RESONANCE

NEWS FOR ECE ILLINOIS ALUMNI AND FRIENDS
FALL 2008

Integrated Circuit turns 50

Also in this issue:

Illinois home to new Microsoft- and Intel-funded parallel computing center

Copper nanowires grown by new process create long-lasting displays

Control, Thy Passion: The story of an eminent Illinois lab

ILLINOIS

Department of Electrical and Computer Engineering

TABLE OF CONTENTS

The future of engineering

Letter from the Department Head

Dear Friends,

This year has marked a number of milestones in the history of engineering and the history of ECE Illinois. In our last issue we featured the accomplishments of John Bardeen, who would have turned 100 this year. Bardeen was part of a team that invented the transistor in 1947. For this accomplishment, the team received the 1956 Nobel Prize in Physics. Bardeen would go on to win another Nobel Prize as part of the team that developed the theory of superconductivity.

In this issue we celebrate the invention of the integrated circuit by Jack Kilby, who graduated from Illinois with a degree in electrical engineering in 1947—appropriately the same year as Bardeen's accomplishment. Kilby also received a Nobel Prize in Physics, his in 2000.

The transistor revolutionized the world, enabling electronics to be made in a smaller scale. Similarly, the integrated circuit further changed how electronic devices are designed and made.

It is appropriate that these individuals and these inventions have connections to Illinois. Our department is at the forefront on innovation for the future. Even now we have people such as Nick Holonyak, whose discoveries and inventions have vastly changed our world, enabling such devices as compact disc players—devices that are commonplace now, but that not so very long ago would have been beyond anyone's imagination.

The innovations associated with this University, either through research done here or by our alumni, continue to push the boundaries of science. The high-tech companies that are peopled by and that benefit from our graduates are familiar names to many. Our world constantly advances through the work of our faculty and alumni.

No one knows how our daily lives in the future will compare and differ from those we live now. But we can be sure that there will be advances and improvements that contain the indelible stamp of ECE Illinois.

Best Regards,

Richard E. Blahut
Department Head
Henry Magnuski Endowed Professor of Electrical and Computer Engineering

Resonance is published twice a year by the Department of Electrical and Computer Engineering (ECE) at the University of Illinois at Urbana-Champaign. Comments and suggestions are welcome. Contact Tom Moone, editor, at **moone@illinois.edu** or mail to the address at right.

Editorial Board: Jeannette Beck, Assistant to the Head; Stephen G. Bishop, Associate Head; Richard E. Blahut, Department Head; Jonathan Hill, Director of Development; Jamie Hutchinson, Publications Office Editor; Jill Jarboe, Coordinator of Alumni and Student Relations; Beth Katsinas, Director of External Relations; Tom Moone, Communications Coordinator; Brad Petersen, Assistant Director of Communications

Contributing Writers: Lauren Eichmann, ECE Illinois; Jim Kloeppel, U of I News Bureau; Rick Kubetz, College of Engineering; Jennifer La Montagne, Computer Science; Bridget Maiellaro, ECE Illinois

Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign
53 Everitt Laboratory
1406 W. Green Street
Urbana, IL 61801

ECE NEWS BRIEFS

NEW RECRUITMENT SITE This spring ECE Illinois launched *Start the Journey*, a new site for prospective students. The site is interactive, allowing users to find more in-depth information about topics of interest. Topic areas of the site include information on ECE courses, research, and faculty, as well as quotes from current students and information on graduate salaries. The presentation can be seen at **www.ece.uiuc.edu/startthejourney** or by clicking on it from the department Web page.

REMODELING IN EVERITT LAB Several areas of Everitt Lab were remodeled over the summer. The student lounge, publications office, and fabrication lab have all had work done to them. In addition to new floors and new paint, the fabrication lab has a new HEPA filter, high purity plumbing, new test benches, new display shelves, and a state-of-the-art fire suppression system. The student lounge has been expanded.

