



## Fall 1996

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The [1995](#) and [1994](#) newsletters are also available.

### ENROLLMENT UPDATE

As of September 1996 we have 24 graduate students, 38 seniors, 37 juniors, 35 sophomores, and 47 first-year students for a total of 181. Included in these figures are 63 computer engineering majors and 6 ELE/CEN majors. We have 15 international students, 5 graduate and 10 undergraduate. The freshman class had an average SAT score of 1243.

### PERSONNEL UPDATE

**LaRae Newby** retired in December after 17 years of service to the Department. We all wish her and her husband, Floyd, the best of luck (and warm weather) in southern Utah where they will be living.

[Mohamad Musavi](#) was promoted to full Professor and [Jim Patton](#) was promoted to Associate Professor with tenure effective this September. Both are due congratulations.

Congratulations are due to [Janice Gomm](#) who was honored at the College of Engineering's 1996 Recognition Banquet by receiving the Leila Lowell award for her contributions to the Department.

### NAMED PROFESSORSHIPS

Two ECE faculty members were appointed to named professorships effective this fall. [John Field](#) was appointed to the Henry R. and Grace V. Butler Professorship. [Jim Patton](#) was appointed to the Robert N. Haskell Power Engineering Professorship. Both of these Professorships are being filled for the first time.

The Butler Professorship was established by Henry R. Butler '20 in collaboration with his children, Dorthea B. Marsden, Frank A. Butler, and Robert L. Butler, all UM graduates. Mr. Butler (Nov. 8, 1898 - April 19, 1995) spent most of his career with ITT from which he retired in 1963 as Associate Director of the Avionics Division. He received eight patents for his creative work in the early development of radio and radio transmission stations. In addition to his technical achievements, he was very civic minded and active in many community affairs.

The Haskell Professorship was established through bequests from the estates of Gladys M. Stetson and Robert N. Haskell '25. Mr. Haskell (Aug. 24, 1903 - Dec. 3, 1987) spent his entire career with the Bangor

Hydro-Electric Company. He began as a design engineer and rose to become President in 1958. He retired in 1985 as Chairman of the Board. Mr. Haskell served in the Maine Legislature for many years, including being President of the Senate from 1955 to 1959. His business leadership was recognized by his service on many corporate boards while his community involvement was acknowledged in his being awarded numerous community service commendations.

Both Professorships have a goal of maintaining the Department's standards of excellence and commitment to teaching and discovery. We are honored that these distinguished graduates saw fit to help us in this way.

### DONATIONS

As a reminder, it is possible for you to direct your alumni donation to the ECE Department. If you want your gift to benefit the Department it is very important that you write "For ECE Department" on your donation card and/or check. In so doing, your gift will be credited to your alumni record and also help the Department. Previous donations allowed us, last year, to establish The Centennial Fund in recognition of the Department's [100th Anniversary](#). Interest income from this fund is used to meet Department needs, including student support and equipment purchases. Unfortunately, because of current interest rates and the amount of the fund's principal, this income is still relatively small. Therefore, this year we are using donations to continue building the fund's principal.

### SCHOLARSHIPS

The following first-year students received scholarships named after emeriti faculty: [Adrian C. Smith](#) of Newburgh received the Waldo Libby Scholarship; **Matthew S. Reynolds** of Addison received the Carleton M. Brown scholarship and **Aaron Johnson** of Unity received the Walter Turner scholarship.

#### Castle Student

The Department named [Cory A. Voisine](#), a junior from Lincoln, as the seventh Castle student. Castle students are supported by an endowment set up by a generous gift from Roger Clapp Castle '21. The endowment also funds the Roger Clapp Castle and Virginia Averill Castle Distinguished Professorship held by [Fred Irons](#).

[Vincent Allen](#), a senior EE student, and [Kevin LeBlanc](#), a senior with a double major in EE and CEN, received scholarships from the Downeast Maine Section of the International Society for Measurement and Control. Vinnie and Kevin have both worked on several industrially funded automation projects in the Department during their undergraduate careers.

#### Spring Awards Banquet

At the Department's annual Spring Awards Banquet, **Michael D. Amos**, **James J. McDonald**, and **Kirk Riley** received Walter Joseph Creamer scholarships. **Robert L. Tukey, Jr.** and **Ryan B. Roderick** received Robert N. Haskell scholarships; **Seth A. Pouwels**, **Maurice P. Kinney**, and **Andrew M. Piper** received David Dunlap Holmes scholarships; **Thomas Kenney** received the Louis H. and Morrison scholarship; [Ryan C. Jacobson](#) received the Harold H. Beverage scholarship, and **Alan Fern** received the RCA Harold H. Beverage scholarship. The Castle scholar was also recognized at the banquet.

### FIRST ECE COURSE REVISED

For several years now we have been offering ECE 101, Introduction to Electrical and Computer Engineering, in the fall of the Freshman year. Recently it focused on the use of two common math analysis programs, Matlab and Mathcad, to analyze and simulate physical phenomena. This fall the course was drastically revised to include more hands-on activities as well as background knowledge to help motivate and prepare our students.

