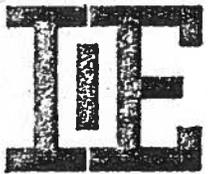


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Annual Alumni Newsletter

The University of Michigan

College of Engineering

September 1978

Volume 1

FROM THE CHAIRMAN

This newsletter inaugurates an attempt by us to describe to you our activities and accomplishments in the last year. We have every expectation to make this forum an annual update for you.

Our objective is simple: To share the sense and pride of accomplishment that we feel daily with you who so much deserve the credit. The educational and research programs here at Michigan are rated as the best in the country. Our faculty is dedicated to sustaining the quality of these activities. If you find a subject of particular relevance, please feel free to write or call us for more information.

It is to some degree an "ego trip" for us, but to no small extent the outstanding reputation of the department rests on the many accomplishments of you and your fellow alumni. It is for this reason that we'd like to know more about you, and in future issues we will include a summary of significant alumni news in the "Alumni Corner".

Lastly, I'd like to thank those of you who have seen fit during the past year to give financially to the department. Your gifts have provided scholarships for many undergraduate and graduate students. These gift funds provide that vital margin so necessary to assure that the best students are provided a quality education. Thank you!

DON CHAFFIN

AWARDS

Three students in our department were the first recipients of the Clyde Johnson Fellowship Award. A luncheon was held, attended by the faculty, the family of the late Prof. Johnson, and families of the recipients. JOHN SCHWARTZ, YAHYA FATHI and ED STOKEL received the awards based not only on their outstanding academic records but also on their obvious interest in applying the principles and disciplines of IOE and assisting and supporting their fellow students.

The Outstanding Graduate Student Award went to DAVE MAGERLEIN at the Engineering Honors Luncheon sponsored by the College of Engineering. Dave has recently completed his Ph.D. and will be going to work for Upjohn Corporation.

Three awards were presented to AMY HANCOCK at this luncheon. First, she received the Marian Sarah Parker Award presented annually to a senior or graduate woman student. She also was selected as the Outstanding Undergraduate Student and, through the Humanities Department of the College of Engineering, received the Technical Writing Award.

STUDENT ORGANIZATIONS

The Student chapter of AIIE, now about 90 members strong, has a number of events planned for the coming year. Among them are an IOE Department picnic for all students, faculty and staff and a tour of General Motors' Detroit Diesel Allison Facility. In addition they will continue holding their Wednesday luncheon meetings with speakers from industry and other universities. If any alumni should be passing through Ann Arbor who would be willing to speak at this luncheon, please let us know. The faculty advisor is GARY HERRIN and the officers for this year follow:

- President: PAT COSIMANO
- Vice-President: ED DOLIKIAN
- Treasurer: SUE ROLL
- SECRETARY: BOB LUTTMAN

In addition to the Annual Banquet and Initiation Ceremonies, the ALPHA PI MU chapter will be publicizing IOE through T-shirts and baseball caps. As in the past they will be presenting the Teaching Award to a faculty member in the department. New activities include a bi-annual student newsletter and organizing and participating in interdepartmental athletic activities. The new faculty advisor is WALT HANCOCK and the officers are :

- President: STEVE OPALESKI
- Vice-President: LISA ANNEBERG
- Treasurer: DAVE MC CORMICK
- Secretary: PAUL DURANCE
- Eng. Council Rep: STACY DRAKE

PH.D. GRADUATES

Six students have completed their dissertations this year. Their names and dissertation titles follow:

- PAUL FUHS, Hospital Discharge Predictions and Their Effect on Admissions Scheduling Systems.
- DAVE MAGERLEIN, Maximum Average Occupancy and the Resultant Bedsize of In-patient Hospital Units.
- JAMES MAGERLEIN, Hospital Operating Room and Admissions Interactions; A Scheduling Methodology for Surgical Patients.
- TAE-MOON KIM, Two-Echelon Reorder Point Periodic Inventory Control System with Performance Constraints.
- JOHN MAYBEE, Efficient Branch-and-Bound Algorithms for Permutation Problems.
- FRED PRESTON, Toward the Design of Coordinated Transit Systems: A Routing and Scheduling Model.

