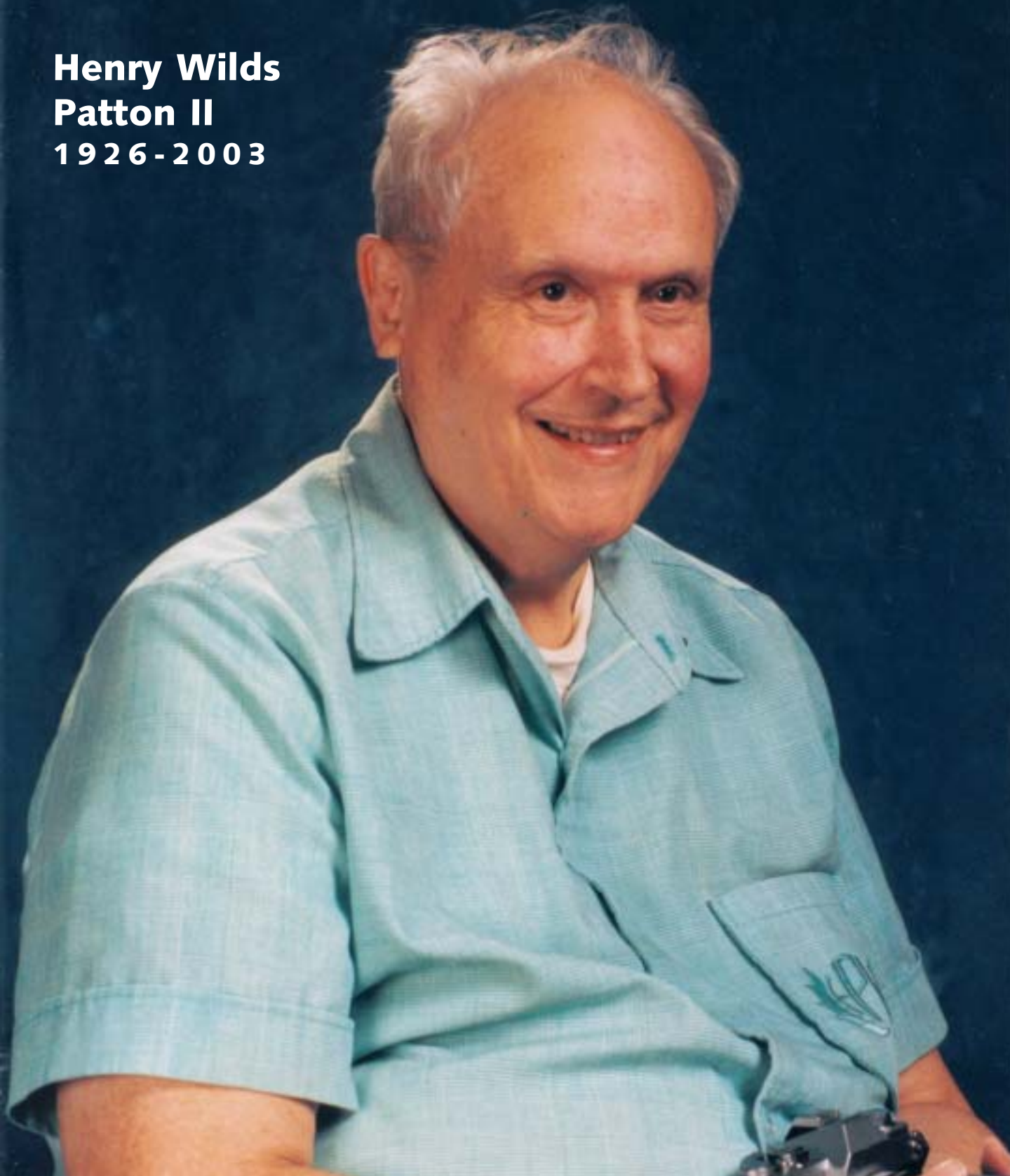


THE DEARBORN
Engineer
UNIVERSITY OF MICHIGAN-DEARBORN

SPRING 2004

**Henry Wilds
Patton II
1926-2003**



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FALL 2004 ONLINE GRADUATE COURSES

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Aeng 596: Internal Combustion Engines

CIS 505: Algorithm Design and Analysis

CIS 525: Web Technology

CIS 553: Software Engineering

CIS 556: Database Systems

CIS 565: Software Quality Assurance

ECE 537: Data Mining

ECE 570: Computer Networks



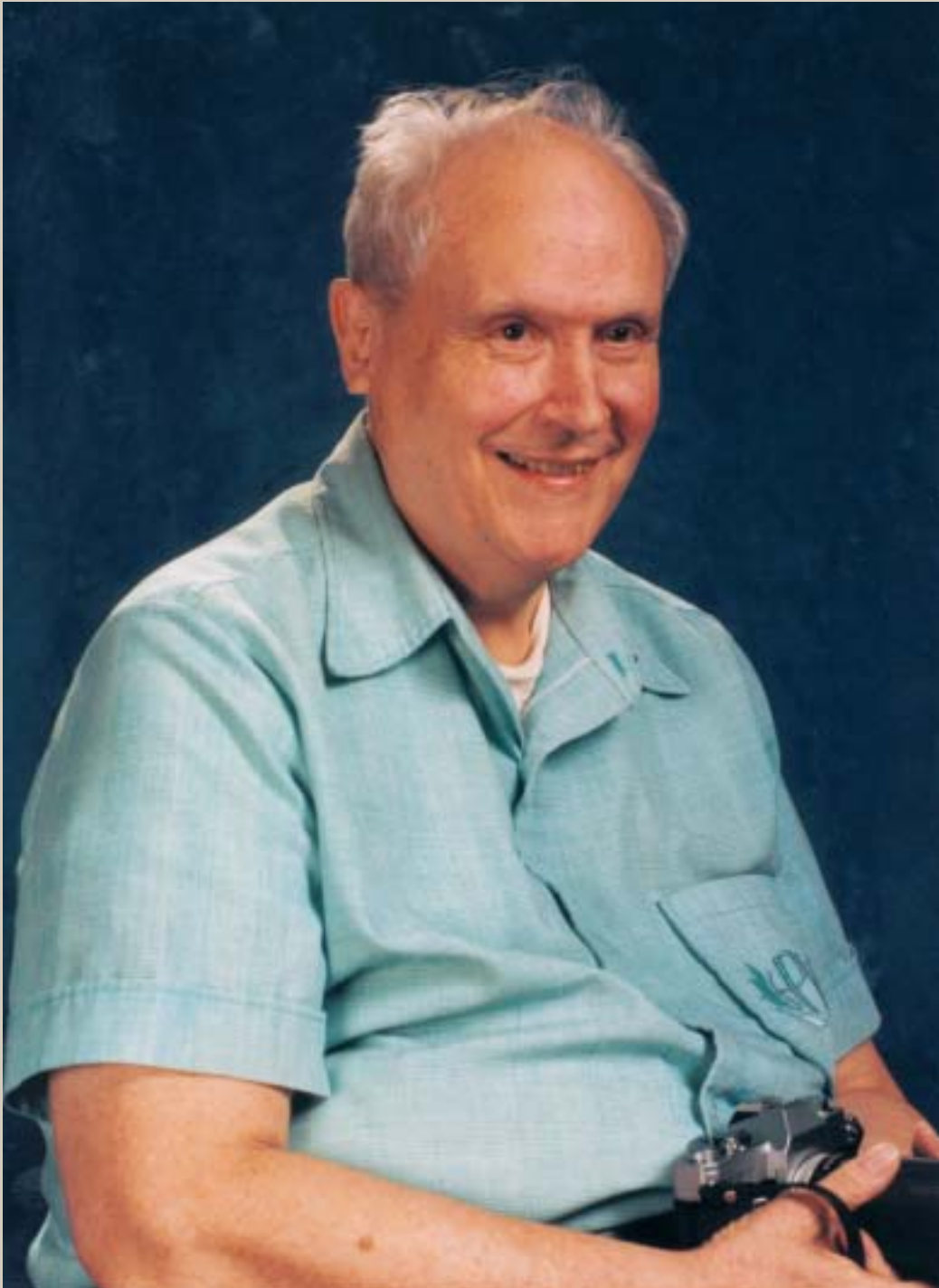
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THE DEARBORN
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SPRING 2004