During the summer of '96, [Eric Beenfeldt](#) designed a remote-controlled car that could be given to the students in kit form. He was assisted by two incoming freshmen and former Young Scholars (YSP), **Aaron Johnson** and [Adrian Smith](#). In lab the students assembled the car, mechanically and electrically. The latter operation required wire-wrapping and soldering as well as testing. In class the students learned about parallel and series resistors, RC time constants, 555 timers, and simple state machines. Additionally, the students were introduced to Mathcad and MATLAB which allowed them to simulate the electronics

modules.

In addition to this technical material the students discussed ethics, various career paths, strategies for being a successful student, and team work. This portion was led by **Shad Roach**, a former YSP participant/counselor and **Garrett Harris**, a former YSP counselor and current ECE sophomore.

Although the semester is not quite over as this item is being written it appears that the course was very popular and successful.

### **MASTER OF SCIENCE IN COMPUTER ENGINEERING**

Last July the Board of Trustees authorized the Department to offer an MS in Computer Engineering degree program. This program complements our EE graduate program and is a natural outgrowth of our undergraduate CEN program. In fact, the original impetus for the MS in CEN came from CEN undergraduates wishing to continue their studies. Computer engineering is one of the fastest growing engineering fields and is expected, by the turn of the century, to be second only to electrical engineering in the number of engineers employed.

### **DEVELOPMENT OF INTELLIGENT SYSTEMS EXPERTISE IN MAINE**

This is the title of a \$1.2 million grant funded by the Dept. of Energy EPSCoR in cooperation with the Maine Science and Technology Foundation. This three year collaborative effort between ECE, ChE, and USM's engineering department is aimed at enhancing Maine's energy-related research capability. Efforts will be focused on the application of intelligent systems technology to promote energy-efficiency and enhanced productivity in the pulp and paper, electric power, and a variety of smaller industries within the state of Maine.

An industry outreach program has begun that will place faculty in Maine companies, learning their problems, helping them to apply advanced technology of interest to them, and teaching intelligent systems methods. As a result of initial contacts, a \$900,000 project has already been funded by the DOE to apply intelligent control systems in the pulp and paper industry; an additional three proposals have been submitted for funding. This effort is the first of its kind in Maine and we are very enthusiastic about its potential.

### **YOUNG SCHOLARS**

[Eric Beenfeldt](#) and [John Field](#) offered a Young Scholars Program (YSP) for the sixth time last summer. The YSP is sponsored by the Research Career Development Division of NSF's Directorate for Education and Human Resources as part of its effort to aid young men and women develop careers in science, mathematics and engineering. National Semiconductor of South Portland also provided support this year.

Our program acquaints high school students with a number of the career choices available in engineering. Specifically, the students learn about computer, electrical, civil and environmental, mechanical, spatial information, and chemical engineering. This is achieved by having brief lectures about each of the disciplines followed by "hands on" lab exercises as well as field trips. Additionally the students learn about engineering research by participating in on-going University projects. They also take a mini-course in digital logic systems and explore engineering ethics by discussing various real world situations. The mini-course shows the students what an "engineering" course is like and that they can do well in it.

Our program has 24 participants, ran four weeks in the summer, is residential and targets students, particularly young women, entering their junior or senior years in high school. There is also a follow-up project that the students work on with high school teachers during the academic year. Unfortunately, as NSF is canceling their support for YSP, we may no longer be able to offer this introduction to engineering.

### **FACULTY ACTIVITIES**

[Rick Eason](#) has continued work in the area of robotics. One main effort has been in leading a team of students in the development of a mobile robot for entry into the Annual International Autonomous Ground Robotics Vehicle Competition. This competition requires a robot to navigate autonomously around an 800' outdoor track marked by white lines and containing obstacles, hairpin turns, inclines, and a sand pit. The team has modified a Honda Odyssey dune buggy by adding electric motors for steering and propulsion, cameras for sensing white lines, ultrasonic sensors for detecting obstacles, and a Pentium PC for

intelligence. In addition to designing and constructing the hardware, the team has also been writing the navigation and control software. The team's first attempt at this competition was made last July when the competition was held at Epcot. The team has already begun making improvements in the hardware and software for next year's entry.



**The 1996 Mobile Robot Project Team in Orlando, Florida**

R. Eason, D. Rawsley, K. Fleming, M. Harriman, L. Chen

(More pictures [here](#).)

Rick has continued to upgrade software on the shoe trimming machine he and [Eric Beenfeldt](#) developed for Dexter Shoe Company. Dexter now has 14 of these machines on line. Last January, patent number 5,485,643 was issued for this machine.

In other activities, Rick spearheaded the creation of the [Computer Engineering Master's degree program](#). In addition, Rick has worked on the creation of an exchange agreement with Kyushu Institute of Technology in Kitakyushu, Japan and is now hosting one student from that institution for a one year visit.

