an antibody response in laying turkey and other avian hens in order to tie up a naturally produced peptide that reduces egg laying behavior.

Licensee: Minnesota Turkey Growers Association, St. Paul, MN—Research Agreement and License Options

Inventors: Mohamed E. El Halawani, Animal Science

7. Titles: **Substituted Pyrroles with Opioid Receptor Activity**

Delta Opioid Receptor Antagonists

Delta Opioid Receptor Antagonists for Deterring Ethanol Ingestion

Use of Delta Opioid Receptor Antagonists to Block Opioid Agonist Tolerance and Dependence

Use of Delta Opioid Receptor-Selective Benzylidene-Substituted Morphinans

Purpose: Highly selective delta opioid antagonists with potential pharmacologic uses in drug abuse withdrawal, analgesia, appetite control, and neurological disorders, cardiovascular responses and respiratory depression.

Licensee: Mallinckrodt Specialty Chemicals Company, Chesterfield, MO—Exclusive License

Inventors: Philip S. Portoghese, Andrzej Lipkowski, Medicinal Chemistry; Akira E. Takemori, Pharmacology; Janice C. Froehlich, Indiana University

8. Title: **Methods and an Acetyl CoA Carboxylase Gene for Conferring Herbicide Tolerance and an Alteration in Oil Content of Plants**

Purpose: To improve weed control with less environmental impact and to increase value of agricultural crops such as corn.

Licensee: BASF Corporation, Parsippany, NJ—Research Agreement and License Options

Inventors: Burle G. Gengenbach, Donald L. Wyse, Margaret A. Egli, David A. Somers, John W. Gronwald, Sheila M. Lutz, Agronomy and Plant Genetics

9. Title: **Use of Non-Nicotine Substance to Alleviate Tobacco Withdrawal Syndrome**

Purpose: Novel substance with potential as active ingredient in smoking cessation products.

Licensee: Lec Tec Corporation, Minnetonka, MN—Exclusive License

Inventors: Dorothy K. Hatsukami, Psychiatry; Robert M. Keenan, NIDA

10. Titles: **Method of Size-Selective Extraction from Solutions**

Temperature-Sensitive Method of Size-Selective Extraction from Solution

Soy Protein Isolation Process Using Poly (N-Isopropylacrylamide) Gels

Purpose: Processing technology using size-selective methods and solvents.

Licensee: Gel Sciences, Inc., Waltham, MA—Exclusive Option Agreement

Inventors: Edward L. Cussler, Jr., Dale W. Johnson, Steven J. Trank, Chemical Engineering and Materials Science

11. Title: **Treatment for Cocaine Use**

Purpose: Use of existing anti-epileptic compounds to assist withdrawal from cocaine addiction.

Licensee: Pharmagene Corporation, Morris Plains, NJ—Exclusive License

Inventors: James A. Halikas, Psychiatry

12. Title: **Avirulent Live Vaccine and Method for Immunizing Animals Against P. Multocida Pasteurellosis**

Purpose: Use of avirulent strains of a bacterium that may be useful to control infection.

Licensee: Oxford Veterinary Laboratories, Inc., Worthington, MN—Exclusive Option Agreement

Inventors: Keum Hwa Choi, Samuel K. Maheswaran, Veterinary Pathobiology

13-19. Title: **Honeycrisp™ Apple Tree**

Purpose: A unique, cold-hardy variety of apple tree with fruit that ripens early and uniformly, stores well, and tastes sweet but juicy and crisp.

Licensees: Dassel Hillside Farm, Dassel, MN—Nonexclusive License
Carver Nursery, Carver, MN—Nonexclusive License
Louis Nurseries, Paynesville, MN—Nonexclusive License
Van Lin Orchards, La Crescent, MN—Nonexclusive License
Shefelbine Orchard, Holmen, WI—Nonexclusive License
Monadnock Orchard, Stanchfield, MN—Nonexclusive License
Edible Forest Nursery, Minocqua, WI—Nonexclusive License

Inventors: James J. Luby, David S. Bedford, Horticultural Science and Horticultural Research Center

Where Federal Budgets Come From

Those of you watching the federal budget process may find it helpful to know some of the rules of the game. From start to finish, the main events are as follows:

Budget Resolution: In February, the Clinton administration proposed to Congress a broad, general budget plan for fiscal 1993 through 1997. In March budget resolutions, the House and Senate approved most of that plan. Understand that a budget resolution, like an authorization act, does not give anyone money to spend. It says, "This is what we want to do, *if we have the money*." Getting the money requires an *appropriation*, a matter addressed in the following steps.

Supplemental Appropriation: For the current fiscal year, 1993, the Clinton administration also proposed spending over and above the budget set last year. In March, the House approved most of this supplemental appropriation for 1993, but on April 21, the Senate voted most of it down.

The 1994 Budget Request: In early April, the Clinton administration proposed a detailed 1994 budget.

602b Allocations: The House has 13 appropriations subcommittees, each responsible for specific departments and agencies. With its 602b allocations, probably made in late April, the House specifies how much each subcommittee has to distribute. The NIH, for example, will get a share of the 602b allocation to the Subcommittee on Labor, Health and Human Services, Education and Related Agencies. The EPA, NASA and NSF come under the Subcommittee on the Veteran's Administration, Housing and Urban Development and Independent Agencies. The National Institute of Standards and Technology gets its budget from the Subcommittee on Commerce, Justice, State, the Judiciary and Related Agencies.

The Mark-Up: House appropriations subcommittees "mark up" their budget bills and send them on to the full House Appropriations Committee. Last year, this mark-up was finished in early June. Because the administration released the 1994 budget later than usual, the mark-up may go on later than usual.

House Floor: The 13 appropriations bills must each be approved by the full House of Representatives before the Senate can act on appropriations. It is here, "on the floor," that most Representatives get their first chance to affect the federal budget. They might amend a bill to remove spending for the space station or super collider, for example.

Senate Floor: Spending bills can now pass through Senate subcommittees, the appropriations committee, and the floor.

Conference Committee: A conference committee, with members from each House and Senate appropriations subcommittee, resolves differences between the House and Senate appropriations bills.

Final Passage: The bills prepared by the conference committee, called "conference reports," go back to the full House and Senate for approval. The bills are rarely changed at this stage.

The President's Signature: Final appropriations bills go to the President for signature. If they are not signed by October 1, the start of the federal fiscal year, then the government continues to run by means of temporary "stop-gap" funding bills.

U of M Sponsored Expenditures, Fiscal 1992, by Sponsor

Sponsor	$ millions
National Institutes of Health	$87.9
Alcohol, Drug Abuse & Mental Health Administration	12.9
Other Health & Human Services	5.6
National Science Foundation	22.4
Dept. of Defense	14.6
Dept. of Education	7.3
Dept. of Energy	4.8
Other federal	32.2
Private	34.6
State of Minnesota, and Local Government	16.8
Total	$239.1

National Science Foundation

Antarctic Research

The National Science Foundation invites scientists at U.S. institutions to submit proposals:

- to perform research in Antarctica, or
- to perform related research and data analysis in the United States.

Scientific research and operational support of that research are the principal activities supported by the U.S. Government in Antarctica. The goal is to foster research on worldwide and regional problems of current scientific importance and to expand fundamental knowledge of the region.

In the U.S. Antarctic Program, three year-round research stations, additional research facilities and camps, airplanes, helicopters, various types of surface vehicles and ships support approximately 120 research projects each year at numerous locations throughout the continent and its surrounding oceans. The research is performed by investigators from universities and, to a lesser extent, from federal agencies and other organizations.

The program areas supported by this program are:

- Aeronomy and astrophysics
  - the stratosphere and the mesosphere
  - the thermosphere, the ionosphere and the magnetosphere
  - astronomy and astrophysical studies of the regions of the universe outside the magnetosphere, including solar astronomy and cosmic ray physics
- Biology and medical research
  - marine ecosystem dynamics
  - terrestrial and limnetic ecosystems
  - population biology and physiological ecology
  - adaptation
  - human behavior and medical research
- Earth sciences
  - determining the tectonic evolution of Antarctica
  - determining Antarctica's crustal structure
  - determining the effect of the dispersal of antarctic continental fragments on the paleocirculation of the world oceans, on the evolution of life and on global paleoclimates and present climate
  - reconstructing a more detailed history of the ice sheets
  - determining the evolution of sedimentary basins within the continent and along continental margins
  - geophysics
- Ocean and climate systems
  - physical oceanography
  - chemical oceanography
  - sea ice dynamics
  - meterology
- Glaciology
  - correlation of climatic fluctuations evident in antarctic ice cores
  - documentation of the geographic extent of climatic events noted in paleoclimatic records
  - establishment of more precise dating methodologies for deep ice cores
  - determination of the Cenozoic history of antarctic ice sheets
  - investigation of the physics of fast glacier flow with emphasis on processes at glacier beds
  - investigation of ice-shelf stability
  - identification and quanitification of the feedback between ice dynamics and climate change
- Environmental research
  - This program, new in FY94, anticipates making five to seven grants per year in the $100,000 to $150,000 range. The goal is to support research that can help reduce the environmental impact of NSF's activities in Antarctica. Areas of inquiry might include policy research, effects of past practices, materials and waste mnagement, current impacts, resilience of ecosystems, and promising technologies.
- Instrumentation
  - acquiring new research equipment or modernizing existing equipment
  - developing instruments or techniques that extend research capabilities
  - supporting research technicians
  - doing demonstration or feasibility projects to test an idea for enhancing existing instrumentation
  - developing new or enhanced remote sensing techniques.

Antarctic proposals may be submitted each year during the one-month window **between May 1** and **June 1**. Proposals received before May 1 normally will be returned for later submittal. Those postmarked after June 1 are subject to return without review.

A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note to gopher@ortta.umn.edu.

National Science Foundation

Directorate for Biological Sciences
Division of Molecular and Cellular Biosciences

The Division of Molecular and Cellular Bioscienes (MCB) supports research and related activities that contribute to a fundamental understanding of life processes at the molecular, subcellular and cellular levels. The Division considers investigator-initiated research proposals through its programs in cell biology, biochemistry and molecular structure and function, and genetics and nucleic acids. These programs also support fundamental studies leading to technological innovation, e.g., biotechnology.

The Division also considers support for:

- research conferences, meetings and workshops, both domestic and international;
- supplements to current grants for research experiences for undergraudates, research opportunity awards and participation of minority students; and
- a variety of NSF-wide activities including Minority Research Initiation (MRI), Research at Undergraudate Institutions (RUI), Young Investigators Awards (NYI), and Research Planning Grants and Career Advancements in the Research Opportunities for Women activity (ROW).

Support for a) shared-use equipment and instrument development, b) data bases, c) large-scale instrumentation facilities, d) collaborative interdisciplinary efforts in instrumentation and software development, and e) postdoctoral fellowships in certain areas is also provided by the Division of Biological Instrumentation and Resources.

Cell Biology Program

Supports research on the structural and functional organization of plant, animal and microbial cells and on signalling pathways and regulation at the cellular level.

Cellular organization includes the assembly and function of structural elements in the cell such as the cytoskeleton, membranes, organelles, and intercellular compartments, intranuclear structures and the extracellular matrix (including walls).

Biochemistry and Molecular Structure and Function Program

Supports research aimed at understanding the structure, function, dynamics and metabolism of biological molecules. Biochemical and biophysical approaches are used in the study of proteins, nucleic acids, lipids, carbohydrates and other cullular components.

Topics include, but are not limited to enzyme mechanism and regulation; structural biology; protein synthesis; structure, function and assembly of supramolecular complexes; energy transduction; photosynthesis; electron transfer; characterization of primary and secondary metabolic pathways; membrane structure and function; biogeochemical cycles; degradation of polymers and zenobiotic compounds; and the synthesis and properties of biomolecular materials. Theoretical as well as *in vivo* and *in vitro* experimental studies are considered in all areas.

Genetics and Nucleic Acids Program

Supports a wide range of studies directed toward answering significant questions of genetic organization, recombination, transcription, genome replication, and function and transmission of heritable information in all organisms from viruses to plants and animals. Such questions can be asked of either the nuclear or organelle genome.

Specific areas include, but are not limited to, mechanisms of gene regulation, recombination, meiotic and mitotic mechanisms, sex determination, interactions at the genetic level between organisms, and molecular evolution of genes. Approches to the questions can utilize Mendelian genetics, molecular genetics or biochemical methods, or, ideally, any combination which will be optimally effective.

To Apply

Annual target dates are **June 1** and **December 1**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note to gopher@ortta.umn.edu. The announcement contains the names and telephone numbers of Division staff members.

National Institutes of Health

Research Supplements to Promote Reentry Into Biomedical and Behavioral Research Careers

The Office of Research on Women's Health (ORWH) and the Office of Extramural Research, National Institutes of Health (NIH) announce a program of a limited number of supplements to research grants to encourage fully trained women and men to reenter an active research career after taking time off to care for children or parents or to attend to other family responsibilities.

The goal of this program is to assist fully trained individuals who have not reentered the research arena. In keeping with this goal, at the time of application a candidate may not be engaged in paid research for more than 10 hours per week.

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Candidates who have begun the reentry process through a fellowship or similar mechanism are not eligible. The candidate must have a doctoral degree, such as M.D., D.D.S., Ph.D., D.V.M or equivalent, and must demonstrate evidence of excellence in research prior to the career hiatus. The hiatus in the research career may not be fewer than two nor more than eight years in duration.

This supplement is not intended to support graduate or postdoctoral training and is not intended to cover career changes from non-research to research careers.

This program will provide administrative supplements to existing NIH research grants for the purpose of supporting full-time or part-time research tailored to update existing research skills and knowledge. Supplemental awards may be made for up to two years and may not exceed $50,000 in direct costs per year. Approximately $1 million will be available for up to 10 supplemental awards in FY93.

The application deadline is **June 4, 1993**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note to gopher@ortta.umn.edu.

National Institute on Aging

Health and Effective Functioning in the Middle and Later Years

PA-93-076

The National Institute on Aging (NIA), National Institutes of Health, invites the submission of research and career grant applications for projects designed to specify how psychosocial processes, interacting with biological processes, influence health and functioning in the middle and later years of life.

As life expectancy has been extended, the proportion of adult life that might be spent in retirement has also increased. However, it remains to be seen whether and how people will benefit from these added years. How can the relatively vigorous health, effective functioning and productivity of the middle years be continued into the later years? How can disability and dependency be postponed until the last years of the extended life course?

Biological, psychological and social processes of growing old are to a considerable extent malleable. However, the mechanisms and conditions that influence health and functioning during the middle and later years remain to be specified. NIA's goal in issuing this program announcement is to encourage basic research studies of these mechanisms and conditions that can extend the productive middle years of life by preventing, postponing or reversing disabilities of old age.

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The mechanisms of support for this program are the research grant (R01), the FIRST award (R29), program projects (P01) and Fellowships (F32, F33). The anticipated average award (direct costs) is $150,000 per year.

This is an ongoing program with annual deadlines of **February 1, June 1** and **October 1** for R01, R29 and P01 applications, and **April 5, August 5** and **December 5** for Fellowship (F32, F33) applications. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note to gopher@ortta.umn.edu. For further information contact Ronald P. Abeles, Ph.D., Behavioral and Social Research, National Institute on Aging, Gateway Building, Room 2C234, Bethesda, MD 20892; 301/496-3136.

NIDDK

Core Grants for Clinical Nutrition Research Units

DK-93-020

The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), National Institutes of Health, invites applications for funding of Clinical Nutrition Research Unit (CNRU) grants to be competitively awarded in FY95. The objectives of the CNRUs are to bring together investigators from relevant disciplines in a manner which will enhance and extend the effectiveness of research related to the nutritional sciences, obesity and related disorders. They are specifically related to the priority areas of nutrition, physical activity and fitness, heart disease and stroke, cancer, diabetes and chronic disabling conditions.

