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INSTITUTE OF TECHNOLOGY
University of Minnesota
Minneapolis, Minnesota 55455

Volume 2, Number 1
Fall Quarter, 1975

items



Dean Richard Swalin
FROM THE DEAN

New directions, cooperation seen for future

In these autumn months, when the focus at almost every campus is on homecoming and our Institute of Technology Alumni Association looks forward to its annual seminar and banquet, it seems particularly fitting to consider the field of university-industry relationships.

At twin events November 7 we'll get together to discuss topics of broad mutual interest. The seminar will examine the future of energy needs, uses, sources and resources, with special emphasis on the Minnesota situation. That evening at dinner many of us from the campus, from large and small industries, and from the community of I.T. grads scattered in different fields will be together again to hear from John Platt, a prominent scientist, a futurist, and a committed humanistic thinker. He is expected to talk about changes occurring in a world that has traditionally separated technological

FROM THE DEAN
(Continued on page 6)

I.T. solar-energy projects from A to Z

Energy alternatives, with emphasis on solar and agricultural sources, are being studied, researched, or developed by I.T. faculty and students with interests ranging from architectural aspects to zoological considerations of human and animal life.

The multi-phased University of Minnesota activities relating to solar energy are concentrated in I.T. departments or programs. Campus and off-campus projects are included, and some incorporate cooperation with industry.

A central resource facility for the numerous efforts has been established in the Space Science building and designated as the Center for Studies of the Physical Environment. Perry Blackshear, Professor of Mechanical Engineering, is its director and Roger Aiken, a Ph.D. candidate at Minnesota in a U.S.-Canadian exchange, serves as the research director.

Aiken described the center's activities as (1) sponsorship of interdisciplinary study groups, with sub-groups on solar-energy and on bio-energy, (2) co-ordination and management of projects in bio-energy, (3) consultation and assistance to solar-energy projects, (4) preparation and presentation of the seminar series on the "steady state earth," a 4-credit course, (5) collection and dissemination of reference material on alternate energy sources. The last of those items includes The Renewable Energy-Environment (TREE) collection, a specialized library.

The solar-energy and bio-energy study groups each meet once a month.

Five University departments — Chemical Engineering, Civil and Mineral Engineering, Mechanical Engineering, Agricultural Engineering, and Soil Science—presently comprise the center, which draws part of its support from the state Pollution Control Agency (PCA). A recent compilation shows at least 16 on-going projects in alternate energy at the University; 21 proposals by faculty members for new conceptual projects, and 16 sub-proposals, chiefly for department-level research.

ENERGY STUDIES
(Continued on page 2)

Main Engineering building renamed for Dean Lind

The name isn't plain Main anymore.

The campus building which houses administrative offices of the Institute of Technology and had been known as Main Engineering to generations of students and alumni, has been renamed Lind Hall.

In formalizing the name change, the University's Board of Regents voted to honor the memory of Samuel Colville Lind, who was the first dean of the University division under the name Institute of Technology, which replaced the former designation as College of Engineering.

Dr. Lind, who had become Dean of I.T. in 1935 and retired from the University in 1947, died in 1965 in a boating accident.

INSIDE ITems: I.T. Alumni Annual Seminar and Banquet;
Lasers and Structures in CEE programs; EE Microelectronics Lab.

ENERGY STUDIES

(Continued from front page)

SECOND COLLECTOR SET AT SOLAR HOUSE

At "Ouroborous South," an experimental house project of the School of Architecture, a new solar collector system has been installed. This second collector unit was designed by John Isle when he was a graduate student in Mechanical Engineering. Isle's collector is set on half of the solar ray surface. The first collector, a Thomason-type similar to one in use in the Washington, D.C. area, occupies the other half of the surface. Isle's collector is expected to minimize heat loss. According to Dennis Holloway, assistant professor of architecture and "Ouroborous" project director, research studies indicate the system could cover almost two-third of the heat load in the house.

"Ouroborous South" is located at the University's Rosemount Research facility. It was designed in competition by architecture students.

A student family is occupying the house as a test of its "living quality," Holloway said.

I.T.—HONEYWELL PROJECT ENDING THIRD YEAR

Preparation of the sixth semi-annual report is now under way on the major solar energy study headed by Richard C. Jordan, Professor of Mechanical Engineering and department head for Aerospace Engineering and Mechanics. The Honeywell company is a prime contractor in this project.