[Duane Hanselman](#) and [Bruce Littlefield](#) are working on the User's Guide to accompany the Student Edition of MATLAB version 5, which will be published in April 1997. In addition they are revising their *Mastering MATLAB* text that published last year to reflect the new capabilities of MATLAB version 5.

Again this year Duane will give a brushless DC motor design short course based in part on his book *Brushless Permanent Magnet Motor Design*. The three day course will be given in March in Chicago, IL under the auspices of the Small Motor Manufacturers Association. He will also present a one day short course at the Incremental Motion Control Systems and Devices Symposium in San Jose in June. Duane continues to interact with Knolls Atomic Power Laboratory on the design of low noise high power brushless DC motors for undersea applications.

In addition to the above work, Duane continues to consult with a variety of companies. This past year he developed a magnetic circuit model for a new type of brushless resolver, which is a position sensor based on sensing mutual inductance that varies sinusoidally with position. Duane developed design software for an axial gap brushless DC motor constructed primarily of plastic. He also consulted for a company that makes respiratory equipment to prevent sleep apnea as well as for a company developing a 60kRPM 60kW motor for high speed milling machines. Currently Duane is working on the design of a brushless linear motor for high speed, high accuracy semiconductor processing applications. Finally, Duane is participating as an expert witness in lawsuits associated with two fires.

[Don Hummels](#) and [Fred Irons](#) continue their work in the Communications Devices and Applications Lab. Currently, 5 graduate and 5 undergraduate students are involved with on-going CDA Lab research efforts. Work was completed in the ARPA HBT/ADC test support program. This program involved the development of methods for characterizing and testing high speed samplers. High speed ADC research continues to be an area of emphasis through a project funded by the Army through DEPSCoR. Under this project, our UHF test facility has been upgraded to support data rates up to one Giga-sample per second, and test frequencies up to 20 GHz. Recent graduates from the CDA Lab include **Deron Gerow**, who was

hired by the MIT Lincoln Laboratory Radar Instrumentation program, and **Cindy Zoldi**, who is now pursuing a Ph.D. in Mathematics at SUNY/Stonybrook.

The DEPSCoR ADC research program is scheduled to run through Sept. 1997. Interesting work involves development of methods for characterizing and testing high speed samplers. Graduate students are looking at high-speed sample/hold architectures, and the effects of non-ideal switch performance on pipeline and successive approximation converters. Another project includes looking at how compensation methods can be used to correct differential as well as integral non-linearities through the use of histograms rather than the data intensive methods that have been used in the past. One student is examining the evaluation and compensation of converters using test-signals generated through the use of (non-ideal) DACs. Another student has been instrumental in the development of test-support software for our evolving ADC test facility. He has implemented a "virtual instrument bus" which provides transparent network access to instruments which may physically

be located anywhere on the Internet. Fred Irons had a busy spring presenting the results of all of this work at various conferences. He attended GOMAC in Orlando in March, the ARPA96 review in May, and the International Measurement Technology Conference in Brussels in June. We were selected as the ARPA contractor of the week in Aug 96, and have recently been selected to negotiate a follow-on project for the ARPA Digital Radar Development program.

Work also continues on the DSP hardware/software project for NUWC. No newsletter would be complete without a reference to our original lab-member, [Shawn Kennedy](#) (now at NUWC/ Newport, RI). Don Hummels continues to work closely with Shawn developing algorithms for ocean targeting and analysis experiments. To support the project, NUWC has loaned the University one of its DSP development platforms. The system includes a UNIX-based development environment with C and assembly-language tools interfaced to an array of eight TMS320/C40 signal processors. An extensive library of routines to support a variety of real-time DSP applications was developed at UMaine over the past year, and has now become an integral part of the development of new applications at NUWC. We look forward to integrating the system into our DSP course over the coming year.

[Ryszard Lec](#), Research Professor in EE and Technical Leader of the Industrial Process Control Sensor program, continues his research and educational efforts in the area of sensors. He and Dr. Vetelino completed the integration of the new and emerging technology of sensors into the undergraduate and graduate Electrical and Computer Engineering (ECE) curriculum. This is a novel interdisciplinary sensor program which combines in a synergetic way research, education and business. The research-education-business effort involves faculty and students from seven departments on campus, researchers from industrial and government laboratories, and business. The focus of the new sensor program is to expose students to the whole sensor development process. Students learn the theory, design, fabrication and testing of different types of sensors, including business and marketing aspects of high-tech products. This new interdisciplinary sensor initiative at Maine has had a positive impact on the engineering curriculum at the University and outside the University. The sensor program is open to students from other engineering departments on campus through the ECE minor degree or technical electives, and to students from other universities through the NSF Research Experience for Undergraduates program. In this new curriculum research has been chosen as a vehicle for implementing educational goals. This program has shown that research and teaching do not have contradictory goals but complement each other. Research naturally leads to the development of novel teaching methods, such as inquiry-based labs, hands-on experience, and cooperative learning, which helps a student build his/her competence and confidence. The sensor program at Maine may serve as a model for the introduction of other emerging technologies into the engineering curricula.

