General Engineering Newsletter

University of Illinois at Urbana-Champaign
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Robotics Laboratory, Engineering Curriculum Undergo Major Changes

The GE Robotics Laboratory, under the direction of **Prof. Mark Spong**, has been upgraded with the help of the National Science Foundation's Instrument and Laboratory Improvement (ILI) Program and the College of Engineering.

Professor Spong received an NSF ILI grant in the amount of $66,807, which was matched by an equal amount from the College of Engineering Manufacturing Engineering Program, under the direction of **Prof. Shiv Kapoor** (M&IE).

These funds were used to purchase 3-D graphics workstations and software, and for the construction of two direct-drive robot arms. Initially, four SUN Sparc2 graphics workstations were purchased along with the software package C*imstation* from Silma, Inc.

Cimstation is an interactive software environment for the design, simulation, analysis, and programming of automated workcells, mechanical devices and robots. The CimStation package provides:

- tools for three-dimensional workcell layout for robots, end-effectors, fixtures, parts, etc.;
- three-dimensional CAD models of parts;
- direct interface to CAD packages such as AutoCAD;
- a Metakinematics package to create robots;
- a Dynamics package to model and simulate robot dynamics and control;
- a Calibration package for robot calibration;
- a movie generator to capture and playback animations of robot motion simulations; and
- SIL I/O postprocessor to generate VAL II code from SIL programs.

The *Cimstation* package has been integrated into the laboratory exercises in GE 389 and has been used in GE 242. In addition, **Prof. Spong** has developed a new course, GE 293, Undergraduate Research in Robotics and Automation, around the *Cimstation* package.

This new course is intended to give students at the undergraduate level an exposure to university research in robotics. Each student in this course works individually on a research project under **Prof. Spong's** direction on projects involving the use of *Cimstation*, for example, modeling an industrial manipulator or creating a simulation of a factory workcell environment.

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UIUC to Introduce Computer Registration During Spring 1995

In the Spring of 1995, the University of Illinois will unveil its long-awaited computerized on-line registration system, **Prof. Michael H. Pleck**, Associate Head, Department of General Engineering, reports.

"Several years in the planning, development, and testing, this system will enable students to go to terminals across campus over a two-week period corresponding to the old advance enrollment week to enroll in Fall 1995 courses and learn on-the-spot if they can get in the courses they want," he said.

If unsuccessful, ample opportunity will exist right up to the start of classes to make schedule adjustments.

At the same time, course enrollment managers in each department will be able to interactively adjust section limits, add or drop sections, and the like. This is in contrast to the old hit-or-miss method.

Students also will appreciate a feature of the system that will give students closer to graduation a priority to get into needed classes.

As the Fall 1995 semester gets underway, students will be able to add and drop courses, change sections, and declare credit/no credit, subject to restrictions or "holds" put into the system.

"For example, courses can't be added or dropped past certain deadlines," **Prof. Pleck** explains. "Likewise, certain required courses cannot be dropped on-line within the deadlines without first getting approval from a dean, who will release the 'hold'."

Due to extensive trials and refinements already in progress, everything is expected to go well in the inaugural full-scale use of the system. But, certain challenges appear on the horizon regarding the College of Engineering's and the G.E. Department's desires to maintain adequate advising of students.

In the old system, the advisor had the last word, because his/her signature was required on program request and change forms. Under UI Direct, no such approvals are necessary, unless imposed in the form of an "advisor hold" — which is supposed to be used only sparingly for students on probation, for example.

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From the Department Head

Elsewhere in this Newsletter, you will see the article announcing the appointment of Ms. Maureen Krauss as the new Coordinator of Development and Alumni Relations. We're entering a new phase in the Department in these two arenas: with the reduction in faculty it has become necessary to appoint a person who can be focused in these two very important areas relating to our department's programs. Ms. Krauss's two major activities will be in alumni affairs and in development. Let me discuss briefly some of our plans and objectives.

At present we have a constituent alumni board made up of 10 individuals who are alumni and are a constituent part of the Alumni Association. For several years now, I have discerned the need to have an industrial advisory board for the Department, but it just didn't make sense to have both a constituent alumni board and an industrial advisory board. We need the industrial advisory board because of our ever-increasing interaction with industry through our senior projects and research activities. A combined constituent alumni and industrial advisory board is the appropriate solution to meet our departmental needs. Within the next six months, we will be taking the steps necessary to convert from a purely constituent alumni board to a constituent alumni and industrial advisory board. We will be able to focus more clearly on the goals and duties of this newly combined board, whose advice will help us to position our existing programs and develop new programs to meet the challenges of the 21st Century. All of this will be done with one over-arching goal in mind: to provide the best educational experience that we can for all of our students, both at the undergraduate and graduate levels. On a related matter, I am pleased that Mr. Leroy Kendricks, '78, has agreed to serve a second two-year term on the University of Illinois Alumni Association Board of Directors as the representative of the General Engineering Constituent Alumni Association.

Another important aspect of alumni activity is sponsorship of alumni events. We have a large contingent of alumni who live in the Chicago area. A number of alumni have asked that we sponsor some alumni events in Chicago, and we have started the planning on this. If you live in the Chicago area, stay tuned. There are other metropolitan areas where there is also a high concentration of alumni. In the coming months, we will be trying to identify such areas of concentration where we might reasonably also have a reception or similar activity attached to a meeting or other large event.