The Honeywell solar collector system is located in Arizona. The I.T. contribution includes construction of instruments to study generation of steam with parabolic trough collectors, thermal insulation and conduction properties of materials, multi-collector linkups, and boiler phenomena in the solar heating system.

SOLAR ENERGY FOR NEW UNDERGROUND BOOKSTORE

Prof. Jordan also is project manager and Prof. Emeritus E.R.G. Eckert project director of solar energy investigations in conjunction with the new university bookstore being built in the space between Folwell and Jones Halls and the Nolte Center on the Minneapolis campus.

Principal investigators for a one-year feasibility and design study in this project are James Ramsey, assistant professor of Mechanical Engineering, and Thomas Bligh, research associate in Civil and Mineral Engineering. Prof. Emil Pfender of Mechanical Engineering is associated with the project's heat transfer studies, and graduate and undergraduate I.T. students assist the research.

Under investigation are the heat transfer properties of soil; a 12-month, time-scale study of heating and cooling needs of an underground building; the potential of small area solar collectors to provide all or part of the necessary energy, and the energy-conserving efficiency of new designs or materials.

4 members added to Advisory Council

Four new members, one of them a former University Regent, have been named to the I.T. Advisory Council. They are John A. Yngve, the former regent, who is president of Nortronics Co.; Frank C. Mullaney of Cray Research and a consultant; Harry C. Smuda, director of the Roseville Development Center of Sperry-Univac Corp.; and Richard J. Vasatea, executive vice president of Setter, Leach and Lindstrom architectural firm.

Hobbie appointed to national bio committee

Appointment of Dr. Russell Hobbie of the Department of Physics and Astronomy to the national steering committee for the Physical Science Modules for Bioscience Students project has been announced by the project's director, R. G. Fuller of the University of Nebraska. The project, supported by the National Science Foundation, is developing a program to incorporate bioscience inputs for introductory college courses in physics and chemistry.

Placement service to aid graduates

A monthly newsletter of open positions listed with the I.T. Placement Office is available for alumni. To receive this, contact the Placement Office, Room 15, Experimental Engineering, University of Minnesota, Minneapolis, 55455.

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



CONTINUING EDUCATION in Engineering and Science

Masonry building course starts Nov. 11

Specialists from industry are serving as faculty and three professional societies are co-operating with the I.T. program of Continuing Education in Engineering and Sciences to present a five-part series of short courses for structural engineers.

Each course consists of a two-hour class one evening per week for four consecutive weeks, augmented by take-out assignments. The initial course on "Steel Design Applied to Building Systems" began September 30 with Dr. Ray Tide of the American Institute of Steel Construction, Inc., as instructor.

The second course series, "Concrete Masonry Building Design," will begin November 11, with a class that evening from 6:30 to 8:30 p.m. and at the same time on three succeeding Tuesdays. These classes will meet at the headquarters of Ellerbe Architects, Engineers & Planners in Bloomington, Minn.

The entire short course series is oriented toward practicing engineers; and subject matter of the masonry course will concentrate on design with non-reinforced as well as reinforced concrete in accordance with the new national codes of the Concrete Masonry Association.

Instructors are Dr. John Hanley and Michael A. Fowler of Fowler-Hanley, Incorporated, an engineering consulting firm.

Co-sponsoring the course with the I.T. continuing education program are the American Society of Civil Engineers, the Minnesota Masonry Institute, and the Consulting Engineers Council.

There is a \$50 registration fee which covers course instruction and study materials. Registration forms and information may be secured from the Department of Continuing Education and Extension, Nolte Center, University of Minnesota, Minneapolis, 55455; By phone, (612) 373-3157.

Other courses in the series for structural engineers:

Reinforced Concrete Building Design

Starts Jan. 6, 1976
Instructor: Professor Ladislav Cerny, University of Minnesota

Topics:
Anchoring
Deflection Due to Gravity Loads
Torsion
Reinforcing Steel Specifications

Timber Design Applied to Buildings

Starts Feb. 10, 1976
Instructor: John Goehl, Structural Wood Corp.

