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Legislature funds 5 percent University increase, but does not meet some budget priorities

Recent legislative appropriations increased the University of Minnesota budget 5 percent, giving the University nearly half of the increment it asked during a period of tight money and leaving its budget base intact.

Though the 1981 appropriation of \$478.4 million was \$23.3 million more than had been appropriated the previous biennium, it fell short of the \$57.6 million or 12.7 percent increase the University wanted, exclusive of salaries.

However, the legislative action allayed fears that the state's financial shortfall might pare more than \$14 million from the University's operating base. The possibility loomed that an additional 10 percent might be lost following a governor's directive to the University to submit a 90 percent budget as well as a full request.

The 1981 appropriation meant mixed success for the Institute of Technology.

The Institute asked \$1 million for the new Minnesota Science & Technology Transfer Center (MINTECH) to direct the transfer of science and technology to the region and to promote collaboration with industry. The Legislature appropriated one quarter of that amount or \$250,000.

"Our victory for MINTECH is a foot in the door for the next two years," said Roger W. Staehle, dean of the Institute of Technology. "It provides us with a start but is far short of what the state needs if it is to continue building on its technological strengths.

"One of my greatest disappointments is the lack of allocation for undergraduate equipment," Staehle said. The legislators denied a specific equipment request of \$750,000 for IT as they did special requests for the School of Dentistry, the College of Biological Sciences, and the Morris and Waseca campuses. The Institute of Technology still uses classroom and laboratory equipment that was on campus in the 1920s and 1930s.

Of the \$775,000 IT and the College of Biological Sciences requested for biomass research as a step toward energy self-sufficiency for the state, \$237,000 was allocated.

Among the special requests, the Mineral Resources Research Center (MRRC) received \$300,000 of the \$800,000 it sought for projects related to the discovery and use of the state's rich



MINNESOTA GOVERNOR AL QUIE (right) and Institute of Technology Dean Roger W. Staehle discuss science and technology education in Minnesota at the August luncheon for the new National Science Foundation Mathematics Institute that will open in IT in Fall 1982.

mineral deposits. (Other MRRC state requests included three to the Legislative Commission on Minnesota Resources or the LCR. Two were funded, one at \$250,000 for one year for equipment to modify the plasma reactor for the manufacture of cement, and the other, more than \$400,000 over the biennium for salaries and equipment to start a new environmental technology unit.)

The Minnesota Geological Survey (MGS) received a special allocation of \$1.2 million for the biennium, though the Legislature turned down its request to continue mapping the geology of Minnesota. "We're currently beating the bushes to keep this mapping program alive," says John Spletstroesser, MGS program director.

(MGS also received two LCR appropriations totaling more than \$860,000 for the biennium.)

The Institute of Technology got \$900,000 to begin remodeling Smith Hall and another \$900,000 to complete the unfinished basement in adjoining Kolthoff

Hall for chemistry research laboratories.

However, the Legislature denied the University's general request of \$3.7 million for the repair, replacement, and betterment of its facilities for research and teaching and prevented IT's remodeling of critical research space. A special request to upgrade an antiquated North Hall on the St. Paul campus where Landscape Architecture is housed also failed.

The Smith and Kolthoff allocations are part of the 1981 state bonding bill which includes \$38.6 million for University buildings. The biggest items in this package are the \$17.3 million for agronomy, soil science, and plant pathology additions on the St. Paul campus, and \$16.5 million for a connected Hubert H. Humphrey Institute building and a business school addition on the Minneapolis campus west bank. The Legislature approved an additional \$190 million bonding bill to finance construction and remodeling of University Hospitals.

Among other University requests
(Turn to page 2)

Library cutbacks erode quality of education . . .

(From page 1)

affecting IT were those for libraries and equipment replacement, and monies needed to combat inflationary price levels. The University asked \$1.8 million for libraries and instructional resources and received about one-quarter of that or \$458,325.

Inflation continues to pinch the University's ability to pay for library acquisitions and equipment for instruction and research; while the budget for such acquisitions increased 2 percent last year, the rate of inflation in book and periodical prices rose 18 percent in each of the last two years.

Additionally, University administrators estimate it would cost \$2.25 million a year to replace worn out or outdated classroom equipment in undergraduate programs alone, and requested a half million dollars to replace equipment generally throughout the system. The Legislature allocated nothing.

When faced with eroding the quality of a University education by substantially cutting back library acquisitions of periodicals and books, the regents passed an additional 3 percent tuition raise on top of the 10 percent increase already planned for 1981-82.

"Libraries are the essential tools of the trade of a university," University President C. Peter Magrath said. Without these tools, the education provided by the University would suffer, he said.

Minneapolis Regent David Lebedoff added that the fiscal realities left the University little choice. "Access to mediocre education is no access," he said. "It's an open door to nowhere."

The 3 percent tuition increase should raise about \$3.5 million for libraries and teaching equipment over the next two years. It would have to be approved again for 1982-83.

The Legislature did allocate \$7.3 million to help the University meet the inflationary price level of supplies and equipment; the University asked for nearly twice as much or \$12.6 million to deal with the erosion of its purchasing power.

The lawmakers also gave the full \$250,000 requested for the Graduate School Research fund, along with a modest increase of \$37,000 in the Graduate School's fellowship program. Both support activities in the Institute of Technology.

Also, the University persuaded the Legislature to fund 2.5 percent of its indirect cost recovering monies so it could increase its research dollars, an area that also affects the Institute.

A final decision on salary increases

Alumni dollars for scholars

Merit Scholarship fund is off to great start

Institute of Technology alumni made gifts totaling \$54,912 to the IT Annual Fund in the 1980-81 fiscal year which ended on June 30, an increase of more than 400 percent over last year, according to Catherine R. Day, IT Director of Development. The number of alumni contributors to the annual fund doubled over 1979-80 participation to make the 400 percent increase possible.

Alumni gifts moved the Institute more than a quarter of the way toward a goal to endow the Merit Scholarship Fund at \$200,000. A letter from IT Dean Roger W. Staehle informed alumni of the need for the scholarship project in October. The letter was followed in the spring by a phone campaign staffed by University of Minnesota Foundation student callers.

In addition to support for the Merit Scholarship Fund, alumni made special contributions to fund departmental needs. Landscape Architecture alumni donated \$2,280 in support of the E.J. Phelps Memorial Fund. Mechanical Engineering student volunteers phoned ME alumni who pledged more than \$7,000 for undergraduate laboratory equipment. In addition, the Civil & Mineral Engineering Class of 1931 made gifts totaling \$7,175 in celebration of their 50th anniversary year.