Dr. Lec provided assistance and expertise to industry. In collaboration with Control Devices Inc., (Standish, Maine), he is developing an engine oil quality sensor. The target application of the sensor is an on-board inexpensive solid state electronic sensing device to signal the need for an oil change in an automobile. Another project with Control Devices Inc., involves the development of a non-contact torque sensor for an automotive smart steering system which could improve vehicle safety in critical situations. In collaboration with Dupont Inc. an on-line sensor system to monitor the production of polymers under conditions of high temperature and pressure is being developed. Such a sensor could improve the yield and quality of a variety of polymer products. Potential applications for this sensor include other chemical, food and pharmaceutical industries. A sensor which monitors burning of house waste with microwave energy is being developed in collaboration with a New Hampshire company. Such a waste treatment technology, which is environmentally safe could reduce waste disposal problems in coastal settings and transportation systems. In

collaboration with BIODÉ Inc., of Brunswick, biosensors for detection of pathogens in blood serum are being developed. Here, work is focusing currently on a method to detect antigens produced in the immune system in the presence of cholera bacteria. Also with BIODÉ, Inc. a sensor for monitoring the electroless and electrochemical plating processes is under development. Such a sensor could improve metal plating techniques which are critical in corrosion protective technologies.

**Mohamad Musavi** has been very active in his neural network research and industrial collaborations in the past year. He is the principal investigator on the DOE/EPSCoR/MSTF "Intelligent Systems" project described on page 2. Pulp and paper companies along with several other industries are participating in this project. In continuation of his work on the S.D. Warren processes, Mohamad received two grants from the NSF and DOE. The DOE grant also involves three scientists from the Argonne National Laboratory. Following his success in the Rome Laboratory project in the past three years, Mohamad, Northrop Grumman, and Vexcel Corp. received a contract from Rome Laboratory on the development of an image registration system.

In addition to the above activities, Mohamad continues his joint research with The Jackson Laboratory on the classification of mouse chromosomes. This research is currently supported by contracts from NSF and DOE/EPSCoR. Mohamad is currently advising four graduate and four undergraduate students.

**Jim Patton** continues to work on NSF and DOE sponsored projects; including being a co-pi of the DOE-EPSCoR Intelligent Systems project described on page 2. This summer much attention was devoted to developing a multimedia hydro-electric power plant simulator. This simulator is being developed in Java. Several important tools were developed as a result of this project: a Java-based multimedia authoring tool kit, network management software allowing simultaneous simulator sessions, interactive web-based short circuit and load flow analysis tools, interactive exercises amenable to distance education applications, and the capability to quickly develop interactive web-based power system monitoring and control applications.

During the past year, Jim has focused much attention on distance education. He represents the University on two system-wide committees, the Education Network of Maine Academic Council and the UMS Telecommunications and Information Technology Task Force. In addition, he moderates a system-wide listserv on distance education and represents the University as a member of the Maine Internet Education Consortium supporting K-12 internet connection activities. Jim and **Andy Sheaff** have been very active in organizing, designing, and installing the Orono school system computer network.

As chair of the College's Distance Education Policy and Steering Committee, Jim helped in acquiring a multi-point bridge that will enable the offering of telephone based real-time audio/video tele-conferencing. In addition, he received funds to help support faculty in the development of distance education instructional materials.

A portable cellular phone-controlled data acquisition system is currently being built for Central Maine Power. This unit will initially be used to characterize transient outages on feeders located in CMP's service territory. However, the primary value to the company is its extreme versatility, made possible through the easy upgrading and exchange of system components and custom programming.

Two previously built data acquisition systems will be used to monitor the University's kW demand at its two main substations. This information will be combined with data retrieved from the University's energy management system to enable real-time load switching recommendations to help reduce electrical demand charges. This project will provide additional information about the University's energy usage and provide load data for an ongoing University power system study.

Along with **Bruce Segee**, **Mohamad Musavi**, and **Scott Dunning**, Jim will be organizing three non-credit short courses during the next semester to be offered via teleconferencing and the World Wide Web. A unique feature of the Web version will be the provision of real-time audio streaming over the net to provide "mini-lectures". Additional information on Jim's activities can be obtained by pointing your WWW browser to: <http://www.eece.maine.edu/Power>

**Bruce Segee** continues to be active in teaching as well as the Instrumentation Research Laboratory. The Instrumentation Research Laboratory is dedicated to research, development, and education related to instrumentation. Areas of particular interest include fuzzy logic, neural networks, and hierarchical control systems. Work in the laboratory includes industrial automation, intelligent instrumentation, neural networks for sensor array calibration, and assistive technology for children with disabilities. The work in the

laboratory has included the use of PCs, PLCs, and embedded controllers.

