

IOE ANNUAL ALUMNI NEWSLETTER

DEPARTMENT OF INDUSTRIAL AND OPERATIONS ENGINEERING

COLLEGE OF ENGINEERING THE UNIVERSITY OF MICHIGAN

Fall 1987

A Message from the Chairman

As you read this, the IOE department will have completed its every-six-years accreditation review by the Accreditation Board for Engineering and Technology, an arm of the National Society of Professional Engineers. In preparing for this complete assessment of our undergraduate curriculum, I was once more struck by the quality and accomplishments of our faculty, students and alumni. For those of you who are not aware of current happenings, this newsletter should help to bring you up to date. To help set the scene, the department

- has over 300 undergraduate students and over 170 graduate students (2/3 of whom are pursuing their Ph.D.).
- includes 21 regular faculty members, 3 research scientists, 8 clerical and administrative workers, as well as two full time staff members dedicated to the development, maintenance and planning for our departmental computer resources.
- has over 2500 alumni (including those of you who were in the pre-1957 production engineering program), and the '57-'69 graduates who remember the department as simply "I.E.".
- hosts two or three visiting and adjunct faculty every year.
- enjoys a national reputation in such diverse areas as ergonomics, operations research and information systems design.
- encourages consulting on the part of faculty (and even students) and considers hands-on experience an important part of the educational and research process.
- is developing a senior design course that will take advantage of the experience (and willingness) of local alumni and other engineers, entrepreneurs, consumers, managers, etc., in order to provide a "capstone" educational experience for seniors.
- welcomes visits or drop-ins from alumni, and has been working with the two-year old Alumni Academy (see below) to formalize the way alumni can interact with our curriculum development, research agenda and student placement programs.
- has active collaboration with a wide variety of U of M units (U of M Transportation Research Institute, Institute of Social Research, Institute of Public Policy Studies, Mechanical Engineering, Center for Research in Integrated Manufacturing, School of Public Health, etc.). This broad impact and influence of our coursework and technological contributions seems particularly appropriate for the modern concept of what Industrial Engineering and Operations Research is all about.

As you look through this newsletter, we hope you will recall some of your own experiences while a student, and perhaps react to what you see here...whether in agreement, questioning or dissatisfaction. Feedback in the educational process is

always valuable and (unfortunately) rare. For those of you who passed on filling out those course/instructor evaluation forms, or those who never were given the opportunity, here's your chance to let us know -- from the vantage point of experience and hindsight -- what you think.

-Steve Pollock

Faculty News

James Bean and **Robert Smith** got their NSF grant for "Infinite Horizon Optimization" extended this year. They, along with **Jack Lohmann** direct the Dynamic Systems Optimization Laboratory, a growing research group housed in two rooms on the first floor of the IOE Building.

Aharon Ben-Tal has been visiting the Department since the beginning of Fall 1986. He is an Associate Professor at Technion, Haifa, Israel. His major areas of interest include Nonlinear Optimization, Convex Analysis and Stochastic Programming.

John Birge continued his work on stochastic optimization models and methods for scheduling jobs on unreliable machines. He was a Visiting Professor at Dalhousie University, Halifax, NS, Canada during September - December 1986. He was granted a National Research Council Research Associateship at the Naval Postgraduate School, Monterey, CA. during January - July 1987. He is the Graduate Program Advisor for IOE.

Yavuz A. Bozer continued to work on the design and analysis of order picking systems, automated guided vehicle systems and integrated material handling systems. He was invited to visit Bilkent University in Ankara, Turkey during Summer 1987. His Ph.D. dissertation which is concerned with maximizing throughput in designing order picking systems received the 1986-87 Outstanding Dissertation Award from the Institute of Industrial Engineers. He was also appointed to membership on CIC-MHE (College-Industry Council on Material Handling Education). Currently he is working on a book concerned with Automated Storage and Retrieval Systems.