The NIDDK-supported CNRUs are part of an integrated program of nutrition- and obesity-related research support provided by NIDDK. These centers provide a focus for increasing collaboration and cost effectiveness among groups of successful investigators at institutions with established comprehensive nutritional sciences and obesity research bases.

The mechanism of support will be through the NIH Core Center Grant (P30). NIDDK anticipates awarding three CNRU grants in FY95. Awards will be for a period of five years and support must be limited to no more than $700,000 per year. Applications exceeding this amount will be returned to the applicant.

An optional, nonbinding letter of intent is requested by October 8, 1993. The letter should include a descriptive title of the proposed research; the name, address and telephone number of the principal investigator; the identities of other

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key personnel and participating institutions; and the number and title of the RFA in response to which the application is being submitted.

The application receipt date is **November 18, 1993**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note to gopher@ortta.umn.edu. For further information contact Van S. Hubbard, M.D., Ph.D., Division of Digestive Diseases and Nutrition, NIDDK, Westwood Building Room 3A18B, Bethesda, MD 20892; 301/594-7573; fax 301/594-7504.

National Institutes of Health

NIMH/NIDA/NIA/NICHD/NIDCD/NCRR/NLM
NSF/NASA/ONR

The Human Brain Project: Phase I Feasibility Studies

The Human Brain Project is a broadly based federal research initiative that encourages and supports investigator-initiated research on information resources that could be used to facilitate neuroscience research.

Phase I of the Human Brain Project will support research related to the development, storage, management, analysis, integration and dissemination of neuroscience information. This initiative will incorporate cutting-edge informatics research with neuroscience research in order to facilitate the integration of neuroscience information and to promote communication and collaboration across scientific disciplines and geographic locations.

Particular emphasis is placed on research on computer storage and manipulation of neuroscience information, network systems, and associated tools that will give neuroscientists access to the stored information. The networks will also provide electronic channels of communication and collaboration to geographically distant laboratories.

To optimize the utility of these technologies to neuroscience researchers, they will be developed in the context of specific neuroscience research. It is important to emphasize that the scientific question being addressed is as important as the technology being developed.

An optional, non-binding letter of intent was requested by April 19. As it may be beneficial for applicants to contact the appropriate program official(s) administering this project, a list of these is included in the program announcement. Although the letter of intent is past due, such contact is encouraged.

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U.S. Department of Agriculture

Biotechnology Risk Assessment Research

The U.S. Department of Agriculture (USDA) is inviting proposals for competitive grant awards under the Biotechnology Risk Assessment Research Grants Program for FY93.

The purpose of the program is to assist federal regulatory agencies in making science-based decisions about the safety of introducing genetically modified plants, animals and microorganisms into the environment. The program accomplishes this purpose by providing scientific information derived from the risk assessment research conducted under it.

Research proposals submitted to the program must be applicable to the purpose of the program to be considered. Proposals based upon field research and whole organism-population level study are strongly encouraged. The development of better methods for field testing genetically modified organisms will also be considered. Awards *will not* be made for clinical trials, commercial product development, product marketing strategies or other research not appropriate to risk assessment.

Proposals are invited in the areas of 1) biotechnology risk assessment research as appropriate to agricultural plants, animals and microbes, and 2) the organization of an annual conference of funded researchers to help communicate research needs, findings and emerging opportunities. (Applicants considering subitting a proposal under this category are strongly advised to consult the program directors before beginning preparation of such a proposal). Emphasis will be given to risk assessment research involving genetically modified organisms, but model systems using nongenetically modified organisms also will be considered if they can provide information that could lead to improved assessment of potential risks associated with the introduction of genetically modified organisms into the environment.

Total funding available in FY93 for this program is $1,700,000. Please note that indirect costs may not be budgeted at more than 14 percent of total direct costs.

The application deadline is **June 14, 1993**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note to gopher@ortta.umn.edu. For further information, please contact Dr. David MacKenzie, Cooperative State Research Service, U.S. Department of Agriculture, Suite 330, Aerospace Center, Washington, DC 20250-2220; 202/401-4892, or Dr. Robert Faust, Agricultural Research Service, U.S. Department of Agriculture, Room 336, Building 005, BARC-West, Beltsville, MD 20705; 301/504-5059.

Gas Research Institute

Basic Research Contract Opportunities

During 1993, the Gas Research Institute (GRI) intends to solicit proposals in several specific areas of basic research important to the U.S. natural gas industry. GRI, a private, not-for-profit organization, plans and manages a cooperative R&D program designed to benefit the natural gas industry and its customers.

These requests for proposals (RFPs) will describe GRI's specific research interests, required proposal format, deadline for receipt of proposals, and proposal evaluation criteria. Contracts may run as long as three years. The research areas and the planned timing of these proposal requests are listed below. Those who wish to receive formal requests for proposals in an individual research area should write to the designated manager, Physical Sciences Department, Gas Research Institute, 8600 West Bryn Mawr Avenue, Chicago, Illinois 60631, fax 312/399-8170. Only written requests for specific individual RFPs will be accepted. The RFPs listed below may change in content or timing without notice.

Please note that ORTTA *will not* be writing for any of these RFPs.

Research Area & Annual Funding	RFP Release Date	Manager
Pinpointing of Leaks in Gas Pipes . . . . . New or improved methods for locating leaks in underground plastic pipes ($500,000).	Spring 1993	F. Fish
Plastic Pipe Location . . . . . New or improved methods for locating underground plastic pipes ($400,000).	Spring 1993	F. Fish
Formation of Gas Reservoirs . . . . . Methods to identify, locate and evaluate seals and production zones in anomalously pressured Gulf Coast natural gas fields ($600,000).	Spring 1993	P. Westcott
Gas Odorant Fading . . . . . Experimental research to develop a predictive model for the loss of organosulfur additives in natural gas ($300,000).	Spring 1993	T. Altpeter
Crystallization Inhibition in Absorption Fluids . . . . . Development of additives to delay nucleation of crystals in absorption cooling fluids ($400,000).	Summer 1993	F. Fish
Surface Chemistry, Gas Heat Pumps and Chillers . . . . . Surface treatment to prevent corrosion in absorption cooling machines at 450-600°F ($400,000).	Summer 1993	K. Krist
Drilling . . . . . Fundamental understanding leading to improved shear-cutting of rock, methods to increase power of downhole motors, and other innovations to improve deep drilling performance ($600,000).	Summer 1993	P. Westcott
Gas Sensors . . . . . Concepts for better sensors for detecting NO_x, CO, CO_2 and CH_4 in natural gas combustion systems ($400,000).	Summer 1993	K. Krist
Post-Combustion Emission Control . . . . . Heterogeneous catalysis for complete oxidation of methane in the exhaust gasses from natural gas combustion equipment ($400,000).	Autumn 1993	D. Scarpiello
Rheology of Drilling and Fracturing Fluids . . . . . Innovations in fluid composition or handling to improve fracturing or drilling performance and methods to measure properties ($300,000).	Autumn 1993	P. Westcott

Faculty Research, Training and Service Awards

This section contains statistics on proposals and awards recently processed by ORTTA. In addition, we have randomly selected awards received by faculty during preceding months. Faculty who have received awards they would like mentioned in a future *Research Review* may send the pertinent data, as exemplified below, to Phil Norcross at ORTTA, phil@ortta.umn.edu, 625-2354.

Proposal and Award Summary

	Number	Amount
Proposals Submitted March 1993	296	$ 48,388,436
Awards Processed March 1993	253	20,731,245
Proposals Submitted July 1992 - March 1993	2,965	446,517,553
Awards Processed July 1992 - March 1993	2,340	188,709,105
Proposals Submitted July 1991 - March 1992	3,214	523,006,507
Awards Processed July 1991 - March 1992	2,330	191,066,629

Parallel Scalable Libraries for Large-Scale Applications
Youcef Saad, Computer Science
USDOD, DARPA
$473,176 - 09/92-08/93

Environmental and Natural Resources Policy and Training Project
William Fenster, International Agriculture Programs
University of Wisconsin, USAID Prime
$419,652 - 04/92-02/93

Carbocyclic Nucleoside Chemotherapeutic Agents
Robert Vince, Pharmacy
NIH, NCI
$286,245 - 12/92-11/93

Effects of Introducing Assessment of Values and Preference
Rosalie A. Kane, Health Services Research Institute
Retirement Research Foundation
$278,201 - 02/93-01/95

Structural Analysis of Methane Monooxygenase
Douglas H. Ohlendorf, Biochemistry (MS)
NSF
$240,000 - 04/93-09/95

Mechanisms of T-Lymphocyte Migration Into Skin
Elizabeth A. Wayner, Laboratory Medicine and Pathology
American Cancer Society
$213,000 - 01/93-12/94

Menstrual Cycle Effects on Symptoms from Tobacco Cessation
Sharon Smith Allen, Family Practice and Community Health
Dorothy Hatsukami, Psychiatry
NIH, NIDA
$203,449 - 03/93-02/94

Topical Radioprotection of Oral and Rectal Mucosa
John P. Delaney, Surgery
Margaret E. Bonsack, Surgery
American Cancer Society
$200,000 - 01/93-12/94

Transmembrane Signalling in Cytotoxic T Lymphocytes
Matthew F. Mescher, Laboratory Medicine and Pathology
NIH, NIAID
$168,836 - 03/93-02/94

Phylogeny and Diversification of Dyrangeaceae
Larry Hufford, Biology, Duluth
NSF
$150,000 - 06/93-11/96

Drought Tolerance in Congruity Backcrosses of Phaseolus
Peter D. Ascher, Horticultural Science
Carl J. Rosen, Soil Science
Agency for International Development
$149,846 - 10/92-10/96

Absorption of Retinoids from the Gastrointestinal Tract
Cheryl L. Zimmerman, Pharmaceutics
Timothy S. Wiedmann, Pharmaceutics
NIH, NCI
$140,467 - 01/93-12/93

Organophosphoranyl Radicals and Organophosphonate Derivative
Christopher J. Cramer, Chemistry
USDOD, Army
$129,882 - 01/93-01/94

Community Service Grant—Radio
Andrew J. Marlow, Continuing Education and Extension
Corporation for Public Broadcasting (CPB)
$121,617 - 10/92-09/94

Cooperative Research on Pseudomonas Syringe pv Tagetis Bioherbicide
Donald L. Wyse, Agronomy and Plant Genetics
David R. Johnson, Agronomy and Plant Genetics
Mycogen-Bioherbicide Research
$100,000 - 01/93-12/94

Genetics of Host and Microbe Affecting Soybean Nodulation Specificity
Michael J. Sadowsky, Soil Science
Agency for International Development
$100,000 - 09/92-09/95

Real-time Servo Control Using Computer Vision
Nikos Papanikolopoulos, Computer Science
DOE, Sandia National Laboratory
$45,151 - 09/92-09/93

Open-Label, Long-Term Comparative, Parallel Safety and Efficacy Study of Flecainide and Quinidine in Patients with Paroxysmal Atria
David G. Benditt, Medicine
3M
$11,962 - 11/92-10/93

Regulation of K Transport in Vascular Smooth Muscle
David H. Warden, Medicine
NIH, NHLBI
$72,222 - 12/92-03/93

Multi-Site Hospital Surveillance of Blood Contacts
Frank S. Rhame, Medicine
Ramsey Foundation
$26,271 - 09/92-09/93

Altered Expression of Muscle Genes in Post-Viral Myositis
Patricia E. Tam, Medicine
Arthritis Foundation - Minnesota Chapter
$15,772 - 01/93-12/93

Killing of Pseudomonas by a Granule Protein from PMNL
Beulah H. Gray, Microbiology
Cystic Fibrosis Foundation
$75,000 - 12/92-11/93

Nitric Oxide: Role in Cerebral Ischemic Damage and in Strategies for Brain Protection
Costantino Iadecola, Neurology
Sklarow Fund
$58,386 - 03/93-07/94

Molecular Analysis of Human Chromosome 17
William B. Dobyns, Neurology
Baylor College of Medicine
$28,439 - 09/92-03/93

Computerization of Data—1949-1955 by Streptococcal Disease
Edward L. Kaplan, Pediatrics
USDOD, Army
$24,500 - 03/93-02/94

Genetic Engineering of Targeted Therapies for Myeloid Leukemia
John P. Perentesis, Pediatrics
NIH, NCI
$95,028 - 03/93-02/94

Vitamin A-Related Gene Expression in Early Embryonic Development
Li-Na Wei, Pharmacology
Minnesota Medical Foundation
$15,000 - 03/93-02/94

Neural Mechanisms of Muscle Pain
Donald A. Simone, Psychiatry
NIH, NINDS
$98,536 - 02/93-01/94

Clinical Studies ACS-28
Carl L. Bandt, Preventive Sciences
Bruce L. Pihlstrom, Preventive Sciences
Atrix Labs
$40,365 - 09/92-09/93

A Randomized, Double-Blind Placebo Controlled Study of the Safety, Tolerance and Preliminary Pharmacokinetics of Ascending Single Doses of Orally Administered Rapamycin in Stable Renal Transplant Tissues
Daniel M. Canafax, Pharmacy Practice
Arthur Matas, Surgery
Wyeth-Ayerst Research
$20,000 - 01/93-12/93

Retrospective Case-Control Study of Severe Racing Injuries
Robert A. Robinson, Clinical and Population Sciences
Calvin Kobluk, Clinical and Population Sciences
Julia H. Wilson, Clinical and Population Sciences
St of MN, Racing Commission
$12,340 - 01/93-06/94

Effects of Chronic Dexamethasone Administration on Bone in Racehorses
Mike Murphy, Veterinary Diagnostic Medicine
St of MN, Racing Commission
$49,110 - 02/93-06/94

Effects of Hemorheology on Oxygen Transport
Douglas Weiss, Veterinary Pathobiology
Raymond Geor, Clinical and Population Sciences
St of MN, Racing Commission
$36,237 - 02/93-06/94

Macrophage Activation by R-837
Arthur G. Johnson, Medical Microbiology and Immunology, Duluth
3M
$49,985 - 09/92-08/93

Computational Techniques for Flows with Finite-Rate Condensation
Graham V. Candler, Aerospace Engineering
NASA
$36,700 - 12/92-12/93

Modeling Solution Crystal Growth Processes
Jeffrey J. Derby, Chemical Engineering
NSF
$41,841 - 02/93-07/94

Infrared Studies of Transient Events: Classical Novae and Variable Stars
Robert D. Gehrz, Astronomy
Terry J. Jones, Astronomy
Edward P. Ney, Astronomy
NSF
$77,170 - 01/93-06/94

Physio-Chemical Evaluation of Asphalt-Aggregate Interactions
David E. Newcomb, Civil and Mineral Engineering
St of MN, Transportation
$30,000 - 02/93-02/94

Estimation Theory Approach to Monitoring and Updating Estimates of Average Daily Traffic
Gary A. Davis, Civil and Mineral Engineering
St of MN, Administration
$40,000 - 03/93-04/94

Effect of Material Chemistry on Rebar Corrosion
Roberto Leon, Civil and Mineral Engineering
Ji-Won Jang, Civil and Mineral Engineering
St of MN, Transportation
$35,000 - 02/93-08/94

Microptics for Semiconductor Laser Amplifiers
James R. Leger, Electrical Engineering
Stephen A. Campbell, Electrical Engineering
USDOD, Navy
$50,000 - 07/92-07/93

US-Sweden Cooperative Research: Relation Between Water Input, Water Pressure, Surface Speed and Basal Till Deformation
Roger L. Hooke, Geology and Geophysics
NSF
$18,250 - 03/93-08/95