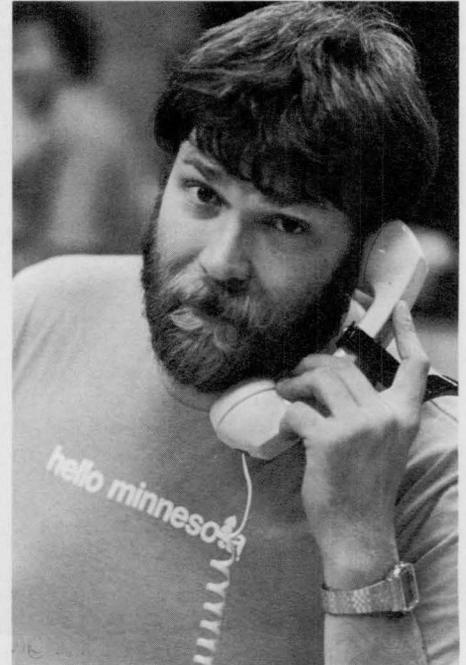
Day called the alumni giving record "a reflection of alumni pride in the Institute, its national prominence, and the desire to see that continue."

Alumni support goes beyond actual dollars, according to Day. "IT alumni, through their gifts and through their memberships in the Minnesota Alumni Association/IT Alumni Society, help us make a stronger case for IT in corporate boardrooms, in the Legislature, and in everything we do. For those of us who

won't be known until this fall. The University had requested pay raises of 31 percent over the next two years for its faculty. Increases were postponed for both faculty and civil service staff pending the outcome of collective bargaining negotiations at the state universities, community colleges, and the University's Duluth and Waseca campuses. The Legislature hesitated to act on the University's recommended \$69 million for salary increases because it was concerned with jeopardizing these negotiations.

Instead, the legislators put two restrictions on the outcome of University faculty pay raises: first, they postponed naming a percentage increase but set aside a lump sum that would limit the percentage of increase; second, they tied

work to advance the Institute, this kind of alumni support is a great morale builder. It tells us that we have a good school and a good program which deserves support."



MEL MOSCHLER (pictured above), program head for the student chapter of the American Society of Mechanical Engineers (ASME), was one of eight students who phoned 302 Mechanical Engineering alumni who pledged \$7,606 for undergraduate laboratory equipment in the ME department. The students gave an evening in April to call former and new donors on behalf of the department. The ME students who participated included Bob Hastings, Paul Hoffman (ASME chair), Steve Kayser, Bryan Kopesky, Michelle Larson (ASME vice chair), Doug Milroy, and John Wotzka.

the University faculty salary raises to those for community college and state university faculty and nonacademic employees.

Faculty raises were the University's number one priority with the Legislature this year and many administrators felt legislators were convinced that a significant pay raise is essential to maintaining the University's quality. The regents may seek a special salary appropriation during the 1982 legislative session.

In other budget action, the Legislature refused additional funding for a retention and recruitment program that has allowed the University to use special state monies to keep key faculty who might otherwise be lured away by industry's higher salaries, as well as to recruit new stars in particular fields.

Major education and research directions announced by Microelectronic & Information Sciences Center

Microelectronic & Information Sciences (MEIS) Center Acting Director Robert M. Hexter and the Management Board adopted four major research foci at their July board meeting.

"We know who and what we have to work with and in what areas we can make immediate contributions so we have focused our strengths and begun," says Hexter, a professor of Chemistry recently named acting director.

The major research center was formed last year in the Institute of Technology through the efforts of IT and Control Data Corporation, Honeywell, and Sperry Univac. MEIS participants study new techniques and methods in microelectronics — the science of putting more electronic circuitry on computer chips — and in the information sciences or the design of computer systems and their software.

One area of MEIS concentration centers on the gift from the CALMA Company, a division of General Electric, of a CHIPS 220 system for integrated circuit design and pattern generation. The California company's design system will be used by IT undergraduate and graduate students and faculty for research and the design of microelectronic circuits or chips.

Minnesota's may be the first such facility in the nation, with others soon to follow, according to Electrical Engineering's Gary Robinson, who also is an associate director of the MEIS Center.

The CALMA design system, a multi-terminal instrument to be housed in 25/35 Lind Hall on the Minneapolis campus, will be coupled with the VAX 11-780 computer, creating a more powerful system. The VAX 11-780 recently was obtained by the Computer Science department through a National Science Foundation (NSF) grant and supplementary MEIS funding.

"Both the Computer Science and Electrical Engineering departments collaborated in developing courses that utilize this equipment," Hexter says.

"By next year we may be able to admit people from outside the University into these courses or schedule special or short courses for them," Hexter adds.

In its design of microelectronic circuits or chips the CALMA system puts out a tape which will be sent to any one of the MEIS Center's sponsors where it will be used to prepare a mask that will become part of the fabrication of a chip. The chip will be returned to the University after it is made, thus allowing the students or researchers to utilize products of their

inventions.

By piggybacking on the shoulders of its sponsors, MEIS promotes use of state-of-the-art fabrication equipment. "We know this is not equivalent to having our own unit, but it's in the spirit of sharing facilities, one of the founding principles of the MEIS Center," Hexter says. And the Center avoids purchasing equipment which is expensive and quickly outmoded.

Hexter sees the CALMA system initiating other collaborative ventures since

four individuals eventually will be able to work simultaneously on the CHIPS 220 and a variety of shifts will allow equipment to be used around the clock.

A second area of MEIS focus — which Hexter cites as one of the strongest now existing in IT — is in materials for microelectronics. Physics Professor Allen Goldman is working with a special team on a major proposal that MEIS has been asked to submit on research in **(Turn to page 4)**

Cray endows \$100,000 lectureship

A new Institute of Technology lectureship in computer science will bring distinguished scholars to the University to explore major scientific problems, thanks to a \$100,000 endowment from Cray Research, Inc.

"We are delighted to be able to work with the Institute on this project," says John Rollwagen, president of Cray, the Twin Cities builder of supercomputers. "The work of the Institute is crucial to the continuing success of our industry and the regional economy."

IT Dean Roger W. Staehle sees the Cray Lectureship enriching the University as well as the Twin Cities and regional corporate communities.

Computer science is in a state of explosive growth and under enormous pressures to provide the proper ambiance for productive research and quality education according to Kurt Maly, acting head of the Computer Science department.

"The Cray Lectureship will allow us to attract top people to the campus who will stimulate both our graduate students and faculty," he says.

The Lectureship boosts the visibility and excellence of the Institute which recently attracted major corporate grants to start a Microelectronic & Information Sciences Center and a National Science Foundation grant to begin a national Mathematics Institute. Both the Cray Lectureship and the Mathematics Institute will start up in Fall 1982.

