DESpite near-death, INDUSTRIAL ENGINEERING DEPARTMENT THRIVING

REGENTS ALMOST AXED IMSE, NOW IT'S AMONG BEST

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by Jennifer Dukes
Daily Staff Writer

An engineering department that nearly died at the hands of the state Board of Regents now boasts of nationwide recognition.

More than three years after the regents' ax threatened to fall on the Department of Industrial and Manufacturing Systems Engineering (IMSE), it is ranked among the best schools in the nation, said Wau Kuo, IMSE chairman.

In February 1989, Iowa State's Long Range Planning Committee report recommended that the department - then called the Industrial Engineering department - be eliminated. The Peat Marwick study, instigated by the regents, examined ways to make ISU more efficient and also recommended elimination, based on the types of courses offered in the department.

Kuo said the department could have been eliminated but Engineering Dean David Kao pleaded with the regents to spare the program. IMSE was one of few survivors. "We were an exceptional case," Kuo said. "But we tried extremely hard." A new focus was the savior.

Kuo said the department molded the program to fit the nation's increasing manufacturing demands. Prior to the change, the department had been more business-oriented.

"The regents finally said 'OK, we'll give you a chance,'" Kuo said, "Actually, I think we were very lucky."

The undergraduate and graduate courses have undergone major restructuring since then, he said. About 50 percent of the classes have been revised or restructured.

Of the 18 faculty members in IMSE, eight to 10 are new. Many departing instructors retired, he added.

In the eyes of engineering professionals nationwide, the changes seemed to work.

The Gorman report ranks ISU's department in the top 10, and the National Science Foundation also considers it one of the best.

Geraldine Montag, IMSE Professor, said the graduate program recently received funding from a $300,000 proposal submitted to the U.S. Department of Education. The program will provide stipends for six full-time study fellowships, tuition, books and foreign travel.

Kuo said the department's success has allowed it to tap into some important research funding. In 1991, IMSE received more than $3 million, one of the highest amounts among industrial engineering departments across the country.

Graduate student Kaio Downs lauds the ISU Department. "The IMSE faculty have very diverse backgrounds providing many different.

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THANK YOU FOR YOUR SUPPORT

The IMSE Department recognizes the following alumni and friends for their gifts to the department during 1992. Contributors supported IMSE's new focus on manufacturing, responded to items they read in IMSE News, or gave as part of ISU's Partnership for Prominence capital campaign.

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IMSE HELPING U.S. STAY COMPETITIVE IN MANUFACTURING FIELDS

By Michelle Minhvorh

Five U.S. students have been selected to participate in ISU's first Manufacturing Fellows Program in concurrent engineering design.

Department Chair Way Kao felt the program was necessary because most engineering graduate programs have a shortage of U.S. citizens. "This deferency will hinder the United States' ability to be successful in today's advanced manufacturing environment," says Kao.

It was proposed to the Federal Department of Education that ISU implement a manufacturing fellows program to help attract quality students to develop their teaching and research expertise in manufacturing.

The IMSE Department received more than $300,000 from the Department of Education and $225,000 from ISU to implement this program. The students are currently participating in the program.

Peter Brust received his B.S. and M.S. degrees from Lehigh University in Bethlehem, Pennsylvania. He has participated in cooperations with AMP Inc.'s Manufacturing Technology Center, U.P.S., and Lehigh's Computer Integrated Manufacturing Lab. Brust is interested in manufacturing processes and automation.

Robert McCoy received his B.S. degree from the University of Idaho, an M.B.A. from Virginia Tech, and an M.S. degree from the University of Arizona. McCoy has worked for Phelps Dodge Corporation in Arizona and Martin Marietta Aerospace in Denver. He is interested in Material Requirements Planning Systems and is working with Dr. Doug Gemmill and Dr. John Jackson. His wife is currently working on her Ph.D. in electrical engineering at ISU.

Michael Moon received his B.S. and M.S. degrees from the University of Iowa and was an instructor at the Gustavus Adolphus College in Minnesota. Moon is interested in statistics and stochastic processes.

Jason Rupe received his B.S. and M.S. degrees from ISU. He was a shelter survey technician for FEMA (Federal Emergency Management Agency). Rupe is interested in reliability and communication networks in manufacturing environments and is working with Dr. Kao.

Scott Singleton received his B.S. and M.S. degrees from Wichita State University and worked at Boeing in Wichita for more than 10 years. Singleton is interested in mathematical modeling of various manufacturing production systems.

Each student receives an annual six-month stipend of $16,000, which includes tuition, textbooks, and travel. Students excelling in their studies will visit various institutions and industries in foreign countries. Jason Rupe traveled to several manufacturing companies in Portugal last summer as part of the program.

"Travel to foreign countries enables the students to learn how manufacturing is practiced outside the U.S.," Kao says. "We want these students to become professors, so they must be familiar with both academic and industrial problems.

"The program could not be progressing better," says Kao. He does, however, hope to search out funds from industries, the National Science Foundation, and the Department of Defense in order to make the program a permanent fixture at ISU.

OUTSTANDING INDUSTRIAL ENGINEERING DESIGN AWARD

During fall semester, 1992, teams of students in the senior capstone design course competed to design a solution to a problem posed by Motorola, Inc. Their problem was to improve the design of assembly lines that were being moved to Motorola's Arlington Heights, Illinois, facility. IE grad Mary Johnson (Hasler) (IMSE 1985) helped arrange the partnership and was also one of the judges. Designs were evaluated on originality, feasibility, thoroughness, and written and oral presentation.