HENRY WILDS PATTON II
1926-2003



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FRONT COVER:
 Henry Wilds Patton II

HENRY WILDS PATTON II, 1926–2003

\$3.6-MILLION GIFT REFLECTS DONOR'S UNWAVERING SUPPORT

Long-time University of Michigan–Dearborn friend Henry W. Patton II's deep commitment to the College of Engineering and Computer Science has become a legacy through a \$3.6-million bequest from his estate to support student scholarships and fellowships.

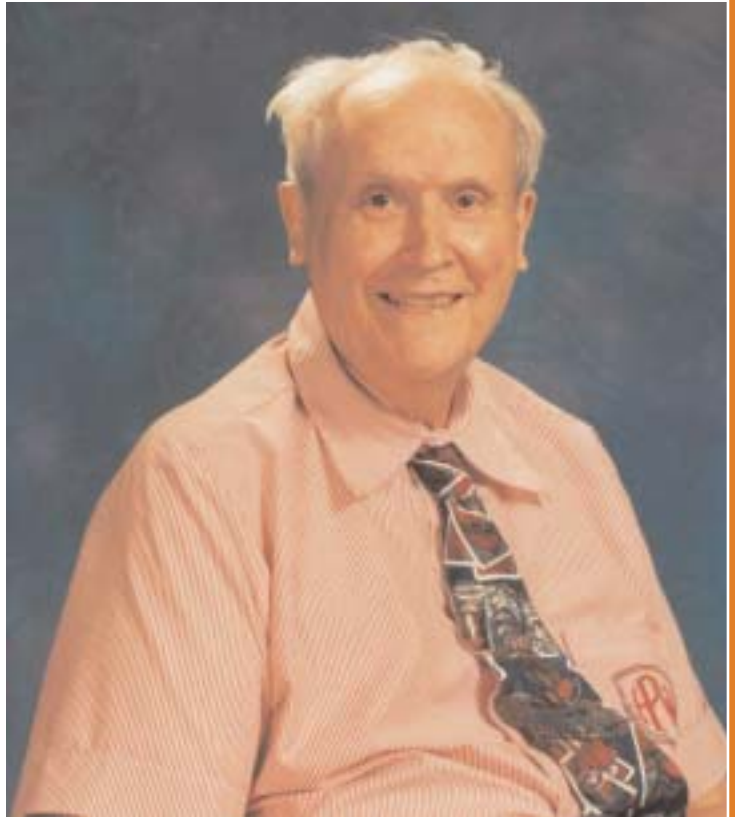
The gift perpetuates Patton's remarkable years of service to the college, including generous financial contributions; technical counsel; and consistent support of its students, graduates, and faculty. In May 2003, Patton received the college's Distinguished Cooperative Education Program Advocate Award, roughly two months before his death on July 23 at age 77.

"This gift had been in his will since 2001, but he never told us about it," said Subrata Sengupta, dean of the college. "He just didn't want us to make any fuss over him. So, I am deeply satisfied that we were able to honor him with the cooperative education program award while he was still with us."

The industrial entrepreneur's work with the college's cooperative education program included hiring several UM–Dearborn students and providing them with invaluable professional experience. Patton was also an advocate of the college's Center for Engineering Education and Practice, which works to develop mutually beneficial partnerships with industry. His expertise and guidance was shared with faculty from across the college, especially with members of the Department of Electrical and Computer Engineering.

"Henry was a great personal friend and will be missed dearly," Sengupta said. "He was an engineer's engineer, who obviously wanted to invest in the future of our young people. He cared so much for this university."

A 1947 graduate of the University of Colorado with a bachelor of science degree in electrical engineering, Patton founded Acromag Inc. in 1957 at the age of 31. The organization relocated from Detroit



Henry Patton

to Wixom in 1966, where he directed its growth into a multi-million-dollar, international enterprise.

Kurt J. Lipsky, personal representative of Patton's estate as well as Acromag's treasurer and director of finance and personnel, said his boss had a keen appreciation for the role of education in an individual's success and in the advancement of the national economy. As a beneficiary of the GI Bill and a man who always appreciated a good investment, Patton was ever mindful of the positive impact of the U.S. government's support of his education.

He went on to supplement his own education through accelerated coursework at Michigan State and Harvard universities. Over the years, he was an active supporter of university co-op programs and worked exclusively with the UM–Dearborn engineering co-op initiative for the last 10 years of his life.

"This mutually beneficial arrangement strengthened students' abilities to relate theory to practice," Lipsky said. "Henry took an active role in making sure that co-op students were successful in their endeavors at Acromag and believed in challenging them from day one."



Dean Subrata Sengupta and Henry Patton

His involvement "gave him the opportunity to share his wealth of experience with students, one on one. He wanted to give back to the next generation of engineers and to the future of technology, an area he felt gave this country a competitive edge in the marketplace," Lipsky added.

Acromag is a leading designer of critical measurement instrumentation for the petrochemical and aerospace industries and a designer of analog and digital control products for the industrial I/O market. Henry Patton was a pioneer in the use of magnetic amplifiers for process measurement applications, developing his early recognition of their potential for measuring low-level sensor signals into the basis for Acromag's success. His roughly 40-year-old design for a thermoelectric metal tester is still being manufactured by Acromag for its aircraft industry clients.

Patton was a long-time member of the Instrumentation Society of America and served as treasurer of the Detroit chapter. He was a classical

music lover and piano collector, keeping his prized Steinway concert grand at Acromag, where he often hosted gatherings of the Piano Tuner's Guild. An avid photographer and camera collector, he was a frequent "volunteer" photographer at university events. His work has appeared in several university newsmagazines and publications over the years.