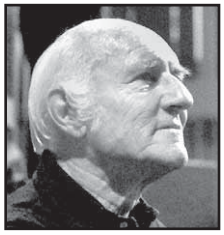
INGENUITY RECEIVES INTERNATIONAL RECOGNITION The Council for Advancement and Support of Education, headquartered in Washington, DC, with members around the world, awarded its Circle of Excellence Award in the "Tabloid and Newsletter Publishing Improvement" category to *Ingenuity*, the newsletter for ECE Illinois students. *Ingenuity* received a bronze medal in this category.

The Circle of Excellence Awards Program recognizes outstanding work in communications and marketing, alumni relations, advancement services, and fundraising. These awards are judged by peer professionals at schools, colleges, and universities, as well as by professionals from outside the education field.

ECE PROFESSOR HELPS FIFTH GRADERS DISCOVER ENGINEERING ECE Professor Elyse Rosenbaum completed her first year teaching introductory engineering to fifth graders at Stratton Elementary School in Champaign. As part of her National Science Foundation funded research project, Rosenbaum aims to improve local students' interest in obtaining an engineering degree from a four year university.

"From my experience as a faculty member, I know that unless students take mathematics every year in high school, they're not going to be eligible for direct entry into a college of engineering," she said. "You need to talk to students about engineering before they get to high school or it's too late."

CONFERENCES REMEMBER BIOLOGICAL COMPUTER LABORATORY This year marks the 50th anniversary of the founding of the University of Illinois' Biological Computer Laboratory in 1958, and two organizations recently contributed to the celebration of this milestone. The American Society for Cybernetics and the annual conference on Understanding Complex Systems met at the University of Illinois in May. These two groups joined together to acknowledge how the work conducted at the Biological Computer Laboratory between 1958 and 1975 continues to inspire research today.



Heinz von Foerster (1911–2002), former Illinois professor of electrical engineering and biophysics, launched the Biological Computer Laboratory in 1958. He is remembered for research on self-organizing systems and self-referential systems, and was the director of the Biological Computer Laboratory until he retired and moved to California in 1975. Though the lab closed upon his retirement, von Foerster and his lab are still revered by those in the cybernetics field.

MOMEI QU WINS ARTHUR ASHE JR. SPORT SCHOLAR AWARD In May, graduating ECE senior Momei Qu was named the 2008 Arthur Ashe Jr. Female Sport Scholar of the Year. This award is sponsored by *Diverse: Issues in Higher Education* and is named in memory of tennis great Arthur Ashe. Nominees for this award are student athletes who maintain a GPA of at least 3.2 and who are active on campus or in the community.

Qu credits her parents for nurturing her achievements on the court and in the classroom. "They are the number one factor why I have been so successful," she said. "They held academics in a really high view, but they also encouraged me so much in all my endeavors as I was growing up. A huge part of my success is due to them."

Eden travels to Israel on Fulbright Grant

By Bridget Maiellaro

As the 2007–2008 Fulbright-Israel Distinguished Chair in the Natural Sciences and Engineering, ECE Professor Gary Eden recently returned to campus following a four-month visit to Israel. During that time, Eden served as a visiting faculty member at the Technion-Israel Institute of Technology's Physics Department through the Fulbright Commission, working to develop microplasma devices.

During his trip to Israel as the 2007-2008 Fulbright-Israel Distinguished Chair in the Natural Sciences and Engineering, ECE Professor Gary Eden was able to spend his weekends touring the countryside. *Photo courtesy of Gary Eden*

"It was just an incredible experience," Eden said. "It's hard to describe by a single phrase."

After arriving in Haifa, Israel, on February 5, Eden primarily contributed to plasma physics research in conjunction with Technion's professors Yakov Krasik and Joshua Felsteiner and their research students. The research team sought to adapt microplasma devices that were fabricated by ECE graduate student Jekwon Yoon and adjunct ECE Associate Professor Sung-Jin Park at the University of Illinois.