The third important aspect of alumni affairs is in alumni recognition and involvement. The Department is graduating approximately 100 students a year and has been doing so for the last five or six years, with our peak being 130 graduates in 1990. We have initiated primarily alumni-driven program to help our present students find jobs. This is called the General Engineering Placement System (GEPS), and is run by Professor David Goldberg. GEPS has been successful in locating a significant number of jobs for our graduates and has been a template for similar activities in other departments. The core concept of this program is alumni helping students make connections to find jobs. As alumni, we ask that you provide information and initial entrées, so that our students can get their cover letters and résumés to the right people who can make hiring decisions. However, the responsibility for getting the job belongs to the student. So far over 300 alumni have assisted us in this endeavor by providing opportunities and leads for the students, and for this we are very grateful.

An important part of our alumni activity is also in recognizing our alumni for their achievements. Each year we honor an outstanding alumna/us and invite her/him to our honors banquet in May. This has been a very successful program. We have also been successful in nominating our alumni for college-level awards for distinguished alums, but we need to be more active in developing university-level recognition for our most outstanding alumni. We will be more aggressive at all levels in recognizing our alumni for their achievements in business, academe, or government service, and for service to the university.

The other aspect of Ms. Krauss's responsibilities are in development, or fund raising. The gifts that alumni make to the General Engineering Department are placed in the UI Foundation, and the interest on those funds is used to support programs and awards in our Department. A donor can also specify a specific project for which the principal would be spent, such as the development of a new lab, the purchase of a piece of capital equipment, or seed money to pay for salaries, equipment, or travel to start a new program. As the amount of state support to the University is decreasing, it becomes more and more important for the University to identify other sources of income. This enables us to provide those extra measures of support for faculty, students, and programs that make the difference between an average program and an excellent program. To do this, we need to develop outside sources of funding from individual donors who are primarily alumni, foundations, and corporations.

The Grainger Engineering Library and Information Center was dedicated last month during Foundation Weekend. At that time, the Foundation announced that the University would be embarking on a $1 billion Campaign Illinois; the focus will be to build endowments for programs in the University.

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Non-Destructive Testing, Evaluation Laboratory Receives Broad Support

The Nondestructive Testing and Evaluation Laboratory, under the direction of **Prof. Henrique Reis**, has recently been moved to Rooms 401, 402, and 403 in the Transportation Building. Currently, the Laboratory supports research work in the following areas: *ultrasonics (immersion, air-coupled, and water-squirt), laser-driven-ultrasonics and interferometry, acoustic emission, acousto-ultrasonics, impact-echo, microfocus radioscopy, ultrasonic and x-ray computed tomography, electromagnetics, eddy currents, and holography.*

The NDT&E Laboratory is currently supported with Grants from the US Army, NASA Lewis Research Center, Illinois Department of Energy and Natural Resources, American Retreaders Association, Extruded Metals, and Amoco Corporation.

Other Laboratory supporters and participants include the Forest Products Laboratory, General Electric Corporation, Goodyear Tire & Rubber Company, Monsanto, Sundstrand Corporation, Ultrasonic Power, Inc., MacWhite Company, Baxter, and the National Science Foundation.

The main research areas in the NDT&E Laboratory are in the development of advanced sensors, on-line process control and materials characterization, life-cycle management of materials and structures, and artificial intelligence towards application in signal analysis and imaging processing.

Special emphasis is placed on the development and optimization of those nondestructive evaluation techniques which lend themselves to intelligent manufacturing and construction processes; evaluation/characterization of advanced materials and structures such as polymer and ceramic composites, concrete, and wood and wood composites; non-contact evaluation of materials and structures in unique environments, such as high temperature and radiation, and advanced sensors for industry application.

Research is aimed at a systems approach in the field of nondestructive testing and evaluation, focusing on real engineering problems in both real-time process monitoring and control and life cycle management of components which arise from a wide spectrum of applications.

Although traditionally nondestructive testing techniques have been used almost exclusively for detection of macroscopic defects (mostly cracks) in structural components after they have been in service, it has become increasingly evident that it is both practical and cost effective to expand the role of nondestructive evaluation to include all aspects of materials production and application and to introduce it much earlier in the manufacturing and construction cycle.

In this NDT&E Laboratory, efforts are being directed at developing and perfecting techniques which are capable of monitoring and controlling materials production processes, manufacturing and construction processes, and the amount and rate of degradation during the materials in-service life. Using advanced sensors, along with signal/data processing techniques, information on the processing conditions and the properties and characteristics of the materials being processed can be continuously generated.

Real-time process monitoring for more effective and efficient real-time process control and improved product quality, safety, and reliability becomes, then, a practical reality.

Leading Firms Sponsoring 12 Senior Design Projects During '94 Fall Semester

The Department of General Engineering senior project course, GE 242, in its 31st year of operation, continues the tradition of focusing senior engineering students on real problems proposed by company sponsors.

During the 1994 Fall semester a total of 12 projects involving 37 students are underway. There are 11 nationally known manufacturers sponsoring 12 separate projects.

For the third semester in a row, **Armstrong World Industries** in Kankakee, IL has sponsored a project in environmental engineering for plant emissions. Sponsoring for its sixth semester in a row, **Cummins Engine Company** in Columbus, IN has outlined a problem on the redesign of a valve for an engine coolant filter. For its second project sponsorship, the **Eureka Company** in Bloomington, IL proposed a problem on the redesign of the drive belt for a vacuum cleaner.

A student team is studying the response of a filing system to an earthquake using a product provided by **Fellowes Manufacturing Company** in Itasca, IL and the shaker table in the crane bay in Newmark Lab. Thanks go to the CE Department and **Dr. Greg Banas** for their cooperation.