The college will use the bequest to create the Henry Patton Endowed Scholarship and Fellowship Fund. The fund will make awards for academic financial assistance to electrical and computer engineering students in the College of Engineering and Computer Science, to be given in the form of scholarships for undergraduate students and fellowships for graduate students. Dean Sengupta noted, "Henry's bequest will make it possible for our college, and particularly the electrical and computer engineering department, to attract and support top-notch students."

A NEW HOME FOR CIS



The CIS department will soon have a new home in the former School of Education Building

After years of sharing space throughout the college, the Department of Computer and Information Science (CIS) has found a new home. CIS was initially scheduled to move into a major section of the new engineering building that will be constructed over the next few years, but those plans changed when the new facility was downsized as part of the campus purchase of the Fairlane Center. When the School of Education announced its intention to leave its current building and move to the Fairlane Center this August, CIS promptly stepped in to fill in the vacancy. Virtually the entire building will now be occupied by CIS.

"The move will bring the CIS faculty together in one building," says Keshav Varde, the college's associate dean. "It will provide additional office space as well as more room for faculty and student research activities."

The target move date for the department is August 11, although some CIS faculty are already beginning to settle into the new facility. Other college staff may also be temporarily housed there, and eight rooms are slated to be occupied by the Natural Sciences department at first.

"We're excited about having our own building," says William Grosky, CIS chair. "That, along with our many research labs, will help further identify us as a department."

The new space will provide more faculty offices, research laboratories, student study rooms, a



library, a meeting room, a seminar room, additional storage space, and room for adjunct professors, research assistants, and visiting professors. The IT department is also upgrading the building for state-of-the-art data infrastructure.

"Our department is getting much better real estate," says Grosky. "We are growing and this building provides much more space for that. We'll have a lot of room to expand. It should serve us for many, many years."

The move to the former School of Education Building, combined with the new construction, will give the College of Engineering and Computer Science a total of six campus buildings.

NAVDEEP SOOCH, '82 BSE-EE SEMICONDUCTOR SUCCESS STORY

Navdeep Sooch, chairman and CEO of Silicon Laboratories "opening the market" at the Nasdaq Market Opening Ceremony on June 21, 2000. Silicon Laboratories' initial public offering took place on March 24, 2000.



Navdeep "Nav" Sooch's fascination with electronics started as a boy, not long after he arrived in Detroit from India and watched his uncle take apart and repair the family's black-and-white television set. "Wow, I want to be able to do that," he recalls thinking.

His parents, both teachers, wanted him to become a doctor. But Sooch held fast to his childhood dream, taking all the electronics classes he could get before graduating from Southfield High School in 1979 at the age of 16. He went on to UM-Dearborn, where he earned straight As and a bachelor's degree in electrical engineering in just three years.

Today, Sooch, 41, is chairman of the board and co-founder of Texas-based Silicon Laboratories Inc., one of the semiconductor industry's fastest-growing and most profitable young companies.

Although Sooch learned most of his chip-design, marketing, and management skills on the job, he credits UM-Dearborn with giving him a solid grounding in engineering. Equally important, he says, it gave him the self-assurance to leave school and home at age 19 and blaze a successful career in the fast-paced technology industry. "Because of the success I had there, I got a level of confidence that told me I could compete with anybody in the world," he says.

Sooch, whose family moved to the United States from Amritsar, India, when he was 10, lived at home throughout his college career. "I was only 16," he says. "My mother wouldn't let me stay in

the dorms." He initially enrolled at the Ann Arbor campus. But because it lacked a cooperative education program that would let him earn credit for work experience, he transferred to UM-Dearborn at the start of his second semester. "The Dearborn campus had an active co-op program for its engineering programs, so I decided to switch," he says.

During his sophomore year, he landed a four-month job with IBM Corporation in Burlington, Vermont. Sooch was thrilled to be living away from home for the first time, and to be earning what seemed like an astounding salary of \$275 a week. "At the time, that was more money than I could possibly dream of," he says.

Although the IBM job mostly involved routine lab work, Sooch got his first exposure to semiconductor design. More specifically, he discovered the arcane world of "analog" chips, which allow the digital language of computers, expressed in binary Xs and Os, to interact with measurements of real-world data such as light, sound, and temperature. "I knew then that I was going to go into the IC (integrated circuit) field for sure," he says. "I could just see that that was the future."

After another stint with IBM the following summer, Sooch graduated from UM-Dearborn in 1982 and was promptly recruited by AT&T Corporation's Bell Labs. In part, he was attracted to the opportunity because of the inspirational stories he'd heard about Bell Labs from former UM-Dearborn Prof. T. R. Viswanathan, who had spoken to his class about what a great place Bell Labs was.

ALUMNI UPDATE

(Viswanathan eventually went to work there himself.) Sooch worked there as a circuit designer for three years, while earning a master's degree in electrical engineering from Stanford University. In 1985, he and several other Bell Labs engineers joined the startup team at Crystal Semiconductor Corporation, where he soon proved his design skills by developing one of the company's mainstay products, an analog-to-digital signal converter that won several patents

Sooch learned some powerful business lessons during his 11 years at Crystal Semiconductor, which gained a reputation for designing chips that were elegant and innovative but not always commercially successful. He particularly recalls one programmable analog filter chip that was "a great technical accomplishment," but proved too expensive for most uses. "That's a painful lesson for an engineering team, or a company, to go through," he says. "You work so hard to make something work, and when it doesn't translate into success, it's an eye-opener."

So when Sooch and fellow chip designers David Welland and Jeffrey Scott left Crystal Semiconductor to start Silicon Laboratories in August 1996, they were determined to pay just as much attention to costs and customers' needs as to elegant design. Like their former employer, they planned to focus on "mixed-signal" chips, which combine both digital and analog functions and are notoriously difficult to design and build.

Mixed-signal chips traditionally have been manufactured with expensive silicon germanium or bipolar processes, which produce faster but more costly and power-hungry chips than the mainstream complementary metal oxide semiconductor (CMOS) technology used by the rest of the industry. Silicon Labs' founders realized, however, that CMOS's performance was advancing faster than rival technologies, because it was attracting most of the chip industry's investment. Even though their design task would be more challenging, they opted to focus strictly on CMOS-based chips.

The company's first target was computer modems, then assembled from a messy assortment of electronic and mechanical components. Silicon Labs' plan was to integrate most of that circuitry onto a few mostly digital chips, thus reducing the modems' size and cost. When their design hit the market in early 1998, costing half as much and using one-fifth the circuit board space as the competition, it was a runaway success. Silicon Labs' modem chips now account for about half of the worldwide market, which totals about 80 million units a year.

Meanwhile, the company had its eye on an even bigger opportunity—developing a similarly compact design to replace the numerous components used in radio-frequency synthesizers, which allow cell phones to select particular radio channels. It took nearly three years and several revisions before the company introduced its first synthesizer chip in late 1999. Once again, buyers embraced the product. Cell phone makers like Samsung, Sony, and Mitsubishi quickly adopted Silicon Labs' synthesizers, buying about 40 million of them last year alone.