Don B. Chaffin was chosen President-elect, American Society of Biomechanics. He was also elected to the Executive Council of the International Society of Biomechanics. He was the Keynote Speaker at the GMI Robot Honor Society Dinner and was an invited speaker at the University of Cincinnati and Long Beach Memorial Hospital Association. His research is supported by over \$200,000 a year from various sponsors including Ford Motor Company, Chrysler Technology Access Fund, GENCORP

Health and Safety Department and Association of American Railroads.

Jay Elkerton's research focuses on the design of human-computer interfaces. He has recently received support from Chrysler Corporation and the Office of Naval Research to redesign the user interface to an integrated set of computer based ergonomic models. This research emphasizes the use of theory driven, task analytic procedures for designing the input methods, graphical displays, and advisory dialogues of this CAD system.

Paul Green is carrying out several projects for Chrysler Corporation. These involve switch types and locations on vehicle instrument panels, and collection of data for determining character sizes on instrument panels. Paul is also continuing his work for NCR on the Wizard of Oz User Interface Rapid Prototyper.

Gary D. Herrln has initiated research projects (funding in excess of \$700,000) with the following: Chrysler Corporation - Ergonomics Technology Development Project, Ford Motor Company - Statistical Quality Control, and Volks Wagon - Statistical Quality Control. He has also given a number of short term continuing education courses dealing with prevention of low back pain through application of Occupational Ergonomics and Micro computer applications in Occupational Health and Safety Management. He is looking forward to his sabbatical leave next year.

Monroe Keyserling was awarded a contract by the UAW-GM National Joint Committee on Health and Safety to investigate the effectiveness of labor-management programs in reducing ergonomic stresses in the workplace. This three-year project will be performed in several Michigan plants. This project is part of a multi-disciplinary effort involving IOE, the School of Public Health, General Motors Corporation, and the United Auto Workers.

Jeffrey Liker was awarded an International Travel Grant from U.M. to visit Japan for purposes of collaborating with Professor Nagamachi of Hiroshima University. They visited five Japanese companies in preparation for a survey of their use of Computer-Aided Design and Engineering to be compared to the same survey conducted in U.S. companies. They also visited two companies to compare the way they manage ergonomics compared to U.S. manufacturing firms. Professor Nagamachi will be a visiting Professor in our department in Fall 1988, to teach a course on Japanese management.

Jack R. Lohmann has been appointed Associate Dean for Graduate and Undergraduate Studies, College of Engineering.

James Miller has published two volumes on product warnings and instructions. They establish behavioral fundamentals, methods of evaluation, and models for design. A forthcoming third volume focuses on the computer aided graphical design of warning labels, government standards for labelling, and operator/instruction manuals.

John A. Muckstadt is a visiting Professor in our department. He was a founder and first director of the Cornell Manufacturing Engineering and Produc-

tivity Program and has been instrumental in the development of COSMOS, a decision support software system for the study of material logistics issues in various manufacturing environments.

Katta Murty, along with graduate student **Soo Chang**, has developed a promising new interior point algorithm, called the "The Gravitational Method" for solving linear programs. The approach is novel. It introduces a gravitational force inside the set of feasible solutions, pulling everything in the direction of the negative gradient of the objective function. A spherical liquid drop is released at an initial interior feasible solution, and the method computationally tracks the path of this drop as it falls freely under the influence of this gravitational force. Katta received a grant from NSF to pursue research on this method.

Stephen M. Pollock is investigating approximation methods for queueing networks, and minimum cost tool monitoring under a contract with General Motors. He and **Damodar Golhar** (IOE '83, Associate Professor at Western Michigan University) have recently published a series of papers on sequential testing.

Candace Yano has a grant from NSF to do research on scheduling with random production yields. She is also working with a major automotive manufacturer on assembly line sequencing and just-in-time inventory control.