The Condensate Fraction in Superfluid Helium Droplets
J. Woods Halley, Physics and Astronomy
Charles E. Campbell, Physics and Astronomy
Clayton F. Giese, Physics and Astronomy
NASA
$90,000 - 01/93-12/93

Movable Bed Physical Model Study of Howard Creek, White Sulphur Spring West Virginia
Gary N. Parker, St. Anthony Falls Hydraulic Lab
Richard L. Voigt, Jr., St. Anthony Falls Hydraulic Lab
USDA
$52,669 - 09/92-01/93

Instrumentation for Animal Observation
Craig Packer, Ecology, Evolution and Behavior
Anne E. Pusey, Ecology, Evolution and Behavior
D. Frank McKinney, Bell Museum of Natural History
NSF
$65,000 - 03/93-08/94

Cooperative Agreement to Develop a Park Management Plan
Donald B. Siniff, Ecology, Evolution and Behavior
St of MN, Natural Resources
$50,000 - 01/93-07/93

Evaluating Relative Impacts of Conventional and Sustainable Agriculture
Richard A. Levins, Agricultural and Applied Economics
University of Missouri
$30,000 - 09/92-08/94

Biological Controls of Weeds in Corn and Soybeans with Dwarf Brassica Smother Plants
Donald L. Wyse, Agronomy and Plant Genetics
University of Nebraska, USDA Prime
$67,000 - 09/92-08/94

{More Awards Next Page}

The Role of Acetyl-Coenzyme A Carboxylase in Regulating Oil Content of Minnesota Soybeans

James H. Orf, Agronomy and Plant Genetics
MN Soybean Research and Promotion Council
$20,500 - 10/92-12/93

Starch and Amyloplast Formation in Maize Grain

Robert J. Jones, Agronomy and Plant Genetics
R. Gary Fulcher, Food Science and Nutrition (Ag)
Midwest Plant Biotechnology Consortium
$89,786 - 07/92-06/93

Reduction in Colon Cancer by Soy Flour

Daniel D. Gallaher, Food Science and Nutrition (Ag)
MN Soybean Research and Promotion Council
$29,046 - 10/92-12/93

Evaluation of Starch Quality in Relation to Flour Mixing Characteristics in Minnesota Wheat

R. Gary Fulcher, Food Science and Nutrition (Ag)
MN Wheat Research and Promotion Council
$18,763 - 07/92-06/93

Development of Soybean Cyst Management Strategies, Population Shifts with Tillage and Rotational Crops in Minnesota

Ward Stienstra, Plant Pathology
William Lueschen, Southern Experiment Station
J. Harlan Ford, Southwest Experiment Station
MN Soybean Research and Promotion Council
$48,160 - 10/92-12/93

Profit from Soybeans Grown in Conservation Production System

George W. Rehm, Soil Science
MN Soybean Research and Promotion Council
$12,740 - 10/92-12/93

National Program Production and Acquisition Grant

Andrew J. Marlow, Media Resources
$44,873 - 10/92-09/94
Paul Schmitz, Media Resources
$25,122 - 10/92-09/94
Corporation for Public Broadcasting (CPB)

FY93 Community Service Grant

Sheldon Goldstein, Media Resources
Paul Schmitz, Media Resources
Corporation for Public Broadcasting (CPB)
$68,091 - 10/92-09/94

Column Flotation Testing

Blair R. Benner, Natural Resources Research Institute
Cyprus Minerals
$18,600 - 04/93-09/93

Minority High School Student Research Program for 1993

Henricus C. Hogenkamp, Graduate School
NIH, NCRR
$21,000 - 03/93-02/94

Proposed Plan for Evaluating the East Metro Community Health Center

Constance C. Schmitz, Center for Urban and Regional Affairs
Saint Paul Foundation
$59,310 - 03/93-02/96

Correction
Computer and Information Science and Engineering Research Instrumentation

Max Donath, Mechanical Engineering
Maria L. Gini, Computer Science
Daniel L. Boley, Computer Science
Nikos Papanikolopoulos, Computer Science
NSF
$114,950 - 01/93-06/94

The Human Brain Project

{Continued From Page 18}

The application deadline is **June 15, 1993**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note to gopher@ortta.umn.edu. In addition to selected NIH Institutes, this program is also being supported by the National Science Foundation, The National Aeronautics and Space Administration, and the Office of Naval Research.

Centers for Disease Control

Unintentional Injury Prevention and Control

The Centers for Disease Control and Prevention (CDC) announces that applications are being accepted for Unintentional Injury Prevention and Control Research Grants. The purposes of this program are 1) to support injury prevention and control research, 2) to encourage professionals from a wide spectrum of disciplines such as engineering, medicine, health care, public health, behavioral and social sciences, and others, to undertake research to prevent and control injuries, and 3) to evaluate current and new intervention methods and strategies for the prevention and control of injuries.

Unintentional injuries constitute the fourth leading cause of death in the U.S., killing approximately 100,000 people each year. Millions are incapacitated, with many suffering lifelong disabilities. Motor vehicle crashes account for approximately half the deaths from unintentional injuries; falls rank second, followed by poisonings, drownings and residential fires. All these fall within the programmatic interests of the program.

Approximately $700,000 may be available in FY94 to fund 2-4 grants for up to 3 years. New grants will not exceed $250,000 per year, including both direct and indirect costs.

An optional, non-binding letter of intent is required by August 5. The application deadline is **October 5, 1993**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note to gopher@ortta.umn.edu. For further information contact Lisa Tamaroff, Grants Management Specialist, Procurement and Grants Office, CDC, 255 East Paces Ferry Road NE, Room 300, Atlanta, GA 30305; 404/842-6796.

Office of Research and Technology Transfer Administration

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UNIVERSITY OF MINNESOTA

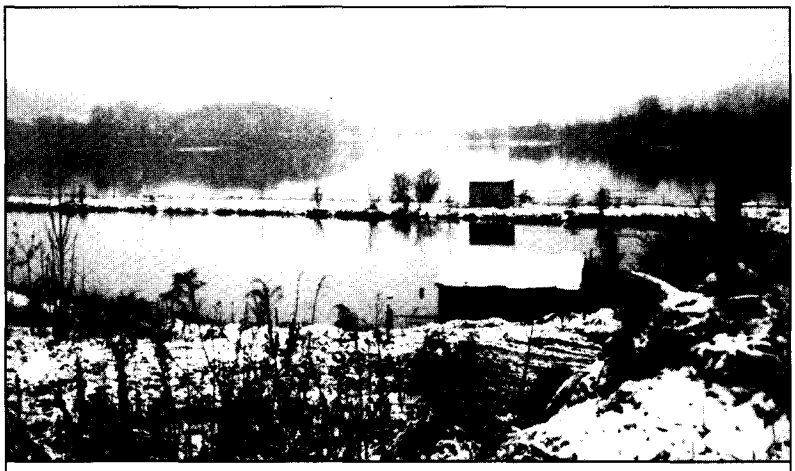
RESEARCH REVIEW

Research and Technology Transfer Administration

June 1993

Minnesota Brings Environmental Help to the World

"We were in Katowice on tour, and we went to a chemical plant with a huge hill next to it. On the other side were two lakes, and between them a path where people were walking their dogs; all around these two lakes was a housing development. The guide threw a stone in the lake, and when it hit, it was like hitting oil, not water. What came up was kind of an orange, rusty-colored substance. Poland is a flat country. The hill we were standing on was waste from the chemical plant.



These two ponds in a residential area of Katowice, Poland, are so polluted with the waste from a chemical plant that the "water" is a rusty orange color.

"Katowice is the most-heavily industrialized area in Poland. About 80 percent of Polish industry is there, and about four million people. They have iron smelters, lead smelters, coal mines, metallurgical industries, chemical industries. The U.S. EPA went and did some testing. One river leaving Katowice is only 14 percent water.

"When we were there just before Christmas, there was a big article in the paper about a child, 12 or 18 months old, whose mother fed him carrots from her garden. Apparently those carrots were the last and fatal dose of lead, and he just died."

Those horror stories come from Victoria Mikelonis, a professor in the Humphrey Institute and spokesperson for a team of four U.S. institutions that teach environmental management in Central and Eastern Europe. Their Environmental Training Project (ETP) is based on the assumption that stabilizing the governments and economies of that region depends upon improving, or at least stabilizing, the health of its environment.

"If they really want to turn the economies around in these countries and move toward a market economy, or some hybrid between their current system and a market economy, they're going to have to find ways to maintain their economic efficiency while still taking care of the

{Continued On Page 9}

Inside

National Institutes of Health

Expanded Authorities — Carry-Forward Balances

Recently, NIH has expressed increased concern regarding carry-forward of large balances from one budget period to the next on grants included under expanded authorities.

In general, the concern seems to be that the Financial Status Report often reflects the carry-forward of large balances (greater than 25 percent of the total-year award), while the continuation proposal has been submitted showing zero or minimal "Estimated Unobligated Balance" for the current budget period (page C of the PHS 2590 kit).

As a result, NIH has been holding up the continuation award pending submission of written justification—the reason for and the use of the large balance.

Therefore, ORTTA *strongly recommends* that when submitting a continuation proposal, the preparer take a close look at the balance remaining at the time the proposal is submitted and determine what, if any, balance will still remain at the end of the budget period. Should a balance be anticipated, show it on page C of the proposal, along with the required explanation/justification.

RESEARCH REVIEW

Volume XXII/Number 12

June 1993

Director of Communications: Michael P. Moore

Editor: Phil Norcross

Editorial Assistant: Tove Jespersen

Associate Vice President: A. R. Potami

***Research Review* is a monthly publication of the Office of Research and Technology Transfer Administration. Its purpose is to inform faculty and administrators who are involved with sponsored research and technology transfer on procedures and policies of granting agencies, on institutional policy and other information necessary to the preparation of research proposals, and on funding opportunities.**

***Research Review* welcomes ideas and comments from all readers. Write to *Research Review* at 1100 Washington Avenue South, Suite 201, Minneapolis, MN 55415-1226, or call Phil Norcross at 625-2354 or Michael P. Moore at 624-9398.**

Indirect Cost & Fringe Benefit Rates

Indirect Cost Rates

The *provisional* rates for July 1, 1992, through June 30, 1994, are listed below. When budgeting for periods beyond 6/30/94, the 7/1/92-6/30/94 rates should be used. **The rate agreement is dated May 13, 1992**. This date should be used where required on proposal applications. In rare cases, particular grant programs have maximum rates that are lower than the rates below. **Please call Marilyn Surbey, 624-4850, or Richard Miller, 626-9895, with questions on indirect costs.**

	07/01/92 06/30/94
Research	
On-Campus	40.00
Off-Campus *	21.00
SAFHL	58.05
Hormel	44.00
Other Sponsored Activity	
On-Campus	20.00
Off-Campus *	10.00
Instruction	
On-Campus	52.00
Off-Campus *	16.00

* A project will be considered off-campus if more than 50% of the direct salaries and wages of personnel employed on the project are incurred at a site neither owned nor leased by the University.

Fringe Benefit Rates

When submitting proposals use either the provisional rates or the applied-for rates, but *do not* use rates from both sources. If you use the provisional rates, you must apply indirect costs to the amount. If you use applied-for rates and are receiving full overhead, you may exempt the graduate assistant fringe benefits.

The applied-for rates have not yet been approved by DHHS and may be subject to change. An agency receiving a proposal with rates that do not match the DHHS negotiated rates ("provisional," below) may choose to deny the fringe request as submitted and only allow the fringe to the extent of rates as currently negotiated.

For questions regarding fringe benefit rate development or the breakdown of charges, call **Vivian Fickling at 624-2009**.

	Academic	Graduate Assistant	Civil Service
1992-93 (Provisional)	31.25%	10.50%	29.50%
1992-93 (Applied-for)	30.25%	9.33%	26.75%
1993-94 (Provisional)	28.00%	31.25%	30.50%
1993-94 (Applied-for)	24.40%	38.00%	28.40%
1994-95 (Applied-for)	24.60%	39.80%	29.30%
1995-96 (Applied-for)	24.75%	41.70%	30.20%

Rate changes will be reflected in this section.

Task Force on Public-Private Partnerships

Statement on the U of M's Involvement in Public-Private Partnerships

Editor's Note: In November 1992 President Hasselmo appointed a Task Force on Public-Private Partnerships to review the University's involvement with industry and other private entities. He asked the task force to report back to him and the Board of Regents with suggested principles regarding those partnerships. The task force submitted the following statement to the President in April 1993; it was reviewed by the regents and discussed at their May 1993 meeting. The regents unanimously passed a resolution endorsing the principles and asking the University administration, in consultation with the University governance system, to implement the task force recommendations.

Public-private partnerships benefit society and form an integral part of the land-grant mission of the University of Minnesota. The economic challenges facing the state, the nation, and the world compel the University to continue to be an innovator in its relationships with entrepreneurs, trade associations, and foundations as well as with companies of all sizes. The University collaborates with industry to develop educational programs and experiences that prepare students for careers, to exchange scientific personnel, and to develop and disseminate the knowledge and technologies needed to sustain competitive growth.

The University consistently ranks among the top ten U.S. universities in total annual R&D expenditures. In 1991, the most recent ranking, it occupied third place. It holds this leadership position in both basic and commercially relevant research because its faculty are innovative and entrepreneurial. Faculty members engaged in research raise an average of $100,000 each year to support their work. As a group, the faculty bring into the state more than $200 million in annual sponsored funding. In 1992, sponsored program expenditures of nearly $240 million directly supported about 6,000 Minnesota jobs and indirectly supported another 4,000. Most of this external support came from non-state sources: 78.5% from federal agencies, 7.3% from industry, 7.2% from private foundations and other non-profit organizations, and 7.0% from the State of Minnesota and local governments.

The University also ranks among the top ten universities in patenting of new research discoveries. Since 1986, it has received 214 U.S. patents. Currently, 160 companies—62 in Minnesota—have licensed the rights to commercialize these patented technologies.

Beyond contractual relationships, the University benefits from several forms of voluntary support from the private sector, including gifts and non-contractual research support. In 1991, such voluntary support totaled $109 million, ranking the University third among public universities and eleventh among all universities in the U.S.

Strong public-private partnerships have benefitted Minnesota in many ways. New industries such as medical device manufacturing, taconite ore processing, and aeronautical systems production arose in the state because of developments made by University researchers. Major corporations such as Medtronic and Rosemount, each of which generates over $1 billion in annual sales and employs about 10,000 persons, began with University-industry partnerships. Graduates carry the University's expertise and entrepreneurial spirit with them to existing or new companies. A study by the Institute of Technology identified nearly 500 companies started in Minnesota by graduates; these companies employ about 85,000 people and earn over $12 billion in total annual revenues.

The entrepreneurial spirit of the University community deserves to be cultivated in a responsible way. To assist the University in fulfilling this obligation, the task force proposes the following principles and recommendations.

Principles

- The University should strive to create and transfer knowledge and technology to industry and the public, on a timely basis.
- To achieve effective knowledge generation and transfer, the University should encourage partnerships with private as well as public entities.
- Regardless of the source of funding, all public-private agreements and activities of the University and its recognized foundations must follow guidelines for appropriate disclosure and oversight.
- When fee-for-service or technology development activities take place at the University, the responsibility for monitoring such activity rests first and foremost with the appropriate unit head, who should ensure that all required reporting takes place within the University system.
- The University should protect academic discoveries with patents, copyrights, and trademarks to fully realize their value and to make them available to industry and the public.

Recommendations

- Communicate to the community inside and outside the University the value of responsibly managed public-private partnerships and entrepreneurial activity, and the

{Continued On Next Page}

Partnerships

{Continued From Previous Page}

University's support for compliance with the policies governing them.