Central to the company's continued growth is Sooch's willingness to bring in experienced management as the business grows. In 2001, the company hired Daniel Artusi, a 25-year veteran of Motorola, as its chief operating officer. This January, Artusi was promoted to president, and in July the company announced he will take over as CEO at the end of this year, leaving Sooch as chairman of the board of directors.

"It's a win-win for me, and for the company," says Sooch, who plans to remain involved with the company's strategy and product selection. He's also looking forward to traveling, spending time with his children, improving his golf game, and setting up a foundation with his wife to support education and help economically disadvantaged people.

Despite having hit the jackpot once as an entrepreneur, Sooch insists that he has no urge to start another company. "As I look back on it, honestly, I'm not so sure I could pull it off again," he says. "I'm satisfied to have done it once."

William Campbell, '62 BSE-ME, '67 MSE-ME, is program manager at DaimlerChrysler in Detroit.

Deborah Morrisett, '78 MSE-EE, is vice president of regulatory affairs at Chrysler Group in Auburn Hills. She is responsible for all regulatory affairs operations at Chrysler Group, including product analysis, vehicle safety, environment and energy, and environment energy regulatory planning.

Brett Bilbrey, '82 BSE-EE, is manager of media architecture at Apple Computer in Cupertino, California.

Steven Wybo, '89 BSE-EE, has been promoted to senior associate at Conway Mackenzie & Dunleavy in Birmingham.

Heather Fairless, '90 BSE-ME, is an applications engineer at Thermal Dynamics in Washington.

Maria Welborne, '90 BSE-ISE, is business excellence projects manager, industrial controls division, at Eaton Corporation in Wisconsin. She was featured in the "40 Under 40" list of *The Business Journal*, a publication which serves Greater Milwaukee. In 1999, Welborne earned master's degrees in business administration and engineering management from Northwestern University. She is a member of the board of directors of COA Youth & Family Centers in Milwaukee's Riverwest neighborhood and serves as chairperson of the organization's youth development committee.

Jason Brewer, '97 MSE-ISE, MBA, is manager, automotive supplier consulting practice, at Plante & Moran P.L.L.C. in Southfield.

Sunil Patel, '03 BSE-CE, BSE-EE, is electronic systems engineer at The Boeing Company.

INTERNATIONAL LEADERSHIP INSTITUTE HOSTS CHINESE LEADERSHIP PROGRAM

*Jerry Lapidés
(far left)
and ILIOT
participants*



This spring and summer, the International Leadership Institute in Operations and Technology (ILIOT) at the College of Engineering and Computer Science (CECS) is hosting 44 managers and government staff members from Guilin, China. Scheduled to run from the end of March to the middle of August, the program provides seminars in topics such as project management, quality management, information systems, operations management, entrepreneurship, and the history of the auto industry.

"It is gratifying that we were selected to provide this program," says Jeanne Girard, director of Engineering Professional Development (EPD), which is overseeing the project in conjunction with United MaxTech Consulting. "It allows EPD to continue creating learning opportunities for international audiences. In this particular instance, it allows us to learn more about the Chinese culture, which will be very helpful to CECS in its future dealings with several Chinese universities who are partnering with the college on a graduate program in automotive systems engineering."

In addition to morning classes four days a week, the syllabus for the program includes field trips to the Henry Ford Museum, the Ford Rouge plant, and various Lansing government departments, including Commerce and Economic Development, where they will meet with state government staff.

"The participants have continually mentioned that they are interested in learning about American methods in government, leadership, and operations," says Jerry Lapidés, retired professor of education and current academic advisor for ILIOT. "We have recruited faculty subject matter experts to facilitate

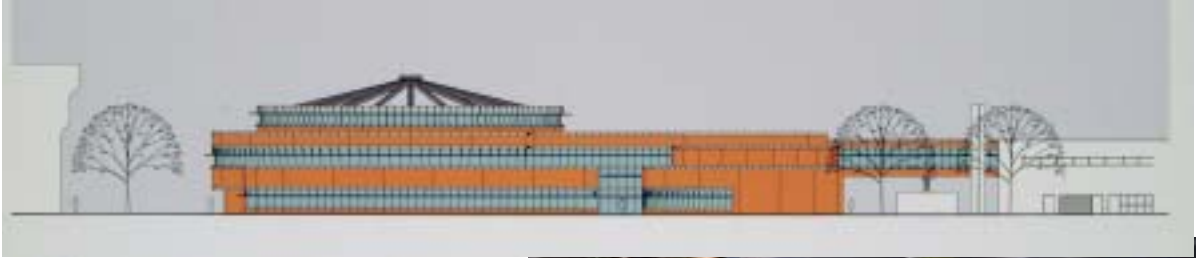
learning in these areas of interest. The program is designed to give the participants a broad background in American leadership techniques. For example, Valerie Murphy-Goodrich, the director of Human Resources for the City of Dearborn, will teach civics and U.S. government." Other instructors include regular and adjunct faculty from CECS and various independent consultants.

"I advise the faculty regarding student requirements for content and process," continues Lapidés. "We stress the idea that we need not teach the group to be users of the technology and operations. Rather, we want to emphasize their roles as leaders in using the knowledge they are acquiring about operations and technology when they return to China."

Student feedback thus far has been very positive. "Most of the teachers here are very earnest and patient," says Guiping Zhu, one of the leadership students from Guilin. "The course content has enlarged my views and the way I think."

"Promotion in China mainly depends on one's ability to innovate, reform, and think strategically," says another student, Lu Qing, who works in the development and reform commission in Guilin's municipal government. "Although five months' study is only a short period of time, I deeply believe that it will help us to take a better command of English, broaden our horizons, improve our managerial skills, and update our managerial ethics. All the things that we learn here will greatly impact our jobs when we return to China. We will benefit immensely in our future career development from what we learn here."

CAMPAIGN BEGINS NEW ERA FOR UM-D AND CECS ALUMNI, COMPANIES, AND PARTNERS KEY TO SUCCESS



After several years of behind-the-scenes partnership building and donation planning, the University of Michigan–Dearborn kicked off its biggest-ever capital campaign on May 14, 2004 at the university's new Fairlane Center in Dearborn. The event was just one of the nearly 90 other kick-off celebrations that were held in Ann Arbor to announce the University of Michigan's overall goal of raising \$2.5 billion during the campaign.

UM–Dearborn has established a campaign target of \$35 million, with the College of Engineering and Computer Science (CECS) aiming to raise \$15 million. "We're particularly excited about this campaign," says Phil Snyder, director of development for CECS, "because it is our first opportunity in some time to specifically focus our efforts on raising funds for programs that will help us meet our growth and expansion goals for the next five to ten years."

The college's goals center around five key areas: endowing the Institute for Advanced Vehicle Systems (IAVS), endowing the Center for Engineering Education and Practice (CEEP), building key new laboratories and facilities in the new engineering building and purchasing much-needed equipment for these spaces, greatly increasing the number of undergraduate scholarships, and naming the college's buildings and centers of excellence.