Center For Ergonomics

The center, confirmed by the regents of the University in 1980 to conduct Ergonomics research, originated as the Engineering Human Performance Laboratory in the Industrial Engineering Department under the direction of Professor Walton Hancock in 1959. Currently, the Center's director is Professor Don Chaffin. The center receives approximately 70% of its funding from private industry and most of the remainder from federally sponsored projects. At present, Center research supports approximately 30 students, most of whom are in IOE Master's and Ph.D. degree programs. The Center's laboratory facilities occupy about 5000 square feet of the IOE building.

The Center offers continuing education opportunities throughout the year in ergonomics, as well as other occupational health and safety areas, for practicing engineers and occupational health and safety professionals. Those with an interest or need to attend these types of programs (conducted in a 1 to 5 day format) should contact **Randy Rabourn**, at (313) 763-0567.

Department Seminars

The IOE Department's Wednesday afternoon seminars provide a forum for the exchange of ideas and dissemination of state-of-the-art research. Last years speakers and topics were:

Aurel A. Lazar (Columbia University), "Decentralized Flow Control of Markovian Queueing Networks with Multiple Controllers".

M.H. Partovi (Bell COR), "Design and Prototyping of a Transmission System Maintenance Decision Support System (MDSS).

T.Y. Li (Michigan State University), "Numerical solution of a class of deficient polynomial systems".

Adi Ben-Israel (University of Delaware), "Canonical Bases in Linear Programming".

Adrian E. Conway (McGill University), "A Unified View of Computational Algorithms for the Analysis of Queueing Networks".

George W. Furnas (Bell Communications Research), "Generalized Fisheye Views".

Henry Wolkowicz (University of Waterloo, Ontario, Canada), "A Volume and Constraint Reducing Algorithm for Linear Programming".

Aharon Ben-Tal (University of Michigan), "The Second Order Steepest Descent Method".

Lidia Filus (Northeastern Illinois University), "Combinatorial view of fixed point computation methods".

Rafael Campo (Independent Consultant), "Long Term Hydrothermal Optimization of a Multi-reservoir System".

Scott Slink (V.P.I.), "The Evolution of the Virginia Productivity Center".

John A. Muckstadt and Peter L. Jackson (Cornell University), "COSMOS: A Research Environment for Computer-Aided Material Logistics".

Paul Olson (University of Michigan), "Glare".

J. B. Moore (University of Waterloo), "A Visual Interactive Decision Support System for Job Shop Scheduling".

John White (Georgia Institute of Technology), "Integrated Systems: A Material Handling Perspective".

Stanley B. Gershwin (MIT, Cambridge, MA) "A Hierarchical Framework for Manufacturing systems Scheduling".

Elmer G. Gilbert (University of Michigan), "Computing the Euclidean Distance Between Polyhedra Which are Characterized by Their Vertices".

Steven T. Hackman (Georgia Institute of Technology), "An Aggregate Model of Project-Oriented Production".

Jean-Philippe Vial (University of Geneva), "A Polynomial Newton Method for Linear Programming"

S.M. Wu (University of Michigan), "Statistical Methods and Stochastic Process Analysis for Manufacturing Engineering".

Christopher D. Wickens (University of Illinois), "Physical and Mental Proximity in Dual Task Performance and Information Integration".

Wei H. Yang (University of Michigan), "Duality Theorems In Plasticity".

John Buzacott (University of Waterloo), "Modelling Integrated Manufacturing Systems: Achievements and Challenges".

Rajan Suri (University of Wisconsin), "Manufacturing Systems Modelling: Its Role, Current Issues, and Research Needs".

Abraham Seidmann (University of Rochester), "Computerized Performance Models of Flexible Manufacturing Systems".

Alumni Academy Activities

You may recall that an Alumni Academy has been formed for the purpose of opening communication channels between the IOE Department and the alumni body, as well as supporting the department's academic programs. Many of you generously contributed your time to filling out a survey conducted by the academy, for which we are grateful. In 1987, the Alumni Academy undertook two new projects which we would like to tell you about.