SPECIALIZED PROGRAMS

ENGINEERING HUMAN PERFORMANCE AND SAFETY RESEARCH LABORATORY

As many of you know, human performance research and educational activities in our department were formalized in 1959 under the direction of WALT HANCOCK. Since then we have expanded to include five faculty and two research engineers. In 1973 Walt shifted his research to the hospital administration area. In recent years, the activity of the laboratory has greatly expanded to emphasize healthful and safe, productive work design. In this regard, a training grant was obtained from HEW to support 8-12 graduate students each year who desire specialized training in the industrial engineering aspects of Occupational Safety and Health. Courses in Human Factors Engineering, Occupational Biomechanics and Work Physiology, Safety Management and Accident Prevention, Industrial Hygiene and Statistical Methods were developed to support this option in IOE. The option has now graduated 78 MS students and 2 Ph.D.'s with 20 students currently involved. Additional research and teaching capability is provided by working closely with the faculty and staffs associated with the Bioengineering Program, The Highway Safety Research Institute, The Department of Environmental and Industrial Health, The Department of Psychology and The Medical School. Research support has been acquired from both government agencies and private industries, thus providing what we believe to be the most comprehensive engineering oriented human performance and safety laboratory in any university, with reports and journal articles numbering over 30 in the past year.

MANUFACTURING SYSTEMS

The program option in Manufacturing Systems Engineering, headed by Professor RICHARD WILSON, prepares its graduates for positions in manufacturing engineering. The manufacturing engineer works with the product design engineer to determine how to manufacture discrete engineered products. This includes planning and specifying the processes to be used, the tools and fixtures required; questioning the feasibility of the materials in each part, determining the engineering and economic feasibility of automation, numerically controlled machines, and new manufacturing facilities. He must build product quality control into a pro-capital investments and operating cost. His manufacturing systems must be safe, provide acceptable working environments for employees, and meet the environmental standards expected by the community.

This program provides a comprehensive overview of manufacturing functions in the areas of: materials; manufacturing processes and design; instrumentation and control processes; computer systems; operations research techniques; information systems, planning and control; and human factors and organization. All students in this program are also required to complete a manufacturing systems engineering project in industry.

HOSPITAL ADMINISTRATION

With hospitals being the second largest industry in the country today (over 8,700 hospitals are located in the U.S.) there is a growing demand for new systems and controls for cost minimization in running these hospitals. Previously involved in hospital administration in typical IE functions (such as laundry operations), the current movement is for more IE involvement in other areas such as in-patient and operating room scheduling systems, data base management systems, nurse staffing systems, purchasing, etc.

The current IOE-Hospital Administration Program, formed in 1970, is an evolution of the past 25 years of interest displayed by IOE beginning with Professor Clyde Johnson who first became actively involved with the hospital industry. The program is now headed by Professor WALTON HANCOCK along with Professor JAMES MARTIN of the Department of Hospital Administration. They are in charge of Management Information Systems, working with computer and engineering systems to minimize costs in hospital operations. Along with Professors Hancock and Martin, there are four full time employees and an average of 15 students ranging from the sophomore to the Ph.D. level. Most of these students are from the IOE Department, with others from Hospital Administration and the School of Public Health. The main activities of the program are located in the School of Public Health Building allowing proximity to the University Hospital and other health care disciplines.

The main activity for the past year and a half has been that of helping with the planning of the new University of Michigan Hospital which has been approved by the Regents for construction around 1983. Areas of concern for this group consist of such things as the approximate number of beds to be utilized and forecast and demand of ancillary operations. Over a quarter-million dollars a year support these activities coming from government as well as other area hospitals.

INFORMATION SYSTEM DESIGN AND OPTIMIZATION SYSTEMS

Professor DANIEL TEICHROEW is the project director of the Information System Design and Optimization Systems (ISDOS) project. The project deals with a software package to help other people with their software problems. The software package, developed primarily with the help of students, is called PSL/PSA (Problem Statement Language/Problem Statement Analyzer). Sponsors of the project include private organizations, government agencies and other universities. These sponsors are not limited to the United States, but are spread throughout the world. The software is also used extensively in the courses on information systems and software engineering.

PUBLIC SYSTEMS ENGINEERING

Public Systems Engineering is a specialty program in which the IOE Department, through Professor STEPHEN POLLOCK, works closely with

the Institute of Public Policy Studies (IPPS). The program is designed to instruct individuals already possessing analytic problem-solving skills to apply these to policy formation, and exposes the student to the difficulties inherent in this task. Courses include economics, political science and seminars in policy analysis and formation. An average of 3-4 students participate in this program yearly.