"The microplasmas are intended to generate electron beams which will be used in larger machines for generating large volume plasmas," Eden said. "Basically it's an electron source."

The experiments went well. In fact, the research group hopes to publish at least one article on their research, which will appear later this fall.

In addition to his research project, Eden was given the opportunity to present several lectures to graduate students, postdoctoral researchers, faculty members from various departments, and undergraduates. One of his lectures focused on ultrafast laser spectroscopy, in which he discussed using extremely short laser pulses to watch a molecule break apart.

"We use the laser pulses in the same way that a strobe light is used at a party," Eden said. "When there is a strobe light flashing, it makes a person's actions look as though they're frozen in time. We're doing essentially the same thing with molecules, but at about 10 million times faster."

On the weekends, Eden toured the country with his wife Carolyn, who accompanied him on the trip. The couple, who stayed at a faculty guest house and later an apartment complex for graduate students, visited Jerusalem, Masada National Park, Galilee, Mount Hermon, Caesarea, and other archeological sites throughout the country.

"One of the joys of this trip is that we really had the opportunity to live among the people, live like them, for four months," Eden said. "We were able to form a number of friendships we hope will last a lifetime. These are memories that will last a lifetime…It's a rich, diverse country that is growing very rapidly. It's a very interesting and exciting place to be."

Throughout his trip, Eden maintained his committee work and kept in touch with the progress of his students at the University of Illinois via e-mail and fax. He returned to the United States June 6, and was back to work at the University on June 7.

"[The University of Illinois] is in my blood, and in the blood of my colleagues," Eden said. "We do this because we love it. We can't imagine doing anything else."

Overall, Eden thoroughly enjoyed working with "laboratories and researchers of the highest caliber" and learning more about the culture of Israel.

"In any of these types of relationships, whether it's with Israel, Germany, or Japan, there is cross-fertilization. That's the beauty of being in science and engineering," Eden said. "You build these relationships, see people on a periodic basis, and share ideas. This exchange sparks ideas, which is the key to science and engineering."

The Fulbright Program, a U.S. government program formed in 1945, is aimed to promote "mutual understanding between the people of the United States and the people of other countries of the world," according to the Fulbright Scholar Program's Web site. Each year, the program presents a distinguished lecturer with the Fulbright-Israel Distinguished Chair in the Natural Sciences and Engineering, allowing awardees the opportunity to conduct research in Israel for four to nine months and providing them a stipend for living costs.

Illinois home to new Microsoft- and Intel-funded **parallel computing center**

By Jennifer La Montagne, Computer Science

The University of Illinois is home to a new joint research endeavor with Microsoft Corporation and Intel Corporation that aims to enable commodity systems to make use of parallel computing techniques previously relegated to the realm of supercomputers. As a pioneer in parallel computing advances, Illinois is uniquely positioned to help usher in a new era of parallel computing for consumer systems that will enable drastically new applications for human-centric and environment-aware computing.

The Universal Parallel Computing Research Center (UPCRC) at Illinois brings together researchers in computer engineering and computer science to discover easy and accessible methods for enabling the multicore computing systems increasingly in use today to take better advantage of their processing capabilities.

"Multi- and many-core computing is becoming pervasive; client-focused mass market applications are now driving parallel programming," said Marc Snir, professor of computer science and codirector of the center. "We face a new challenge: one that places emphasis on productivity over high performance; and one that addresses the needs of the broad community of application developers. In such an environment, parallel programming must be accessible to all programmers."

A central research thrust will be the development of new applications that aim to dramatically improve the quality of life for the end user, but are not feasible with the computing power available on today's clients.

> Members of the UPCRC group gather outside the Seibel Center at the University of Illinois. In front are (from left) Codirector Marc Snir (in red suspenders), Codirector Wen-mei Hwu, and Director of Research Sarita Adve.