Topics:
Applicable Texts, Design Aids and Codes
Fastening and Connections
References, Theory and Philosophy

Prestressed Concrete in Building Design

Starts March 16, 1976
Instructor: Professor Ladislav Cerny, University of Minnesota

Topics:
State of the Art and Code Update
Torsion, Shear, & Flexure
Deflection Connections

Short course, symposium look into state-of-the-art in laser anemometry

A "double-header" short course and symposium on laser anemometry has been organized under the program for Continuing Education in Engineering and Sciences of the Institute of Technology.

The first segment, a short course October 20-21, is structured to provide engineers and scientists opportunities for a comprehensive examination of the principles and applications of laser anemometers, with particular emphasis on liquid flow measurement.

The second part, a three-day symposium October 22-24, is intended to assemble reference information and generate discussion of recent laser anemometry developments on a worldwide scale.

Base headquarters for all sessions is the Registry hotel in Bloomington, near Minneapolis-St. Paul International airport and having freeway access to the University and other parts of the metropolitan area. The short course includes tours and demonstrations at several points. Registration fees are \$175 for the short course and \$60 for the symposium, with a combined economy fee of \$210 for those desiring to attend both.

The short course is oriented toward technological personnel already holding a bachelor degree in

engineering or having equivalent background, but specific knowledge in laser anemometry is not required.

Lecturers for the short course will be Dr. Franz Durst of Karlsruhe University, West Germany; Dr. L.M. Fingerson, president of Thermo-Systems, Inc., and Profs. Richard Goldstein and Benjamin Liu of I.T.'s Department of Mechanical Engineering.

SYMPOSIUM STRESSES INTERNATIONAL INPUTS

Referencing the state-of-the-art in laser anemometry is a major aim of the symposium, which will fill out the week after the short course. To this end, papers have been invited from international contributors, but oral presentations will be in English.

Proceedings of the symposium will be published, along with abstracts of oral presentations on work in progress and edited versions of the discussions. It is planned to have the published proceedings available for distribution within about two months, or roughly around year's end.

E. R. G. Eckert, Regents Professor Emeritus at the University, is chairman of the symposium committee and is assisted by Fingerson, Goldstein, and Liu.

Special for managers of projects

Two special offerings in project management for engineers—a fall conference and a two-quarter course sequence—have been scheduled by Continuing Education and Extension and I.T. Continuing Education in Engineering and Sciences.

The three-day conference, November 5-7, is designed to promote an understanding of the principles of project management. Inquiries for further information and registration materials should be addressed to Thomas Richards, project director, or Priscilla Mowbray, Department of Conferences, Nolte Center, University of Minnesota, Minneapolis, 55455, or (612) 373-3157 or 373-3155.

The larger program, a credit course sequence, will be given during Winter and Spring quarters of 1976. Class sessions will be Mondays from 3:15 to 5:45 p.m., and the course will carry three regular I.T. credits each quarter.

The content has been developed especially to meet the needs of engineers active as project managers, to analyze the problems of project management and to develop skills for solving such problems.

Further information about this course may be received by contacting Prof. Morris E. Nicholson, Director of Continuing Education in Engineering and Sciences for I.T., 11 Mines and Metallurgy, University of Minnesota, Minneapolis, 55455, or (612) 373-3132.

Video-tape refresher courses

More than 30 practicing engineers enrolled for the video tape series on Fundamentals of Engineering in preparation for Engineer In Training exams to be given in November, according to Prof. Morris E. Nicholson, Director of I.T. Continuing Education in Engineering and Sciences.

The evening sessions were scheduled for five Wednesdays in October.

The "Fundamentals" series will be repeated during the Winter quarter; and three other extension classes also will be offered during Winter quarter for engineers interested in taking examinations for Registered Professional Engineer certification next spring.

The courses are structured as re-

Microelectronics lab program in fourth year of operation

Central focus of the Microelectronics program in electrical engineering has been the research laboratory now entering its fourth year of operation, but the program also encompasses a teaching lab, graduate courses, and a firmly-established seminar, according to Raymond Warner, Jr., chairman of the Microelectronics committee.

The seminar, in fact, antedates the microelectronics program as such, having been initiated five years ago. Its purpose was to address a variety of



Raymond Warner

topics not only for student and faculty audiences but also to attract and serve participants from the area's technological industrial concerns.