First, we are assisting the department in developing and teaching a design course offered to IOE seniors. The purpose of the course is to give IOE seniors a chance to get their hands dirty and work through a real problem before graduation. Alumni Academy members will act as project coordinators for small teams of about three students. The project coordinators will provide a real IE problem in their company and supervise the student teams as they define the problem. The product will be paper. This course will formally be the responsibility of Professor Jeff Liker, but Alumni Academy members will play a central role in "teaching" the course and students will get a head start on real world problem solving.

Second, the Academy attempted to sponsor the "First Annual Alumni Weekend." There is currently an engineering college-wide alumni weekend, but no separate activity for IOE alumni. We were able to piggy-back on the college weekend which was held the weekend of October 17-18, homecoming week. We added Friday events, including workshops given by IOE faculty and a dinner with Dean Charles Vest as our guest speaker, and a tour of the IOE building on North Campus. Apparently, this was not sufficiently attractive, because only about a dozen alumni signed up. In fact, IOE alums were drastically under-represented in the college-wide activities compared to alums from other engineering departments. Needless to say, we cancelled the IOE events. The following alums were exceptions and had all signed up for the cancelled IOE activities:

| | |
|------------------------------|----------------------------|
| Marlaine D. Applegate | Timothy Clancy |
| Dick DeLong | Robert W. Haessler |
| Wei-Ching Lin | Frederick L. Locke |
| J. Leigh Melvin | Milton Netter |
| Harold T. Rhodes | R. Jean Ruth |
| Ann Tembrunsel | Katherine Terlizion |
| Theresa M. Wyza | |

In sum, of the two projects that we initiated this year, the senior projects course looks very exciting, but the "Alumni Weekend" was a bust. We are disappointed, but not defeated! We would like to know why the response was so poor. Was there something wrong with the agenda we put together? Was there something wrong with our advertising? Did you get the advertisement? We would like to hear from you. Please write or call:

Andy Crawford, President

Ascott Corp.

1202 N. Main

Ann Arbor, MI 48104

(313) 663-2023

-Jeff Liker

Alpha Pi Mu

As is the case every year, Alpha Pi Mu will be very active within the Department of Industrial and Operations Engineering. Tutoring will be offered for all 300-level Industrial Engineering courses and 100 and 200 level pre-engineering courses. Other activities include the IOE Option night (discussion of career opportunities and paths in IOE), the MBA vs. MSIOE Debate (discussion of the pros and cons of these two graduate programs), the Alumni Forum (a gathering of UM IOE grads discussing their careers), and other worthwhile programs in the department.

The Executive Officers of APM are:

| | |
|--------------------|---------------------|
| Susan Khoury | President |
| Steven Pearson | Executive V.P. |
| Christopher Rennie | V.P. Finance |
| Betsy Westover | V.P. Communications |
| Barbara Greenly | V.P. Correspondence |

Institute of Industrial Engineers

The student chapter of IIE offers a number of opportunities for IOE's in both professional and recreational arenas. Weekly luncheons and night meetings provide a forum for meeting professionals in the field. Plant trips and participation in local and national conferences offer a real-life view of IOE work demands and state-of the art technology. On the social side, college life is enhanced by our frequent TG's, student/faculty wine and cheese parties, and raffles. For more information, contact the Undergraduate office in the Industrial Engineering building (313-764-6473).

For Fall 1987 IIE has a host of events planned. Jeff Lebow from Mitsubishi spoke at a dinner meeting on September 28 about the "Insider's View of a Japanese Corporation". Our first happy hour was held on October 2, immediately after a Proctor & Gamble pre-interview session. John Schaefer from Creative Foam spoke at a luncheon on October 15, followed by Dean Askounis of GMF Robotics on October 21. Wrapping up the October list of events was Monica Fox from Kelsey-Hayes, speaking on Material Systems and MRP on October 29.

November plans include visits from Jeff Alden of General Motors, Tech Day on North Campus, and IIE elections. IIE will host the Detroit Senior Chapter IIE meeting on November 18, at the Michigan League. An IIE student/faculty wine and cheese party is also in the works.