"We believe that most parallel programmers should be able to use simple, intuitive ways of expressing parallelism," said ECE Professor Wen-mei Hwu, codirector of the center. "Future microprocessors will contain hundreds, and perhaps thousands of cores. While parallel languages must become simpler, hardware is becoming more complex. We will be researching ways to bridge this enlarging gap to enable client-focused applications of the future."

The center's research activities are founded on the premise that advances in multicore computing will require a coordinated, multidisciplinary effort that encompasses all components of the multicore system.

"We have a new opportunity and a new challenge for parallel computing today," said Sarita Adve, professor of computer science and director of research for the center. "The market is larger, so there is an opportunity to provide different programming solutions for different applications. The challenge is that these solutions must be supported by one, flexible hardware architecture and a few software system architectures."

The UPCRC at Illinois is one of two such centers funded by Microsoft and Intel. The other center will be at the University of California, Berkeley. This research alliance is the first joint industry and university research center of this magnitude in the United States focused on mainstream parallel computing.

"We are excited about working with the University of Illinois because its stellar faculty and students are global leaders in creating breakthroughs in parallel software and architecture," said Andrew Chien, vice president of the Corporate Technology Group and director of Intel Research. "Their excellence builds on a long tradition of excellence in parallelism which goes back over many decades."

"We are pleased to be working with the University of Illinois to solve one of the most complex issues facing the technology industry today," said Tony Hey, vice president of External Research at Microsoft Research. "By having the expertise of both industry and academia at our new research center, we are confident we will make great strides in this area and ultimately bring the benefits of parallel computing to consumers."

Faculty publications showcase ECE Department's **research, contributions**

By Bridget Maiellaro

Since its founding in 1891, ECE has become one of the best engineering programs in the world. With innovations in a variety of specialized areas, including microelectronics, telecommunications, and electromagnetics, the faculty have shared their research findings inside and outside of the classroom.

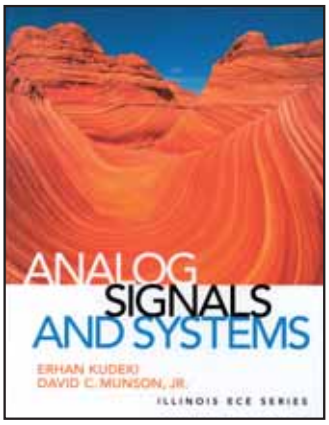
One key method for sharing research findings is through textbooks and other publications.

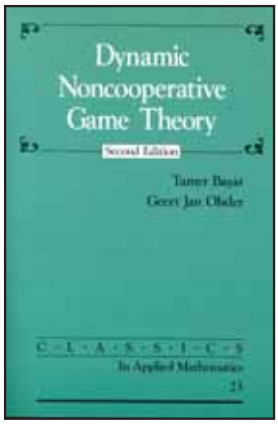
In fact, within the past year (July 2007 to June 2008), 43 faculty members have added to their already stellar publication lists.

"I think that one way scholarship advances is by the publication of books," said Richard Blahut, department head and Henry Magnuski Professor of Electrical and Computer Engineering. "Our Illinois faculty know the latest developments in electrical and computer engineering as well as anybody in the world. New knowledge needs to be organized and archived in some way to go on to the future, and we're the best people to do that."

As department head, Blahut sets an example with eight books to his name, three of which have been translated into a variety of languages, including Russian, Chinese, and Japanese. Blahut has also edited or coedited three books and has written five chapters in various publications.

Associate Head for Undergraduate Affairs Erhan Kudeki co-authored one of the department's newest textbooks, released in March of this year. The publication, *Analog Signals and Systems*, is being used for the first time this summer in ECE 210: Analog Signal Processing. Kudeki began writing the book based on notes from the course that he and former ECE Professor David Munson, Jr., taught in 2000. Over the course of seven years, Kudeki sought to improve previous versions of the notes until the book was published as part of the Illinois ECE Series at Prentice Hall.