Corporate and general publics will be encouraged to attend the Lectureship's annual programs and the proceedings will be widely distributed.

Seymour R. Cray, founder of Cray Research and an electrical engineering graduate of the Institute of Technology, first worked for Univac as a computer

designer. He then helped start Control Data Corporation before founding Cray Research to design, develop, manufacture, and market large capacity, high speed scientific computers for governmental and industrial use.

Cray Research since has built the Cray-1 and dominates the supercomputer market. The Cray-2, to appear in the mid-80's, promises to be five times as powerful as the original lightning-fast system which can perform calculations few other computers can.

Cray Research spends about 15 percent of its annual revenues on research and development — amounting to more than \$7 million yearly — and has projected a Cray-3 for the 1990's.



JOHN ROLLWAGEN, president of Cray Research, emphasized the need for industry to work with the Institute of Technology at a luncheon where he announced Cray's recent gift to IT.

MEIS used matching funds to build . . .

(From page 3)

understanding the properties of matter bearing on electronics. "When electronic devices or their components are scaled down to submicron dimensions, their properties change," Hexter says. "At IT we've been interested in such changes for a long time."

This MEIS research proposal follows acceptance of a preliminary one by the sponsors of a special U.S. Department of Defense (DOD) program tagged USER — Ultra-Small Electronics Research.

The Minnesota proposal deals with three subspecialties: the nucleation and growth and the physical properties of dimensionally constrained materials (thin films and wires); electronic transport (III-IV compounds, electronic localization and submicron devices); and such unconventional materials as Josephson tunneling junctions, microstructures through chemistry, and conducting polymers.

The MEIS team should know in the spring of 1982 if they will receive approximately \$1 million a year for three years to facilitate research in each of these three areas, involving educators and graduate students from numerous IT departments. MEIS will match the DOD funds.

The Center also is concentrating on the early stages of renovation of IT's microelectronics laboratory. "Though this laboratory has existed in the Electrical Engineering department for more than 10 years, it needs to be upgraded to state-of-the-art," Hexter says. MEIS has agreed to initiate upgrading its facilities and staff.

"Full renovation is an extensive project that will last more than four years and cost an estimated \$2 million," Hexter says. In supporting the startup of the project, MEIS is matching \$200,000 that the University will supply during 1981-83.

For the future, as the 14 faculty members who will become associated with the laboratory compete for and achieve funding for major research proposals, MEIS will match their grants. "The success of their efforts will dictate further MEIS involvement in renovation," Hexter says.

The fourth area of MEIS focus is in software engineering and design automation where the Center now collaborates extensively with industry, according to Hexter. "Many initiatives here were taken by our industrial sponsors. Now we have four University/industrial committees working in these areas, in the educational and research aspects of both software engineering and design automation."

A faculty group — mainly University and industrial computer scientists — will ask NSF for approximately \$3 million to increase the quality and productivity of software development. "We want to make better software in a shorter time at a lower cost," says William R. Franta, the other MEIS associate director and a professor of Computer Science.

The NSF and matching MEIS funding would mean additional course offerings and upgraded facilities for IT — all exposing students to the real world of software projects. "Research teams would be made up of University faculty and graduate students and industrial people," Franta says.

In bringing IT's software education facilities into modern times, equipment gained through the grant would provide an appropriate interface in faculty and graduate student offices, meaning work

CALMA Company joins MEIS Center supporters

CALMA Company, a California-based subsidiary of General Electric, has become an Associate of the Microelectronic & Information Sciences (MEIS) Center with its gift of a system for integrated circuit design, analysis, and pattern generation.

CALMA's gift is a two-station color terminal CHIPS 220. When coupled with the Institute of Technology's Computer Science department VAX 11-780 computer, the system brings powerful state-of-the-art capabilities to students, faculty, and researchers working on MEIS projects.

Through its gift, CALMA has helped MEIS create one of the first such educational design centers in the country.

stations to communicate with resources in local industry as well as in national networks, and increased in-house computational power.

In the same proposal, Franta's group also seeks to develop algorithms that use parallel and pipelined computer design to address electronic automation problems. As a University/industry effort, this work would increase the amount of design done in parallel time, doing more in less time.

In yet another new development, the MEIS board tentatively approved the establishment of a MEIS Fellow Program. For IT faculty and MEIS sponsors' employees, the honorific program will distinguish individual achievement while creating an identity for MEIS. It is patterned after the University of Minnesota Regents' Professorships.

"This program is a device for

technology transfer," Hexter says. "We will ask the fellows to form a monthly seminar at which current advances and discoveries in microelectronics and the information sciences will be discussed."

Additionally, the Center will seed new IT faculty positions. "We have said that we would seed new positions in microelectronics and computer science if we can find matching funds to pay salaries. The University administration agreed to commit \$400,000 in new position money to IT faculty by 1985," Hexter notes.

All of the Center's work is on the matching fund basis, using its present \$5 million in funding in conjunction with other monies.

MEIS is looking for additional sponsors among local and national companies, among other universities that would cooperate in research, as well as from state and such federal agencies as NSF and DOD.

Its current sponsors gave MEIS the biggest university grants they ever awarded. And for their dollars these companies get basic research results that cost less than if each one paid for similar research programs and a steady supply of IT graduates who have been involved in Center activities.

Working with Hexter, Franta, and Robinson to guide the Center is a new directors advisory committee which succeeds the MEIS technical advisory committee whose members now serve as informal consultants. The directors advisory committee includes:

- Allen Goldman**, professor of Physics, University of Minnesota;
- Robert Herr**, group research executive, Electronic & Information Technologies Sector, 3M; (Alternate: **Thomas C. Ensign**, laboratory manager, Process Technologies Laboratories, 3M);
- W.W. Lindemann**, vice president, Microcircuits/Printed Circuits Division, Control Data Corporation; (Alternate: **Kenneth W. Morrissey**, general manager, engineering & advanced technology systems, Peripheral Products Company, Control Data Corporation);
- William T. Sackett**, vice president, Corporate Technology Center, Honeywell; (Alternate: **K.C. Karl Nomura**, vice president & general manager, Solid State Electronics Center, Honeywell);
- Larry L. Walker**, director, systems design, Sperry Univac; (Alternate: **Richard J. Petschauer**, director, storage & technology development, Sperry Univac).

ALUMNI NOTES

AERONAUTICAL ENGINEERING

'75 **Djordje Dulikravich** '75MSAeroE, Cleveland, OH, continues research into transonic turbomachinery analysis and design at the National Aeronautics & Space Administration's Lewis Research Center and at the *Institut for Theoretische Stromungsmechanik* in Goettingen, Germany.

'80 **Thomas Knoicke** '80BAeroE, Minneapolis, MN, is stationed at the U.S. Air Force Flight Test Center, Edwards Air Force Base, CA.