- Adopt a University-wide "Statement of Integrity" that describes the employee's relationship to the University and the responsibilities inherent in that relationship. After this statement has been reviewed by the appropriate governing bodies and approved by the Board of Regents, it should be considered a condition of employment for all faculty and appropriate academic staff.
- Review and revise existing policies related to public-private relationships. These policies should require disclosure of financial relationships and other non-University commitments that may affect the integrity of the individual's responsibilities in research, technology transfer, or other University activities. On the rare occasions when a product must be developed and commercialized at the University, an independent committee must review such activities and require appropriate disclosure.
- Establish a Committee on Public-Private Partnerships to advise the University administration on complex ethical issues that cannot be resolved by direct application of existing policies. Although some members of this committee should be drawn from within the University to provide relevant information and guidance, the majority should represent a broad spectrum of constituencies outside the University. This committee should meet regularly and have the ability to draw on additional expertise to help it in its deliberations. The primary purpose of this committee would be to provide external perspective on the complex issues confronting the University in its public-private partnerships.

The Task Force on Public-Private Partnerships:

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Chairman of the Board
Medtronic, Inc.

Anne Petersen, Ph.D.
Vice President for Research, and
Dean of the Graduate School
University of Minnesota

Members

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Southwest Minnesota Initiative Fund

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Professor and Director
Center for Interfacial Engineering
University of Minnesota

Lyle French, M.D., Professor Emeritus
Department of Neurosurgery
University of Minnesota

Leo Furcht, Ph.D.
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Educational Policy and Administration
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IBM
Alternate: Alfred Cutaia, IBM Fellow

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Hospital Board

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A.R. Potami
Associate Vice President
Research and Technology Transfer
University of Minnesota

Michael P. Moore, Director
Research Communications and Technology Marketing
University of Minnesota

Six Faculty Join National Academies

Sue Donaldson, professor of physiology and professor of nursing in the School of Nursing, was elected to the Institute of Medicine, National Academy of Sciences, in April. Donaldson's chief contributions to science are in skeletal and cardiac muscle physiology, and in the development of research programs in nursing. She was founding director of the University's Research Center for Long-Term Care of the Elderly, and she is the first occupant of the nation's first endowed chair for nursing research. Last year, Donaldson became a fellow of the American Academy of Nursing.

Regents' Professor John Chipman and Professor Avner Friedman were elected to the National Academy of Sciences in April. Chipman studies international trade from the Department of Economics. Friedman directs the Institute for Mathematics and Its Applications and is an authority on partial differential equations and control theory; he is also a member of the American Academy of Arts and Sciences.

Nicolai Krylov, professor of mathematics; Frank Sorauf, regents' professor of political science; and Daniel Joseph, professor of aerospace engineering were elected fellows of the American Academy of Arts and Sciences in April. Joseph is also a member of the National Academy of Sciences and the National Academy of Engineering, the only person at the University to be a member of those three academies, according to University Relations.

The National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine are sibling organizations all established under the federal charter to the NAS, the oldest of the three. Together, they administer the National Research Council, their "principal operating agency . . . providing services to the government, the public, and the scientific and engineering communities."

Sue Donaldson

Sue Donaldson came to the University and the Cora Meidl Siehl Chair for Nursing Research in 1984. The chair was endowed by the Siehl family for the purpose of supporting a research leader within the School of Nursing. From 1988-1992, Donaldson also served as associate dean for research in the University's School of Nursing.

The endowed chair allows Donaldson to choose her leadership roles, she says, and "the most exciting was the opportunity to establish a center of excellence in long-term care of the elderly. We have a significant cadre of nurse-researchers now working on health problems of elders."

The Research Center for Long-Term Care of the Elderly was founded in 1989 with funding from the NIH's National Center for Nursing Research. It has since become a permanent part of the University's School of Nursing, and Donaldson has passed the directorship to Professor Muriel Ryden.

"What pleases me is that what we initiated has become very permanent," says Donaldson. "Now I am moving on to another initiative."

That new initiative is to create a nursing research program that integrates biological and behavioral perspectives on human health. "Nursing research has been predominantly psycho-social research," Donaldson explains. "It has dealt with human behavior, not biological processes. I'm trying to integrate biological, social and psychological parameters. There is a call for proposals from NIH, and I'll be putting my efforts into that."

Sue Donaldson, professor of physiology, professor of nursing, in the School of Nursing, is a new member of the Institute of Medicine, National Academy of Sciences.

In addition to developing research initiatives, Donaldson runs a basic science research lab, where she studies cellular-molecular processes in skeletal muscle. "I'm linked with an entirely different group of researchers beyond the School of Nursing," she says. "I have collaborators in the Department of Biochemistry, [College of Biological Sciences] and the College of Veterinary Medicine, as well as throughout the Medical School.

"The University of Minnesota has been a wonderful environment to play out all of these ideas and initiatives."

NIH named Donaldson its second National Center for Nursing Research Distinguished Scholar in 1989. Donaldson has been principal investigator on NIH basic research grants continuously since 1974. Between 1980 and 1984, at Rush University, she was director of clinical nursing research and PI for a program development grant that strengthened fac-

{Continued On Page 7}

Cohn Receives Medical Alley Award

Professor of Medicine Jay N. Cohn, M.D., received the Medical Alley association's 1993 award for "Outstanding Contribution in Research and Development." Cohn heads the Cardiovascular Division of the Medical School and directs the cardiovascular fellowship training program.

"Over the last 20-some years, this man has had made a very large mark in the field of cardiology," said Medical

Professor of Medicine Jay N. Cohn, M.D., head of the Cardiovascular Division of the Medical School, received an award from Medical Alley for *Outstanding Contribution in Research and Development.*

Alley's written text for the award presentation last March. "Throughout this time, he has gone against traditional theory in research, and was not just interested in the heart, but in the circulation as a whole—believing the heart does not work in isolation, and therefore should not be evaluated in isolation."

Cohn pioneered hemodynamic assessment of cardiovascular function in patients with heart failure, and helped develop the concept of vasodilator therapy, according to documents from Cohn's office.

In collaboration with Stanley Finkelstein and Charles Chesney, Cohn holds three U.S. patents and has two more pending for methods of diagnosing, monitoring and treating hypertension and congestive heart failure.

In particular, Cohn's method for measuring blood vessel stiffness by analyzing arterial pulse waves is now in commercial development and has potential to become a standard tool in the diagnosis and treatment of a variety of cardiovascular diseases, including hypertension, heart failure, shock, diabetes and aging.

Cohn joined the University of Minnesota medical faculty in 1974. He earned his M.D. from Cornell University Medical College in 1956 and did his internship and residency at Beth Israel Hospital in Boston. He served on the faculty of Georgetown University School of Medicine from 1965 to 1974.

Cohn's current research support totals over $1.5 million per year from the NIH, American Heart Association, and five pharmaceutical makers. In 1992, *Minneapolis-St. Paul Magazine* listed him among the 250 top doctors in the Twin Cities area.

Cohn has written extensively on circulatory physiology, hypertension, congestive heart failure and its treatment, and nervous system control mechanisms in heart failure. His bibliography runs to nearly 450 titles.

He is editor-in-chief of a new peer-reviewed journal, *Journal of Heart Failure*, to begin publication in 1994. He is also an editor for *Progress in Cardiovascular Diseases* and the 1993 textbook *Cardiovascular Medicine*.

Cohn has recently served as a committee chair for the NHLBI Task Force on Research in Heart Failure and as chair of the Congress at the International Symposium on Cardiovascular Pharmacotherapy.

He is a fellow of the American College of Physicians and the American College of Cardiology and is a member of the Association of American Physicians and the American Society for Clinical Investigation.

For 1993, Cohn has three honorary lectureships, at the University of Gent, Belgium; at the Royal College of Physicians of Edinburgh, Scotland; and at Beth Israel Medical Center, Newark, New Jersey.

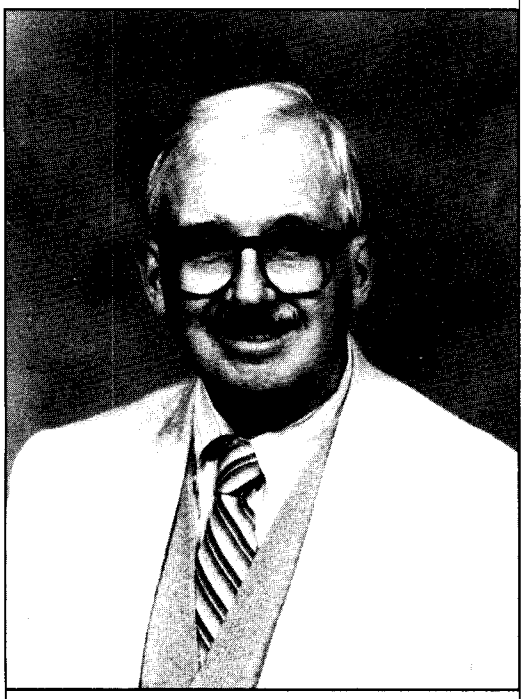
White Named Fellow of Humanities Center

Luise White, assistant professor in the Department of History, has been named a fellow of the National Humanities Center for 1993-94. The Center is in Research Triangle Park, North Carolina. White will study rumor and history in East and Central Africa.

Academies

{Continued From Page 5}

ulty research for the doctoral program in nursing. For NIH, she chairs *ad hoc* study sections, has chaired the Physiology Study Section, and frequently serves on panels for the National Center for Nursing Research (NCNR) and the National Institute for Arthritis and Musculoskeletal and Skin Diseases (NIAMS).



Regents' Professor John Chipman, Department of Economics, new member of the National Academy of Sciences.

The American Heart Association awarded Donaldson its Award of Merit in 1990. For the AHA, she has served on research review committees since 1983 and was instrumental in establishing the National Behavioral Science and Epidemiology Study Committee. She has also twice been elected to the Council of the Biophysical Society, and served on the advisory committee for the Clinical Nurse Scholars Program of the Robert Wood Johnson Foundation.

Donaldson has published in the *Proceedings of the National Academy of Sciences*, as well as other leading journals. She has served or now serves on editorial boards for *Advances in Nursing Research* and *American Journal of Physiology: Cell Physiology*, respectively.

Donaldson earned a Ph.D. in physiology and biophysics from the University of Washington in 1973, a B.S.N. and M.S.N from Wayne State University in 1965 and 1966. Before joining the University of Minnesota, she held faculty positions in both physiology and nursing at the University of Washington, then at Rush University.

John Chipman

John Chipman has been on the University of Minnesota faculty since 1955. During his appointment here he has also served as *standiger gastprofessor* at the University of Konstanz, and as visiting professor at Vanderbilt, Duke and Harvard universities, among others, and at the Stockholm School of Economics, and the Institute for Advanced Studies in Vienna. Last year, he became a fellow of the American Association for the Advancement of Science.

"I study econometric methods, welfare economics, international trade," says Chipman, "especially in the Swedish and German economies, because they have such good data. I work to relate prices, imports/exports, and production to changes in international prices." Chipman's models show, for example, how sudden changes in oil prices affect those economies. He makes yearly trips to Germany to work with collaborators there.

Chipman has supervised 26 Ph.D. theses since 1965. The bibliography of his work lists 109 titles. His current research support consists of $400,000 over three years from the German Research Foundation, for "Structural Changes in German Foreign Trade: Economic and Institutional Determinants," and of computer time at the Cornell Supercomputer Facility, for "Economic Analysis of the Effects of Price and Interest-Rate Changes in a General-Equilibrium Model of International Trade."

A native of Montreal, Chipman studied law at the University of Chile during 1943-44, while his father was Canada's ambassador to Chile. He received a B.A. and M.A. in economics and political science at McGill University in 1947 and 1948, and a Ph.D. in political economy at Johns Hopkins University in 1951. He served as an assistant professor of economics at Harvard from 1951 to 1955. Chipman became a U.S. citizen in October 1987.

Avner Friedman

Avner Friedman has directed the Institute for Mathematics and Its Applications since 1987. He is a member of the National Research Council's Commission on Physical Sciences, Mathematics and Applications, and has served the past four years on the NRC's mathematical science board. Friedman's re-

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Professor Avner Friedman, director of the Institute for Mathematics and Its Applications and new member of the National Academy of Sciences.

Academies

{Continued From Previous Page}

cent work for the NRC includes chairing 1991 studies of mathematics' role in high-performance computing and in materials science.

The institute Friedman directs, 11 years old and funded chiefly by NSF, is meant to bring together mathematical scientists with engineers and other scientists who use mathematics. "This is both to propagate mathematical methods and ideas into application areas, and at the same time to bring new problems into mathematics," says Friedman. "Our job is to break new ground for mathematics."

Friedman and the institute have a strong interest in mathematical contributions to manufacturing. Friedman became president of the Society for Industrial and Applied Mathematics (SIAM) this year. For SIAM, he coauthored a 1992 report titled "The Mathematical and Computational Science in Emerging Manufacturing Technologies and Management Practices." The institute holds a weekly Seminar in Industrial Problems and has developed a course and textbook titled "Industrial Mathematics for Undergraduates."

"We are living in changing times where there are demands on people in universities to perform research of short-term consequences and to improve the educational standards and skills of the work force," says Friedman. "At the same time there doesn't seem to be more money. Certainly one has to prioritize. That is where NAS has a role to play."

Regarding the University's role in the Minnesota economy, Friedman affirms that economic competitiveness and manufacturing should be research priorities: "This state has been thriving on high-tech," he says. "We are already coming from a good situation. On the other hand, it's very easy to assume that everything's going to go as well forever—and that's not the case. Competition is stiff, not only internationally, but nationally as well. I think it would be good to have more interaction between scientists in the University and in industry. It needs encouragement from the legislature."

For the institute's part, "we have an increasing number of post-doctoral researchers working jointly with industry and the institute," says Friedman. For example, "one project with Honeywell is helping reestablish the preeminence of the U.S. in high-definition television." The institute has 12 other participating corporations.

Friedman, a native of Israel, earned a Ph.D. at Hebrew University in 1956. He was on the University of Minnesota faculty from 1959 to 1961. He has also held research and faculty positions at the University of Kansas, and Indiana, Stanford, Northwestern and Purdue universities.

Research and Technology Transfer

Rick Dunn Has Left University

Rick Dunn, assistant director in the Office of Research and Technology Transfer, left the University effective May 14, 1993. Mr. Dunn was appointed assistant director in June of 1990; before that he had been a grant administrator for two years. He has accepted a position with Hennepin Faculty Associates as administrator of their department of medicine.

Mr. Dunn's supervisory responsibilities will be reapportioned to Assistant Directors Mary Lou Weiss and Todd Morrison, as follows (changes in bold):

Mary Lou Weiss

Judy Krzyzek, Senior Grant Administrator
Kevin McKoskey, Senior Grant Administrator
Liz Klitzke, Senior Grant Administrator
Eyvette Flynn, Senior Grant Administrator
Lorrie Awoyinka, Grants Assistant
Sue Conard, Grants Assistant
Linda Lorenz, Grants Assistant

Todd Morrison

Amy Levine, Senior Grant Administrator
Susan Stensland, Senior Grant Administrator
Judy Volinkaty, Senior Grant Administrator
David Lynch, Senior Grant Administrator
Virginia Olson, Grants Assistant

ORTTA staff, in addition to their other assigned areas, will be responsible for the following agencies, formerly administered by Mr. Dunn:

Elizabeth Klitzke: USDA; Miscellaneous Federal; Minnesota Technology, Inc; AURI.

David Lynch: Department of Energy and Federal Labs; Miscellaneous Associations.

Judy Volinkaty: IBM.

Eyvette Flynn: Environmental Protection Agency.