"I think the key is coming up with better ways of teaching," Kudeki said. "And the book is a documentation of this effort, a way of presenting the student with course material in a cohesive way. That's the exciting part. … If you do this sort of thing for all the courses, then we'll have a nice set of electrical engineering books. The Illinois ECE Series is an attempt for doing this."

Other recent contributions include those by Professor Thomas Huang, who co-edited two new publications and contributed to five book chapters, and Professor Jennifer Bernhard, who authored *Reconfigurable Antennas* and wrote three book chapters. Throughout his career, Huang has co-authored eight textbooks, edited or co-edited 18 publications, and contributed to 107 book chapters. Bernhard has authored one textbook and written or cowritten five book chapters.

Professor Tamer Başar has also made a vast number of contributions over the years, with both of his textbooks dubbed classics by prestigious organizations. The Society for Industrial and Applied Mathematics (SIAM) selected Başar's first publication, *Dynamic Noncooperative Game Theory* (1982), to be included in their Classics in Applied Mathematics series in 1999. Meanwhile, *H-infinity Optimal Control and Related Minimax Design Problems: A Dynamic Game Approach* was made a Birkhäuser Classic earlier this year.

"I believe my books have made the lists because game theory and the material in the books have endured the test of time. Particularly dynamic game theory was quite innovative at the time I wrote the books," said Başar, who has also edited or co-edited six publications and contributed to 42 book chapters. "It's a topic that is still in great demand and use today."

Blahut is very pleased with the ECE faculty's contributions and knows that the trend of producing prestigious publications will continue for years to come. "We're a very strong department," he said. "Our books are highly valued by those around the world who teach at different universities. We are where people look to find the most current knowledge."

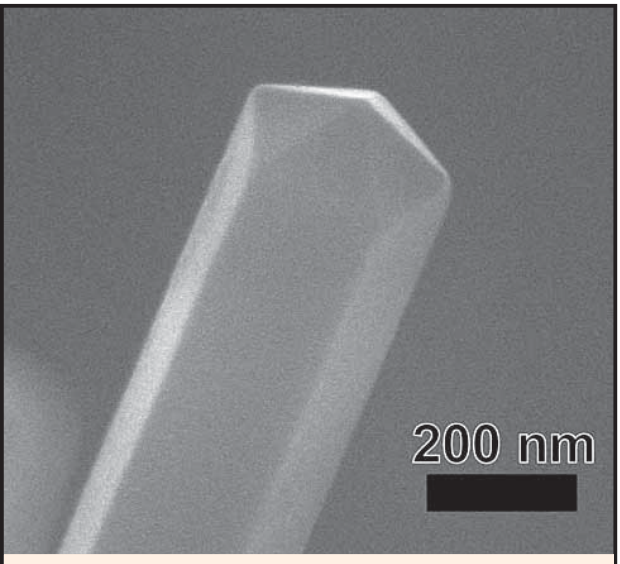
Copper nanowires grown by new process **create long-lasting displays**

By James E. Kloeppel, U of I News Bureau

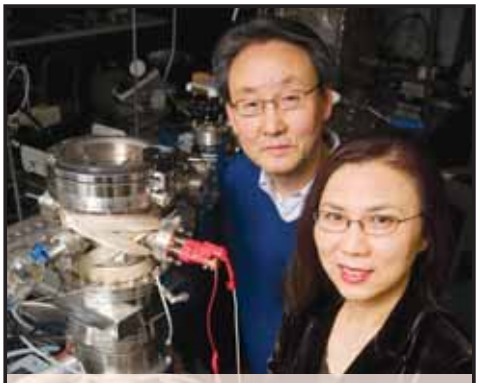
A new low-temperature, catalyst-free technique for growing copper nanowires has been developed by researchers at Illinois. The copper nanowires could serve as interconnects in electronic device fabrication and as electron emitters in a television-like, very thin flat-panel display known as a field-emission display.