The winning team (shown here left to right) of Iowans John Duren (Osage), Steve DaFord (Cedar Rapids), and Kenny Wickman (Rid- man) developed a design judged to be of excellent quality and highly worthwhile. Judges cited the team for their attention to details and the number of factors they considered. The team received an award of $400 from Motorola, and their names were added to a plaque displayed in the IMSE Department.

The IMSE Department and Motorola congratulate these students on their excellent design effort.

GRADUATE RESEARCH WITH LIN-LIN CHEN

One ongoing research project in the IMSE Department is at building a virtual environment model of a computer-integrated manufacturing workcell. "A Virtual Environment for Manufacturing Systems" funded by the Office of Naval Research for $372,238 for a period of three years from 1992 to 1995, is a joint project that involves Dr. James Oliver and Dr. Martin Vanderplaag from the Department of Mechanical Engineering, Dr. Lin-Lin Chen from the IMSE Department, and the Iowa Center for Emerging Manufacturing Technology. Under this research grant, Dr. Chen and three ISU graduate students, Ming-En Wang, Swarnaath Rajagopalam, and Shiang-Fong Chen, have been working on the design and implementation of visualization tools for generating and verifying assembly plans.

During the last three months, the research focus has been the development of algorithms for generating potentially disassembly trajectories. Ming-En Wang has been working on the development of a new set of algorithms for generating potential assembly/disassembly directions for components with freeform surfaces. Swarnaath Rajagopalam has been working on the development of an interactive tool for visualizing a Bezier surface and its corresponding Gaussian Map formed by translating the unit surface normals at the points on the surface to a Bezier surface. Currently, Shiang-Fong Chen has implemented an algorithm for generating an assembly/disassembly plan of a two-dimensional assembly.

The goal of these research efforts is to build an interactive assembly planning tool that takes an input, designs of parts in their final positions in the assembly, allows the user to select a part or a subassembly from the screen, and provides a feasible trajectory for removing the part or subassembly, and, if none feasible disassembly trajectory can be found, assists the user in determining a trajectory that minimizes the collision volume.

UNIVERSITY RESEARCH WITH JO MIN

Since December 1991, a few undergraduate students in the Department of IMSE have been investigating critical components of production systems such as inventory and allocation policies under Dr. K. Jo Min's supervision. These students have been supported by a Research Experiences for Undergraduates (REU) grant from the National Science Foundation and an undergraduate fellowship from the Iowa Center for Emerging Manufacturing Technology.

Wallace Chow (IE, Senior) has been working on the design and analysis of efficient allocation mechanisms for semiconductor products and the development of software for allocation policies. Jennifer Leng (ISIE, December 1992) and Karen Johnson (IE, Senior) have been working on the conceptual modeling of competitive inventory and pricing policies. Their findings, thus far, are summarized in three technical reports. In November 1992 an additional undergraduate fellowship was awarded to further investigate the issues of inventory and pricing policies.

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1980 B.S. and 1992 M.S.
Debra Bishop was awarded the AT&T Bell Laboratories Doctoral Fellowship to begin working on her Ph.D. at Iowa State University Fall Semester, 1992.

1984
David P. Skarsaug has joined Skarsaug Testing Laboratory Inc. of Ames as vice president. Skarsaug is a registered professional engineer in California and was an industrial engineer with Puritan-Bennett FOGS Division in Carlsbad, California. Other companies Mr. Skarsaug worked for in California are General Dynamics, Plessey Electronic Systems, and Litton Automated Systems.

IMSE HIRES A LAB TECHNICIAN

by Michele Mikhailovich

The IMSE department added a new member to its family last October when it hired former ISU student, Michael D. Renze, as the IMSE lab technician.

Assistant Professor Richard Linn said, "Technology has changed so much. The new equipment and computers that need to be implemented and repaired in the new IMSE labs made it necessary for a full-time lab technician."

Renzé received his B.S. degree in computer engineering at ISU and was working on his M.S. degree when he was hired by the university. He also worked part time with RTAG (Research Technical Assistance Group), now part of ERI's technical services.

Renzé is responsible for all eight IMSE labs, including the Industrial Design, Work Analysis and Ergonomics, Large-Scale Systems, Manufacturing Processes, Manufacturing Systems, CAD/CAM, Materials Handling, and Quality Reliability labs.

Renzé will develop computer-based instrumentation; maintain the department operating system; consult with faculty about purchasing and updating software and equipment; install new equipment and software; and serve as a troubleshooter when problems arise.

Renzé is also responsible for monitoring inventory; instructing faculty, students, and staff on the proper use and care of equipment; and maintaining the IMSE security system.

In order to stay on top of the increasing technological changes, Renze will attend at least two seminars or workshops each year.

Before Renze was hired, professors were responsible for getting equipment and software back on track. "It was getting to be very overwhelming," said Richard Linn. IMSE is pleased to welcome Renze aboard.

THE IMSE DOCTORAL PROGRAM

The IMSE department now has one of the highest admission standards for doctoral students among peer departments across the nation. A national survey ranked the IMSE department requiring, among other criteria, the highest cutoff on General Record Exam (GRE) analytical score. The GRE is a universal graduate entrance exam used by most universities.

The quality of the doctoral program is evidenced by the funding of a $300,000 proposal by the U.S. Department of Education for "Manufacturing Fellows Program in Concurrent Engineering Design." The program is currently providing stipends for five graduate students (see story, p. 2).

Industrial and Manufacturing Systems Engineering
College of Engineering
265 Engineering Annex
Iowa State University
Ames, Iowa 50011-2070