Currently the laboratory is working on a number of projects involving the use of embedded controllers, sensors, and PCs running Windows '95. The embedded controllers are utilized as intelligent instrumentation to gather information, communicate with the PC, and perform low-level control. The PCs organize the data, perform "number crunching" and provide networking and file transfer capability. Multi-tasking and inter-process communication allow existing software packages to be utilized when developing new applications.

Bruce has continued to receive support from a variety of sources locally and nationally. Additionally, Bruce has worked with students supported by NSF Young Scholars Program, NSF Research Experiences for Undergraduates, Upward Bound, and other programs for high school and undergraduate students.

A major emphasis of Bruce's research is focused on finding solutions to problems faced by local industry. This work has received a boost through EPSCoR funding from the Department of Energy to develop expertise in intelligent systems in the State of Maine. This work has helped establish liaisons between numerous industries and the University of Maine. These liaisons have identified number of potential future projects dealing with intelligent systems. It is believed that this will lead to research projects that involve students in the solution to real-world problems (and better prepare them to do the same after graduation) that directly benefit the local economy, and that demonstrate the role that the University plays in the economic health of the State.

[John F. Vetelino](#) and his research group which currently consists of 3 PhD students, 7 MS students and 3 undergraduates, continue to work on basic and applied research in gas sensors, biosensors, corrosion sensors and water quality sensors. The last two areas represent new research directions and involve collaboration with chemists for the corrosion sensors and civil and environmental engineers for the water quality sensors. The sensor work is supported by NSF, James River Paper Company, the BIODE Corporation, and Sensor Research and Development (SRD) Corporation.

Dr. Vetelino is on the organizing committee for the 1997 IEEE Ultrasonics Symposium to be held in Toronto, Canada, in October 1997. Dr. Vetelino is also a candidate for the Advisory Committee for the IEEE Ultrasonics, Ferroelectrics and Frequency Control (UFFC) Society. He also chairs an IEEE Adhoc Committee on integrating sensors into the UFFC Society via the IEEE UFFC Transactions and Symposia.

Two small businesses, namely, BIODE and SRD Corp., which were incubated from the sensor research at the University of Maine, have recently been successful in obtaining several small business innovation (SBIR) grants from NSF, Dept. of Energy, National Institute of Health, Dept. of the Army and the State of Maine. Of particular significance are two phase II SBIR grants totalling 1.5 million dollars. These companies, which are located in Hermon and Orono, employ several former and current UMaine students on a part time or full time basis.

Dr. Vetelino received an NSF grant that supports undergraduate research in the Electrical and Computer Engineering Department. This ten week summer program involves undergraduates from the University of Maine and other U.S. universities in departmental research activities, some of which are industrially sponsored. At the end of the summer, students write reports describing their research activities and also make presentations. This award represents the sixteenth award Dr. Vetelino has received from NSF to support undergraduate students in research. Dr. Vetelino has also received an NSF equipment award to upgrade the photolithography laboratory to a state-of-the-art facility for the fabrication of a large class of state-of-the-art microsensors.

### [ALUMNI/AE NEWS](#)

**Peter H. Priest '77** is pleased to announce the relocation of his thriving law practice from NYC to Chapel Hill, NC where he is becoming acclimated to the hot and humid weather. Along with the notice of the move, he sent along this bit of verse penned by his wife Nancy with inspiration from Dr. Seuss whose books they read regularly to their children, Willie and Sarah.

*When the law firm split up, Peter went on his own,  
working at home with a fax and a phone.  
His business expanded. Our home felt too tight.  
An adventure was needed we decided one night.  
We sold our apartment near Park Avenue*

*and bought a big house with yard and a view.  
We moved all our stuff, our toys, books, beds, and china,  
to the southwestern part of East North Carolina.*

**Allen J. Bingham '54** sent in the following: My career consisted of 30 years with General Electric as an electric utility power systems engineer and engineering manager, power plant project engineering manager, environmental engineering, two years with Middle West Service Company, a Chicago consultant, and two years in rocket development at Redstone Arsenal (now Marshall Space Center) in Huntsville, Alabama. Retirement careers in Maine: two years in real estate sales and four years as project manager at the Department of Environmental Protection, Augusta. Now active in: US Coast Guard Auxiliary, Boothbay Harbor; Sigma Chi fraternity trustees, UM; member of planning board, town of Waldoboro. Married to Joanne Owen ('56), three children: Jean (UM '81), Carol, Brad, and five grandchildren.

**Chris Field '93** has left LORAL to work for a small contracting company (KES: Korean-American Engineering Solutions) in San Diego, CA. He is working on the Marine Corps' Simulation effort which is geared towards supporting an exercise called Synthetic Theatre of War-97 (STOW97). STOW97 is a technical demonstration which will have 10,000-50,000 participants consisting of actual vehicles, manned simulators, and computer controlled vehicles. Chris' responsibilities include architecting software solutions, assessing the cost (in time and money) of software enhancements, training other developers, and interacting with the customer/sponsor. He is sharing an idyllic beach front home which makes it easy for him to indulge his surfboarding. He indicates that San Diego has a nicer climate than Maine - particularly in January!