The laboratory's activities are charted by the committee chaired by Warner and including five other Electrical Engineering faculty members: Professor B. A. Shenoi, Associate Professor A. Tuszynski, and Assistant Professors W. P. Robbins, G. Y. Robinson and Rolf Schaumann. Laboratory Manager W. K. Smith also is a committee member.

Warner reported recently that the laboratory now has equipment valued at about one-third of a million dollars

and occupies 2,500 square feet of space.

A compilation of subjects investigated and items developed since the microelectronics laboratory was initiated in 1972 includes:

A bipolar transistor-like device whose current gain is essentially independent of temperature or current levels. Broad-ranging research, feasibility testing and development have figured in this.

A distributed RC line having electronically-tunable parameters.

An integratable voltage amplifier having a designable and temperature-independent gain.

A high-frequency active filter without capacitors to operate in the low megahertz range.

A three-terminal Gunn-effect amplifying device.

New ohmic and Schottky-barrier contacts for silicon and gallium arsenide devices.

A design concept for improved amplifier stability.

A new statistical variability criterion for design and evaluation of active filters.

A piezo-electric surface-wave convolver for signal processing.

Magnetoelastic surface-wave devices.

A surface-wave linear FM filter.

A monolithic integrated "master chip."

A monolithic high-voltage solar battery.

A bipolar transistor with a new and favorable combination of current gain and common-emitter breakdown voltage.

A new avalanche-breakdown criterion for silicon-diffused junctions.

An improved statistical model describing the yield of integrated circuits.

Besides using equipment manufactured by major firms, the lab's students and personnel have fabricated monolithic circuits in connection with Ph.D. programs and honors projects of bachelor degree seniors.

The teaching laboratory concentrates on electronic, physical, chemical, and metallurgical principles basic to semiconductor processing.

A one-year graduate course of the microelectronics program deals with material properties, integrated circuits and design of LSI products such as computer memories and microcomputers.

Annual alumni banquet, seminar and awards

The major yearly functions of the Institute of Technology Alumni Association, an annual seminar and banquet, will be held November 7 at the Radisson South hotel.

Theme for this year's afternoon seminar program is "Biomass-Minnesota's Abundant and Renewable Energy Resource."

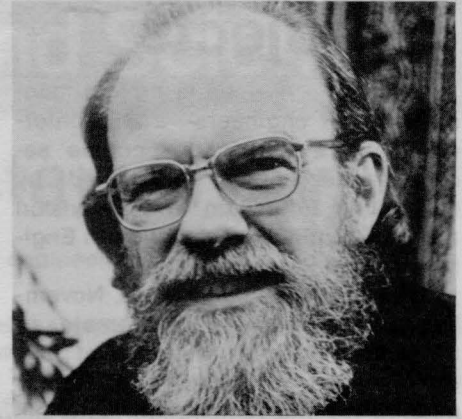
The topic of the banquet speaker, John Platt, will be "The Great World Transformation Today." Platt, a physicist who is associate director of the Mental Health Institute at the University of Michigan, has called himself a "humanistic scientist." He was a post-doctoral fellow at the University of Minnesota several years ago.

In his address at the banquet Platt is expected to consider ways in which people might meet future problems. He has participated in future-oriented programs and once referred to ecology as "the first ethical science" and one of four keys to a philosophical basis for the society of the future. The other keys to the future expounded by Platt on that occasion were awareness of personal interactions, responsibility for one's future, and an experimental approach toward selecting goals for the society.

The banquet program includes presentation of the Outstanding Achievement Award, Minnesota's highest alumni honor, to four I.T. graduates.

A social hour at 6 p.m. will precede the 7 p.m. dinner. Reservations at \$10

ANNUAL MEETING
(Continued on page 6)



John Platt

Alumni support helps sustain reputation and status of I.T.

An article in the previous issue of I.T. items reported that the I.T. Placement Office had expanded its referral service for engineering alumni. It reminded me of the employment service offered by the U. of M. back in '49, the year of my graduation and a difficult time to find engineering jobs.

In spite of that difficulty, I still felt good about being an I.T. graduate. Then as now I.T. had a reputation as an outstanding technical school with high standards and an outstanding faculty. It meant something not only to me but also to perspective employers that I was from I.T. at the U. of M.