Among the most important projects for CECS will be the construction and outfitting of a new facility to house IAVS, which will be built during the next two years. The college will also focus on other academic and infrastructural upgrades that will be critical to accommodating the continued growth of the school and to improving the quality of education of the college's graduate and undergraduate students. These areas include developing new degree programs, expanding the facilities for student and faculty research, and strengthening the school's relationships with business and industry.

"Engineering programs require leading-edge technolo-



gy, equipment, facilities, and materials for faculty to teach students and conduct research," says Dean Subrata Sengupta. "This capital campaign is especially meaningful because the world of engineering is advancing very rapidly, and this focused period of partnership-building will help our school to grow and advance to meet the needs of our students, faculty, industry, and community. Without our partners and supporters, none of this would be possible. They shape the future of this school, even of industry itself."

Another important goal of the campaign, in addition to raising the needed funds, is to increase alumni, corporate, and community involvement in the school's planning and activities. Sengupta and other key officials will continue meeting with alumni, friends, company executives, foundations, and organizations to explain the school's programs, goals, and plans and to provide opportunities to support the college during this campaign and in the future. Adds Sengupta, "We need the long-term support of our graduates, company partners, and other people if we are to continue achieving our mission of preparing outstanding engineers who are ready to make valuable contributions to industry."

Above: One aspect of the planned Engineering Laboratory Building addition

Below: The new building will expand the facilities for student research projects

VISTEON DONATES LIGHTWEIGHT COMPOSITE TRUCK FOR RESEARCH

Left to right: Phil Hemenway; Brian Andonian; Alan Woodliff, director-advanced business development; Mark Jarvis, technology acquisition manager; Amber Mott, campus relations consultant; and Greg Sadler, technology acquisition manager, all from Visteon, with Dean Subrata Sengupta



With the assistance of a College of Engineering and Computer Science alumnus, Visteon Corporation has donated a one-of-a-kind composite vehicle and its scale model to the university. Worth approximately \$200,000, the experimental 1999 Dodge Dakota pickup was sitting idle when Brian Andonian, a UM-Dearborn automotive systems engineering graduate and a product design engineer at Visteon, spotted it. He contacted his former mechanical engineering professor P. K. Mallick last April and asked if he would be interested in obtaining it for research and teaching purposes.

"I immediately jumped on it," says Mallick, who went to Visteon to look at the vehicle and set the wheels in motion for the donation to take place.

Visteon had modified the Dodge Dakota to make it as lightweight as possible. Large portions of the body structure and chassis are made out of composite materials, which include lightweight carbon-fiber- and glass-fiber-reinforced plastics. The company's engineering team designed and fabricated lighter versions of the vehicle's frame, springs, pickup box, brakes, drive shaft, and various suspension and exhaust components. Visteon spent approximately \$2 million in parts and labor to build and modify the truck.

"My team developed the vehicle to demonstrate the viability of the use of composite materials to build automotive structures that can be used in mass production," says Phil Hemenway, manager of

advanced manufacturing engineering at Visteon. "The advantage of composites over traditional steel structures is their significantly lighter weight and the significantly lower tooling cost involved to fabricate them. Lighter weight allows better fuel efficiency and a more environmentally friendly vehicle. In this case, the donated vehicle is 800 pounds lighter than a traditional Dodge Dakota platform. The lighter weight allows the vehicle to enjoy improved fuel economy, faster acceleration, and improved vehicle dynamics behavior."

Hemenway provided data and drawings to Mallick as part of the donation. "We envision that the vehicle will be used by students to learn about the use of composite materials in an automotive structure," he adds. "With this donation, students can study and analyze an actual vehicle that has been fabricated to meet or exceed current vehicle specifications, such as crash and durability. We imagine that they'll be able to realize the potential for composite structures in non-automotive areas as well."

A small, one-fifth scale model of the vehicle was also donated to the university. "I plan to use the scale model in the classroom for teaching purposes," says Mallick, who will use both the vehicle and its scale model for the first time in a graduate-level automotive composites class this summer. "But it will be great to have the full vehicle for students to walk around and see, to take measurements from, and to use for research."

LEAR DONATES BATTERY-OPERATED VEHICLE

For the second time in as many years, Lear Corporation has made a key donation to the University of Michigan–Dearborn that has the potential to improve the research and teaching capabilities within the College of Engineering and Computer Science (CECS). The initial donation, a programmable vehicle module, was joined this year by a battery-operated 1998 Ford Electric Ranger, which Lear had been using for research and development purposes. "Since Lear no longer had a use for this vehicle internally," says Dave Perkins, manager of Test Engineering at Lear, "we thought that donating it to a worthy cause would be a way to extend its usefulness."

During the past several years, executives from Lear have worked closely with the college on many levels, including its Visiting Committee and the Institute for Advanced Vehicle Systems, and have gained a strong understanding of the importance of students and faculty using up-to-date equipment in classes and research. Donating the electric vehicle to the college's Department of Electrical and Computer Engineering was an easy and practical solution for Lear.

Chris Mi, assistant professor of electrical and computer engineering, will be using the Ranger in projects and research related to alternative fuel vehicles, including powertrain modeling and design, dynamic braking, and hybridizing. Collaborating with him will be Yi Zhang, associate professor of mechanical engineering; Natarajan Narasimhamurthi, associate professor of electrical and computer engineering; and John Shen, associate professor of electrical and computer engineering.

"Our department plans to develop new strategies to control this vehicle," says Malayappan Shridhar, chair and professor of electrical and computer engineering. "We want to optimize the overall efficiency in terms of the distance traveled between battery charges. We will also examine the use of regenerative braking to improve the retention of each battery charge."

"We are very grateful to Lear for this gift," says Mi. "We believe it will greatly advance our research and provide an outstanding test platform for many



Professors Malayappan Shridhar and Chris Mi with Dave Perkins and Mike Fawaz of Lear Corporation

of our research projects. It will offer our students the ability to perform real-time experiments and give them hands-on experience they wouldn't otherwise have had. I believe this donation will lead to further collaboration between Lear and the college."

Although the Ranger is currently valued at approximately \$8,000, its value to the university is much higher. "We would probably never spend the \$20,000 or more needed to purchase an electric vehicle from a dealership," says Phil Snyder, the school's director of development. "And since it has only 8,000 miles on the odometer, we are getting a relatively new vehicle through this donation."

Lear feels that they have also benefited from the donation. "As a major automotive interior supplier, Lear is constantly exploring new product concepts and technologies," says Perkins. "We understand that there are no keener eyes or creative minds than those of college students, and from a marketing standpoint, they represent a very influential generation of consumers. Industry needs to tap this resource by developing relationships with local universities and colleges, and we look forward to seeing what these innovative students will develop in the area of automotive design and engineering."

TARIQ SHAMIM RECEIVES 2004 RALPH R. TEETOR EDUCATIONAL AWARD



Tariq Shamim

Tariq Shamim, associate professor of mechanical engineering, is one of nine recipients nationwide to receive the prestigious Ralph R. Teetor Educational Award from the Society of Automotive Engineers (SAE). Shamim received the award on March 9 during the Honors Convocation at the SAE 2004 World Congress in Detroit, Michigan.