INTERNSHIP PROGRAM

The internship program in the Industrial and Operations Engineering Department is designed to foster, encourage, and organize projects for academic credit involving students, faculty, and off-campus organizations. Participating off-campus organizations include manufacturing, government, and service industry operations. Projects are undertaken by students who analyze situations, prepare proposals, conduct work, and design or assist in a research program under faculty supervision. Student participants are usually awarded three academic credits equivalent to approximately one quarter of the student's workload. Projects typically last one semester with students devoting ten hours per week to the project.

A successful internship can be a mutually rewarding experience. Many organizations have found that students, in seeking to confirm the value of their academic training and possibly to stimulate an offer for permanent employment, are highly motivated. Consequently, a project will culminate in a written report which can provide the organization with a positive contribution to the designated topic, and also an opportunity to evaluate prospective new employees at minimum cost. The student gains a real world experience unavailable on campus and enriches his/her understanding of career alternatives before graduation.

CONTINUING EDUCATION

ENGINEERING SUMMER CONFERENCES

Continuing education at the University is supported by the College of Engineering through the Engineering Summer Conferences held each year. This past summer 36 courses were offered with a total enrollment of 1,255 attendees. This figure is up from 1,175 for 36 sessions last year. These short courses are for engineers, scientists and managers with experience in industry, government or education. They appraise new scientific and technological developments as well as present established theories and modern applications.

The IOE Department faculty continues to support this effort in several areas. Professor KATTA MURTY was chairman of two courses this year. The first course, entitled: "Operations Research and the Management Sciences A: Methods and Tools," presented a broad, integrated picture of those parts of mathematics, both classical and new, that are applicable to the managerial decision process; and leads through the process of applying these tools to decision problems in

business, industry, or the public sector. Topics covered included: modelling, linear programming, scheduling and production planning, probability models, decision analysis, multi-objective decision analysis and simulation. Professors JOHN BARTHOLDI and STEPHEN POLLOCK, also of IOE, were among the lecturers for this course.

The follow-up course presented by Professor Murty was entitled: "Operations Research and the Management Sciences B: Recent Developments." The course surveyed the available methods for optimization. Recent developments in and recent applications of these methods were discussed with examples of real applications used as illustrations. The course also included a review of available computer programs for these methods.

Professors DON CHAFFIN and JAMES MILLER participated as lecturers in a course, "Human Factors Engineering" chaired by Richard Pew. This course provided a survey of basic human factors principles and also emphasized the theoretical and quantitative appraisal of human performance capacities and limitations. Among the lecturers on various human factors topics, Professor Chaffin covered physiological stress and Professor Miller concentrated on the interpretation of Federal legislation bearing on human factors.

"Cost Containment in Hospitals" was another course chaired by IOE faculty member, Professor WALTON HANCOCK. In-depth presentations were made on such topics as: the measures of cost containment; admissions scheduling and control systems; preadmission testing and early testing programs; demographic planning and cost reduction; radiology and laboratory facilities operation and planning, nurse scheduling and management control programs; utilization review systems; sizing methodologies; implementing change in hospitals; surgical scheduling systems; and budgeting systems.

A course entitled, "Control and Optimization of Manufacturing Systems" was chaired by IOE Professor BERTIL COLDING. This course was designed to alert managers and technical staff of mechanical manufacturing industries to significant technological advances in the computerized control of manufacturing systems. Included in the course were methods that can be presently applied to conventional computer assisted and adaptive systems as well as to systems for the future.

FLINT EXTENSION PROGRAM

The Industrial and Operations Engineering Department offers a complete Master's Degree Program through the U of M Extension Service at its Flint Regional Center. This program is of interest to those engineers who are working full time at industries in the Flint area, but wish to pursue additional course work or a degree in their evening hours.

A broad selection of 400 and 500 level courses are taught in the evenings with the same content and professors as on the Ann Arbor campus. Either one or two courses for each of Fall and Winter terms is usually offered, with each

course consuming a three-hour slot one night a week. In terms of enrollment, there are about 30 students in the program who have been accepted to Rackham and who are pursuing a Master's Degree. There are another 10 students who are taking courses in preparation for application to the graduate program, and another 20 students who occasionally take courses strictly to satisfy their educational curiosities and provide additional professional capabilities for themselves, and do so on a voluntary basis and not as a regular part of their academic appointment responsibilities. The success of the program in offering a broad selection of courses, has resulted entirely from the excellent cooperation the faculty have given this program through their willingness to participate in it.