"We can grow forests of freestanding copper nanowires of controlled diameter and length, suitable for integration into electronic devices," said ECE Professor Kyekyoon "Kevin" Kim.

"The copper nanowires are grown on a variety of surfaces, including glass, metal, and plastic by chemical vapor deposition from a precursor," said Hyungsoo Choi, a research professor in the Micro and Nanotechnology Laboratory and a lecturer at ECE. "The patented growth process is compatible with contemporary silicon-processing protocols."



Scanning electron microscope image of copper nanowires grown on a silicon substrate at 250 degrees celsius at high magnification. *Photo courtesy Kyekyoon Kim*



ECE Professor Kyekyoon "Kevin" Kim and ECE Lecturer Hyungsoo Choi have developed a new low-temperature, catalyst-free technique for growing copper nanowires. *Photo by Brian Stauffer*

The researchers describe the nanowires, the growth process, and a proof-of-principle field-emission display in an article published in the May 2008 issue of the journal *Advanced Materials*, and posted on its Web site.

Typically, the nanowires of 70 to 250 nanometers in diameter are grown on a silicon substrate at temperatures of 200 to 300 degrees Celsius and require no seed or catalyst. The size of the nanowires is controlled by the processing conditions. The columnar, five-sided nanowires terminate in sharp, pentagonal tips that facilitate electron emission.

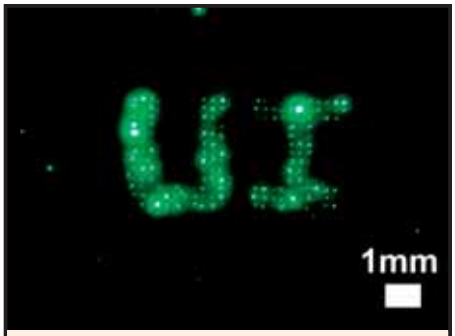
To demonstrate the practicability of their process, the researchers first grew an array of copper nanowires on a patterned silicon substrate. Then they fashioned a field-emission display based on the array's bundles of nanowires.

In a field-emission display, electrons emitted from the nanowire tips strike a phosphor coating to produce an image. Because the researchers used a bundle of nanowires for each pixel in their display, the failure of a few nanowires will not ruin the device.

"Our experimental results suggest bundled nanowires could lead to longer lasting field-emission displays," said Kim.

In addition to working on flexible displays made from copper nanowires grown on bendable plastic, the researchers are also working on silver nanowires.

With Kim and Choi, co-authors of the paper are graduate student and lead author Chang Wook Kim, graduate student Wenhua Gu, postdoctoral research associate Martha Briceno, and professor and head of materials science and engineering Ian Robertson.



Magnified optical image produced by a proof-of-principle copper nanowire-based field-emission display activated in a vacuum-sealed chamber. *Photo courtesy Kyekyoon Kim*

Funding was provided by the University of Illinois. Characterization of the samples was conducted at the University's Center for Microanalysis of Materials, which is partially funded by the U.S. Department of Energy.

Bruce Wheeler retires

By Tom Moone

On May 6, a reception was held on the fifth floor of the Beckman Institute to honor ECE Professor and Bioengineering Interim Department Head Bruce Wheeler on the occasion of his retirement from the University of Illinois. Wheeler first came to Illinois in 1980 when he joined the ECE faculty. He had served as interim head of the Bioengineering Department since it first opened its doors to students in 2004.

ECE Professor Bruce Wheeler received a gift in commemoration of his retirement from the University at a reception held May 6 at the Beckman Institute.

Wheeler was in fact one of the driving forces behind the establishment of the Bioengineering Department. Michael Insana, who succeeds Wheeler as interim head of Bioengineering, said at the reception, "If you are in an established department, you may not fully appreciate what a major undertaking it is to begin a new department." Insana then listed the multitude of tasks that Wheeler undertook to get the department underway: writing necessary documents to establish the department, setting up the graduate and undergraduate curricula, moving through the necessary processes at the campus and state level to establish this department, developing new courses, and hiring the staff and faculty to serve the incoming students.