"I was pleased," says Shamim. "It's great to have your accomplishments recognized by your peers."

The award, funded since 1965 through a generous contribution by former SAE

president Ralph Teetor, honors outstanding engineering educators in recognition of their importance to the future careers of engineering students.

Shamim received the award for his outstanding performance in teaching, research, and service over the past six years. Shamim's research focuses on computational thermofluids with major emphasis on combustion, emission control, fuel cell, and

thermal spray. His work has received support from the National Science Foundation, the U.S. Department of Energy (DOE), the U.S. Department of Defense, and the automotive manufacturers.

He is a recipient of the DOE Summer Faculty Fellowship at Oak Ridge National Laboratory and a member of various boards and committees, including the SAE's Transaction Committee, the Board of Associates of the Internal Combustion Engine Division, the Combustion Institute, and two committees of the Heat Transfer Division of the American Society of Mechanical Engineers. In addition to his regular course teaching at UM-Dearborn, Shamim has also developed graduate-level courses containing new knowledge from his recent research.

Shamim holds a doctorate in mechanical engineering and a master's degree in aerospace engineering from the University of Michigan-Ann Arbor. He received a second master's in mechanical engineering from the University of Windsor, Canada.

"This award is important to me on a number of levels," says Shamim. "In particular, it provides me with opportunities to interact with industry leaders and develop long-lasting relationships. These will, I hope, help me to better understand industry's needs and perspectives and bring them to the classroom."

ELECTRICAL ENGINEERING CO-OP STUDENT WINS DISTINGUISHED STUDENT LEADER AWARD



Stephen Khoe and Anthony DeLaRosa

Electrical engineering student Stephen Khoe has been honored with the 2004-2005 Distinguished Student Leader Award. The award recognizes students, faculty, staff, and student organizations that have had a positive impact

over the past year on student life and growth at the University of Michigan-Dearborn and in the community at large. Six nominees were selected for the award this year.

In addition to completing multiple semesters on the dean's list, Khoe has been an active and valued member of both the electrical engineering honor society (Eta Kappa Nu) and the Emerging Leaders Program. "As an advisor to the Emerging Leaders Program, I observed Stephen demonstrate an admirable degree of inquisitiveness and lead several group discussions," says Anthony DeLaRosa, director of the engineering co-op program.

Khoe also completed two co-op assignments, the most recent being at TRW Automotive in Farmington Hills, where he received outstanding marks from his employers. "Stephen has done a wonderful job of balancing his academics and co-op education while continuing his extracurricular activities on campus," says DeLaRosa. "He is pursuing a well-rounded education and the experience necessary to develop the essential qualities of a leader."

ECE STUDENTS DESIGN FIREFIGHTING ROBOT

If three UM-Dearborn electrical and computer engineering (ECE) students have anything to say about it, firefighters may play a significantly different role in battling blazes. And this seems to be a goal for many other college students throughout the country. Since 1995, Trinity College in Hartford, Connecticut, has hosted a home firefighting robot contest. This year, graduating ECE seniors Sam Farhat, Colin Kerwin, and Ben Liem saw their robot qualify for the senior division of the contest. A total of 52 robots competed in their division.

Their senior design project entry, christened "UMD Firefighter," was designed to navigate around obstacles in a model floor plan of a house, locate a burning candle, and extinguish it. A highlight for Kerwin came when the robot found its way to the flame and zeroed in on it. "Because we didn't have the time or money to implement image processing with the robot's navigation, I didn't expect that to happen," says Kerwin. "It was a pleasant surprise."

Since the robot did not use image processing at the competition, it had to rely solely on UV sensors, which proved inadequate to actually extinguish the flame. "It couldn't center itself on the flame," says Liem. "But even with just the UV sensors, it managed to find the fire."

Under the direction of associate professor of electrical and computer engineering Narasimhamurthi Natarajan, the students created the robot from scratch, gathering pieces as they needed them. "We contemplated using a chassis kit," says Kerwin, "but realized that designing it on our own would give us more flexibility in terms of modifying if need be." The robot, which had to be smaller than 30 x 30 x 30 centimeters, was made of metal and plastic. "We had to use multiple layers in order to keep it small," says Kerwin. The students programmed its Motorola HC11 microprocessor using the C programming language.

"These students worked really hard under considerable financial constraints," says Natarajan. "I think the lack of funds, within reason, was a good



UMD Firefighter's team members successfully navigate the robot through a maze to a candle flame

learning experience. I was constantly amazed by the innovative solutions the students came up with."

After the competition, the students modified their robot and added the critical image processing, using MATLAB. "Next time, we would use analog rather than digital proximity sensors," says Liem. "With analog, the robot would have navigated more crisply. Also, we would use one UV sensor rather than two."

Liem found positive aspects of the experience on two levels. "For personal growth, I would say the teamwork and communication were invaluable. From a technical perspective, I benefited most from the digital sensor implementation and circuit design."

"I would recommend this competition to other students," continues Liem. "It will give them a hands-on experience with electronics, circuit design, embedded system design, and software development."

"It has been very fun and exciting," adds Kerwin.

During the preparation for and at the competition, the team was assisted by ECE senior Vin Varghese, president of the Intelligent Systems Club, a campus club that promotes robotics.

VISION GROUP BRINGS SPECTRUM OF ENGINEERING POSSIBILITIES INTO FOCUS

John Miller, associate professor, and Malayappan Shridhar, professor and chair



Imagine an automotive system that automatically warns you when you're not paying attention to the road, or a sophisticated optical scanner that rapidly analyzes the signatures on thousands of cancelled checks to detect fraud.

Researchers in the College of Engineering and Computer Science's vision group are helping transform these and other advanced concepts into reality for a wide range of applications, while providing invaluable new insights into the innovative ways images can be captured, filtered, and analyzed. Under the direction of Professor Malayappan Shridhar, electrical and computer engineering department (ECE) chair, vision group members work independently or in partnership with each other and outside organizations to cultivate optics-related solutions that meet a variety of challenges. Armed with today's cost-effective, faster, and more user-friendly hardware, including advanced high-resolution digital cameras, the group is helping the marketplace focus on machine vision technology in novel ways. With as many as seven faculty members currently or recently involved in a diverse assortment of R&D projects, the vision group delivers comprehensive expertise in variety of disciplines.

"The body of technical tools used may be similar, but the applications for our work are wide ranging," Shridhar said. "What's unique about this group is that

we are able to come together when needed, but we each have our own areas of specialization to pursue projects individually."

NEW VISION FOR MANUFACTURERS

Associate Professor John Miller's work includes the implementation of vision-based industrial applications to help manufacturers gauge product or tool quality, identify defects, and ultimately reduce production costs. Miller, a specialist in image processing, machine vision applications, and optical metrology, develops high-speed algorithms that can be run on relatively inexpensive computers to perform precise, image-based analysis in support of various manufacturing processes, including automotive glass and electronics production.