General Electric in Louisville, KY has sponsored their 34th and 35th project, following up on both of last semester's projects on CAD tools and washer suspension analysis.

A student team is designing a robot transporter in response to a proposal by **Genesis Systems Group** in Davenport, IA. **Kraft Food Ingredients** in Champaign has presented a process optimization problem. **Ed Wells** (GE 1986) was instrumental in proposing a fault detection problem sponsored by **McDonnell-Douglas** in St. Louis, MO.

MCI (Jerry Hogan, GE 1959) in Richardson, TX has sponsored its third semester in a row, asking the students to look at the instrumentation required to automatically record the position of a cable as it is buried.

Testor Corp. in Rockford, IL has sponsored a project for the third semester in a row suggesting an intriguing material handling problem. **Transparent Container Co.** in Berkeley, IL asked a student team to design a roll lifter to reduce injury possibility on one of their packaging lines.

Both **Testor** and **Transparent Container** had hired GE students as summer interns. These interns are then assigned to the GE 242 projects the companies subsequently sponsored. Those projects took off at a blistering pace as a result.

Would that work for your company? We can help you find top-notch summer interns from our list of GE seniors and juniors. Call **Prof. James V. Carnahan** (217-244-8835).

G.E. Professor Receives Prestigious NSF Award Over Next Three Years

Prof. Ramavarapu S. Sreenivas has received a National Science Foundation Research *Initiation Award* for his research on "Modeling, Analysis, Control and Performance Evaluation of Discrete Event Dynamic Systems."

The grant pays $90,000 over a three-year period.

Traditional system theory concerns systems with continuous-time or discrete-time variables that can be modeled by difference or differential equations, possibly including random or non-deterministic elements.

Modern technology such as computers, manufacturing processes, communication networks, intelligent vehicle/highway systems (IVHS), etc., has forced upon us event-driven dynamics (or information-driven dynamics): systems in which the state changes only at discrete points in time in response to the occurrence of particular events.

There is a growing need for the study of systems whose states have logical or symbolic, rather than numerical values that change with the occurrence of events. Such systems are called *Discrete Event Dynamic Systems* (DEDS), and are the primary focus of **Dr. Sreenivas's** research.

He has published extensively on the pure and applied aspects of the theory of DEDS. During the summer he has successfully applied these theories to a project on the justification of capital investment for an in-state company engaged in steelmaking.

Dr. Sreenivas is a member of the multi-departmental, working committee responsible for the College of Engineering's Control Systems Laboratory.

He also is a member of the Conference Editorial Board for the *33rd Conference on Decision and Control* to be held in Orlando, Florida, this December and the *1995 American Control Conference* to be held in Seattle, Washington next June.

Prof. Strauss Receives $1.6 Million NSF Grant

The National Science Foundation has awarded a $1.6 million grant to **Prof. Mark G. Strauss** for research in understanding the reasons for the under-representation of persons with disabilities in Science, Engineering, and Mathematics (SEM) careers pursuing college degrees.

Prof. Strauss is director of the three-year project called PURSUIT, with a staff of 12.

The program will use mentors to interact with high school and university students with disabilities.

Persons with a disability in a SEM career or persons interested in being a monitor should contact PURSUIT for additional information.

ISGE Elects Officers, Sets Programs for '94-'95

The Illinois Society of General Engineers has announced their officers for the 1994-95 academic year.

They are: **Timothy Phillis**, Urbana, president; **Peter Vadhanasindhu**, Champaign, vice president; **Jared Howerton**, Elmwood, secretary; **Waymond Eng**, Chicago, treasurer; **Aimee Frake**, Champaign, Engineering Council Representative; **Cyril Knuffman**, Atlanta, Engineering Open House Coordinator;

Kevin McInerny, Mokena, social coordinator; **Ryan Geister**, Dundee and **Andy Morin**, Homewood, publicity coordinators; **Scott Brown**, Naperville, GEPS student coordinator; and **Bradley Whitmore**, Coal Valley, Graduate Advisor.

Prof. David Goldberg is faculty advisor.

ISGE is the student society serving the department, and the alumni membership is open to all GE students, faculty, and alumni.

The organization holds workshops on résumé and job interviewing skills, panel discussions with freshmen on what to expect from the next four years. It works closely with the GE Placement Service and has monthly meetings with guest speakers.

Several social events also are held throughout the year.

A current concern is how to improve better communication between students and alumni.

(Computer Registration from page 1)

Thus, an increased awareness of important factors affecting course selection, including prerequisites and "critical paths," will have to be undertaken.

Interestingly, UI Direct will not check course prerequisites now nor in the future; the planners and developers deemed this goal insurmountable. That drawback is expected to create a lot of problems for everyone.

But overall, the introduction of UI Direct will alleviate on-campus residual registration in the Armory, an anathema to everyone, and is expected to enable more people to get what they want course-schedule-wise with fewer hassles.

Send us your personal items.

Keep us current.

Navy Missile Control System Improvements

Research conducted at the University of Illinois by **Prof. Juraj Medanic**, General Engineering, and **Prof. William Perkins**, Electrical and Computer Engineering, was adapted by McDonnell-Douglas Aerospace Co. and termed a "success story".

The research was completed in May 1990 and was titled "Systematic Low Order Controller Design for Disturbance Rejection with Plant Uncertainties".

The objective was to develop techniques that simultaneously satisfy a diverse set of requirements including transient performance, disturbance rejection, robustness and reliability.