'81 **Peter O. Dille** '81BAeroE, New Brighton, MN, serves in the Air Force at the Edwards Flight Test Center in California.

ARCHITECTURE

'74 **Joseph A. Jameson** '74BArch '75BCivE, St. Cloud, MN, has joined Horner Associates, St. Paul (MN) structural consulting engineering firm, as vice president of engineering.



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Director
of Development Catherine R. Day
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Council Charles M. Denny, Jr.
President, IT Alumni Society Leigh E. Nelson

The University of Minnesota adheres to the principle that all persons shall have equal access to its facilities, activities, and employment without regard to race, creed, color, sex, national origin, or handicap.



UNIVERSITY PRESIDENT AND MRS. C. PETER MAGRATH greeted Institute of Technology students — now alumni — at a President's reception for members of campus honor societies. Sixteen IT honor groups were represented.

CHEMICAL ENGINEERING & MATERIALS SCIENCE

'22 **Leslie Stone** '22BChEng '23MSChem '27PhDChem, Toledo, OH, retired after 33-plus years with the duPont Company at five different research and production locations and after more than 17 years in consulting work.

'61 **Jim Dickey** '61BChE, with Exxon Research & Engineering in Florham Park, NJ, has been elected president of the American Society of Lubrication Engineers.

'65 **W.T. (Bill) Taylor** '65BChE, St. Paul, MN, General Mills' new manager of energy programs, has been a senior energy engineer with that company since 1974.

ELECTRICAL ENGINEERING

'57 **Roger E. Handberg** '57BEE, formerly general manager of AN/AYK-14 computer programs, has been appointed general manager of Control Data Corporation's Honeywell division in Minneapolis, MN.

'73 **Quentin Denzene** '73BEE, Waseca, MN, has been promoted from senior electronic engineer to group leader in microprocessor/logic design of E.F. Johnson Company's Radio Products division.

GEOLOGY & GEOPHYSICS

'19 **John W. Gruner** '19MSGeo '23PhDGeo, a University of Minnesota Geology professor from 1923 until 1959, died in May 1981. Gruner pioneered the use of x-rays to examine the crystal structures of layered silicates, and for decades was the leading authority in the

mineralogy and geology of Minnesota's iron formations and Colorado's radioactive mineral deposits.

MECHANICAL ENGINEERING

'42 **Arthur D. Brinkman** '42BME, State College, PA, professor emeritus of mechanical engineering at Penn State University, died April 13, 1981.

'35 Civil Engineers return for campus reunion

Nineteen 1935 civil engineering graduates, most of them now retired, came back to the Institute of Technology on May 8th from Florida, Oregon, and Minnesota for a reunion.

Leon Hamlet came from Sanibel, FL, while Fred W. Bartel and Howard W. Schleiter came from Scappoose and Klamath Falls, OR, respectively.

Among the Minnesotans who attended were Arthur W. Anderson, Finlayson; Ford G. Carlson, Minneapolis; Delbert Diessner, Edina; Jake E. Essen, Annandale, a part-time consultant; Vance A. Johnson, Minneapolis, with Al Johnson Construction; Goodwin H. Kolstad, St. Paul; Elmer H. Lindquist, Buffalo; Thomas J. O'Loughlin, Rochester; Gordon A. Peterson, Edina; Edward Silberman, Golden Valley, an IT professor of Civil Engineering; Carl A. Sivertson, Duluth; Kenneth B. Skrivseth, Bloomington; Amos F. Sutton, St. Paul; Harold W. Toy, Minneapolis, a part-time consultant; Lucian G. Vorpahl, Minneapolis, in the printing business; and Orville K. Wright, West St. Paul, with Toltz, King, Duvall & Anderson.

Texans meet Staehle

IT Dean Roger W. Staehle and Catherine R. Day, IT Director of Development, reported a warm reception by Texas alumni during their visit in April.

The North Texas and Houston chapters of the University of Minnesota Alumni Association invited Staehle to speak to alumni in the Dallas-Fort Worth and Houston areas at their chapter dinner meetings.

IT alumni attending the April 9 Houston meeting included:

Neal Amundson '37BChE
'41MSChE
'45PhDMath
Walter Bauer '60MChE
Bill Coit '76BME '79MSME
George Davis '63BEE
Allan Eggleton '43BMEtE
John Folsom '39BArch
Bill Gorman '28BGeo '32PhDGeo
Carolyn Hall '80BME
Robert Moulton '40BACH
W.W. Souba '43BME
Robert Sutter '67BArch
Charles Swanson '44BChE
Ed Vihstadt '42BME
Sid Wolfenson '40BEE
Allan Ziarnik '79BChE

IT alumni attending the April 10 Dallas meeting included:

Jeff Anderson '80BEE
Kenneth Farrell '59BGeo
Dick Hanchen '45BEE
Don Holzchuh '48ME
Hugo Kamb '25BMinGeo
Robert Olson '38BEE
Craig Phelps '80BChE
William Poole '36BEE
Raymond Rantala '42BGeo
'47MSGeo
Julie K. Rogers '80BChE

Staehle and Day plan to return to Texas in November to meet with additional alumni.

**MARK YOUR
CALENDARS
NOW!**

**Science &
Technology
Day, 1981**

NOVEMBER 6

**Featuring
Governor
Al Quie**

CALENDAR . . .

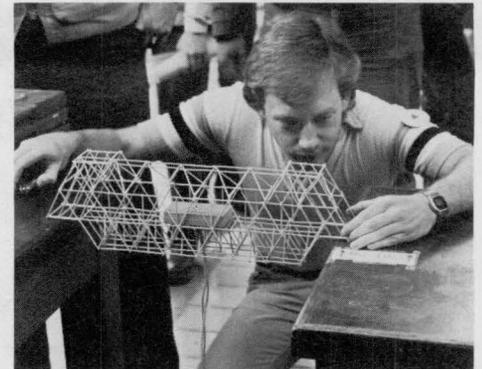
SEPTEMBER

- 8 ALUMNI SOCIETY**
Institute of Technology Alumni Society
Executive Board meeting
- 9-11 PARTICLE TECHNOLOGY LABORATORY
SHORT COURSE: Aerosol
Measurement** (in cooperation with
TSI, Inc.)
Modern techniques of airborne particle
measurement, including the
operating principles of various
measurement devices and the
applications of these devices to
practical problems
Registration information: Dr. B. Y. H. Liu,
Mechanical Engineering department,
(612) 373-3302
- 14-15 CONTINUING EDUCATION:
DISTRIBUTION WAREHOUSING,
ORDER PICKING & PACKING**
Faculty: Arthur S. Liebeskind, vice
president, Howard Way &
Associates, Inc.
Earle Brown Continuing Education
Center, St. Paul campus, 9 a.m. to
4:30 p.m.
Registration information: (612) 373-
5361
- 14-18 MECHANICAL ENGINEERING
DEPARTMENT SHORT COURSE:
Fluid Mechanics Measurements** (in
cooperation with TSI, Inc. and St.
Anthony Falls Hydraulics Laboratory)