A FOCUS ON DRIVER SAFETY

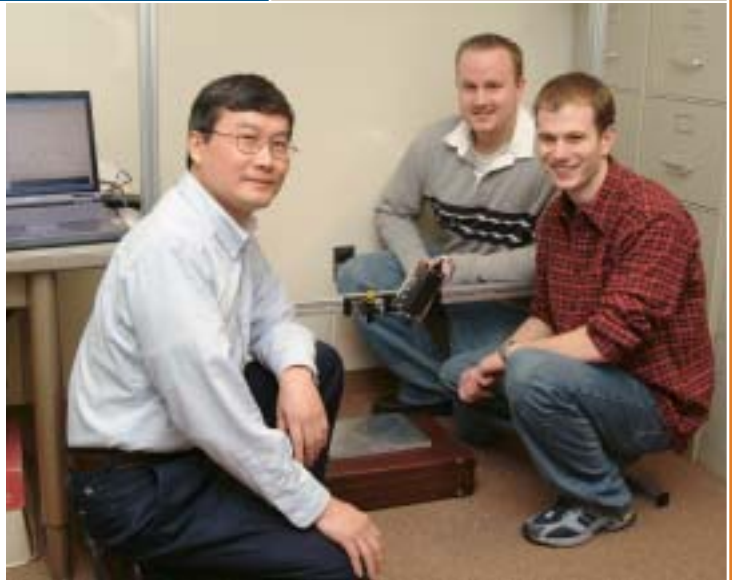
Associate Professors Sridhar Lakshmanan and Paul Watta have been working on a project for the National Highway Traffic Safety Administration that analyzes video data of a driver collected as he or she operates a vehicle. The task is to determine where the driver is looking, otherwise known as "the pose estimation." The goal is that this information can be used to trigger a new generation of safety devices that will activate only when it is determined that the driver has become inattentive to the road. Current safety devices trigger alarms, which can become a distraction to the vehicle operator.

IMPROVING AUTOMATION TECHNOLOGY

Drawing on his experience in algorithm design for machine vision applications, 3-D imaging, and laser radar imaging, Associate Professor Dongming Zhao's recent work includes two projects with the National Institute of Standards and Technology's Advanced Technology Program. The first, "Robust, Fast 3-D Image-Processing and Feature-Extraction Tools for Industrial Automation Applications," included development of an algorithm library to expedite machine-vision-based industrial automation. The second, "Flexible Robotic Applications for Powertrain Assemblies," integrated technologies in robotics, 3-D imaging, and vision, as well as rapid system development for manufacturing, particularly automotive assembly. In addition to its value in semiconductor and chip manufacturing as well as electronics assembly, Zhao said, "machine vision is a key automation technology due to its potential to allow automatic inspection, process monitoring, and robot guidance. It is particularly useful in discrete manufacturing industries where automated inspection and assembly can lead to substantial improvements in quality and cost."

FOILING CHECK FRAUD

With a specialty in pattern recognition, including handwriting and document analysis, image processing, and machine vision, Professor Shridhar brings 20 years of experience to his current research. Included in this research is the integration of advanced document analysis for banking



applications. "At the end of the business day, banks have hundreds of millions of checks to be cleared," he said. "Our automated, labor-saving system delivers fast, accurate results consistent with human results but not subject to human fatigue." Shridhar's technology can process 20,000 checks in a random sample, screening for discrepancies and fraud based on everything from check numbers to handwriting.

Associate Professor Dongming Zhao with ECE students Dustin Willim and Philip Lechowicz

FROM WORKER STRESS REDUCTION TO MILITARY TRAINING SUPPORT

Professor Yi Lu Murphey's work includes development and implementation of automatic machine vision systems for on-line inspection of automotive electronic display boards. The work was supported by Jabil Circuit, Johnson Controls, and 3Com. She has also been involved in the development of a smart machine vision system for cost-effective printed circuit board inspection deployed on manu-

facturing lines. It was created, in part, to relieve human testers of stressful, often unrealistic inspection requirements. Additional research conducted in conjunction with professors Miller and Shridhar has resulted in development of a machine vision system to accurately classify the occupant in a car's front passenger seat and track his or her head position. Supported by TRW Automotive, the system is being applied for enhanced airbag deployment. Finally, Murphey is working on a TACOM project that helps locate objects in real-time video and relate them to virtual objects in a database. The work is relevant for a number of applications, including robotic navigation, surveillance, and military training and operations.



Professor Yi Lu Murphey (center) with some of her research assistants

FACULTY RESEARCH AWARDS



Paul Richardson

Hasina Abdu, assistant professor of computer and information science, has received \$15,000 from the University of Michigan Rackham Grant and Fellowship Program to support development of a generic framework for adaptive distributed systems.

Alan Argento, professor of mechanical engineering, was awarded a \$39,200 unrestricted grant from Ford Motor Company to support continuing research on the high strain-rate properties of nanocomposites.

Alan Argento, professor, and **Pravansu Mohanty**, assistant professor, mechanical engineering, have received \$205,831 from Ford Motor Company to support research in modeling of ultrasonic joining of thick plate structures.

Vivek Bhise, professor of industrial and manufacturing systems engineering, received an additional \$57,771 for his "ACE Project: Human Factors Engineering Support for Automotive Cockpit Integration."

Chi L. Chow, chair and professor of mechanical engineering, has received \$70,000 from Sandia National Laboratories for his project "Enhancement and Validation of Solder Material Model."

William Grosky, chair and professor of computer and information science, has received \$212,731 from Wayne State University and Michigan Life Sciences Corridor to support a collaborative effort to develop biocomputing and bioengineering tools for computerized surgical applications.

Prof. Grosky also received \$15,962 from Wayne State University for his project "A Drosophila Genome-Wide Protein Interaction Map."

Jinhua Guo, assistant professor of computer and information science, has received a \$15,000 Rackham grant to develop routing protocols for vehicular ad hoc networks.

John W. Miller, associate professor; **Yi Lu Murphey**, professor; and **M. Shridhar**, chair and professor, electrical and computer engineering,

were awarded \$15,000 from TRW Automotive to survey and evaluate 3D imaging hardware.

Pravansu Mohanty, assistant professor of mechanical engineering, and **Pankaj K. Mallick**, director of interdisciplinary programs and professor of mechanical engineering, have received \$23,725 from the U.S. Council for Automotive Research to support collaboration with Ford Motor Company to research corrosion rate measurements of experimental creep-resistant magnesium alloys.

Yi Lu Murphey, professor of electrical and computer engineering, has received a \$20,079 award from the U.S. Army-TACOM to support research in performing model-based fault diagnostics for electric vehicular systems.

Paul Richardson, assistant professor of electrical and computer engineering, was awarded \$158,616 from the U.S. Department of Defense for the Vetronics Institute.

Prof. Richardson has also received an additional \$368,439 from the U.S. Army-TACOM to support collaborative research with Texas A&M and Oakland University through the Vetronics Institute.