Although originally intended for Aircraft Application MDA, engineers applied the technique to the Tomahawk Missile.

They saw potential in a Robust Servo Linear Quadratic Regulator design approach developed at the UI under Wright Laboratory sponsorship.

The technique using projective control, enabled MDA engineers to adapt the modern control design methodology to the Tomahawk autopilot structure.

The application provided improvements in altitude control loop overshoot, roll command following, bank-dip coupling and turn coordination while yielding a significant cost savings by reducing design time.

The Navy's Tomahawk Missile currently has different variants to satisfy land and sea engagements. The land attack variant was used very successfully during Operation Desert Storm.

GE Placement Service for Students, Alumni

The General Engineering Placement Service (GEPS) is a program which involves the student, the faculty, and alumni GE graduates. The purpose of this service is to enhance the amount of resources the GE graduate has offered to him/her in landing their first job.

Various handouts and materials have been designed to help the graduating seniors and summer job hunters with how to prepare and succeed in their job search.

In addition to this information, a handbook, compiled both by faculty and student committee, gives listings of companies who have and/or are willing to hire GE students for the coming year. The handbook also gives alumni contacts, company contacts, and positions for which they are or have hired for in the past.

The student committee is continually updating this database of information, and any information which could lead to possible job opportunities is solicited. Resume books also are available from the department.

For more information on GEPS, contact the Department of General Engineering, 117 Transportation Building.

Name New Staff Member to Head Development Office

Maureen Donohue Krauss has been appointed Coordinator of Development and Alumni Relations for the Department of General Engineering, Prof. T. F. Conry, Department Head, has announced.

Her duties will involve all aspects of alumni relations, including the Alumni Board and alumni events. Responsibilities in development will be to produce communications materials and coordinate the development activity in connection with the College Office of Development.

Ms. Krauss received her BA in Political Science from Albion College in 1984 and a Master of Public Policy from the University of Michigan in 1985.

Her previous experience has been in economic development in Mount Clemens, MI, 1985-88 and in Port Huron, MI, 1988-90.

Most recently she was Executive Director of the Peoria (AZ) Economic Development Group, Inc., 1991-94.

Announce Changes In Clerical Staff

Donna Eiskamp began her duties on July 5 as Administrative Secretary for the Department of General Engineering.

A 12-year-veteran of University employment, she previously served as secretary to the Dean of the College of Education.

She fills the vacancy created by the retirement of **Marilyn Butler,** who was on the GE clerical staff for 33 years.

Sheryl Hembrey, Staff Clerk, joined the GE staff last Spring after **Sydney Cromwell** transferred to Theoretical and Applied Mechanics.

Also on the GE staff are **Peggy Hills**, Staff Secretary, and **Carolyn Reed**, Secretary III.

A vacancy that has not as yet been filled was created when **Lynne Hoveln**, Secretary III, transferred to the School of Life Sciences.

Faculty Notes

Prof. L. Daniel Metz

— will present five papers in the inaugural SAE Motor Sports Engineering Conference to be held in December 1994 at Dearborn, MI. The papers are based on research in vehicle dynamics:

— "Understeer/Oversteer Characteristics of a Locked Differential" with **Patrick Hopkins** examines handling characteristics of locked-differential racing cars;

— "Evasive Maneuver Capability Without and in the Presence of a Flat Tire" with **Troy Torbeck** and others includes simulated lane change maneuvers and emergency stops of a NASCAR vehicle with tire problems at various locations;

— "Analysis of a Dirt Track Sprint Car Accident" with **Kevin Forbes** of Indianapolis Motor Speedway examines a particular accident, and analyzed the driver belt loads and vehicle dynamics of a rough-and-tumble accident which occurred in Springfield, IL;

— "Protection of Drivers and Spectators from Pit Entrance Injuries Incurred During Loss of Control Accidents" with **Forbes** examines the energy-absorbing capabilities of the new pit lane barrier attenuator device installed at the Speedway and catalogued the results of a number of accidents involving this barrier; and,

— "Analysis of 1994 Indianapolis 500 Mile Race and Practice Accidents" with **Forbes** reconstructing the 15 accidents which occurred during May 1994 at Indianapolis.

Prof. Mark W. Spong

— presented a paper, "Partial Feedback Linearization of Underactuated Mechanical Systems," at the Intelligent Robots and Systems Symposium in September at Munich, Germany;

— presented a paper, "Swing Up Control of the Acrobot Using Partial Feedback Linearization," in September at the IFAC Symposium on Robot Control in Capri, Italy.

Prof. Louis Wozniak

— presented a paper, "Efficiency Based Optimal Control of Kaplan Hydrogenerators," with **P. Schniter** at IEEE Power Engineering Society Summer Meeting July 1994 in San Francisco;

— elected officer of IEEE (PES) Energy Development and Power Generation Committee for Technical Sessions and Conferences, July 1994;

— is an invited member of ASME Committee PTC 29, "Speed Governing Systems for Hydraulic Turbine Generator Units."

Prof. Manssour H. Moeinzadeh

— presented a paper, "Optimization Analysis of the Dynamic Motion of the Upper Limbs During Wheelchair Propulsion," with **G. R. Kopp** at the Engineering Research Institute, April 16-17 at the University of District Columbia, Washington, D.C.

— presented a paper, "Effect of Speed and Experience on Kinematic/Kinetic Factors During Walking on a Stair Climbing Machine," with **J. Shih** at the 1994 American College of Sports Medicine, June 1-4 at Indianapolis, IN.