Lecturers: Ronald J. Adrian, Illinois-
Urbana-Champaign; Roger E. A.
Arndt, head, St. Anthony Falls
Hydraulic Laboratory, Minnesota;
William Blake, Taylor Naval Ship
Research & Development Center;
Ernst R. G. Eckert, Regents'
Professor, Minnesota; Leroy M.
Fingerson, president, TSI, Inc.; R. J.
Goldstein, head, Mechanical
Engineering, Minnesota; Owen C.
Jones, Jr., head, Thermal Hydraulic
Development, Brookhaven National
Laboratory; G. E. Mattingly, Fluid
Engineering Division chief, National
Bureau of Standards; Thomas J.
Mueller, Notre Dame; John L. Way,
Illinois Institute of Technology
UNITE classroom, 108 Mechanical
Engineering, Minneapolis campus
Registration information: K. Sikora,
Mechanical Engineering department,
(612) 373-3302

EASY DOES IT

Contestants in E-Week's bridge building contest used toothpicks, glue, and nail clippers to put together trusses that held a 60 pound weight when suspended.



TECH FAIR RETURNS IN '81

The latest in cars, computers, motors, oscilloscopes, photographic equipment, and much more appeared under big yellow tents on the Minneapolis campus Mall during E-Week's Technology Fair. The two-day event, open to the public, featured corporate displays and demonstrations along with tours of IT laboratories.



28 **ALUMNI SOCIETY**
 Institute of Technology Alumni Society
 Board meeting
FIRST DAY OF FALL QUARTER CLASSES

OCTOBER

6 **ALUMNI SOCIETY**
 Institute of Technology Alumni Society
 Executive Board meeting

7 **DISTINGUISHED LECTURERS IN ORGANIC CHEMISTRY: Louis S. Hegedus, Colorado State**
 Organic synthesis, organometallic chemistry
 8 p.m., Smith Hall 325

Registration information: (612) 373-3157
(Conference will be repeated February 17, 1982)

12-16 **CONTINUING EDUCATION: COLLOIDS AND SURFACE SCIENCE (A Short Course)**

Faculty: H.T. Davis, D. Fennell Evans, W.G. Miller, L.E. Scriven, Matthew V. Tirrell, University of Minnesota
 Nolte Center for Continuing Education, Minneapolis campus, morning and afternoon sessions every day but Friday
 Registration information: (612) 373-3157

Business Administration, University of Houston
 Earle Brown Continuing Education Center, St. Paul campus, 9 a.m. to 4:30 p.m.
 Registration information: (612) 373-5361

NOVEMBER

6 **ALUMNI SOCIETY Science & Technology Day: "The Impact of Technology on Society"**
 Institute of Technology Alumni Society
 Banquet speaker: Governor Al Quie

12-13 **CONTINUING EDUCATION: MANAGEMENT OF QUALITY CONTROL**

Faculty: William A. Spurgeon, program director for production, research and technology, National Science Foundation
 Earle Brown Continuing Education Center, St. Paul campus, 9 a.m. to 4:30 p.m.
 Registration information: (612) 373-5361

17-18 **CONTINUING EDUCATION: MINNESOTA POWER SYSTEMS CONFERENCE**
 (Co-sponsored with Institute of Electrical & Electronics Engineers)

Earle Brown Continuing Education Center, St. Paul campus, Tuesday 8 a.m. to 5 p.m., IEEE Banquet at 6 p.m.; Wednesday 9 a.m. to 3:30 p.m.
 Registration information: (612) 373-3173



BED RACES DRAW CROWDS

Besides beds, IT students raced tricycles, wheelbarrows, and non-combustion cars as part of the week-long engineers' celebration.

7-9 **CONTINUING EDUCATION: USING INSTRUMENTATION FOR DYNAMIC MEASUREMENTS**
 Faculty: George M. Hieber, president, Hieber Engineering, consultants in dynamics and measurement problems
 Sheraton Airport Inn, Bloomington, MN, 9 a.m. to 4:30 p.m.
 Registration information: (612) 373-5361

8 **ADVISORY COUNCIL**
 Institute of Technology Advisory Council general meeting
 Featured speaker: Walter Massey, Argonne Laboratories

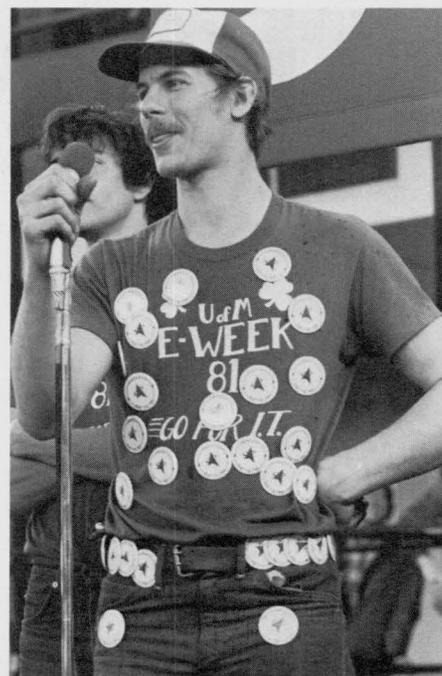
12 **CONTINUING EDUCATION: WRITING AS AN ENGINEER AND MANAGER**
 Faculty: Marilyn Dashe, Jean Thomson, Patrick Moore, University of Minnesota
 Earle Brown Continuing Education Center, St. Paul Campus, 8:30 a.m. to 4:30 p.m.

21 **DISTINGUISHED LECTURERS IN ORGANIC CHEMISTRY: Dieter Seebach, Laboratorium for Organische Chemie, Eidgenossischen Technischen Hochschule, Zurich**

22-23 **CONTINUING EDUCATION: HOW TO DESIGN & IMPLEMENT A PREVENTIVE MAINTENANCE PROGRAM**
 Faculty: Joseph D. Patton, Jr., president, Patton Consultants, Inc.
 Earle Brown Continuing Education Center, St. Paul campus, 9 a.m. to 4:30 p.m.
 Registration information: (612) 373-5361

26-27 **CONTINUING EDUCATION: PIPING DESIGN & ANALYSIS**
 Speaker: Robert P. Dolesh, chief, Process & Instrumentation department, H.K. Ferguson Company
 Earle Brown Continuing Education Center, St. Paul campus, 9 a.m. to 4:30 p.m.
 Registration information: (612) 373-5361

29-30 **CONTINUING EDUCATION: MANUFACTURING COST ESTIMATING**
 Faculty: William B. Kretlow, College of



PLUMB BOB SHINES

Evan Whitby, Plumb Bob president, guided and moved plans for 1981's successful E-Week. His enthusiasm was evident throughout the festivities.