Linda Lorenz: Additional NSF.

Virginia Olson: Center for Interfacial Engineering, Member Companies.

Environment

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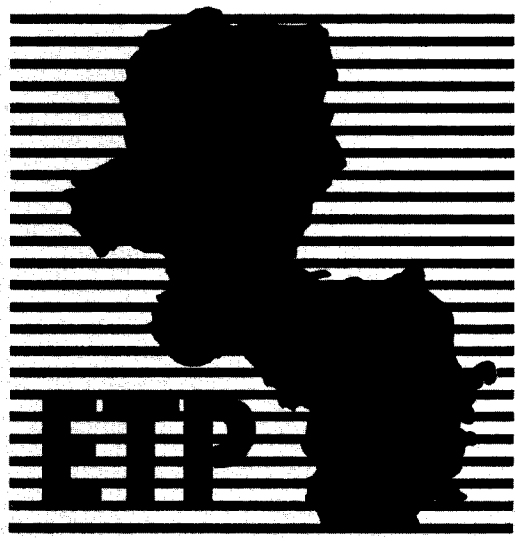
environment," says Mikelonis, "or else this development is not going to be sustainable. And with the economies unstable, the political system is unstable. It all seems to trickle down to the environment. It's like a house of cards."

"Management skills are the most deficient," says the ETP's director, Zbigniew Bochniarz. "There is technical skill, very good skills, very high-level. They can compete with the States and other West European countries in mathematics, physics, chemistry. But managerial education, economics, marketing are very weak."

Bochniarz (pronounced Bok'nee arz), a senior fellow of the Humphrey Institute since the fall of 1985, is a Polish citizen. His wife had a Fulbright scholarship, and they were visiting the United States, when Wojciech Jaruzelski declared martial law in Poland in 1981. They decided to stay in the United States. "I had some political problems with martial law," says Bochniarz, "and the University offered me great resources."



Bochniarz has been gradually building up to the ETP, starting with a small grant in 1987 to study economic mechanisms for environmental protection in Central Europe. He wrote a set of policy recommendations for Poland, 60 percent of which have since been adopted by the government in Warsaw. Then he wrote similar documents for Czechoslovakia, Hungary and Bulgaria. Now Bochniarz heads a "portfolio," as he calls it, of 10 such projects funded for about $18 million. The ETP is the largest, with $11 million for five years from the U.S. Agency for International Development.

The ETP operates in Bulgaria, Hungary, Poland, Romania, the new Czech Republic and Slovakia. During 1992-93, its first year, it presented 27 training programs in how to conduct environmental audits and impact assessments; how to manage a small business that provides environmental services; how to recruit members and financing for nongovernmental organizations, or *NGOs* ("The nascent equivalent of organizations like our Sierra Club," says Mikelonis); and how to manage conflict and negotiate policy. Clientele in those programs represent business, NGOs, local government, and universities or research institutes—"all four of the sectors that need to work together," says Mikelonis.

The expertise necessary for that range of programs and clients comes from four institutions that Bochniarz drew together for the ETP Consortium: the Center for Hazardous Materials Research at the University of Pittsburgh, the Institute for Sustainable Communities at the Vermont Law School, the World Wildlife Fund, and a number of units at the University of Minnesota.

Within the consortium, the University's fields of expertise are business management and strategic planning. For example, "Barbara Lukermann and Ronnie Brooks went to Romania in mid-May to do a strategic planning session in the Arges River area. They worked with all four sectors to identify problems and plan how to improve water quality in the area," says Mikelonis.

Mikelonis teaches proposal writing to the Central and East Europeans because they have to get funding from the West. The banking system in that part of Europe is not organized to help small business, she explains. Its interest rates run between 52 and 73 percent, with 160 to 200 percent collateral on loans. "We tell them, 'You're going to be going to westerners for funding. We will teach you how western financiers and foundations think.' We teach them how to write problem statements and objectives and methodologies; the logic is new to them. We bring in people from the Polish-American Enterprise Fund and the World Bank to talk about the programs available."

The ETP draws on expertise from all over the University. Its deputy director is James Perry in the Department of Forest Resources. Julie Borris in International Agricultural Programs wrote the budget for the proposal. Harald von Witzke in agricultural economics chairs the consortium's governing council. "We bring in instructors from the Carlson School of Management, from the Humphrey Institute, and from the College of Agriculture," says Mikelonis. "It really is a cooperative venture with a lot of units within the University." This past spring the ETP solicited proposals for $800,000 worth of training "subgrants."

"My idea is to hire people who are better than me. I can learn from them," says Bochniarz. "I appreciate what my colleagues at the University are doing. There are great compliments about their performance. I am fortunate."

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International Markets for Environmental Services and Technology

Minnesota Leads U.S., Says State Trade Advisor

"Probably no other country in the world has as many regulatory guidelines as the United States. However, it's a good thing that we do. We are globally known for being a leader in environmental technology, training and technical assistance," says Karin Nelson, of the Minnesota State Trade Office. "Monitoring equipment, waste processing, filtration systems, and emissions controls are all matters that the U.S. is considered to be a leader in."

The Minnesota Trade Office works to increase the export of Minnesota products and services, and to attract foreign investment—except foreign purchase of Minnesota real-estate. Nelson, a native of Germany, is the Trade Office's "environmental industry advisor," meaning she devotes all her time to promoting international trade in environmental technology, engineering, consulting and services.

. . . our mistakes are helping other countries.

In some ways, says Nelson, the United States is a leader in environmental protection and pollution control. "We started very early to regulate water quality and air quality in particular. Now our mistakes are helping other countries. We are the one country in the world that is more willing to share anything we have, including knowledge, than any other country that I know."

On the other hand, she describes U.S. participation in international environmental commerce as just plain sad: "Worldwide trade of environmental goods and services totals $40 billion annually. In spite of the fact that we are globally known for being a leader, the United States only has about a 10 percent share in this enormous business. It's sad, because we could do much better."

At the state level, Minnesota leads the nation, says Nelson. International corporations like 3M and Honeywell have put Minnesota on the world trade map. So has the University. At the U.S. Department of Commerce and at foreign consulates and embassies, Minnesota is known as "the one most aggressive state in the union when it comes to marketing its environmental industry."

Nelson spoke to a seminar on soil remediation, sponsored by the University's Department of Soil Science, in April. She came to the seminar, she said, to speak of "where your [the faculty's] scientific knowledge and research eventually lead—hopefully to international trade. Many of the companies active in the environmental field are based on scientific findings that probably many of you will be involved in or are already involved in. Much of the knowledge that you gather here at the University, the research you do and the conclusions you come to, will be extremely important to marketers in the Minnesota environmental industry."

Nelson also points to the University as an asset that can help her bring foreign investment to Twin Cities manufacturing. "A company doesn't decide to settle in a particular area based solely on the climate. (Everybody says its too cold in Minnesota. That's not true. It's just as cold or worse elsewhere.) Educational possibilities are extremely important. Availability of funds, of an educated work force, of state-of-the-art research institutions—all of those things are very important. I think we would be very warm in welcoming foreign companies to locate here."

Nelson acknowledged that her job includes making Minnesota well known "not only for what we have to sell, but also for what we have to share—knowledge, expertise, teaching facilities. A significant number of delegations from foreign countries visit the Twin Cities. Much of the reason is the University of Minnesota." Nelson cites the University's ties to Korea, for example: During a mission to Taiwan, Japan and Korea last year, Governor Carlson hosted a reception for Korean alumni of the University. "You wouldn't believe how many there are in Seoul," said Nelson.

In many ways, then, Minnesota and the United States are positioned to lead the environmental industry. So how can we account for our poor showing in international environmental commerce? Nelson lays the blame to arrogance, inexperience and naivete:

"Americans are too focused on themselves," she says. "We don't realize that 'small' countries like France could outdo Americans. Think again. Americans thought they would be the first ones on the scene when they arrived to do some business in Thailand. Surprise! Guess who was standing at the pier and at the airport to say 'Hello. You made it'? The French, the Germans, and the Japanese. They had been there for years, without big fanfare. And the reason is that all those countries, particularly European countries, have been doing international business for centuries. They are trading nations, always have been; America has never been a trading nation. The Germans have dealt with the entire world for centuries; America has not. Many of the companies I deal with in Minnesota think they're exporting when they're shipping to California. We are very naive, and we usually lag behind in entering markets.

"The Minnesota Trade Office is here to at least try and remedy that to a certain degree, for the state of Minnesota."

By Phil Norcross

Economics for Environmental Quality

Excerpts from Terry Roe, "Economic Growth and Environmental Degradation: Win-Win or Lose-Lose?" Minnesota Agricultural Economist no. 670 *(summer 1992), pp. 1, 6-12.*

The alleviation of poverty in developing countries will help to lessen many kinds of environmental degradation. . . . As real economic growth occurs and individual disposable incomes grow, individuals are willing to spend a greater proportion of their rising incomes to offset those environmental factors that cause ill health.

Environmental degradation should not be simply viewed as increasing the costs of producing goods and services and, therefore, decreasing a country's competitive advantage in world markets. Instead, health and environmental amenities should be viewed as consumption goods that the market, by itself, fails to provide at socially optimal levels.

Briefly, there are five additional routes through which policy reform to achieve economic growth can also resolve environmental degradation.

First, inward-oriented policies that tax the rural sector [and protect the industrial sector] almost always give rise to the under-valuation of the rural sector's sector-specific assets, such as land, forests, and natural resources.

Second, policy reform that increases the profitability of previously taxed firms should also increase their willingness to accept and pursue policies that save on natural and environmental resources, while the previously protected and marginally profitable firms should either decrease their scale of economic activity or shut down.

Third, relative to inward-oriented policies, policy reform tends to open up an economy to international markets for information and technology that, by substituting for the old technology, can save on the use of environmental resources.

Fourth, policy reform that decreases fiscal deficits, and broadens a country's tax base by decreasing its reliance on foreign trade taxes is not only good for economic development, it is also good for the environment.

Fifth, policy reform and investments in public goods, particularly in education for both men and women, will tend to reduce environmental degradation associated with relatively large numbers of low-income households in rural areas.

Hence, conditional on the ability of governments to pursue policy reform and their ability to resolve problems of market failures, there appears to be considerable grounds for optimism. Win-win development strategies are very possible, and may be indispensable.

Many health and resource productivity benefits from environmental policies in developing countries accrue to the wealthy countries, and some of the potential ill health and resource productivity problems facing developing countries have their origin in the economies of wealthy countries. The implication is clear: wealthy countries should compensate the poorer countries.

International Environmental Policy Research

In addition to the Environmental Training Program, the University of Minnesota is home to at least one other group of researchers who search for solutions to environmental problems in other nations. Terry Roe, in agricultural economics, studies how a nation's economic policies affect its use of natural resources, and how those policies might be reformed. "We search for win-win strategies, ways to improve economies *and* improve the environment," says Roe. Hans Gregersen, of forest resources, studies reforms in forest and watershed policy. George Honadle, of forest resources, studies the implementation of environmental policy changes.

Roe, Gregersen and Honadle do that work under the umbrella of a federal project administered by the University of Wisconsin: the Environmental and Natural Resources Policy and Training Project, or *EPAT*, which is run by the U.S. Agency for International Development (USAID). EPAT is a multi-million-dollar, five-year program of work that began in 1992 at 15 universities, institutes, and corporations.

USAID's goal is "cooperating-country adoption of economic policies which promote sustainable use of natural resources and preservation and enhancement of environmental quality." The EPAT pursues that through research, publications, conferences and training of policy-makers in the nations AID assists. The EPAT is a little broader in scope than the Environmental Training Program run by the University of Minnesota; it includes research as well as training, and it addresses more nations. Roe, for example, works in Morocco, Ecuador, and Turkey.

—JPN

Ford VP Tells AAAS:

Research Must be Selective, Educational and Fully Supported

Only the highest-quality research and education programs deserve support, institutions must attend to teaching as well as research, and the federal government must fully fund research, said John McTague, Ford Motor Company's vice president for technical affairs. He spoke to the AAAS Colloquium on Science and Technology Policy in April.

To deal with budget cutbacks and plan new programs, institutions must be selective, said McTague: "It means realistically appraising the future availability of resources, and most of all it means choosing to support the highest-quality programs every time."

The problem, as McTague described it, began in the 1960s and early '80s. Large "spurts" of federal funding led to a number of new research programs and departments, but "not always with an eye on whether they were the highest quality or whether they could be sustained."

While state governments and private institutions are now cutting budgets, "institutions should not count on research funds from the federal government to make up for cutbacks," said McTague, "because the federal government, despite intentions to increase funding for research, obviously has its own deficit-reduction problems."

Echoing a report by the President's Council of Advisors on Science and Technology (PCAST), McTague reminded the AAAS that the joint research and education system does not just produce discoveries. It also trains our future scientists and engineers. The link between research and education has served well, he said, "but many research institutions have lost the balance. They have turned away from commitment to the educational part of their missions, particularly with regard to undergraduate education."

McTague reported PCAST's finding that the public is losing confidence in universities and higher education. He also referred to testimony from student-researchers who feel prevented, by the demands of research careers, from gaining teaching experience. "My analysis is that higher education is not giving these people, who sincerely want to teach, the tools to teach, or the time to learn how to do it," he said.

McTague and PCAST recommended that faculty become increasingly involved in teaching both graduates and undergraduates, and that the system increasingly reward that teaching.

Regarding federal support of research, McTague summarized the first and second principles presented in the PCAST report: First, there must be continued national investment in basic research to sustain world-class accomplishments in all major areas of science and technology. Second, the federal government must pay the full cost of the research it supports.

Those principles require modernization of the research infrastructure, said McTague, most notably through a large, merit-reviewed, nationwide competition for grants to repair, renovate and modernize.

McTague described a dim view of current relations between academe and industry. It is "disheartening," he said, to find that students' impressions of industrial research "ranged from woefully uninspired to dreadfully mistaken." He laid the blame on professors with little knowledge or experience of industrial research, and he stressed the need for both academe and industry to give up negative stereotypes and learn to work together.

From *Washington Fax*

Environment

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The ETP operates at a local and regional level, rather than dealing with entire nations and capital cities, because that is where the new responsibilities are heaviest. "You have local and regional officials who, with the break-up of the communist system, had to take on more and more responsibility. The power has devolved to them. They're the ones who are going to have to make the policy decisions, and set up environmental standards, and enforce compliance," says Mikelonis. "A lot of them don't know how to govern. But they're learning."

As the work proceeds, the consortium will increasingly contract services from those local European organizations and individuals. "The whole idea is not to keep us in business," says Mikelonis, "but to have them do it themselves. The courses that we're teaching—we're training European teachers to take them over.

"What we'd like to do is set up an environmental extension service," she continues, "but it's such a foreign notion that for us to impose it wouldn't work. Right now most European universities are research universities. They don't see the kind of service that a land-grant university has as its mandate; that's not part of their role.