Insana said much of the department's current and future success is due in large part to Wheeler. "We can say we have a dedicated faculty who all like and support each other, a truly outstanding department staff, and students that are off-the-charts in terms of qualifications and enthusiasm, all acquired under Bruce's leadership," he said. "I can say on behalf of the department faculty and staff that we have all been profoundly honored to have been a part of the department's development under Bruce's leadership. And that we will continue to do all we can to see it flourish."

ECE Department Head Richard Blahut said, "I have known Bruce since his graduate student days at Cornell, and as a colleague here at Illinois. He has served the ECE Department well as the associate head for undergraduate affairs, and has served the College ably and patiently as the interim head of the Bioengineering Department during its formative years. I shall miss him."

Because the Department of Bioengineering opened its doors to its first students in the fall of 2004, this past May saw Bioengineering's first class of graduating seniors. As a parting gift, Wheeler was presented with a framed copy of the T-shirt the department had given to this first class of graduating seniors.

After the presentation of his gift, Wheeler reminisced about his time at Illinois. "This is one of those jobs where you can't believe they actually pay you to have fun," as Illinois " is driven by immense curiosity." He noted that "universities have existed for a millennium and have a unique responsibility to society, one carried out exceptionally well by Illinois, the ECE Department, and the new Bioengineering Department."

In his research, Wheeler has long had an interest in neural signals. He currently lists his research interests as multichannel neural signals, microminiature sensors for neural recording, controlled stimulations of neuronal networks, and patterned growth of neurons. Over the course of his distinguished career, Wheeler has received numerous awards. He was a recipient of the 3M Faculty Development Award in 1984 and 1985. He is a Fellow of the IEEE and the American Institute for Medical and Biological Engineering. He is the editor-in-chief of the *IEEE Transactions on Biomedical Engineering* and serves on many university and national review panels. He is a recipient of the Medical Scholars Program Outstanding Advisor (2003), the Campus Award for excellence in Advising Undergraduate Students (2000), the Illinois Dad's Association Outstanding Faculty Award (1999), and the Stanley H. Pierce Award (1987). He was made an Honorary Knight of St. Pat in 1999, and he has been included in the Incomplete List of Teachers Ranked as Excellent numerous times.

Though Wheeler is retiring from Illinois, he is not retiring from the profession. He will be joining the University of Florida in Gainesville, where he will be a professor of biomedical engineering.

Brunet receives Campus Award for Excellence

By Bridget Maiellaro

Marie-Christine Brunet, ECE lecturer and chief advisor, recently received the Campus Award for Excellence in Undergraduate Teaching.

Brunet, who is the course director for ECE 110: Introduction to Electrical and Computer Engineering, said that continued support from colleagues and students, in addition to actively improving the course, contributed to her receiving the award.

"I've done so many things to the class, especially over the last four years," she said. "I've put in a lot by trying to change it, by trying to make it better, and trying to involve students."

Brunet began revising the contents of ECE 110 when she became the course director in fall 2004. She said most changes were reflected in the course during fall 2006. However, one change she is most proud of took place in fall 2005, when Brunet implemented support groups for women in ECE 110, who usually make up 10 to 15 percent of the class.

Brunet and the women engineers meet one or two times a week, with those who can attend, and brainstorm about problems relating to class in a small setting.

A second updated course feature began last fall, when Brunet adjusted the structure of the class so students in ECE 110 now work in groups of four or five for research activities.

"Students are working in teams to learn how to use the library as a resource to find papers, write proposals, and figure out the different topics in ECE," she said. "It's more interesting than just going to class, sitting, and listening how great it is to use those things."