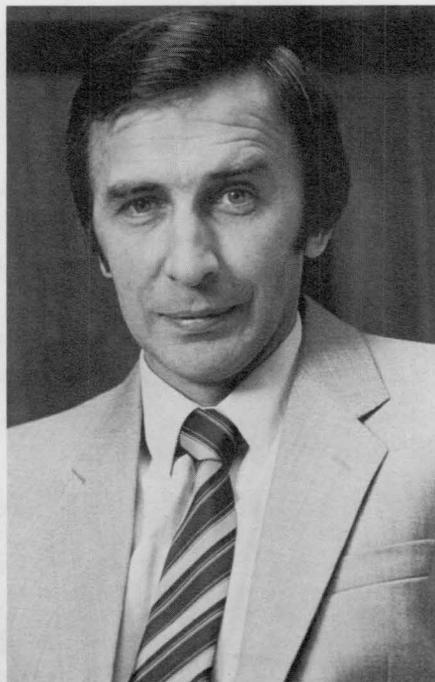
IN THE INSTITUTE . . .

The **RCM Civil Engineering Scholarship**, established at the University in memory of Delbert Rieke and Robert Carroll, both IT graduates and the founding partners of the Minnesota architectural and engineering firm, Rieke Carroll Associates, Inc., consists of two \$500 awards. They will be presented annually to two Civil Engineering undergraduates.

Esther Kariv Miller joins the Chemistry department this fall as an associate professor specializing in organic electrochemistry. Educated at the Hebrew University in Jerusalem and the Weizmann Institute of

Science in Rehovot, she received her Ph.D. from the latter in 1967 in organic chemistry. After postdoctoral work as a fellow at the Weizmann Institute, Kariv joined Tel-Aviv University as an instructor and later was promoted to lecturer and assistant lecturer. She received the Bat Sheva de Rothschild Award in 1970. She came to the Twin Cities in 1977 as an assistant professor at Macalester College in St. Paul.

Leaders of IT student organizations, with Dean Roger Staehle and Associate Dean Edwin Stueben, gathered at 3M Company for a **Dean's Seminar** on April 29 to meet John Pitblado, 3M president of U.S. Operations. Pitblado joined the company in 1946 after receiving his degree in chemical engineering from IT. He retired from 3M this August. The Dean's Seminar pro-



ROMANIAN-BORN BERND HOEFFLINGER has been appointed the new head of IT's Electrical Engineering department. He will take over from acting head, E. Bruce Lee, on November 1. Educated at the Universities of Goettingen and Munich and the Technical University of Munich in Germany, Hoefflinger founded the University of Dortmund's Department of Electrical Engineering and was its dean for two years. He also was that German university's Ordentlicher Professor in the Chair for Electron Devices for nine years. During 1979-80 Hoefflinger served as a visiting professor at the University of California-Berkeley. He has authored over 40 publications and is the editor and co-author of a 400-page book on large-scale integration. This year he chaired the European Solid-State Conference in Freiberg, Germany.

gram is held each quarter to offer hard-working student leaders an opportunity to meet and learn from executives in high-technology industry.

Two new faculty members will join **Aerospace Engineering & Mechanics** this fall. They are **Drs. Hiroshi Higuchi** and **Bradley S. Liebst**. Higuchi, who received a Ph.D. in aeronautics from California Institute of Technology in 1978, has taught for the past several years at the University of Santa Clara (CA) and worked as a research scientist for Dynamics Technology while in residence at NASA Ames Research Center. He specializes in fluid mechanics. Liebst, a 1981 aerospace engineering Ph.D. graduate from the Massachusetts Institute of Technology, specializes in aerostaticity and control.



K-12 CONSORTIUM WORKS TO UPGRADE SCIENCE EDUCATION IN PUBLIC SCHOOLS

Minneapolis Public Schools Superintendent Richard Green (right) joined educators from the public schools and the University, corporate representatives, and others in stressing the importance of upgrading science and mathematics education in all K-12 levels. Honeywell's Pat Hoven is at his right and IT Dean Roger Staehle in the background. A grant from Honeywell made the conference possible.

Those who attended the K-12 Science Education Consortium Planning Conference this summer faced issues of improving teacher skills, computer literacy, industrial involvement in the classroom, counseling, and special programs, and renewing a commitment to opening science-based careers to minorities and women. The consortium brings together resources and builds support for the public schools, providing appropriate education for children who must survive in a technological society. A public hearing will be held by the Minnesota Board of Education in October on increasing the amount of science instruction in the state's junior high schools.



Matthew Tirrell

Matthew Tirrell, professor of Chemical Engineering, believes that the scientist and engineer have a strong responsibility to society and that this sense of responsibility is inherent in the way the students are taught. "If the engineers are better educated," he says, "then they will have the tools to be more responsible in their decision-making." His attitude toward education and his work at the University was recognized this spring. The George Taylor/IT Alumni Society Award for Research was presented to him at IT's May commencement for his research activity and future promise. Earlier this year his research work brought him the Henry and Camille Dreyfus Award as outstanding teacher/scholar, in national competition. Tirrell's current research emphases are the diffusion and flow properties of synthetic polymers, polymerization, and the flow properties of biological polymers. In May the Minnesota Student Association announced that he had received the Gordon L. Starr Faculty/Staff Outstanding Contribution Award for his work with University students. The award is based on nominations from the University community which are in turn acted upon by student leaders.



ALUMNUS RANDALL VOSBECK (left), president of the American Institute of Architects (AIA), returned to the Twin Cities and the Institute of Technology in May to preside over AIA's annual convention. Vosbeck visited the Department of Architecture & Landscape Architecture from which he graduated in 1954 and, with department head **Ralph Rapson** (above right) toured a display of alumni work that complemented AIA convention activities. Vosbeck lives in Alexandria, VA, and is affiliated with the family firm of Vosbeck, Vosbeck, Kendrick, and Redinger.

Institute of Technology Advisory Council (ITAC) member **Willis K. Drake**, chairman of the board and chief executive officer of Data Card Corporation, is now a University of Minnesota regent, elected by the Minnesota Legislature. A past chairman of ITAC, Drake also heads the advisory committee to the Minnesota Commission for Economic Development.