THE STUDENT BODY

There is no doubt around the College that Engineering education is "in". The quality of the students entering the College is at an all time high, as measured by their standing upon high school graduation. Of the entering freshmen for the Fall 1978 term, 65.8 percent were in the upper 10 percent of their high school class. This is up 5.3 percent over last year. Also, the number of applicants is up 15 percent from last year, and there are more transfer students from other schools and colleges.

IOE has seen a steady rise in the undergraduate enrollments over the last three years, with yearly totals of 204, 229 and this year 260 students seeking our bachelor degree. A very nice aspect of this trend has been the increase in numbers of women undergraduates in the Department, increasing from 32 two years ago to 52 this year. At the graduate level enrollment has remained essentially constant with approximately 70 masters students and 57 Ph.D. students. Ten of the graduate students are women and four are U.S. minorities. Other colleges have seen a slight decrease in graduate enrollments. It is probably due to the number of scholarships and fellowships that we offer, thanks to the support of our alumni, that we have been able to maintain our graduate student body over the last two years. These students provide the life blood of our research and service programs, and thus they are a continual concern. Your assistance in recruiting and supporting outstanding graduate students is vital to all of us.

NEW FACULTY: NEW DIRECTIONS

The IOE Department welcomed five new faculty in the past year. THOM ARMSTRONG joined our staff upon graduation to continue his investigations of occupational carpal tunnel syndrome etiology, with the National Institute for Occupational Safety and Health (NIOSH), as well as the modeling of reach and strength capability of the physically disabled with the Michigan Department of Education, Bureau of Vocational Rehabilitation Services. This month he assumed an assistant professorship with the School of Public Health at U of M and we look forward to his cooperation and leadership in our Occupational Health and Safety Engineering Masters degree option in Industrial Engineering.

In addition to preparing "first time" classes, JOHN BARTHOLDI participated in several research activities; one on manufacturing flow and material handling analysis, another the "Motor Meals" program, a charitable service affiliated with Parkview Medical Center. His plans are to expand these activities to a more general and concerted exploration of routing and distribution problems.

His research has resulted in several papers and presentations. One paper was published in Management Science; another, entitled, "Circular Ones and Cyclic Staffing", presented at the ORSA/TIMS National Convention in New York, 1978, received the Nicholson Prize!

Another new faculty member, LOUIS BOYDSTUN, is contributing to the development of a biomechanical reach model under a Transportation Rehabilitation grant shared by IOE, Mechanical Engineering and Highway Safety Research Institute. He has made visits to several rehabilitation related facilities for purposes of exploring potential IE contributions to workplace design for handicapped individuals.

A second aspect of these efforts includes the evaluation of controls and driving skills for handicapped individuals. A computer controlled driving simulator is being constructed to aid these efforts by providing a safe driving environment for these individuals.

LOREN PLATZMAN just joined our department from Bell Telephone Laboratories where he has been a member of the Technical Staff, designing strategies for real-time service and resource management, e.g., overload control and memory allocation, and contributing to overall software evaluation. His major interest areas are operations research, probabilistic models, and optimization and control with emphasis on practical design algorithms, complex socio-economic systems, applications to inventory control, marketing, transportation networks, hospital administration, management information systems and data processing.

In June 1977, TONY WOO joined our department coming from the University of Illinois where he had a joint appointment with Electrical Engineering and Mechanical and Industrial Engineering. His background is in the area of computer graphics and computer aided manufacturing. During the past year, he taught courses in Data Processing and Computer Graphics. Recently, he was awarded a grant from Ford Motor Company to study the description of mechanical components in computer based systems.

OLD FACULTY: NEW DIRECTIONS

The new faculty mentioned above are joining a staff which during the past year has developed many new activities and directions. An update looks something like this:

In addition to assuming new responsibilities as Chairman of IOE in September 1977, DON CHAFFIN has expanded his research on wrist injury in women workers, and the adverse health effects of manual materials handling activities in industry. Gift funds from ALCOA Foundation, Dayton Tire, Jewel Industries, Kaiser Aluminum, United Air-

lines, and Firestone have allowed a great deal of cooperative field studies in these industries and helped provide financial support for students.