The Executive Officers of IIE are:

| | |
|------------------|--------------------------|
| Mary Beth Soloy | President |
| Michael Grossman | Executive V.P. |
| Renee Mortier | V.P.-Chapter Development |
| Jerry Rattenbury | V.P.-Programs |
| Sarah Donmyer | V.P. Fundraising |
| Chris Rennie | V.P. Fundraising |
| Kim Clack | V.P. Membership |
| Barb Ziots | Treasurer |
| Marissa Bahn | V.P. Communications |
| Paula Cupples | Luncheon Coordinator |

Cindy Jacobs
Lillian St. Angelo
Todd Schulte

Luncheon Coordinator
Luncheon Coordinator
U.M.E.C. Representative

Alumni Support

Even if you normally just "glance at" our newsletter, we certainly hope you will read this section and consider the importance of private gifts and alumni support to our Department and the University in general.

Although we have all known the University of Michigan as a public (state supported) institution, the manner in which our University is funded makes it look very much like a private institution. In fact, annual gifts to the College of Engineering have grown rapidly in the recent years. However, in terms of alumni support, we are still considerably behind private institutions such as Yale, Harvard, or Stanford. Considering the hard-earned success that many of you achieve as Michigan graduates, we hope reading this section will remind you that financial support to deserving students can go a long way in helping them through the program.

There are two levels of support. The first level consists of alumni who make regular contributions to the University. The second level consists of one-time gifts. These gifts are generally large and can come from individuals or corporations. Alumni need to be aware of the importance of their regular contributions on the first level and that they should use their influence within their professional community to support the University on the second level.

If you think that you might have an interest in supporting the University or our Department we encourage and urge you to act now. For this reason we have set up a number of points of contact within the College for further inquiry and coordination:

| | |
|---|------------------------------------|
| Dan Atkins (313) 763-2174 | Associate Dean for Research |
| Brad Canale (313) 763-2160 | Director of Development |
| Robert Schnelder (313) 763-5630 | Director of Corporate Relations |

Donations can be designated for the University as a whole, the College of Engineering or the IOE department. You can even specify exactly what the funds are to be used for. You may support the University with the following gifts:

1. Presidential Fund
2. The University Library
3. Other (please specify)

For supporting the IOE department, you may also select from the following lists:

1. Wyeth Allen Scholarship (for undergraduates)
2. Arthur Andersen IOE Scholarship (for outstanding senior)
3. Clyde W. Johnson Memorial Scholarship (for deserving graduate and undergraduate students)
4. Rita and Theodore Williams Scholarship (student-support for joint MBA/MSE degree)
5. IOE Discretionary Funds (for equipment, facilities, books, software, seminar series)

6. IIE Activities
7. Other (please specify)

We sincerely hope to receive your contribution in response to this newsletter. Please make your check payable to the University of Michigan. If you prefer to contribute to any of the IOE scholarships and/or funds listed above, please indicate so in a cover letter or on the "for/memo" section of your check. Otherwise, your contribution will be used at the discretion of the University.

If you have questions regarding any one of the above potential uses or you think you might be interested in setting up a separate scholarship/award fund please call:

Steve Pollock Chairman, IOE
(313) 764-9403

Note: Your gifts, of course, are tax deductible as allowed by law.

Alumni News

Dick DeLong (BS-IE, 1956) is Vice President, Pharmaceutical Production at Upjohn. He is responsible for all pharmaceutical manufacturing and packaging operations, including production planning and inventory control, for their Kalamazoo, MI based operations. He is a member of the IOE Alumni Academy.

Richard A. Saputo (BS-IE, 1960) is President, Amtec Flotation Sleep Systems, Inc. in California. Amtec, an international company, is one of the largest manufacturers of soft-sided waterbeds.