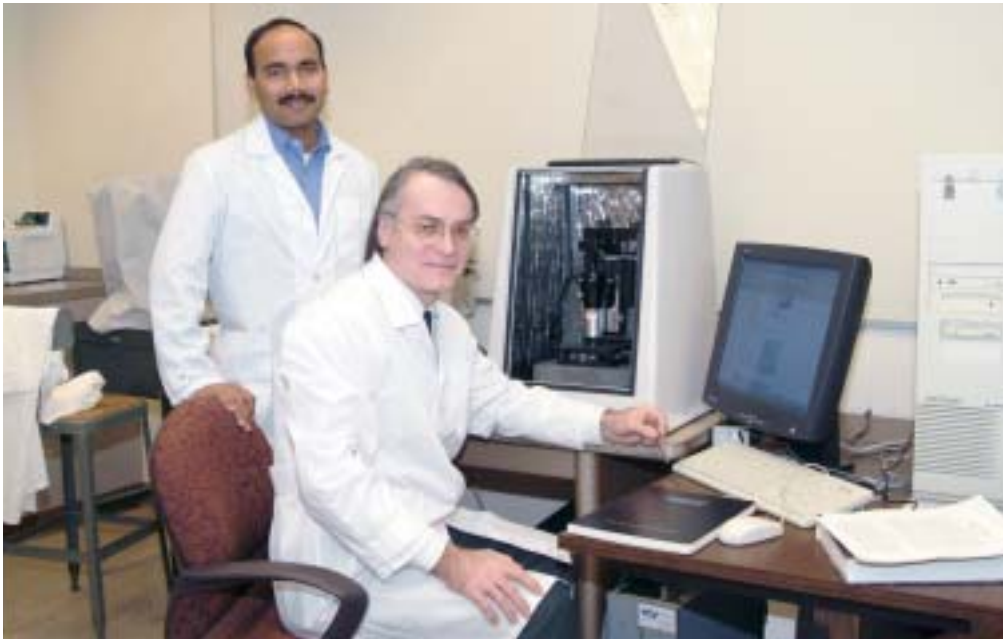
German Reyes-Villanueva, assistant professor of mechanical engineering, received a \$15,000 Rackham grant for the development of a new low-cost, lightweight thermoplastic-based composite/metal hybrid system.

Dongming Zhao, associate professor of electrical and computer engineering, received \$210,000 from Ford Motor Company to develop statistical models for the residual values of used vehicles in the U.S. auto market.

Qiang Zhu, associate professor of computer and information science, was awarded an \$11,000 Rackham grant to explore database indexing methods for multidimensional non-order discrete spaces.

Oleg Zikanov, assistant professor of mechanical engineering, received \$12,000 from the National Science Foundation to conduct joint research with Ilmenau University of Technology, Germany.

NANOSCIENCE ENHANCES ENGINEERING CURRICULUM WITH GRANT FROM NSF



Pravansu Mohanty, assistant professor of mechanical engineering and Marat Batalov, a solid-state physicist

According to Pravansu Mohanty, assistant professor of mechanical engineering, good things come in very small packages. Using a National Science Foundation grant, he is spearheading a new initiative to integrate nanoscience, the study of very small things, into an interdisciplinary curriculum at UM-Dearborn.

"Many believe that nanotechnology will usher in the new industrial revolution," says Mohanty. "In recent years, significant progress has been made in nanoscience, which is expected to create new industries, commercial products, and markets. While new things are being discovered and virtues of these small things are being realized continuously, parallel efforts must be directed toward enhancing nanoscience literacy and preparing the workforce for the nanotechnology future."

Nanoscience deals with systems and phenomena at nanometer scale, one-billionth of a meter, but its impact may be huge. "As fuel economy and emissions constraints are becoming tighter, conventional techniques for design and thermal management of powertrain components and systems are approaching their limits," says Mohanty. "One of the alternative approaches involves applying newly designed nanoscale materials and manufacturing processes that can provide significantly enhanced thermal, mechanical, chemical, electrical, and wear properties that improve performance and emissions. The automotive industry is slowly catching up but now needs engineers and scientists who have a nanoscience and technology background."

To that end, Mohanty has introduced a new course,

"Nanoscience and Nanotechnology," and has incorporated several new nanoscience modules into existing engineering classes. This summer, four undergraduate students will participate in nanoscience research fellowships.

Mohanty is also in the process of completing a laboratory, which is already being used for instruction and research in the study of nanomaterials. Marat Batalov, a solid-state physicist, is helping Mohanty run the lab. It currently houses a scanning probe microscope, which is comprised of an atomic force microscope, a scanning tunneling microscope, and a scanning electrochemical microscope. The lab also accommodates a transmission electron microscope, a scanning electron microscope, and a micro-hardness tester. Students can use the lab to do nanolithography, creating patterns at the nanoscale level. "You need highly sophisticated tools to visualize materials at this kind of scale," says Mohanty.

"Nanotechnology is a very open field," he continues, "but given my background, most of the projects we're doing are related to the study of materials. Right now, students are studying the structure of traditional materials and comparing it with nanomaterials. They're also learning the principles and operation of the analytical tools needed for nanoscience, along with the many interesting challenges of this technology."

Student and industry response to the new curriculum focus has been highly positive. "Students are excited about it," says Mohanty, "and industry is anxious to know more about it. It has been a great learning experience for me, too."

ANNUAL ALUMNI RECEPTION



Top Left: Richard Anderson, Dean Subrata Sengupta, John Cole, and Robert Lust, '78 BSE-ME

Above: Co-op Director Tony DeLaRosa (standing) with guests

Left: Graduates from many years attended the reception

Graduates from a wide range of years gathered on March 10 for the College of Engineering and Computer Science (CECS) alumni reception at the Hotel Ponchartrain in downtown Detroit. This event was again hosted by the college's Alumni Affiliate Board of Governors and coincided with the annual Society of Automotive Engineers World Congress held at the Cobo Convention Center.

Dean Subrata Sengupta greeted alumni and talked about the college's most recent activities, including ongoing plans for the school's new 50,000-square-foot building, which will house the Institute for Advanced Vehicle Systems. CECS faculty members were in attendance along with

students from the school's Mini Baja and SAE Formula Car teams.

John Cole, '76 BSE-ISE and newly elected president of the college's alumni affiliate board, welcomed the group and discussed the need for alumni to get involved in the college's activities whenever possible. Dean Sengupta and Cole then acknowledged past-president Richard Anderson, '74 BSE-IS, '82 MSE-IS, for his valuable service to the school during the past decade.

Next year's event will be held in March 2005 during the week of the SAE World Congress at the Ponchartrain Hotel. For more information, contact the college's development office at 313-436-9141.

Keep in Touch

Help us keep in touch by making sure our alumni information is up to date. Use the form below to send changes to the address at the right.

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College of Engineering and Computer Science
University of Michigan-Dearborn
4901 Evergreen
Dearborn, MI 48128-1491

Name

Address

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Degree

Department

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Please list any activities or recent honors you would like reported in future issues of the Dearborn Engineer.

Keep in Touch Online

The "keep in touch" form is now available online. College of Engineering and Computer Science alumni are invited to visit <http://www.engin.umd.umich.edu/alumni> to update or add information about themselves, including career moves, recent honors, and address changes.