"But as we bring together in joint training people from these different sectors, folks are picking up the idea that it would be good to share information. In Romania in February we were approached by people from one of the research institutes who said that a lot of the NGOs could use information that they [the institute] generate, especially in monitoring

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Services Provided by the Minnesota Trade Office

The Minnesota Trade Office, a division of the Minnesota Department of Trade and Economic Development, works to increase the export of Minnesota products and services, and to encourage foreign investment in Minnesota. According to Trade Office publications and Karin Nelson, the office's expert on the environmental industry, the Trade Office provides the following services, largely free of charge:

- News of environmental and development projects funded by foreign governments and international agencies. "We make applications for grants. We look for partners to make applications for grants," says Nelson. For a directory to such grants, Nelson recommends William A. Delphos, *Environment Money: The International Business Executive's Guide to Government Resources* (Washington, DC: Venture, 1990). For a copy, phone 202-337-6300.
- "The most comprehensive international business library between Chicago and San Francisco." Files on almost every country in the world contain statistics, marketing reports, business periodicals, directories, and information on worldwide environmental regulations.
- The *Minnesota Environmental Protection Industry Directory*.
- "Export Tools and Techniques," a three-day course for Minnesota businesses just beginning to explore international markets. There are shorter training programs as well.
- Capital. For businesses with overseas buyers, but insufficient capital, the Trade Office can help insure against risk, help find federal financing, and guarantee commercial loans.
- Consulting as to whether, where and how a product might succeed internationally, and contacts to help with international patents and copyrights.
- Representation at international trade shows.
- Presence in foreign cities. The Trade Office recently closed its Taiwan office, for lack of money, but "the Japanese one we will not close," says Nelson. In several European cities, large Minnesota corporations volunteer staff time to help the Trade Office.

For more information, contact

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International Trade and Development Advisor
Minnesota Trade Office
1000 Minnesota World Trade Center
30 East 7th Street
St. Paul, MN 55101-4902
296-4879, fax 296-3555

—JPN

Environmental Technologies Available from the University

When University researchers invent new technology of benefit to the public, the University seeks to disseminate that technology by acquiring patent protection and then licensing the right to commercially develop the technology. The following is a sample of environmental technologies now available for licensing.

Compression-drying of biomass materials
A method and press for dehydrating freshly cut wood chips for use as fuel. The system uses significantly less energy than current mechanical methods of drying biomass.

Solar energy storage via electrochemical conversion
A laboratory method that could be used to develop improved solar energy generation and storage devices. The invention provides an efficient, readily controlled method for electrochemically initiating the conversion of a quadricyclane to the corresponding norbornadiene. The inventors have achieved conversion yields of at least 97 percent and an energy gain of 25 to 1, so there is potential for high yield of energy.

Generation of diamond from liquid chemical wastes
A plasma torch system and a method to pyrolize liquid carbon substances that are common industrial toxins, such as PCBs. Destruction of the toxins exceeds 99.99 percent, and, as a byproduct, the system can produce diamond films or powders suitable for industrial uses.

Metal and cyanide recovery from plating baths
A more efficient and less expensive means of recovering cyanide and metals from metal plating baths and rinse waters. Concentrated sodium cyanide is generated for recycling into plating solutions.

Lightweight, pelletized aggregate from sludge ash
Provides an economically feasible, environmentally acceptable use of incinerated sewage wastes and other ash. Lightweight, pelletized aggregate for light construction and for landscaping could be produced on a large scale.

Liquid membrane system to remove nitrate from water
A more effective system for extracting nitrates from contaminated water or isolating metals from metallurgical solutions. It could be used to purify drinking water, to isolate metals from hydrometallurgical leach solutions and plating baths, or to selectively remove anionic species from aqueous feedstocks.

Biodegradation of halogenated hydrocarbons
A method for detoxifying and degrading halogenated hydrocarbons, trichloroethylene for example, by use of ammonia-oxidizing bacteria in aqueous solution or dispersion, in a slurry of contaminated soil, or in soil alone.

Changes in NIH Financial Reporting Procedures

A letter from the National Institutes of Health (NIH) in March concerned the delinquent submission of Financial Status Reports (FSRs) by the University of Minnesota. NIH FSRs are required to be submitted within 90 days after the close of the budget period. As part of an effort to improve the timeliness of FSR submission, NIH reviewed data on FSR submission from all institutions for a period of time that happened to coincide with CUFS conversion. Several institutions that submitted a high percentage of late FSRs were designated for review (98 percent of FSRs from the University of Minnesota were late).

As a result of the review, NIH has requested that the University develop and submit a detailed plan that:

1) Identifies the problems that have prevented timely submission of FSRs in the past;

2) Outlines the steps that will permit the University to submit future FSRs on time; and

3) Details the steps that will be taken to submit currently delinquent reports.

If these requests are not met, the University could be excluded from using expanded authorities and could subsequently lose advanced payments and/or be designated as a high-risk grantee.

After reviewing Report of Expenditure (ROE) requirements, several procedural changes have been made to facilitate the submission of all NIH financial reports within the time-frame required.

New Procedures for Grants Ending June 30, 1993

ORTTA has requested special pre-Period 12 CUFS Reports that will be received in early July. These reports, the Grant Summary, Grant Detail, and Commitments and Revenues by Sub-object and Sub-org, will be provided exclusively to ORTTA. They will be used to do FSRs for all NIH grants with expanded authorities and no restricted categories, and on continuing grants without expanded authorities that are in overdraft. ORTTA will *not* include expenditures not on the special pre-Period 12 reports.

A copy of the FSR will be sent to the principal investigator and departmental accountant with a copy of the pre-Period 12 Report. However, there *will not* be an option of reviewing or making changes to these reports for the usual 10 days. Reports will not be revised. *Any expenses that a principal investigator wants reflected on the FSR must have been included on the pre-Period 12 Report.*

All financial documents, including Type 38's, should be received by ORTTA by noon on June 25th in order to meet Business Services cut-off date of July 1 for the pre-Period 12 Report.

If necessary, the pre-Period 12 Report will also be used for other financial reports or invoices to meet submission deadlines. *These procedures will not be used on final reports or reports that have categories with funds that revert.*

The pre-Period 12 Report will only be used until the Period 12 Report is available, which is scheduled to come out the last week in July. ORTTA has advised NIH that balances will be larger than in the past because of these new procedures.

New Procedures beginning July 1, 1993

1) When a grant has a deadline for submission of financial reports that is less than 120 days (NIH is 90 days), that deadline supersedes the 120 day cost transfer policy.

2) For grants with *expanded authorities*, ORTTA will not pick up any expenditures after the end date of the budget period. ORTTA will not contact the department prior to sending the report.

3) For *continuing or renewed grants* that are not under expanded authorities and have 90-day deadlines, all expenses must hit the ledger of the month following the end of the budget period in order to allow for timely submission. ORTTA will no longer look for applicable charges on the second month.

4) When a *continuing* grant is in overdraft, expenses will not be picked up after the end of the budget period. The overdraft will automatically be carried over to the continuing year. This includes grants with expanded authorities and grants on which funds revert with open travel and subcontract encumbrances.

5) For *terminating* grants, all expenses must hit the ledger within the following two months. All encumbrances, including subcontracts, must be closed within that time period.

6) Departments will be given 5 working days after notification of an overdraft to either remove the overdraft to a nonsponsored account or to give ORTTA a nonspon-

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Cost Transfer Policy

Issued: December 1, 1975

Purpose:

This statement sets forth policy under which direct charge cost transfers can be made to sponsored research/training programs.

Applicability:

All sponsored programs (Federal, State, Private) and all cost categories.

Background:

Recent audit determinations have cited frequent instances where departments have transferred charges from one project, program or account to another sponsored project many months after the original charges had been recorded in the institution's accounting records. As a result of these findings, agencies have promulgated policies regarding ost transfers which must now be adhered to by all University units involved with any sponsored programs.

Policy:

The policy of the University of Minnesota regarding cost transfers to sponsored projects is as follows:

1. Cost transfers to a sponsored project must be made within 120 days of the original incurrence of the charges. However, such transfers must be made within the time frame established by the agency for the preparation of the financial report. This period may, in many instances, be less than 120 days. Adjustments or cost transfers of salaries and wages cannot, however, be made after the "monthly certification report" has been certified by the department. Transfers made after the 120 day period raise serious questions concerning the propriety of the transfer. Therefore, any request for a deviation from this policy must be fully justified before it will be accepted.

2. All cost transfers must contain adequate explanation on the document to support that the cost is a proper and allowable charge to the project, i.e., date of original charges, reference number of original document, description of the charges transferred, and most importantly, why the cost is being transferred. The test is whether the justification given is sufficient for Office of Research and Technology Transfer personnel or auditors to determine the allowability of the charge.

3. Accounting documents transferring costs must be reviewed and signed by the principal investigator or designee and the Office of Research and Technology Transfer.

4. Transfers of costs which represent corrections of clerical or bookkeeping errors must be made promptly after the errors are discovered. The transfer must be supported by documentation which contains a full explanation of how the error occurred and a certification of the correctness of the new charge. An explanation which merely states that the transfer was made "to correct error," "to correct charges" or "to transfer to correct project" is not sufficient and will not be accepted.

5. Cost transfers between closely related projects may be proper. However, frequent, tardy transfers where significant cost overruns or unexpended balances exist must contain proper justification as outlined above and will be scrutinized carefully. Transfer of charges from any account in overrun status to a federal project will not be accepted unless unusual circumstances exist. Nor will cost transfers to a project having unexpended funds and made in the last months of a project be routinely accepted or approved.

Cost transfers lacking adequate justification will be returned to the originating department for further documentation or explanation prior to approval by the Office of Research and Technology Transfer. Because many sponsored program charges could be disallowed as a result of the failure to implement this policy fully, this policy will be strictly enforced by the Office of Research and Technology Transfer.

Reporting Procedures

{Continued From Previous Page}

sored account number to which to remove the overdraft. After 5 working days and no action by the department, ORTTA will remove the overdraft to the department's 1003 number. Late charges will be handled in the same manner.

7) Departments and principal investigators will be given a 5-day review period for the report when funds are reverting. For grants under expanded authorities and for those on which funds revert with a zero balance, the departmental and investigator's copies will be sent after-the-fact.

ORTTA is in the process of reviewing the procedures for preparing all financial reports. Additional information regarding changes will be forthcoming. For questions

University of Minnesota

Intra-University Consulting Fees

Change in Procedure

In order to comply with federal tax laws, the University has changed procedures to pay consultant fees and expenses when the consultant is also a current University employee. **Effective immediately, consultant fees paid to a current University employee must be paid through payroll.** Any out-of-pocket expenses incurred by the employee-consultant will be reimbursed through established employee expense reimbursement procedures.

This change was instituted rather quickly and there has been some confusion about how it affects sponsored (ORTTA) funds. In the process of contracting with an internal consultant on sponsored funds, only the payment mechanism and the total cost of the service are affected. All other requirements remain unchanged. For example:

- The consulting must be allowed by the academic units involved.
- The consulting must be allowed by and is subject to any conditions of the sponsoring agency. On federal grants, contracts and subcontracts, the consulting must be across departmental lines and the fee cannot exceed the consultant's current daily rate of pay.
- A memorandum of agreement (MOA) is required if a fee is to be paid (sponsored funds only), regardless of the dollar amount. NOTE: In addition to the usual required signatures, the MOA must be signed by the consultant's department head.
- A signed invoice from the consultant is still required to verify that the services were performed. The invoice must be retained in grant files for audit purposes.
- The PV document to reimburse the consultant for out-of-pocket expenses must contain a statement of benefit to the project charged.

Budgeting and Effort Certification

Two significant consequences of paying the fee through payroll are that fringe benefits will be charged as an added cost, and the payment will have an effect on the consultant's effort certification card.

Departments who plan to use internal consultants are advised to budget for the fee and associated fringe in the salary and fringe categories of their proposals and to make a footnote or describe in the budget justification that the pay is a consulting cost over and above the individual's current appointment.

Departments whose faculty provide consulting services will be required to adjust the effort certification and to remove the consulting cost from the payroll and effort distribution columns and note on the card that this was a consulting payment.

Questions of acceptability on a sponsored program or preparation of the MOA should be directed to the ORTTA grant administrator for the project being charged.

Questions on processing payment should be directed to Payroll Services.

Environment

{Continued From Page 12}

air, water or soil quality. They would like to work with them in an information exchange.

"That's exactly the kind of thing we would like to set up. One of our thrusts in year three will be to help build this extension service."

Other items on the ETP's agenda include helping Central and East European universities create curricula and certificate programs in environmental studies and environmental management; bringing European graduate students to the U.S. for a year's study; and bringing Europeans to the U.S. as interns, so they can see how recycling systems operate, for example, and maybe make contacts for joint ventures.

"I think the most exciting thing is we're seeing some trust building," says Mikelonis. "In the past, there was such isolation and fear of betrayal that people didn't readily talk to one another. As we bring these people together for training, we are giving them the tools and helping them start reforms. We are phasing ourselves out."

By Phil Norcross

Committee on the Use of Human Subjects in Research

Consent Forms

The Committee on the Use of Human Subjects in Research continually reviews its standards for consent forms and its adherence to the regulations pertaining to human subjects protection. A recent review of Committee-approved consent forms highlighted areas that need attention.

Researchers are reminded that *consent forms must be submitted when annual renewal of approval is requested.* The consent form is reviewed in conjunction with the overall report to ensure that the form complies with current standards. These standards change over time, in part due to changes in regulatory mandates and community styles and expectations. In come cases, following the report of new findings or adverse events, consent forms might require revision to better represent the current understanding of an experimental intervention.

Researchers may be asked by the Committee *at any time* to make changes in their consent forms in order to conform to current standards.

An examination of Committee records indicates that our standards should be revised with respect to contact information. All consent forms should explain who to contact regarding questions about the research, the research subject's rights, and research-related injury. (All three elements must be mentioned in any study involving physical contact.) The principal investigator's name and telephone number should be included in this discussion. If the researcher is a student, the advisor's name and telephone number should also be included.

In studies where subjects are exposed to drugs or devices, the patient-subject should be told that the research and medical records may be reviewed by the Food and Drug Administration (FDA) in addition to review by the sponsoring company.

In any case where a drug or device is used in any fashion not already approved by the FDA, the *experimental* status of the drug/device must be disclosed in the consent form.

In all cases, researchers should review their consent forms for clarity of purpose and to ensure that the form contains language that is clear and understandable by the average lay person.

If you have questions, please call Moira Keane at 624-1889.

Director Healy's Last Testimony

In the health-care discussions that abound, one often hears a nostalgic yearning for the so-called good old days of medical care: days when costs were low and the family doctor made house calls. What we often forget to mention about the medicine of yesterday is that there was no kidney dialysis or organ transplantation, no open-heart surgery or angioplasty. There were no coronary care units or medical intensive care units, and doctors did exploratory abdominal surgery instead of CAT scans. Women endured radical, deforming mastectomies for breast cancer instead of lumpectomies for localized disease. Hodgkin's disease was uniformly fatal, and malignant hypertension a common emergency room problem. As late as the 1950s, widespread panic about polio caused health officials to close public swimming pools. But now the iron lung has gone the way of the iron curtain. Our investment in medical research has changed all that and more. —Bernadine Healy

Probably for the last time, Director of NIH Bernadine Healy testified to Congress on May 13 regarding the NIH budget. President Clinton's fiscal 1994 request is worse than "devastating," she said. About $600 million more is needed.

NIH originally asked the Department of Health and Human Services for $11.1 billion for 1994. The president's request cut that to $10.6 billion. To maintain current programs and allow for 4.1 percent inflation, said Healy, would require $600 million more than the president's request.

To achieve a success rate of 25 percent for 1994 grants, NIH needs $180 million more than the president requested. The present request will allow 1500 fewer grants in 1994 than in 1988, and 1400 fewer than 1992.

"Biomedical research is not valued by the public," said Healy. "They take medicine for granted. We have failed to inform the public that NIH is critical to their well-being. . . . For whatever reason, biomedical research is not viewed as a national priority."

Healy also presented to the subcommittee final drafts of the NIH strategic plan, saying that it "will keep needs from falling through the cracks and provide guidance for a balanced investment at the NIH."

Healy spoke to the House subcommittee responsible for NIH appropriations—the Appropriations Labor, Health and Human Services, Education, and Related Agencies Subcommittee. Chairperson William Natcher said he had never seen a more qualified leader than Healy. Minority leader Edward Porter said, "I am going to miss your candor."