There is no question in my mind that all alumni wish for that reputation to continue. We would like I.T. at Minnesota to be the finest. To maintain I.T.'s reputation or even to improve it, requires not only effort by the administration and faculty but also requires the support of alumni.

I have three suggestions to provide that required support:

1. If you do not belong to the Alumni Association, now is a good time to join; and if you are already a member, invite others to join.
2. Provide direct financial support to the U. of M. and specifically to I.T. There is an erroneous assumption that a state-supported institution does not need independent and individual support. The state and federal support is considerably less than 100 percent. Independent support is necessary.
3. Your legislators are dependent on your input in establishing priorities of state funding. Let them know that the U. of M. is high in your priorities.

On a lighter note, the gentlemen in the accompanying photograph are reportedly from the graduating class of 1904. The picture was taken in 1935, at a reunion. Notice the keg in the center of the picture? Some traditions **do** last from generation to generation.

Join me at our I.T. Alumni Association's banquet November 7.



1904 engineers at 1935 reunion

JAMES A. LENARZ, President
I.T. Alumni Association

ANNUAL MEETING

(Continued from page 5)

each may be made to the Minnesota Alumni Association office on or before November 5 by mail to 2610 University Avenue, St. Paul, 55114, or by phone to 373-2466.

Recipients of the 1975 Outstanding Achievement Award are:

Vernon Stenger, Ph.D. '33, Chemistry.

Glenn Ulliyot, B. Chem. '33 (Ph. D. Illinois, '39).

Stanley Wawzonek, Ph.D. '39, Chemistry.

Robert Westbee, B.S. '32, M.S. '33, Electrical Engineering.

The seminar, free and open to the public, will run from 1:30 p.m. to 4:30 p.m.

Perry Blackshear, professor of mechanical engineering and Director of the Center for Studies of the Physical Environment at the University, will be moderator of a panel discussion on the biomass theme. Besides identifying energy problems, the panelists are due to report on research and programs to convert field crop and other wastes into practical fuels and will examine economic implications of such programs.

The five panelists will be:

James Carter, Research director of the Minnesota energy agency.

Walter Maier, Department of Civil and Mineral Engineering.

Dale Moss, Agronomy and Plant Genetics.

David Kittelson, Mechanical Engineering.

Patrick Starr, Division of Industrial Engineering and Operations Research.

While the seminar and banquet are official functions of the I.T. Alumni Association, non-members are welcome. Representatives of industrial firms traditionally attend in groups.

FROM THE DEAN

(Continued from front page)

and social interests.

The existence of those differences and what we are doing or might do to bring them together is what leads me to write about industry-university interaction in this alumni-centered publication.

Universities are going to be called upon—and in my view possibly more than ever before—to contribute to the national effort. But instead of space or defense needs, the emphasis will be on areas such as energy, pollution control, urban transportation or crime prevention.

Universities will be called upon as before to attack many problems in partnership with industry.

In both education and industry we already are aware of obsolescence of technical personnel because change comes so fast. So universities will play an increasing role in providing relevant continuing education.

It's hardly necessary to mention that one of the major changes has been in the area that we try to make less distasteful by calling it "financial constraint," tight budgets due to a slower economy and inflation.

If those observations are reasonable, modifications become necessary in certain university objectives.

The faculty needs to become more familiar not only with the operations of industry but also with the problems and methodology of local government. Students, and especially at the graduate level, will need training of a broader nature rather than high skills in narrow specialties. They will also need more preparation in areas such as economics, business and government.

Academic research will need to achieve wider support from industry as replacement for less federal support.

Fortunately, we are moving in the directions indicated here, but the accelerated pace that seems necessary depends on cooperation of the campus community, the area's industries, and our graduates.

The Institute of Technology now has an Assistant Dean for industry and professional relations; a full-time Director of Continuing Education in Engineering and Sciences; an Adjunct Professor program calling upon successful practitioners; "exchange programs" between industry and I.T. and a wide spectrum of refresher courses; and we have an organized I.T. Advisory Council to assure and improve effective contacts among us.

The publication in which these remarks appear also is part of the increased drive for interaction and understanding; but none of those efforts alone can bring about full change. It requires a cumulative effort.

RICHARD A. SWALIN, DEAN
Institute of Technology

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