Institute of Technology enrollment increased nearly 5 percent from spring quarter 1980 to spring quarter 1981 — from 4,587 to 4,814. More students were enrolled at the University of Minnesota during this quarter than have attended spring quarter classes in the history of the University. Figures from the Office of Admissions & Records showed a total of 52,043 registered for classes on the University's five campuses — a 3.5 percent increase over the previous spring quarter when 50,260 students attended.

Minnesota's engineering societies named **Donald R. Riley**, assistant professor of Mechanical Engineering, **1981's Young Engineer of the Year**, recognizing his work in computer aided design and com-

puter aided manufacture (CAD/CAM). Earlier the Minnesota section of the American Society of Mechanical Engineers accorded him a similar honor. Riley, who has taught here since 1976, currently is involved in the creation of a CAD/CAM center in IT which will promote stronger ties between the University and private industry.

Tau Beta Pi's spring **Technology & Assessment Program** this year focused on "Women in Non-Traditional Careers: Science and Engineering." The annual program assembles students, faculty, government representatives, and top industrial executives to discuss an issue affecting society and technology. Tau Beta Pi's 1981-82 officers include president Grant Benjamin, vice president Wendy Marti, recording secretary Denise Kanyuh, corresponding secretary Dan McDonald, cataloger Steve Strand, and executive assistant Karen Chandler.

Paul S. Hoffman '81 BME, selected a Tau Beta Pi Fellow for 1981-82, will do graduate work in urban transportation. He is one of 29 Tau Beta Pi members honored nationally this year by the engineering honorary.

GRADUATION '81

Engineers and scientists could save U.S. economy

James J. Renier, president of Honeywell Control Systems, delivered a major commencement address at the Institute of Technology's May 27th graduation. He stressed the importance of professionalism and an awareness of human relations in the careers of scientists and engineers. Renier feels that technologists who make the most of human resources can be instrumental in bringing the U.S. back to a position of dominance in productivity and world leadership.

The following are excerpts from his speech. A complete copy is available from the IItems editor.

At the beginning of the 1970's, America had the highest standard of living in the world. Today we are fifth in gross national product per capita.

During the last decade our share of world markets dropped by 23 percent. And American manufacturers lost more of their domestic market to foreign imports than ever before.

Since 1973 productivity in Japan has grown at the rate of 4.1 percent per year; in West Germany, 5 percent per year; in France, almost 5 percent per year; and in this country, just 1.6 percent per year. In 1979 our productivity actually decreased by 2.1 percent.

An editorial in *Science* magazine pointed out that we are becoming a colony of the rest of the industrial world, supplying food and raw materials, and moving toward increasing economic peril. Now even our former wealth of raw materials is running low. You and I are used to thinking of this country as the strongest industrial power in the world. It is shocking to think that we may fall back in the pack and become one of the "also rans."

It was not until 1900 that we gained the highest gross national product per capita. It is now clear that we do not hold our high standard of living by divine right. We have to earn it every day.

Two major resources could solve U.S. economic problems

So what do we do? It comes down to this: We have two powerful resources to work with, technology and people. We have to do as much as we can with both of them.

Our technology has always been a source of pride to us. Along with the energy we found on this continent and the other raw materials, it made us a self-reliant nation. But today other countries are gaining on our technology

and also are surpassing our training of engineers.

Yet, simply increasing our fund of new knowledge is not the total answer. We also will have to make the investments in plant and equipment that will put that knowledge to work for us.

But technology is where it all starts. And the burden of preparing for a career in technology rests with the graduates.

Understanding human relations makes a technician a professional

A technical education — no matter how complete and sophisticated — has certain limitations. The hard sciences demand so much time, aptitude, and interest that there does not seem to be any time left in our college curriculums for what hard scientists call the soft sciences. For good or ill, however, the soft sciences determine much of what happens in industry and in



COMMENCEMENT SPEAKER JAMES J. RENIER began a new tradition this year for IT graduation ceremonies, that of a corporate leader from the Minnesota region talking about his philosophy for undertaking and executing important responsibilities. Renier, as president and chief operating officer, control systems, is responsible for Honeywell's worldwide operations of such systems which include commercial, residential, industrial, and aerospace and defense products and systems. He received his Ph.D. in physical chemistry from Iowa State University in 1955. He is a member of the U.S. Navy Research Advisory committee, the board of directors of the Northwestern National Bank of Minneapolis and InterNorth of Omaha, Nebraska, and a trustee of the College of St. Thomas, St. Paul.

the world. And engineers and scientists who feel insecure in them — in dealing with people — tend to draw a protective cloak of technical specialization about themselves.

Yet human relations is the arena in which conflicts are resolved, goals are set, and directions established. If technologists withdraw from the arena, marketing and finance and other disciplines will take over as they did in the 1960s.

Many young engineers or scientists coming out of school into their first jobs find they are involved in many things that are not really science or engineering, and are given job assignments they don't really understand.

What is wrong? They took jobs without a very clear understanding of where engineering or science fits into company objectives. Moreover, they are not equipped with the understanding of human motivation and relationships that would enable them to deal effectively with others. They thought they knew the technical profession — but they did not know its "practice" in the real world.

And the irony of the situation is that their supervisors, who may have graduated from the same technical schools 10 years earlier, are not equipped to understand them, nor to help them, and are now lost in the same bureaucracies.

If you aspire to a successful and satisfying career, your education is just a beginning. From your first day in industry or government, or whatever arena you enter, you will have to start expanding on the education you already have.

Seven steps to a special awareness

I would recommend that both on-the-job and in after-hours courses you develop an alertness and an appreciation for some of the soft sciences, specifically in seven different areas:

Psychology — Observing the needs and motivations of individuals to help create an understanding of what makes people tick, what drives them.

Team Dynamics — How to work with others effectively, how to use what others know, and how to make contributions to group objectives.

Communications — How to listen, what to listen for, how to hear what people are really saying, and how to winnow the wheat from the chaff.

A Foreign Language — To be able to deal with people of other nations, who are exerting tremendous influences on American business, and to have some understanding of their cultures.

Economics — To understand the business context in which we operate.

Business Management — To appreciate the factors that go into business decisions.

Marketing — To help the technical specialist weigh the considerations that are important to marketing colleagues, and to understand the language they use.

Business today demands more teamwork than ever before. Matrix operations are becoming common. When a design engineer, for example, is assigned to a project, that engineer works with specialists in human factors, test engineering, production engineering, factory management, marketing, and accounting — in addition to a departmental boss and the project boss.

The design engineers or the scientists will feel comfortable and secure in such a diverse group only if they know what their teammates are talking about and if they have some facility in communications and intragroup relations.