— presented a paper, "Ground Reaction Force Analysis of Changing During Walking," with **D. Xu** at the 18th Annual Meeting of the American Society of Biomechanics, October 13-15, The Ohio State University, Columbus, OH.

— received $13,000 from Nordic Track for "Walkfit, Motorized and Jane Fonda Joint Impact Comparison Study," with **J. Shih** over the next year.

Receives UN Award

Manssour H. Moeinzadeh, Professor of General Engineering and Bioengineering, has received a United Nations Development Programme Award under "Transfer of Knowledge Through Expatriate Nationals (TOKTEN)" Project. The award provides for travel and some expenses for collaborative research and educational projects with overseas institutions.

Prof. Moeinzadeh plans to utilize this award during his sabbatical leave this year at the Sharif and Amirkabir Universities of Technology in Tehran, Iran. He will be collaborating on several research projects in the areas of Rehabilitation Engineering and Biomechanics.

GE Professor Receives Honor

Prof. Henrique Reis was elected to **Fellow** by the *British Institute of Nondestructive Testing* and by the *Acoustic Emission Working Group*. **Prof. Reis** is the current Chairman of the *Universities Programs Committee* of the *American Society for Nondestructive Testing (ASNT)*. This Committee awards three yearly fellowships to three graduate students, to support their research projects, and a yearly faculty fellowship to develop courses in nondestructive testing and evaluation. In addition, the *University Programs Committee* is also responsible to represent ASNT at the Annual ABET Board of Directors Meeting.

Prof. Reis also is the Chairman of the *Planning and Finance Committee* of the ASNT Education and Qualification Council. In addition to being a member of the Education and Qualification Council, he also is a member of the ASTM Awards Committee and a member of the Research Council.

Five GE Student Projects Receive Lincoln Arc Awards

Five student project teams from General Engineering have been cited by The Lincoln Arc Welding Foundation in the Fall 1993/Spring 1994 Student Engineering Design Competition.

A **Gold Award** (first place) granting $1,000 went to the project: "Design of a Two Position Turntable". The team consisted of **Bruce T. Atkins**, Champaign; **Andrew Wang**, Libertyville; and **Brad J. Whitmore**, Coal Valley. Faculty advisor was **Mark W. Spong.**

A **Silver Award** (second place) awarded $750 for the project: "Drive-by-Wire Outboard Motor Throttle Control". The team included **David W. Ingram**, Catlin; **Tracey L. Meek**, Champaign; **Joshua M. Minnihan,** Sycamore. Faculty advisor was **Roland L. Ruhl**.

Merit awards of $250 went to three projects:

— "Experimental Study of Tool Life Enhancement." Project team was **Donald L. Chamberlain**, Polo; **Michael C. Gianasi**, Taylorville; and **David B. Halm**, Chicago. Faculty advisor was **Harry S. Wildblood**.

— "Pelletizing Fly Ash for Use as an Agricultural Lime." Project team was **Alejandra C. Cornejo**, Olympia Fields; **Michael N. Kourinos**, Belleville; and **Schy J. Willmore**, West Frankfort. Faculty advisor was **W. Brent Hall**.

— "Protection of a Catalyst from Ash Particulates." Project team was **Cary P. Bronson**, Chicago; **Monica B. Heckert**, Sterling; and **Angela M. Riedi**, Des Plaines. Faculty advisor was **Angus Simpson.**

GE students won five of the 17 undergraduate awards given with the cash prizes being split among the student members.

In the past three years, GE student teams have won 11 awards. **Profs. W. Brent Hall** and **Henrique L.M. dos Reis** have been faculty advisors on three award winners each.

Robotica Package Draws World Wide Interest

A new software package, *Robotica*, has recently been developed by **Prof. Mark W. Spong** and his student, **John Nethery** (ECE). It is a *Mathematica* package for symbolic and numerical computation of robot kinematics, dynamics, and control equations. *Robotica* also allows the animation of robot motion.

An X-windows graphical users interface greatly facilitates the use of *Robotica* and shortens development time considerably. *Robotica* has been installed in all of the College of Engineering Workstation laboratories and in the GE Robotics Laboratory, and is used extensively in GE 370 and GE 389.

Robotica was announced in the paper, **J. Nethery** and **M. W. Spong**, "Robotica: A Mathematica Package for Robot Analysis," *IEEE Robotics and Automation Magazine*, Vol. 1, No. 1, 1994.

Prof. Spong is currently distributing the *Robotica* package via electronic mail free of charge to anyone who requests it. Over 100 universities and industries have requested and received the *Robotica* package in the U.S., Japan, Canada, Mexico, Brazil, Great Britain, Spain, France, Italy, Germany, Norway, Sweden, Russia, Australia, The Czech Republic, Croatia, Poland, India, China, and several other countries.

Engineering Open House to be Held March 3-4

The 1995 Engineering Open House will be held on Friday and Saturday, March 3 and 4, 1995.

Theme for the annual event is "75 Years of Innovation". **Jason Silcox**, Grant Park, senior in Computer Engineering, is general chairman.

Each year hundreds of high school students, parents, faculty advisors and the public throughout the state to view the exhibits and learn first-hand about engineering education.

(Robotics Lab, continued from page 1)

In addition to the workstation and software purchases, **Prof. Spong and** his students have designed and constructed two direct-drive robots to facilitate instruction in robot control systems. Each of the arms is interfaced to a Digital Signal Processor (DSP)
development system and a PC-486 workstation. Students in the lab now have the capability to program and test different control algorithms on these robot arms.