**Dan Clavette '95** and his wife Laura are proud to announce the birth of their son, Derek, who was born Dec. 22, 1995. He was 14 lbs, 7oz and was 21.5 inches. They live in Coventry, RI. Dan's work for Cherry Semiconductor keeps him pretty busy. He has designed a switching regulator and a linear regulator. In addition to two other ICs he also designed a PWM power supply regulating IC that has several possible patent possibilities. Dan gave an excellent presentation to the juniors this fall as part of the Junior Seminar series.

**George Pettit '67** is a patent attorney in Washington D.C. where he is a partner in the firm of Pollock, Vande Sande & Priddy. After graduation he spent several years doing circuit design (from DC to S band) and was enrolled in a graduate EE program when a patent examiner introduced him to the possibilities of combining his engineering knowledge with legal education. He graduated from law school in 1975 and went to work for Magnavox representing them in various matters before the FCC, the Bureau of Radiological Health, and the U.S. Patent Office. Eventually he became Patent Counsel for the Consumer Electronics Division. He has been in private practice since 1982. He had some good things to say about the education he received at UM. He also predicts that in the future the wealth of nations will depend on their technological creativity, and those individuals who have an education which allows them to adapt to new technologies will participate in this wealth.

**Glen Riley '85** has moved once again! Glen and his wife Judy, and children, Erica (7 years old) and Austin (6 years old), have moved to Allentown, Pennsylvania. Glen accepted a position with Lucent Technologies, a new \$21 billion company spun off from AT&T in September. Lucent is the former manufacturing business of AT&T that makes central office switches, transmission equipment, PBX's, telephones, and microelectronics. In addition, Bell Laboratories is spinning off from AT&T and will be part of Lucent. Glen is the General Manager of the Mass Storage IC Product Line within the \$2 billion Integrated Circuits Division of Lucent. He is responsible for design engineering, product engineering, applications engineering, marketing, and the overall profit and loss of the product line. Lucent's Mass Storage group makes integrated circuits used in hard disk drives made by companies such as Seagate and Quantum. Their primary offering is mixed-signal read channel IC's and highly integrated ASIC's for the IDE and SCSI controller functions. If you would like to contact Glen, he says the best way is via email, since he gets over 50 a day and regularly reads them all. His email address is glenriley@lucent.com.

**Nikolay Guenov '93** was accepted in the "Corporate Leaders" program at Arizona State University which encompasses several Masters programs in Engineering, Computer Science, and Management. He is in the Department of Industrial and Management Systems Engineering working towards a Master's with a concentration in Management of Technology, and a Master's in International Management. The program of study includes a year at Arizona State University and one and a half years at the American Graduate School of International Management - Thunderbird (currently rated as Number 1 in International Management by U.S. News and World Report). He received a Honeywell Fellowship which means that during the school year he works for them on a part time basis and attends classes full time; during vacations he works full

time.

He is really excited about the opportunity, as it allows him to combine his engineering education with his international experience. Presently he is working on a new generation of "smart field instruments" - the Fieldbus type. He and his wife Kristin enjoy Phoenix and the weather. They have adjusted to the heat and feel that it is not too bad. Nikolay says "The nights in the summer are great! Very soft, not hot, and beautiful."

**Debbie Goodeill Manning '88** and her husband, Richard, were blessed with a baby boy, Ryan Christopher, on May 10, 1996. Debbie is working at Bangor Hydro, primarily in substation design. She and her siblings, Sue and Todd, gave a neat panel discussion at one of this fall's Junior Seminars. Debbie also is acting as a sort of "big sister" to the Department's first year women students.

**Yves C. Maurais '93** sent the following email to Jim Patton after finding our WWW home page.  
 "Everything is fine with me...I have been living in Alabama...25 miles from the Gulf coast for a little less than 3 years now...I am enjoying the warm (hot) weather and beautiful beaches...!! I was transferred here a few months after graduation and my first project was to install a brand new automated roll wrapping system for an old paper mill in Jackson, Alabama...Can you say baptism by fire??? Anyhow, I have worked on various projects since then and am learning more everyday!" Yves is working for the Fitch Company.

**Linden H. McClure ELE '89, CEN '90**, graduated in August from the University of Colorado at Boulder with a Ph.D. in Electrical Engineering. His dissertation was related to the use of commercial off-the-shelf embedded systems in ultra-low-cost spacecraft. He was in charge of designing the embedded system for a NASA-funded Hitchhiker payload which will fly in the Space Shuttle in July 1997. (There is a good chance Linden will to go to Florida for payload integration and actually go in the Shuttle payload bay.) After graduation he went to work for Hewlett-Packard's Colorado Memory Systems Division in Loveland, CO with the title, Project Lead, CD Products Research & Development. Present work involves ReWritable CD (CD-RW) products which are particularly interesting to him because of the variety of different CD formats and the prospect of using Recordable and Re-writable CDs in his home recording studio.