Emil J. Nagy (BS-IE, 1963) is Vice President at MECON. He credits Professor Clyde Johnson for introducing him to the health care field. He has been vice president for the past two years for the San Francisco based national health care consulting firm, specializing in productivity and software. He is still married to his Michigan sweetheart, Elsa Weipert, and has four children. He lives in the Colorado Mountains, and invites friends to come by and visit, telephone: (303) 567-4343.

Lynn T. Rayle, Jr. (BS-IE, 1963) is Manager, Manufacturing Systems at Whirlpool Corporation. She is involved in the development and implementation of a new, state-of-the-art manufacturing system. Her daughter, Angela, has just started at U of M in IOE!

O. George Kennedy (IOE, 1966) is President of the Kennedy Group, a national healthcare information systems consulting firm.

J. Michael Moore (Ph.D., IOE, 1967) is Section Head, Management Science Section of Exxon's Central Service Organization. In addition to managing the section which provides management science tools and services to Exxon affiliates internationally, he also plays a key role in worldwide application of Management Science technology.

Richard Wm. Barnes (M.S., IOE, 1971) is a Senior Research Staff Member at Oak Ridge National Laboratory. His job entails supervision of data systems research and development.

Virendra Nath (M.S., IOE, 1978) is President of Honolulu Data Entry Project, an off-shore data entry

service bureau. The company provides low cost data conversion services for high volume clients, and has a nationwide market. He has been in Hawaii since 1980.

R. Jean Ruth (Ph.D., IOE, 1979) is Senior Research Engineer at General Motors Research Labs, in their Operating Sciences Department. Current projects involve the analysis of service operations and customer satisfaction and the modeling of uncertainty in decision-making.

M. Zafer Yakin (Ph.D., IOE, 1981) is member of Technical staff at AT&T Bell Labs. He works in telecommunications planning. He joined Bell Labs in June 1987, after 6 years on the faculty at the University of Houston.

Jeff Lebow (M.S.E., IOE, 1981) is Industrial Engineer at Mitsubishi Consumer Electronics America, Inc. As facilities/manufacturing Engineer, he implements new equipment and processes into color TV assembly operations. He has had success as a stand-up comedian during non-work time.

Murray D. Wikol (M.S., IOE, 1982) is Corporate Account Manager at GMF Robotics. He is on a leave of absence from work, while attending Stanford's Executive Management program. He is one of 42 selected worldwide for the program.

Theresa Moran Wyza (B.S.E., IOE, 1983) is Value Engineer in the Value Management Department of Delco Electronics, Flint. She conducts workshops in which teams use a step-by-step problem solving technique, called the Job Plan, to solve problems.

Doris Silney (M.S.E., IOE, 1984) is Product/ Applications Engineer at GMF Robotics. Her responsibilities include developing customer robotic system proposals, their description, scope of work, deliverable components, schedule and pricing.

Jeff Alden (Ph.D., IOE, 1986) is working in the Operating Systems Research department at General Motors.

Don Blowski (Ph.D., IOE, 1986) is Assistant professor at the University of Utah.

Bradley Joseph (Ph.D., IOE, 1986) is Assistant Professor at Ohio Medical University.

Robert Radwin (Ph.D., IOE, 1986) is Assistant Professor at the University of Wisconsin.

Thomas Chan (Ph.D., IOE, 1987) will be joining the faculty of the O.R. and Management Engineering Department at Southern Methodist University.

Jose Dula (IOE '87) completed his Ph.D, spent a year as a post-doctoral research scholar at CORE, Belgium, and is now an Assistant Professor at Southern Methodist University in Texas.

Koth Ganesh (Ph.D., IOE, 1987) is Productivity Manager at the IBISM division of Citibank, North America.

John Mittenthal (Ph.D., IOE, 1987) is Assistant Professor at Rensselaer Polytechnic Institute in New York.

Charles Noon (Ph.D., IOE, 1987) is Assistant Professor at the University of Tennessee, Knoxville. Chuck married his longtime sweetheart Missy in August.

Mimi Yang (M.S., IOE, 1987) is an Industrial Engineer with Proctor and Gamble.