In parallel to the equipment upgrades to the GE Robotics Laboratory, the robotics curriculum in the College of Engineering is also undergoing important changes.

Prof. Spong has joined with **Profs. Seth Hutchinson** and **Narendra Ahuja**, both from the ECE Department, to create a new sequence of introductory robotics courses to replace the existing robotics courses, GE 389 and ECE 371.

These courses have been created in an effort to eliminate the overlap between the introductory robotics courses in GE and ECE and to utilize faculty and laboratory resources more efficiently. In place of the existing four hour, full semester courses, GE 389, Robot Dynamics and Control, and ECE 371, Introduction to Robotics, a sequence of
three, half semester, two hour courses have been created, GE/ECE 370, Introduction to Robotics, GE/ECE 379, Robot Sensing, and GE/ECE 389, Robot Dynamics and Control. The overlap between the original courses has thereby been eliminated, and a GE student taking both GE 370 and GE 389 receives the equivalent credit and material as he/she would have received in the old GE 389.

In addition to the above curriculum modification, the equipment formerly housed in the ECE Robotics Laboratory has been incorporated into the GE Robotics Laboratory. This has provided an additional four SUN workstations and two PUMA industrial manipulators and has effectively created a new College Robotics Laboratory from the existing Department Laboratories.

Gamma Epsilon Names New Officers for 1994-95

The 1994-95 president of Gamma Epsilon is **Meggan Fitzgerald** of Evergreen Park.

Other officers include: **Mark DePoorter**, Moline, vice president; **Brian Shea**, Chicago, secretary; **Eric Hilquist**, Park Ridge, treasurer; **Cyndi Czop**, Joliet, Engineering Council representative; **Jill Borthwick**, Hoffman Estates, Engineering Open House GE Chairman; **Carlos Pero**, Champaign, publicity chairman; and, **Jeff Carter**, Westville, and **Jeff Rhodes**, Chicago, social co-chairmen.

Prof. Brent Hall is faculty advisor, and **Andy Sieveking**, Mt. Prospect, is the graduate advisor.

(Department Head Corner from page 2)

During the last 10 to 15 years many new buildings were constructed on the Urbana Campus, including the Beckman Center, Microelectronics Center, the addition to the Digital Computing Laboratory, the Grainger Engineering Library and Information Center, as well as the razing of the buildings between Springfield Avenue and the Boneyard Creek to provide a new quadrangle in front of the Grainger Center. This new capital campaign will focus on people by building an endowment, the income from which will be used to fund professorships at different levels, fellowships for graduate students, scholarship awards for undergraduates, and developing laboratories and studios to further enhance our undergraduate and graduate programs.

How does an endowment work? Simply put, the endowment principal earns interest through the investments that the Foundation makes. The policy at the University of Illinois, is to permit a maximum draw of 5 percent to the Department; the remaining interest is added to the principal. We want the endowment to fund the program for which it is intended, but we also want the endowment principal to grow and keep up with inflation. The endowment provides a recurring source of income to support programs. For instance, if you wish to provide an endowment to support a $5000 per year fellowship for a graduate student, the rule of thumb is that the endowment required to support that fellowship would be $100,000.

If we are to provide those extras that enable us to develop excellent programs, and to attract the best students and the best faculty, we will have to find a way to supplement available support from the State. This is a reflection of a trend in which the best public universities are taking on characteristics that have been, up until now, unique to private schools. If the University of Illinois is to maintain its leadership role as an institution of higher learning and a leader in teaching and research, we have no choice but to follow this path. We will be asking you as alumni to help us in this effort in the years to come.

As always, we welcome your comments and ideas on any of these topics. We look forward to hearing from you.

Thomas F. Conry
Professor and Head

Alumni Notes

1938 **Eugene H. Pietsch**, MS '39 Purdue U., has moved from West Des Moines, IA to Winter Park, FL. A retiree, he suffered a stroke in Oct. '93 but has shown good improvement.

1943 **Lowell A. Wessels**, Columbus, OH, is President of Coin Systems Co., Columbus, OH. He is past President and Chairman of the Board of American Pioneer Life, Orlando, FL and is a retired Naval Air Corp pilot.

1949 **Rudolph G. Larson**, Aurora, IL, has retired from his residential real estate firm. His son, John, is in Computer Science research, and son, James, is a graduate of Aurora College and now a probation officer in Kane County.

Michael J. McCarthy is retired and resides at Indian Head Park, IL.

1950 **McKay J. Seaton, Sr.**, Geneva, IL, passed away May 6. He worked for U.S. Gypsum Co., Chicago, for 36 years before his retirement in 1987.

1961 **Harold C. Martin**, San Jose, CA, was a senior engineer with Los Alamos Technical Associates, Kennewick, WA. He passed away in Feb. 1994.

1965 **Ronald J. Kessner**, regional marketing and sales manager, Commercial Applied Equipment and Services, Carrier Corp., has been appointed Vice President of American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. A registered professional engineer, he joined Carrier in 1965.

1969 **Robert C. Shook**, MBA '76 Syracuse U., has been named Senior Manufacturing Engineer with Rockford Powertrain, Rockford, IL. He resides in Roscoe, IL.

1972 **Louis J. Mancini**, MS '73, Ph.D. '75 Stanford U., is Vice President for Engineering, Northwest Airlines, St. Paul, MN. He has been appointed by Northwest to serve on the Board of Directors for ARINC, Inc. He was named *General Engineering Distinguished Alumnus* in 1993.

1974 **Alex G. Bersin**, MSME '75, is a senior engineer with Barnant Co., Barrington, IL. He recently moved to Long Grove, IL.