Linden just moved into his brand-new condo in Fort Collins and, in his spare time, he plays ice hockey, skis, works in his music studio, and is working on co-teaching a senior-level computer design lab at CU-Boulder. Summer vacation plans include Maine so we are hoping he will be a regular visitor to the Department. On a trip to Maine this fall he gave a very interesting talk as part of the Junior Seminar series. His Internet address is: [Linden McClure@HP.com](mailto:Linden_McClure@HP.com)

**Robert Hennigar '92** and **Tosha Elliott Hennigar '93** are pleased to announce the birth of their son, Kurt, who was born February 23, 1996. They live in Fairfield, Ohio. Robert works for Champion International at their Hamilton, Ohio mill as a Process Control Engineer. He is in an MBA program at Xavier University and expects to graduate in May, 1997.

**Tom Braun ELE&CEN '94** and **Susanne Gedaro Braun ELE '94**, were married June 14, 1996 in Scarborough, ME. They made their home in Virginia but will be moving to the Orlando, FL area after the first of the year. Tom is finishing up with Camber Corporation where he was their lead engineer in the design and integration of a multi-sensor fusion mine detection system for the US Army. He has accepted a job with Lockheed Martin in Orlando to do modeling and simulation of missiles as well as image processing. Sue graduated from Virginia State Polytechnic Institution in December with an MBA and will also be seeking employment in the Orlando area.

### EXTERNAL FUNDING

The following is a list of external funding available for expenditures between July 1995 and June 1996. Descriptions of many of these projects can be found in the Faculty Activities section. If you would like to know more about any of these grants, please contact us.

PRINCIPAL INVESTIGATORS	TITLE	SPONSOR	AMOUNT
Field, Beenfeldt	MERITS H.S. Teacher Participation YSP	MERITS	2,500
Field, Beenfeldt	Engineering Experience for High School	NCFE	17,122

Field, Beemerd	Students	NSF	77,155
Field, Beenfeldt	Hands-on Approach to Building Confidence	University of Maine	1,600
Field, Segee	MERITS H.S. Student Research Participation	MERITS	2,000
Hanselman, D.	Brushless Permanent-Magnet Motor Analysis	Knolls Atomic Power Lab	99,340
Hummels, D.	AUTEC Digital Signal Processor+B34 Development	Naval Undersea Warfare Ctr	24,409
Hummels, Irons	Develop Multi-GHz Sampling Capability	Dept. of Army	111,637
Irons, F.	Coaxial Autotune System Development	Control Devices	20,272
Irons, Hummels	ADC Test Support Program	ONR	42,429
Lec, R.	Automotive Sensor Development	Control Devices	36,000
Lec, R.	Medical Sensor Application	BIODE, Inc.	16,950
Lec, R.	Sensor Research Fund	Maine Medical Center	1,000
Lec. R.	Acoustic Sensing Tech for Monitoring Nylon Proc	DuPont	29,597
Musavi, M.	Vectorization of Hard Copy Maps Using Art. NN	MSTF	23,000
Musavi, M.	Prediction of Wood Pulp K# with Neural Networks	S.D. Warren	15,000
Musavi, M.	Prediction of Wood Pulp K# with Neural Networks	NSF	38,825
Musavi, M.	Classification of Mouse Chrom. Using Neural Networks	NSF	118,351
Musavi, M. (40%)	Intelligent Process Control Sys... Ceiling Boards	Armstrong	40,000
Patton, J.	Multimedia Power Systems Control and Sim Labware	NSF	45,847
Segee, B	Flowmeter Revision	Central Maine Power	750
Segee, B.	RIA: Application of NN to Gas Sensors	NSF	22,841
Sheaff, A.	Robot Sensor Development	Dexter Shoe Co.	2,600
Vetelino, J.	SS Sensors for Aeronautical & Space Appl	NASA EPSCoR Prog	75,000
Vetelino, J.	Prototype Acoustic Wave Fluid Microsensors	BIODE	59,942
Vetelino, J.	Undergraduate Research Participation in EE	NSF	57,095
<b>TOTAL</b>			<b>934,118</b>

## PUBLICATIONS

July 1, 1995-June 30, 1996

## JOURNALS

F.H. Irons and D.M. Hummels, "The modulo time plot - a useful data acquisition diagnostic tool," *IEEE Trans. on Instr. & Measurement*, vol. 45, Nn. 3, pp. 734, June 1996.

R. Lec, "Piezoelectric sensors," *Archives of Acoustics*, no. 2, pp. 179-194, Feb. 1996.

B. Segee, J. Field, B. Littlefield, "Using simulation with hardware verification for teaching computer architecture," *CAE*, vol. 3, issue 3, pp. 173, Nov. 1995.