From *Washington Fax*

Department of Health and Human Services

Basic Rules Help Grant Scores

According to DHHS, applying for grants can be less painful for those who follow a dozen simple and time-worn tenets. Novice and veteran applicants are reminded of some basic principles. Although DHHS developed the guidelines for its own programs, they apply to most federal grant programs.

Match the idea to the funding source.

A targeted and fine-tuned approach will succeed more often than the alternative strategy—to submit a boilerplate proposal in response to any solicitation that remotely matches the grantseeker's needs.

Thoroughly understand what the program wants and integrate its goals and objectives into the proposal work plan.

Use the program office for technical assistance.

Few applicants seek out program staff, but DHHS says successful grantseekers consult officials every step of the way. As applicants organize their ideas and write their proposals, they should check and see if their approach meets the program's intent.

Applicants may also request successfully funded applications with a high score to use as a general guide. And they should always sign up for any technical assistance workshops agencies offer.

Begin groundwork early.

Grantseekers should get started even before agencies issue program announcements.

Preliminary work includes establishing a network of contacts that can help later, such as state and local agencies; developing a committee and getting key participants in place, including any necessary partners; and working on the proposal.

Establish a timetable and organize necessary personnel as soon as an agency announces funding availability.

Identify one person to write the entire application, although others may contribute. Also, appoint a person or small committee to critique drafts of the application and identify someone to request and coordinate letters of support.

Follow instructions and format.

Reviewers expect applicants to adhere to the program's format and may penalize applicants who depart from it. Sticking to the format means attending to every detail, such as number of pages and copies required.

Lay out a master plan.

Take a long view, even though some ideas aren't fully developed. Most often, funding will not be available for the entire project, so grantseekers must explain how the proposal will fit into a larger scheme, as well as identify other possible sources of funding.

Match the proposed use of funds with the problem described in the application.

Tie specific needs to requested funds, using statistics and letters of support. Reviewers may lower an application's score if needs don't add up to the funding request.

Be reasonable and realistic.

Grantseekers who promise more than they can deliver or provide too much or too little detail risk turning reviewers off. Try gearing detail and length to the amount of the award. Few reviewers expect the same detail from a $50,000 proposal as from a $1 million request.

Respond to all evaluation criteria.

Many programs give reviewers rating sheets that ask them to score how well the proposal met certain evaluation criteria. Leaving out information or presenting it in the wrong order can doom an application.

To be sure reviewers don't miss the point, applicants should use the same terms the program uses in explaining how the project will meet each criterion.

Explain omissions.

Reviewers may not be experts in a particular field, so applicants must explain omissions of detail even if a point seems obvious. Applicants also should never cover up a problem, but explain how the project will address it.

Make a reasonable funding request.

Keep in mind the program's total funding and the number of projects it intends to support. In making the request, clearly relate the budget to the narrative, detailing how different parts are linked to items in the budget.

Keep the proposal businesslike and professional.

The application should appear ready for publication, with no errors, missing parts or incomplete forms. Have someone check every page.

From *Federal Grants and Contracts Weekly*

National Science Foundation

Proposal Preparation

On October 1, 1992, the National Science Foundation implemented new policies on the format and length of proposals. The aim of the new policies is to make proposals shorter and easier to read.

Under the new rules, the text of the proposal (Project Description) is limited to 15 pages or less, regardless of whether single- or double-spaced, and appendices (including attached reprints or preprints) are strictly forbidden. Other changes include detailed specifications for Biographical Sketches and for special information that should not be in all copies of the proposals, but should be attached to the signed original.

In answer to many specific inquiries, NSF has provided the following clarification:

1) Graphs, maps, photographs and other "visual materials" are currently *not* included within the specified page limit, but please do not violate the spirit of the new rules either by including an excessive number of illustrations or by including lengthy captions or other textual material in the guise of illustrations.

2) The page limit applies to the material discussed in the application form *Grants for Research and Education in Science and Engineering (GRESE)* under "Project Description (including Results from Prior NSF Support)" and *does not* include "Bibliography," "Biographical Sketches," "Budget" or "Current and Pending Support."

3) Letters from collaborators confirming availability of facilities, willingness to collaborate, etc., are *not* included within the 15-page limit and do not require a special waiver.

4) Wherever there is a specific NSF announcement containing specifications that are at variance with those in GRESE, the specifications in the announcement take precedence.

The most common violations being observed from recent proposal submissions are:

1) Project Description in excess of 15 pages. 30 double-spaced pages is no longer an acceptable substitute.

2) Biographical Sketches longer than two pages.

3) Attached reprints, preprints or other appendices.

4) Margins or type size smaller than stated minimums. Proposal preparers should realize that such devices are likely to annoy and alienate reviewers.

5) Failure to include a list of recent collaborators and co-authors or failure to specifically identify graduate or postdoctoral advisors. A list of current and former thesis advisees, although not required, is always desirable.

6) Incomplete or inaccurate listings of Current and Pending Support.

Proposals having one or more violations of this type will normally *not be considered for funding.*

The recent GRESE revision also notes that, "The Foundation encourages proposals with a requested duration of 3 to 5 years, where it is technically and managerially advantageous." Such long-term support, where appropriate, can significantly reduce the time spent in writing, reviewing and processing proposals. Extended support, however, must be justified by the scope of the research being proposed.

During the latter half of 1993 NSF will be moving to its new home. This move should not affect submission of proposals, which should continue to be sent to the current address given in GRESE. Further details on the move will be forthcoming.

Federal Executives Offer Science, Engineering and Technology Reports

FCCSET, a council of high-level federal executives organized by John Gibbon's Office of Science and Technology Policy, is assembling a mailing list for its forthcoming series of reports on federal science, engineering and technology policy.

FCCSET is the Federal Coordinating Council for Science, Engineering and Technology. Near the end of June, it plans to publish six reports with the following titles:

Advanced Manufacturing Technology
High-Performance Computing and Communications
Global Change Research
Advanced Materials and Processing
Biotechnology Research
Science, Mathematics, Engineering and Technology Education

If you wish to be on that mailing list, send a note to Phil@ortta.umn.edu, and he will send you FCCSET's order form.

Advanced Research Projects Agency

Technology Reinvestment Projects

The Advanced Research Projects Agency (ARPA), along with other agencies, has issued a joint solicitation (May 14 *Commerce Business Daily*) for a variety of projects to generate and exploit competitive technologies for dual commercial and defense uses.

The reinvestment initiative will fund grants under the following statutory programs that mandate significant university involvement either as lead applicant or partnership participant: manufacturing engineering education; manufacturing managers in the classroom; manufacturing extension programs; defense dual-use assistance extension programs; regional technology alliances.

About $500 million is available for grants.

The application deadline is **July 23, 1993**. For further information contact Advanced Research Projects Agency, Contracts Management Office, 3701 North Fairfax Drive, Arlington, VA 22203-1714; 703/578-4212.

Naval Research Laboratory

As announced in the April 6 *Commerce Business Daily*, the Naval Research Laboratory is inviting proposals under a broad agency announcement for long-range scientific projects to advance priority technologies.

Areas include artificial intelligence, research into space, high-performance computing, radiation effects in semiconductors, innovative applications of magnetic resonance, and research in biomolecular science and engineering.

Eligible applicants are colleges, universities and industry. Funding was not specified in the announcement.

The broad agency announcement will be open for one year. For further information contact Pat Schaefer, Naval Research laboratory, Code 3230, 4555 Overlook Avenue SW, Washington, DC 20375-5320; 202/767-6263. Refer to BAA NRL 02-93.

Department of Energy

Energy Postdoctoral Fellowships

The U.S. Department of Energy (DOE) is inviting applications for distinguished postdoctoral fellowships to support research in the physical sciences, computer sciences and engineering.

{Next Column}

Applicants should have received their doctorates after 1990 and be U.S. citizens or permanent resident aliens.

Awards are $52,800 and may be used at various national laboratories. DOE will make 10 awards.

The application deadline is **July 1, 1993**. For further information contact the Energy Department Distinguished Postdoctoral Research Program, Science/Engineering Education Division, Oak Ridge Institute for Science and Education, PO Box 117, Oak Ridge, TN 37831-0117, 615/576-9934.

Sandoz Foundation for Gerontological Research

The number of elderly people is increasing both in the industrialized and in the developing countries and there are many problems linked with this phenomenon. Sandoz has long since taken up the challenge in the context both of the pharmaceutical research which it carries out and of the support it gives to individual scientists and institutions worldwide.

To mark its centenary in 1986, Sandoz created the Sandoz Foundation for Gerontological Research. The Foundation is international in scope and has as its aim to promote scientific research concerned with aging and the problems of the aging individual.

Within that broad context, the Foundation supports biology, pharmacology, immunology, geriatrics (in general), geriatric psychiatry (behavioral aspects) and geriatric internal medicine.

The foundation will support 1) salaries, in whole or in part, 2) the cost of equipment and materials under certain circumstances, 3) contributions to traveling expenses, 4) contributions to the cost of publications, and 5) contributions to administrative expenses, including 15 percent overhead. A maximum of $35,000 will be awarded for each grant approved for a period of one year; renewals are an exception. Applications may be made by individual researchers, groups of researchers, interdisciplinary teams, and institutions, although the Foundation endeavors to sponsor primarily the work of researchers new to the field.

The annual deadlines are **May 1** and **November 1**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note to gopher@ortta.umn.edu. The Foundation address is Regional Committee, Sandoz Foundation for Gerontological Research, 59 Route 10, East Hanover, NJ 07936-1080; 201/503-8519; fax 201/503-7185.

National Science Foundation

Graduate Research Traineeships

In 1992, The National Science Foundation (NSF) initiated Graduate Research Traineeships (GRT). The principal objective was to increase the numbers of talented American undergraduates enrolling in doctoral programs in critical and emerging areas of science, mathematics and engineering, and to strengthen the human resource base across all geographical sectors and among all underrepresented groups.

The FY1993 competition has been announced, with some differences in the submission guidelines between FY92 and FY93. The differences are:

- Disciplinary focus. Several critical and emerging areas will be targeted for GRT support. These areas are listed in the announcement.
- Institution submission limitations. Only one proposal *per targeted subject area* may be submitted by an eligible institution; overall, an institution may not submit more than three GRT proposals.
- Structural innovation. NSF will encourage and give preference to proposals which include unique and progressive characteristics. These are listed in the announcement.
- Funding pattern. In contrast to the fully-funded five-year awards made in the FY92 competition, the FY93 awards will be made on a 1-year continuing basis for up to five years (i.e., funding of years 2-5 will be based on satisfactory progress and availability of funds).

Within each award, traineeships will provide a $14,000/year stipend and a $7,500/year cost-of-education allowance in lieu of tuition and fees normally charged to students of similar academic standing.

The application deadline is **June 25, 1993**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note to gopher@ortta.umn.edu. Questions concerning GRT proposals should be directed to GRT Program Director, Division of Graduate Education and Research Development, National Science Foundation, 1800 G Street NW, Room 1202, Washington, DC 20550; 202/357-9453.

Amyotrophic Lateral Sclerosis

Recent data have implicated mutations in superoxide dismutase in the pathogenesis of familial ALS. Therefore, the ALS Association is soliciting research proposals to investigate the role of free radicals in the process of motor neuron cell death. This request will encompass both basic and clinical investigations but will not include clinical trials of therapy.

Topics of particular interest include:

- Analysis of the factors controlling the generation and scavenging of free radicals in motor neurons and potentially unique susceptibility of motor neurons to free radicals damage;
- Approaches to the evaluation of oxidative damage in both sporadic and familial ALS patients;
- Studies of the properties of normal and mutant superoxide dismutase with particular attention to function in the context of motor neurons;
- Studies of factors governing the expression of SOD1 in motor neurons, and of related genes which alter the expression and function of SOD1;
- Evaluations of compounds which ameliorate free radical damage in either animal or *in vitro* models; or
- Other research areas broadly related to the phenomenon of free radical injury in motor neurons.

The Association will support multi-year grants but favors short-term (two years or less) proposals with a $40,000 funding limit.

A one-page abstract, in triplicate, is requested by **July 1, 1993**. The abstract should contain the title and nature of the proposal (including its specific aim), estimated length of time needed for the project and the amount of funding requested on an annual basis. Application forms and instructions will be sent with the invitation to submit a full application.

The full proposal deadline will be in September, 1993. For further information contact The Amyotrophic Lateral Sclerosis Association, 21021 Ventura Boulevard, Suite 321, Woodland Hills, CA 91364; 818/340-7500, fax 818/340-2060.

United States Information Agency

University Affiliations Program

The Bureau of Educational and Cultural Affairs of the United States Information Agency announces a program of support for institutional partnerships between U.S. and foreign universities with a demonstrated commitment to internationalization of their academic programs.

The program seeks to promote institutional relationships through grants for the exchange of faculty and staff for a period of not less than three years. Exchange visits will involve at least one of the following activities: teaching, lecturing, research and/or faculty and curriculum development directly related to the purpose of the affiliation. Research proposals must include collaboration by researchers from both institutions and be linked to substantial participation in graduate-level seminars.

Geographic areas include sub-Saharan Africa, selected American republics, selected East Asian/Pacific countries, selected European countries, some Newly Independent States of the former Soviet Union, selected North African, Near Eastern and South Asian countries, Mexico and Canada. The announcement lists the specific geographic areas and the eligible academic disciplines supported for each.

Eligible institutions include colleges and universities, including graduate schools. Consortia of universities and/or community colleges, individually or as systems, are also eligible. Overseas, participation is limited to recognized degree-granting institutions of post-secondary education and internationally recognized and highly regarded independent research institutions.

The proposed budget may not exceed $120,000. Matching funds are not required, but cost-sharing is encouraged. Grants to institutions with fewer than four years experience in conducting international exchange programs will be limited to $60,000.

The application deadline is **November 8, 1993**. A complete copy of the announcement is available from ORTTA and may be requested by calling 624-9004 or by sending a note to gopher@ortta.umn.edu. For further information contact Ms. Camille Barone or Ms. Deborah Trent, University Affiliations Program, Office of Academic Programs, U.S. Information Agency, 301 4th Street SW, Room 349, Washington, DC 20547; 202/619-5289.

William and Flora Hewlett Foundation

The William and Flora Hewlett Foundation supports national and international projects in the environment, population, conflict resolution, education and the performing arts.

Under its environment program, the foundation funds organizations that produce policy studies or disseminate environmental information to U.S. policymakers at the national, state or regional level; that work on international issues if there is a U.S. policy concern; and that study, document or demonstrate how environmental decision-making can be improved.

Support regarding population issues focuses on the development of research, policy and program expertise in developing countries; international delivery of family planning services; training at U.S. universities of population experts from developing countries; U.S. organizations that inform policymakers here and abroad on the importance of population issues; and organizations that try to bridge the gap between research and policy implementation.

The conflict resolution program supports university-based projects that improve interdisciplinary research and dispute-resolution practices; mediation and practitioner groups seeking to improve their capacity and develop new approaches and applications; and organizations that provide conflict resolution training.

Education giving seeks to strengthen networks of research libraries; improve comprehensive teaching and education programs in academic institutions in the U.S. and Mexico, focusing on relations between the two countries; improve academic achievement among minority students; and strengthen elementary and secondary education through state policy reform.

Higher education institutions and nonprofit organizations are eligible to receive grants.

There is no application deadline. The agency contact is Marianne Pallotti, Vice President and Corporate Secretary, William and Flora Hewlett Foundation, 525 Middlefield Road, Suite 200, Menlo Park, CA 94025-3495; 415/329-1070.