Bruce L. Hurvitz, Deerfield, IL, has been elected President of the National Heat and Power Corp., Niles, IL. The corporation is a commercial and industrial mechanical contracting firm specializing in H.V.A.C., Plumbing and Process Piping Applications servicing the greater Chicagoland area.

1976 **John B. Holz**, MSGE '81, is Managing Director for RISC System/6000 Marketing in the Asia Pacific region. The family resides in Tokyo.

1977 **John Baruch**, M. Engr. Mgmt. '90, Northwestern U., has been named Director of Operations, Orton Life Systems Inc., Wheeling, IL.

Caleb H. Didriksen, JD '82, Tulane, U., is partner in Didriksen & Carbo, PLC, a law firm in New Orleans, LA, which specializes in technical claims, insurance disputes, patent, trademarks and copyright law. He resides in Harahan, LA.

1978 **Rick Frewert**, MBA '81, U. Chicago, of Foster City, CA, is Consulting Manager for Oracle Corp., Redwood Shores, CA. The firm implements state-of-the-art software systems (ERP/MRP-II) for Fortune 500 Manufacturing Companies. He was married in May 1994.

1979 **Todd C. Green** is senior project engineer with Cobe Laboratories, Inc., Lakewood, CO.

David O. Reip, Burke, VA, has been appointed Aeronautical Information Specialist with National Ocean Service, Silver Springs, MD. He also recently became a Warrant Officer in the Virginia National Guard, flying UH-1 helicopters.

1980 **David V. Adams**, MSME '83, U of CA (Berkeley) is a mechanical engineer with Acuson, Mountain View, CA.

Timothy C. Johnson, Assistant Professor at the University of Tennessee, received the Council of Logistics Management's 1994 Doctoral Dissertation $5,000 Award. It was presented October 17 at an awards luncheon in Cincinnati, OH.

1981 **Bill Schaeffer**, MCS '85, has been appointed Art Director, CST Entertainment Imaging, Culver City, CA.

1982 **Kent D. Kowalske**, MBA '91, Bradley U., is General Supervisor, Gas Distribution Engineering with Central Illinois Light Co., Peoria, IL.

Gary LaFine, MBA '94, U. St. Thomas, has been promoted to Program Manager with Onan Corp., Minneapolis, MN.

1983 **Michael W. Hartley**, MBA '88, Northwestern U., is employed by Illinois Tool Works, Des Plaines, IL. The son of the late GE Professor Thomas C. Hartley, he was recently married and resides in Elmhurst, IL.

Robert A. Plotke, MS '85, a senior manager with Andersen Consulting, Chicago, has been assigned to southeast Asia where he is responsible for the Andersen Network Consulting Group. He resides in Kuala Lumpur, Malaysia.

1984 **Gerald L. Fellows**, MSIE '89, Penn State U., JD '92, Marquette U., is a patent attorney with Reinhart, Boerner, Van Deuren, Norris and Rieselbach, Milwaukee, WI. He has been Adjunct Professor of Intellectual Property Law at Marquette since 1993. This year he has been elected Chairman of the Intellectual Property Section of the Wisconsin State Bar.

Carolyn Strong Petro, Issaquah, WA, has been named Quality Assurance Manager of Haworth-Lunstead Operations, Kent, WA. She received 1S09001 Certification after first audit in 1994.

Kim M. Schuelke is employed part-time as an Environmental Health and Safety Engineer for General Electric Motors Division in Jonesboro, AR.

1985 **John S. Romuk** has been promoted to Senior Systems Engineer with Hitachi Data Systems, Sacramento, CA. He resides in Elk Grove, CA.

1986 **Cedric A. Ball**, MBA '93, U. of Michigan, has joined Owens-Corning Fiberglas Corp., Toledo, OH, as a aStrategic Planner. He formerly held the same position with General Motors' Saturn Corp.

Eve K. Sierocki Hastings, MS '88, is a Principal Engineer with Baxter Healthcare, Round Lake, IL. She is married to Randy Hastings, BS (chemistry) '88, and their first child was born in Jan. '94. They reside in Lake Villa, IL.

William L. Johns, MBA '91, U. of Chicago, is National Account Manager for CCC InAmation Services, Chicago, IL.

Joel G. Lehman has been named Sales Manager — State of Illinois for Johnson Controls, Inc., Arlington Heights, IL.

Andrew W. Sigle, MBA '93, U. of Chicago, is a member of the technical staff of AT&T Bell Laboratories, Naperville, IL.

Chris A. Weber has been named Project Engineer — Gatorade USA by Quaker Oats, Newport, TN. He resides in Kodak, TN.

1987 **Ellen M. Duffy** is employed by United Conveyor Corp., Waukegan, IL. She resides in Carol Stream, IL.

Terry D. Thomason is Business Manager of ITW Deltar, Mokena, IL. A resident of Kankakee, he recently was granted a US Patent.

1988 **Craig S. Agney**, MBA '94, Indiana U., has taken a position as Product Manager with Terimex in Gdansk, Poland.

Stanley T. Gratt (Grotkiewicz) has been promoted to manager and assigned to Technical Group of Andersen Consulting in Chicago. He resides in Hickory Hills, IL.

Edward M. Karls, MBA '94, U. of Michigan, has moved to Bethesda, MD.

Dwight E. Krahn, previously with the Department of Energy Headquarters in Washington, D.C., has taken a position as Safety Engineer with Westinghouse-Hanford, Co., Washington, D.C.