J.F. Vetelino, M.D. Antonik, J.E. Schneider, E.L. Wittman, K. Snow, and R.J. Lad, "Microstructural effects in W03 gas sensing films," *Thin Solid Films*, vol. 256, pp. 247-252, 1995.

J.F. Vetelino, J.C. Andle, J.T. Weaver, and D.J. McAllister, "Selective acoustic plate mode DNA sensor," *Sensors and Actuators B*, vol. 24-25, pp. 129-133, 1995.

J.F. Vetelino, J.D. Galipeau, R.S. Falconer, J.J. Caron, M.G. Schweyer, J.C. Andle and E.L. Wittman, "Theory design and operation of a surface acoustic wave hydrogen sulfide microsensor," *Sensors and Actuators B*, vol. 24-25, pp. 49-53, 1995.

J.F. Vetelino, F. Josse, "On the mass sensitivity of acoustic plate mode sensors," *Sensors and Actuators A*, vol. 53, pp. 243-248, 1996.

J.F. Vetelino, F. Josse, J.C. Andle, R. Dahint, and M. Grunze, "Theoretical and experimental study of mass sensitivity of PSAW-APMs on ZX LiNbO<sub>3</sub>," *IEEE Transactions on Ultrasonics and Ferroelectrics and Frequency Control*, vol. 43, no. 4, pp. 517-524, July 1995.

## CONFERENCE PROCEEDINGS

D. Hanselman, "Fourier decomposition of radial and tangential forces in brushless DC Motors," Proceedings: Twenty-Fifth Annual Symposium on Incremental Motion Control Systems and Devices, San Jose, CA, pp. 137-144, June 1996.

D.M. Hummels, I.N. Papantonopoulos, F.H. Irons, "Identification of error mechanisms in a folding and interpolating ADC," *IEEE Intl Symp on Circuits and Systems*, vol. 4, pp. 176-178, Atlanta, GA, May 1996.

D.M. Hummels, J. McDonald, F. Irons, "Distortion compensation for time-interleaved analog-to-digital converters," *IEEE Intl Symp on Instr & Meas*, vol. 1, pp. 728-731, Brussels, Belgium, June 1996.

F.H. Irons, D.M. Hummels, Cindy Zoldi, "ADC architectural diagnostic testing procedures," Govt. MicroCircuit Applications Conference (GOMAC), pp 79-80, Orlando, FL, March 1996.

F.H. Irons, D.M. Hummels, I.N. Papantonopoulos, & C.A. Zoldi, "Analog-to-digital converter error diagnosis," *IEEE Intl Symp on Instr & Meas*, vol. 1, pp. 732-737, Brussels, Belgium, June 1996.

R. Lec, "Acoustic Wave Sensors," XI International Microwave Conference MIKON '96, Warsaw. vol. 3, pp. 50-59, May 27-30, 1996.

M. Musavi, M. Ziao, M.T. Davisson, and E.C. Akeson, "Classification of mouse chromosomes using artificial neural networks," Proceedings of the International Conference on Neural Networks (ICNN), Washington DC, June 3-6, 1996.

J. Patton, D. Price, C. Sweetser, and S. Harris, "Versatile data acquisition system for power system research," *Proceedings of North American Power Symposium*, pp 311-319, Oct. 1995.

B.E. Segee, P.M. Bajaria, "A study of the application of the CMAC artificial neural network to the problem of gas sensor array calibration," *Proc. 1995 IEEE Workshop on Neural Networks for Signal Processing*, pp. 494-503, Sept. 1995.

B.E. Segee, R. Olson, H Wang, "Power line communication in industrial environments using LonWorks™ Technology," Lonusers Conference Proceedings, May 1996.

J.F. Vetelino, J.C. Andle, and J. Caron, "Surface acoustic wave substrates for gas sensing applications," *IEEE Ultrasonics Symposium*, Seattle, pp. 461-466, Nov. 1995.

J.F. Vetelino and J.C. Andle, invited paper "Acoustic wave biosensors," *IEEE Ultrasonics Symposium*, Seattle, pp. 451-460, Nov. 1995.

J.F. Vetelino, R. Dahint, J. Schumacher, F. Josse, M. Grunze, J.C. Andle, "On the mass sensitivity of acoustic plate mode sensors," Transducers '95/Euroensors IX Proceedings, Stockholm Sweden, Nov. 1995.

J.F. Vetelino, M. Schweyer, J. Andle, "Acoustic plate mode properties of rotated y-cut quartz," 1996 IEEE Frequency Control Symposium, Honolulu, HI, June 4-8, 1996.

J.F. Vetelino, J. Caron, J.C. Andle, "Surface acoustic wave substrate for high temperature application," 1996 IEEE Frequency Control Symposium, Honolulu, HI, June 4-8, 1996.

**BOOKS**

Duane Hanselman and Bruce Littlefield, *Mastering MATLAB*, Prentice Hall, 1996, 528 pp.

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