We should mention that Don has been a major organizer of a group of experts from the U.S. and Great Britain to write a "Work Practice Guide on the Hazards of Manual Materials Handling," sponsored by NIOSH. He has been consultant to Dr. Eula Bingham, Director of the Occupational Safety and Health Administration, to evaluate the Directorate of Safety Standards performance and organization. He has headed a team of experts at the U-M in writing human factors critiques of OSHA Standard on Safe Walking and Working Surfaces. He is also an organizer of the NATO Symposium on Biomechanics to be held in Yugoslavia in 1979; and has been appointed by the Secretary of Labor, Ray Marshall, to serve as a member of the National Advisory Committee for Occupational Safety and Health.

HERB GALLIHER must love Vermont. He decided to stay an extra term after his sabbatical last year. He was, however, here last fall and winter teaching courses in stochastic processes, queuing, analysis of inventory systems and reliability, replacement and maintenance. He also continues his research with the National Cancer Institute.

WALT HANCOCK states that his "...main objective is to become a leading authority on the improvement of hospital operations." He has now made the transition from human performance to this area and is publishing regularly in the health care area in publications such as Hospital Financial Management, Inquiry, International Journal of Man-Machine Studies, and Health Services Research. Presently, he is heavily involved in the planning of the new University Hospital. His group supplies technical expertise in such areas as demand analysis, bed sizing and operational feasibility. He and his group have developed many solid relationships with St. Joseph's of Ann Arbor, Henry Ford of Detroit, Greater Detroit Area Hospital Council and Bon Secours Hospital of Detroit. In addition, he has been committee chairman for four Ph.D. graduates, as well as Undergraduate Program Advisor this past year.

GARY HERRIN has been active establishing in-plant occupational health monitoring and evaluation systems in 7 companies within 4 industries. He has also been involved in the design of national supplemental surveys with the Bureau of Labor Statistics and Occupational Safety and Health Administration. On the home front, he has been administering the Occupational Health and Safety Engineering Traineeship Program, serving as Freshman Counsellor for the College, and the AIIE Faculty Advisor.

CRAIG KIRKWOOD has spent the last year working with Woodward-Clyde Consultants in California. He feels that the use of multiobjective decision analysis methods for engineering planning and evaluation is increasing rapidly and that Woodward-Clyde Consultants is in the forefront of this work. He has contributed to it and improved his own technical and managerial skills. He believes the work will strengthen the department's educational program in decision analysis by en-

abling him to advance the state-of-the-art in the field. The new material developed will be introduced into IOE courses in decision analysis.

In May 1978, GARY LANGOLF was awarded a three-year research grant from NIOSH for a longitudinal study of effects of industrial mercury exposure. He managed to enlist the help of the University Hospital Physical Medicine staff to accompany him on field trips to examine mercury exposed employees. Prospects are good for another proposal to study behavioral effects of carbon disulfide exposure, through the Olin Corporation.

A member of several professional societies, Gary's main service work this year has been with the Human Factors Society in helping to organize its national meeting which will be held in October in Detroit.

During Fall 1977, JIM MILLER accepted an invitation to become the personal advisor on safety matters for Dr. Eula Bingham, Assistant Secretary of Labor for OSHA. This activity involved analyzing the existing national OSHA safety standards in terms of their current adequacy and needed future revisions.

Dr. Bingham asked Jim to recommend and assist in the recruiting of well recognized safety professional persons who could provide the research, management and liaison activities in the OSHA Safety Standards Directorate.

His experiences and information acquired are being utilized in preparing monographs which analyze the current state of the occupational safety movement. He proposes new directions for national policy which concentrate safety standards and enforcement more in the areas where statistics indicate accidents are occurring.

Most of the past year, KATTA MURTY has been working to get out the second edition of his book, Linear and Combinatorial Programming. The first edition was published by Wiley in August 1976 and has been well-received. The second edition will include all the recent algorithmic developments in linear programming, network flows including matchings, combinatorial and integer programming, and complementarity problems. This new information will add 700 pages over the first edition, extending the book to two volumes!

He just completed his third year as Graduate Program Advisor and chairman of the Graduate Program Committee. We are proud to note that he received the Outstanding Teaching Award from Alpha Pi Mu for 1977-78.