Kent A. Miller, MS '90, has moved to Koln, Germany, to do a 2-year assignment with Ford of Germany in the area of vehicle dynamics.

Shawn M. Sowers, an Engineering Systems Engineer, EDS, Detroit, MI, was inadvertently listed as Sharon Sowers in the 1994 Spring GE Newsletter.

Michael K. Walter, MBA '91, has a new position as Media/Business Manager-Advertising with Jewell Food Stores, Melrose Park, IL. He resides in Palos Hills, IL.

1989 **Sheila Manion Kimlinger**, MSCE '91, has accepted a position as Staff Engineer-Structures, ADM Design Services, Decatur, IL.

Jamie S. Peterson is SQA Administrator with Wolfram Research, Inc., Champaign, IL.

Karen A. Shineflug has taken a position as Senior Systems Engineer, Abbott Laboratories, Abbott Park, IL.

Carol L. Casada Tadros, MS (Industrial Engineer) '90, U. of California (Berkeley), is a Manufacturing Engineer with Amdahl Corp., Sunnyvale, CA. She resides in San Jose, CA.

Gregory M. Vydra, MSIE '90, Northwestern U., has relocated to Durham, NC, to accept a position as Senior Decision Support Analyst with Glaxo, Inc., Research Triangle Park, NC.

Douglas A. Wilcoxon has a new position as Project Engineer, Equipment and Specifications Supervisor, Hillsboro Glass Co., Hillsboro, IL.

1990 **Stephen R. Bicking** is a Civil Engineer III-Hydraulics Specialist, Illinois Department of Transportation, Schaumburg, IL. He resides in Hanover Park, IL.

Karen M. Vallero Capuano has resigned her position from Factory Mutual Engineering in Hoffman Estates, IL following the birth of a son in Feb. 1994.

1991 **Mark F. Buwen**, Chicago, has been named Federal-Aid Location Engineer, Bureau of Local Roads and Streets, Illinois Department of Transportation, Schaumburg, IL.

Tamera C. Kroencke Depke, MS '92, is an Engineer II, Vectra Technologies, Inc., Naperville, IL.

Paul R. English is senior project engineer, Automated Analysis Corp., Peoria, IL. He resides in Chillicothe, IL.

Wes A. Houtz, MSME '93, is a mechanical engineer R&D Division, S&C Electric Co., Chicago, working on the design and development of new generation high voltage switchgear. He was married in May to Angela Kirkwood, DVM '94.

Stephen L. Lesniak, MS/MBA '93, has accepted a position as Account Manager with Commonwealth Edison, Oak Brook, IL. She works in the firm's energy services organization.

Jennifer L. Schaulin, a resident of Puyallup, WA, is an Account Manager, GE Medical Systems, Issaquah, WA.

Steven P. Seaney, MSME '94, U. of Wisconsin, has accepted a position as Control Systems Engineer with Woodward Governor Co., Rockford, IL. He is engaged in designing hydro-mechanical control systems.

1992 **Karen S. Bender** has a new position as Total Quality Management Specialist with Phoenix Closures, Inc., Naperville, Inc.

Michael K. Biarnesen is with Abbott Laboratories, Abbott Park, IL. He is a resident of Gurnee, IL.

Alexander Weng Fong, who formerly served as a manufacturing engineer intern with Litton Kester Solder, Des Plaines, IL, is now in Miyagi, Japan, teaching in the Japanese school system.

Andrew S. Hunter is a sales engineer with Chicago Blower Corp., Glendale Heights, IL. He was married in November to Angelique Przybyszeski and resides in Bartlett, IL.

Yuko Kobeshita is an engineer in the Vehicle Component Research Division, Hino Motors Ltd., Tokyo, Japan.

Robert L. Newton has been named Design Engineer with USD Products/Cooper Industries, Chicago. He resides in Elgin, IL.

Rudolph S. Piskule is a Manufacturing Engineer, Meco Inc., Paris, IL.

Jason A. Struthers, MBA '94, Ashland U., has accepted a position as Electro-Mechanical Application Engineer, Parker Hannifin Corp., Automation Actuator Div., Wadsworth, OH. A resident of Medina, OH, was married to Amie Marie White last July.

Michael L. Watson, MBA '94, resides in Sleepy Hollow, IL.

1993 **Harry Almeida**, Chicago, IL, has accepted a position as a mechanical engineer with Motorola Cellular, Libertyville, IL.

Christy E. Cienkus has been appointed Project/Test Engineer, Spraying Systems Co., Wheaton, IL. She resides in Lisle, IL.

Richard Coronado is an engineer with Abbott Laboratories, Abbott Park, IL. He is a participant in a 2-year rotational development program concentrating in manufacturing operations.

Mauricio A. Lopez, MBA '93, has been named Marketing Engineer with Cummins Engine Co., Columbus, IN.

Anne L. Marsan is studying for an advanced degree at U. of Michigan.

Clinton J. Wallace is a Cost Engineer with Proctor and Gamble, Cincinnati, OH.

Brad E. Weinshenker has accepted a position as Application Engineer with Mannesman/Rexroth/Indramat, Wood Dale, IL. He resides in Carol Stream, IL.

1994 **Andrew J. Lampitt** of Oak Park, IL, is a sales representative, SDP Technologies, Westchester, IL.

Wife of Former Staff Member Dies

Word has been received that Mrs. Robert (Mary Lee) Jewett, wife of former G.E. staff member, passed away August 14, 1994 in Lakeland, FL after a long illness. She suffered a stroke five years ago.