Most universities are mindful of the problems of technologists and their managers. More than 70 schools have established curricula in technical management which include business-related courses. But few of them recognize the need for group skills, communication, and the "softer" aspects of management.

Some companies have stepped in themselves to fill the need.

People are among our most valuable resources

Along with our technology and our dwindling natural resources, people are the most valuable resource we have to work with in the competition for the world's markets.

Unfortunately, this is one resource that American industry has traditionally taken for granted.

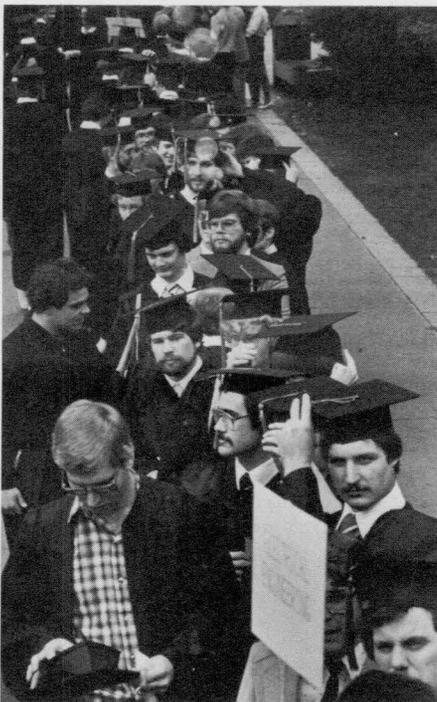
I believe that if we are going to be successful in preserving the standards that we have all come to accept as a part of America's birthright, we are going to have to develop a new appreciation for these human principles and make that understanding a part of the way we conduct our organizational and professional lives.

It comes down to this: An understanding of the human side of the organization is perhaps the most important agenda item in your continuing education — whether it is on-the-job or in more formal courses.

People and technology are the two best answers we have to the challenge of world competition. When you look at what this nation needs to pull even with the world leaders, the bottom line is productivity.

NEARLY 1,200 UNDERGRADUATES RECEIVED DEGREES from the Institute of Technology during the 1980-81 school year. Many of them and their families attended IT's Spring Recognition Ceremony for Baccalaureate Degree Candidates on the evening of May 27 in Northrop Auditorium.

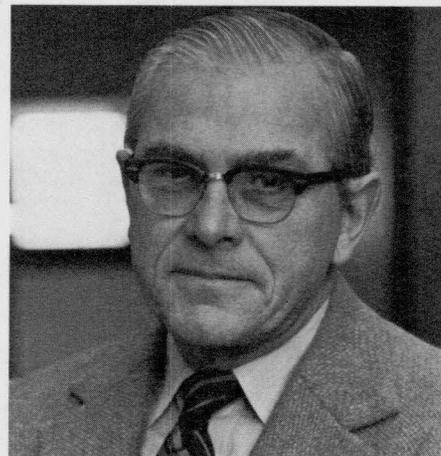
In his commencement address, IT Dean Roger W. Staehle said that the Institute, the University, and the people of the state who support the University, together represent a joint commitment to the development and improvement of our culture which is the most significant symbol of graduation. "... The true capital available to our industries and to the state for future development is first, an educated people, and second, free and effective linkages among these people. Together they form a resource which is not depletable and, in fact, increases in substance with usage," he said.



GRADUATION '81

"AS ENGINEERS AND SCIENTISTS it is important to be aware that the answers we may find may have enormous consequences. They may completely alter the character of human life . . . To ensure that what we may find becomes known to the world and gets into the right hands, we must learn to communicate. Without communication it does not do us any good to find answers. It is important to build a network of communications between ourselves and the world." — Aimee Song '81BME for the Graduating Students.

(Aimee Song received the 1981 Honeywell Outstanding Senior Award and the 1981 Royal Society of Hearts Silver Medal. She will attend Medical School in the fall. Aimee's father is IT Civil Engineering Professor Charles C. Song.)



PROFESSOR OF CHEMISTRY STUART W. FENTON received the IT Alumni Society's George S. Taylor Award for Distinguished Teaching at spring commencement ceremonies.

← **STUDENTS ADDED FUN** to graduation's serious moments. The Landscape Architecture graduate pictured here was joined by a pink flamingo in the procession.

IT tops national competition for NSF Mathematics Institute

On May 29 it became official that the Institute of Technology had attracted one of two major National Science Foundation (NSF) Mathematics Institutes because of its great strengths in applied mathematics and its history of collaboration between mathematicians and other researchers.

The Minnesota institute will focus on the applications of mathematics research while the University of California-Berkeley institute will focus on pure mathematics. NSF funded both with the intent that such research can improve productivity in engineering and science.

Minnesota and Berkeley edged out a dozen other universities who competed for the awards, among them the Universities of Chicago and Michigan, Harvard, Massachusetts Institute of Technology, and Stanford. IT's Mathematics department had worked for two years on the award, said Willard Miller, head of the department.

The \$5 million, five-year renewable NSF grant to Minnesota launches a research institute that will bring mathematicians from around the world to the Twin Cities campus to work with scientists and engineers in solving high-level problems. The Minnesota institute will open in Fall 1982.

Both institutes will function like the Institute for Advanced Study in Princeton, New Jersey, in that neither will have a permanent faculty.

The institute provides an area of needed connection between mathematics



STUDY ROOM IS ELBOW TO ELBOW when fall quarter opens on September 28. This picture was taken in the Institute of Technology Engineering Library located in Lind Hall.

and the sciences, according to Mathematics Professor Hans Weinberger, who is directing the Minnesota institute. "It is a natural place to do interdisciplinary

work," he said.

Each year a different scientific area will be chosen for research, Weinberger said. During the first year researchers will analyze statistical and continuum mechanisms to phase transition, the properties of materials at high and low temperatures (such as a gas evaporating or a liquid freezing), and magnetism.

In subsequent years researchers will cooperate on problems involving the biological, social, and physical sciences and engineering.

Participants will come from industry as well as from universities. About 30 researchers will be working at the institute at any one time. "We're beginning to recruit some of the stars now," Weinberger said. Mathematicians James Serrin of Minnesota, Clifford Truedell of Johns Hopkins, Bernard Coleman of Carnegie Mellon, and Saunders Machane of the University of Chicago already have made commitments to the Minnesota institute for 1982.

Some of the researchers will be funded through the NSF grant. Others will be funded by a consortium of eight midwestern universities which have contributed \$10,000 apiece to the institute in order to share more directly in their discoveries. Still others will be supported by grants from industry to fund post doctoral fellowships. Thus far Honeywell, 3M, Cray Research, and the Magnetic Controls Company have pledged support and additional support will be requested.

ITEMS

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