STEVE POLLOCK has spent the past year exploring operations research and mathematical modeling of public sector operations. He has also been involved in the detection of collusion among bidders supplying goods to public agencies, the analysis of criminal recidivism, and probability assessment methods for large sample spaces. His teaching interests have continued to center around mathematical modelling as contrasted to teaching the methods involved in operations research.

In addition he served this year as Chairman of the Education Committee and also on the Publications Committee of ORSA. He is an Area Editor for Operations Research, and Associate Editor for SIAM Journal of Applied Mathematics.

DAN TEICHROEW has continued his teaching and research in Information Systems. As project director of the Information Systems Design and Optimization Systems (ISDOS) project, supported by many agencies throughout the world, he continues to develop a software package to help other people with their software problems.

During 1977-78 DICK WILSON enjoyed a sabbatical devoted to the initiation of an NSF research project on manufacturing flow and material handling analysis. Between May 1977 and May 1978, this project provided support for numerous IOE graduate students and faculty.

The project is directed toward the development of improved methodology for modelling flow properties of material handling systems. As part of this work he has visited over one dozen industrial organizations, three universities, and made presentations at two national meetings.

ADJUNCTS, VISITORS, RETIREES, ETC.

No fewer than twelve other faculty have passed through the West Engineering arch in the past year to visit for a term, teach a course or more, and have a major impact on the form of our department. A short note on these:

WILLEM BAKKER, Visiting Netherlands Professor from Twente University of Technology will be advising the department on Manufacturing Engineering in the coming year.

SETH BONDER, President of Vector Research, Inc., shares his experiences and the applications of OR activities by presenting courses each year on large scale modelling and decision analysis. Vector Research, Inc., has also been instrumental in the Internship Program offered by the department enabling students to learn of the field of engineering consulting.

BERT COLDING, from the Royal Institute of Technology in Stockholm, accepted the college's Goebel Professionship these past two years to help us organize and develop a Manufacturing Engineering option within IOE.

RALPH DISNEY is now settled in at Virginia Polytechnic Institute in Blacksburg, Virginia where he is the Charles O. Gordon Professor of Industrial Engineering and Operations Research.

BOB FARRELL from Vector Incorporated taught a course in stochastic processes for graduate students emphasizing applications in consultative research.

JIM FOULKE has been busy this year in the Human Performance Safety and Research Laboratory. His development of an 8-component Kristal Force Platform will provide a new tool for force analysis. The force platform measures components of forceful exertions as test operators simulate job tasks. Applications of the force platform include, analysis of complex tasks, lifting dynamics, stability and walking forces contributing to slips and falls. Of course, he continues to offer his popular course on instrumentation methods and to counsel and assist student research projects.

STEVE GRAY, Vice-President of Chi Systems, Inc. in Ann Arbor, is serving as an adjunct lecturer this term and to help BERT STEFFY with his Engineering Economics course.

LEO HANIFIN of Staff Planning at Chrysler taught a course in plant layout in the Winter Term.

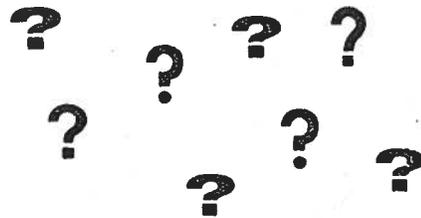
N.K. JAISWAL visited the department this past spring and summer from the Indian Statistical Institute in New Delhi. His special course offerings on stochastic processes and queueing networks were thoroughly enjoyed by those who summered in Ann Arbor.

BILL MAXWELL from Cornell University spent the past year on sabbatical helping DICK WILSON and BERT COLDING develop the Manufacturing Engineering option. He also taught a course on production and inventory control last fall.

FRANK NOONAN has returned to Boston as an Associate Professor at the University of Massachusetts. Something about the Atlantic coastline is apparently even more pleasant than Ann Arbor.

BERT STEFFY is still teaching! Believe it or not, Bert was called out of retirement to teach Engineering Economics this term. Over 80 students line the walls of his class. He also has books in various stages of production. One entitled, Economics of Machine Tool Procurement, has just been published.

MARLIN THOMAS just arrived from the Naval Post Graduate School in Monterey via two years at the University of Wisconsin-Milwaukee. He will be teaching a course in stochastic processes as well as managing the department of Advance Reliability, Systems and Planning at Chrysler Corporation in Detroit.



In future issues, we would like to include news items about you. Have you had a promotion lately? Are you working on a super project which would be of interest to other alumni? Please send your contributions to:

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