Faculty Research, Training and Service Awards

This section contains statistics on proposals and awards recently processed by ORTTA. In addition, we have randomly selected awards received by faculty during preceding months. Faculty who have received awards they would like mentioned in a future *Research Review* may send the pertinent data, as exemplified below, to Phil Norcross at ORTTA, 625-2354.

Proposal and Award Summary

	Number	Amount
Proposals Submitted April 1993	317	$ 42,258,823
Awards Processed April 1993	255	23,340,167
Proposals Submitted July 1992 - April 1993	3,282	488,776,376
Awards Processed July 1992 - April 1993	2,595	212,049,272
Proposals Submitted July 1991 - April 1992	3,487	576,771,552
Awards Processed July 1991 - April 1992	2,463	203,420,716

Renovation of the Experimental Condensed Matter Facility
Marvin L. Marshak, Physics and Astronomy
NSF
$1,455,701 - 03/93-02/96

AIDS Demential Complex
Richard W. Price, Neurology
NIH, NINDS
$754,929 - 02/93-01/94

Acquisition of a New Electron Microprobe
James H. Stout, Geology and Geophysics
NSF
$336,000 - 04/93-09/95

The Automated Plate Scanner Catalog of the Palomar Sky Survey
Roberta M. Humphreys, Astronomy
Robert Pennington, Astronomy
NSF
$262,755 - 02/92-09/94

Substance Abuse and Pregnancy—A Multiagency Intervention
Amos S. Deinard, University Hospital and Clinic
St of MN, Department of Human Services
$212,500 - 07/92-06/93

Organization and Role of Lens Membrane Proteins
Charles F. Louis, Veterinary Pathobiology
NIH, NEI
$201,473 - 04/93-03/94

Cancer and Leukemia Group B—Minnesota Oncology Group
Bruce A. Peterson, Medicine
NIH, NCI
$194,648 - 04/93-03/94

RNA in DNA Virus Assembly
Dwight L. Anderson, Oral Sciences
NIH, NIGMS
$185,979 - 04/93-03/94

New Ion Channel Forming Amphophiles
Scott Rychnovsky, Chemistry
NIH, NIGMS
$185,811 - 04/93-03/94

Mutation in Hybrids of Drosophila
Michael J. Simmons, Genetics and Cell Biology
NIH, NIGMS
$184,435 - 04/93-03/94

New Mechanisms for Parallel Loop Scheduling
David J. Lilja, Electrical Engineering
NSF
$160,942 - 02/93-07/96

Metabolic Regulation of Gene Expression
Cary Mariash, Medicine
NIH, NIDDK
$152,605 - 04/93-03/94

Transpression: Consequences for Pluton Emplacement in the Sierra Nevada
Christian Teyssier, Geology and Geophysics
NSF
$150,000 - 07/93-06/96

B43 Radioimmunoconjugates
Fatih Uckun, Therapeutic Radiology
Sterling Winthrop Research Institute
$150,000 - 11/92-11/93

Transition of Submarine Debris Flows to Turbidity Currents on the Continental Shelf
Gary N. Parker, Civil and Mineral Engineering
USDOD, Navy
$144,951 - 01/93-12/94

Mammary Carcinogenesis by N-Substituted Aryl Compounds
Danuta Malejka-Giganti, Laboratory Medicine and Pathology
NIH, NCI
$139,907 - 04/93-03/94

Thermodynamics and Processing of Block Copolymer Mixtures
Frank S. Bates, Chemical Engineering and Materials Science
USDOD, Air Force
$130,886 - 03/93-02/94

Interface Formation with Atoms, Ions and Clusters
James R. Chelikowsky, Chemical Engineering and Materials Science
John Weaver, Chemical Engineering and Materials Science
NSF
$120,500 - 04/93-09/94

Relation Between Water Input, Water Pressure, Surface Speed and Basal Till Deformation, Storglaciaren
Roger L. Hooke, Geology and Geophysics
Neal R. Iverson, Geology and Geophysics
NSF
$114,369 - 04/93-09/94

Long-Term Processes Affecting the Hemlock-Hardwood Mosaic at Sylvania, Michigan
Margaret Davis, Ecology, Evolution and Behavior
NSF
$110,000 - 04/93-09/94

Function of Material Investment in Mating by Male Lepidoptera
Karen Oberhauser, Ecology, Evolution and Behavior
NSF
$106,403 - 05/93-10/95

Institute for Intelligent Vehicle/Highway Systems Concepts
Richard P. Braun, Civil and Mineral Engineering
DOT
$100,000 - 10/92-09/98

Biomedical Image Processing Laboratory
Edward Egelman, Cell Biology and Neuroanatomy
NSF
$56,000 - 05/93-10/95

Antitropsin Inhibits Pneumolysin: A Novel Activity
Jeffrey B. Rubins, Medicine
NIH, NIAID
$67,786 - 04/93-03/94

A Comparative Study of Prozac vs. Provera in the Treatment of Sex Offenders

Eli Coleman, Family Practice and Community Health
Nancy Cox Raymond, Psychiatry
S. Margretta Dwyer, Family Practice and Community Health
St of MN, Department of Corrections
$83,550 - 08/92-06/93

Molecular Mechanisms of MHC Class I Antigen Recognition

Matthew F. Mescher, Laboratory Medicine and Pathology
NIH, NIAID
$48,300 - 03/93-05/93

Cerebellar Physiology of Motor Control

Jose Gomez, Medical School
Timothy Ebner, Neurosurgery
NIH, NIGMS
$24,842 - 01/93-12/93

Clopidogren vs. Aspirin in Patients At Risk of Ischemic Events

Alan Hirsch, Medicine
Sterling Winthrop Research Institute
$85,000 - 09/92-08/93

Use of Pyruvate in Organ Transplantation and Shock

Karl A. Nath, Medicine
Baxter Healthcare Corporation
$60,000 - 12/92-11/93

Investigate and Identify Means of Controlling Virus in Indoor Air by Ventilation, Filtration or Source Removal

Lisa M. Brosseau, Environmental and Occupational Health
Donald Vesley, Environmental and Occupational Health
Thomas Kuehn, Minnesota Building Research Center
American Society Heating Refrigerating Air Conditioning Engineers
$35,231 - 04/93-06/93

Effectiveness of Managed Competition

Bryan E. Dowd, Institute of Health Services Research
Roger D. Feldman, Institute of Health Services Research
Agency for Health Care Policy and Research
$45,535 - 04/93-05/93

Mechanisms of Chronic Opiate Mediated Pulmonary Infection

Jack M. Risdahl, Clinical and Population Sciences
Thomas W. Molitor, Clinical and Population Sciences
NIH, NIDA
$81,473 - 03/93-02/94

Computational Modeling of Contaminant Transport and Biodegradation

Robert S. Maier, Army High-Performance Computing Research Center
University of Arizona
$30,000 - 03/93-04/94

Statewide Statistical Subgrade Characterization

Randal J. Barnes, Civil and Mineral Engineering
St of MN, Department of Transportation
$36,240 - 04/93-03/95

Strategies for Achieving Land Use and Transportation Balance in Minnesota

Richard P. Braun, Center for Transportation Studies
St of MN, Department of Transportation
$14,600 - 04/93-08/93

Expert Computer Vision Based Crab Classification System

Ahmed H. Tewfik, Electrical Engineering
INFOPET; Prime: State of Alaska
$73,498 - 04/93-09/94

Solid-State Micromechanical Pump

Dennis L. Polla, Electrical Engineering
Westinghouse Electric Corp.
$30,000 - 09/92-08/93

Quantum Effect Devices Fabricated Using X-Ray Lithography

Marshall I. Nathan, Electrical Engineering
Stephen Y. Chou, Electrical Engineering
P. Paul Ruden, Electrical Engineering
USDOD, DARPA
$90,000 - 07/92-11/93

Static Phase-Shifter Study

Ned Mohan, Electrical Engineering
MN Power and Light Company
$18,488 - 04/93-12/93

Semiconductor Ultraviolet Detectors

Philip I. Cohen, Electrical Engineering
Marshall I. Nathan, Electrical Engineering
USDOD, Navy
$150,000 - 01/93-01/96

Permeability and Rheology of Partially Molten Upper Mantle Rocks

David Kohlstedt, Geology and Geophysics
NSF
$29,999 - 05/93-10/94

Passive Immersion-Cooled Multichip Module

Avram Bar-Cohen, Mechanical Engineering
3M
$35,000 - 02/93-01/94

An Effective Multidisciplinary Computational Technology

Kumar Tamma, Mechanical Engineering
Lockheed
$48,063 - 02/93-09/93

Characterization of mRNA Instability Determinants

Janet L. Schottel, Biochemistry (CBS)
NSF
$91,000 - 04/93-09/94

Maximum Likelihood Analysis of Quantitative Genetic Data

Ruth G. Shaw, Ecology, Evolution and Behavior
NSF
$26,800 - 01/93-08/93

Design for Public Safety

Mary C. Vogel, Architecture
P. Michael Robinson, Landscape Architecture
Mary DeLaittre, Design Center for American Urban Landscape
City of Saint Paul
$24,800 - 01/93-10/93

Coming to Know Mathematics: A Minority Perspective

Laura Coffin Koch, General College
NSF
$49,966 - 04/93-09/94

Time to Adopt: Using Count-Data Regression Analysis to Model Technology Adoption Decisions

Yacov Tsur, Agricultural and Applied Economics
USDA
$25,145 - 09/92-09/93

Patriot Sprayer Vehicle and Boom Research

Jonathan Chaplin, Agricultural Engineering
Tyler Limited Partnership
$23,590 - 02/93-08/93

Gene Mapping and Transfer Using Oat x Maize Hybridization

Howard W. Rines, Agronomy and Plant Genetics
Ronald L. Phillips, Agronomy and Plant Genetics
Midwest Plant Biotechnology Consortium
$98,879 - 07/92-06/93

Isolation of the Chicken Pituitary (PIT-1) cDNA

Douglas Foster, Animal Science
Eli Lilly and Company
$33,600 - 03/93-02/94

Improving Swiss Cheese Quality with Plasminogen Activator

Eric B. Bastian, Food Science and Nutrition (Agr)
National Dairy Promotion and Research Board
$22,000 - 01/93-06/93

Biotechnology in Mungbean Cloning and Breeding of Resistance Genes

Nevin Dale Young, Plant Pathology
Asian Vegetable Research and Development Centers
$34,500 - 01/93-12/93

Factors Limiting the Abundance and Distribution of Sloth Bears

James L. David Smith, Fisheries and Wildlife
Earthwatch
$15,200 - 12/92-07/93

Juvenile Restitution Initiative Project

Mark Umbreit, School of Social Work
Florida Atlantic University
$24,494 - 01/93-01/94

Minneapolis Transition Information and Planning (TIPS) Training Project

David R. Johnson, Educational Psychology
Scott McConnell, Institute on Community Integration
Minneapolis Public Schools
$25,000 - 01/93-06/93

Minnesota Transition Training Project

David R. Johnson, Educational Psychology
Scott McConnell, Institute on Community Integration
St of MN, Department of Education
$31,325 - 02/93-06/93

Rural Transition Information and Planning System

Scott McConnell, Institute on Community Integration
David R. Johnson, Educational Psychology
St of MN, Department of Education
$30,000 - 02/93-09/93

Benjamin Franklin Fellowship Proposal in Business Administration

Mahmood A. Zaidi, International Program Development
Institute of International Education
$46,512 - 09/92-06/93

1993 Minnesota Women's Institute for Chemical Health

Sharon Vegoe, Professional Development and Conference Services
St of MN, Department of Human Services
$40,000 - 08/92-07/93

Logic Analysis System for Integrated Circuit Component Testing

Christopher Carroll, Computer Engineering, Duluth
NSF
$22,140 - 04/93-08/95

Title IIb - Summer Youth

Don Cavalier, Counseling, Career Planning and Placement, Crookston
Northwest Private Industry Council
$39,707 - 04/93-09/93

Transportation and the Economy of the Upper Midwest

Candace Campbell, Humphrey Institute
St of MN, Department of Transportation
$24,940 - 02/93-02/94

National Research Resources Seeks Planning Help

The National Center for Research Resources (NCRR) at NIH seeks advice from the scientific and education communities to help it write a strategic plan. It also seeks nominations for panel members, and encourages people to nominate themselves. The NCRR planning panel will convene later this year to develop specific objectives for the plan.

"The NCRR is requesting input from the broad scientific community to define the current state of resources and technologies and to identify research gaps and future needs," said Judy Vaitukaitis, director of NCRR.

In the May 7 *Federal Register*, page 27,294, NCRR solicited written answers to four questions:

Which research resources and technologies are most vital to your present research needs? How well do these meet your current needs?

What are the most important basic and clinical research trends that will drive NCRR's future research portfolio? Which research technologies and resources will be critical?

NCRR asks that responses be one single-spaced page. Send responses by **June 15** to Dr. Caroline Holloway, Director, Office of Science Policy, NCRR, 9000 Rockville Pike, Bldg. 12A, Room 4047, Bethesda, MD 20892-1012; phone 301-496-2992; fax 301-402-1775.

NCRR pursues resources and technologies for biomedical and behavioral research. Vaitukaitis stressed the multidisciplinary nature of NCRR's programs, its promotion of collaboration within and across disciplines, and its quick, flexible approaches to new and emerging needs.

"To achieve advances that improve human health, scientists require a broad range of technologies and resources that enable research to thrive," wrote Vaitukaitis. "Recognizing this need, the NCRR supports primary research to create and develop these critical resources and technologies and provide them to researchers supported by other NIH components."

From *Washington Fax*

Sponsored Programs Information Network (SPIN)

The Sponsored Programs Information Network (SPIN) is a computerized locator of funding opportunities (federal, nonfederal, and corporate) for faculty and institutional research, development, and education program support. It is available free of charge to University faculty and staff through ORTTA.

Based on a description of the research areas and/or the type of support sought, faculty and staff can search the Keyword Code Table and Award Type Table to identify codes for specific areas of interest. The Keyword Code Table, a taxonomy developed by SPIN to catalog funding sources, is divided into the following ten major classifications:

- **Agriculture/Food/Forestry**
- **Arts/Culture/Humanities/Communications**
- **Business/Economics/Management**
- **Education**
- **Health/Medical Sciences**
- **International Affairs/Area Studies**
- **Miscellaneous**
- **Science/Technology**
- **Social/Behavioral Sciences**
- **Social Welfare/Public Affairs**

The Award Type Table offers codes that will more specifically target the search results to the award type(s) sought. Some of the award types included in the Award Type Table are:

- **Conference**
- **Fellowship**
- **Projects Outside the U.S.**
- **Publication**
- **Seed Money/Start-Up Funds**
- **Student Support**
- **Training/Professional Development**

The result of a search is a set of profiles of applicable funding sources that provides (1) the sponsor's name; (2) the sponsor's contact address and phone number; (3) deadline dates; (4) program titles; (5) objectives or interest areas of the sponsor; and (6) restrictions that would affect the submission of a proposal. This set of profiles is sent to the requestor.

ORTTA's Gopher contains a section devoted to SPIN and offers you the opportunity to review the Keyword Code Table within the topics shown above to find keyword codes of interest. You then e-mail a note to the Gopher Editor (spin@ortta.umn.edu) requesting a SPIN search based on the chosen keyword codes (limit, 20 keywords). Be sure to provide your name, address and phone number on the message in case ORTTA staff need to contact you for clarification. If an e-mail address has been provided, the search results will be forwarded to that address if possible.

If the results of the search are not satisfactory, you may contact our office for further discussion and guidance in the selection of codes. For further information regarding the SPIN system, please contact ORTTA through e-mail (spin@ortta.umn.edu) or call 624-9004.

SPIN searches are also available through the Research and Development Office in the College of Liberal Arts and the Agricultural Experiment Station.

Office of Research and Technology Transfer Administration

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