In addition to these substantial changes, Brunet said she is always trying to improve homework, tutorials, online materials, and her lectures.

Brunet completed all of her degrees in France, attending the University of Paris. After earning her bachelor's and master's degrees in applied math in 1983 and 1985, respectively, Brunet went on to obtain her PhD in computer science in 1989. While earning her PhD, she also worked at an IBM research center in Paris.

After obtaining her PhD, Brunet was offered a postdoctoral position later that year at IBM in Yorktown, in a group that focused on parallel machines on various projects. She eventually came to work at a research center at the University of Illinois. In 1994, the University needed someone to teach a pilot class, now known as ECE 110. Since Brunet was available, she said yes. Soon enough, she started teaching other classes, but "continued to have a soft spot for ECE 110."

"A lot of people don't have an extreme interest in working with freshmen, but I do," she said. "I really enjoy it. I like how it's their first year; they are trying to figure out what is going on."

In 1998, when the ECE Department needed someone to help with advising, she jumped at the opportunity.

ECE Lecturer and Chief Advisor Marie-Christine Brunet (left) received the 2008 Campus Award for Excellence in Undergraduate Teaching.

"It is the perfect deal of doing what I love to do. I teach and help students through advising. It's really a blessing," Brunet said.

To be eligible for the Campus Award for Excellence in Undergraduate Teaching, faculty members must have taught at least one undergraduate course for four years prior to being nominated for the award. Teaching assistants and instructional staff are also eligible. Nominations may be submitted by faculty members, administrators, alumni, or students. ECE Professor Stephen Bishop, associate head for administrative and instructional affairs, nominated Brunet, while ECE Department Head Richard E. Blahut gave his approval by signing off on the nomination.

Past ECE recipients of the Campus Award for Excellence in Undergraduate Teaching include G. E. Anner ('75), M. S. Helm ('76), W. G. Albright ('78), N. N. Rao ('89), Burks Oakley II ('93), Michael C. Loui ('95), Ricardo Uribe ('04), and Eric A. Dunn ('04).

Alumnus Kilby's integrated circuit turns 50

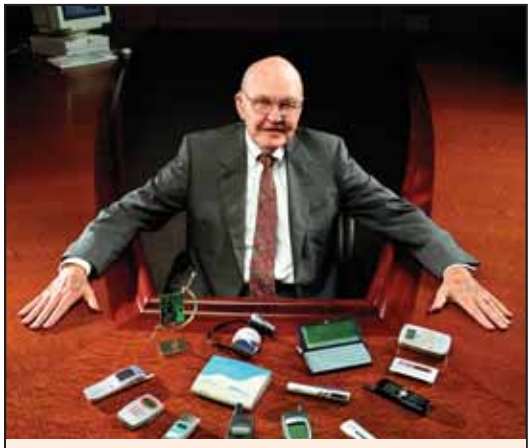
By Jamie Hutchinson

Fifty years ago it was just a baby, about the size of a paper-clip. Since then it hasn't really grown, but it sure has grown up.

On September 12, 1958, ECE alumnus Jack Kilby (BSEE '47) demonstrated his brainchild to executives at Texas Instruments in Dallas. As a circuit, the invention was nothing special: just a few basic components—transistors, resistors, and capacitors—forming a simple phase-shift oscillator. What made it special was the integration of components in one solid slab of silicon. Kilby's "monolithic idea" led directly to today's densely packed microprocessors with computing power that was unimaginable in 1958.

In the decade following the 1947 invention of the transistor by ECE professor-to-be John Bardeen and his Bell Labs colleagues William Shockley and Walter Brattain, circuit designers had hit a wall they called the "tyranny of numbers." Transistors were faster, smaller, more reliable, and more efficient than the vacuum tubes they replaced, but the new devices still had to be wired together and soldered. What's more, engineers had harnessed transistors to design bigger, more complex circuits than ever before, further subjecting circuits to the vagaries and expense of hand wiring and soldering.

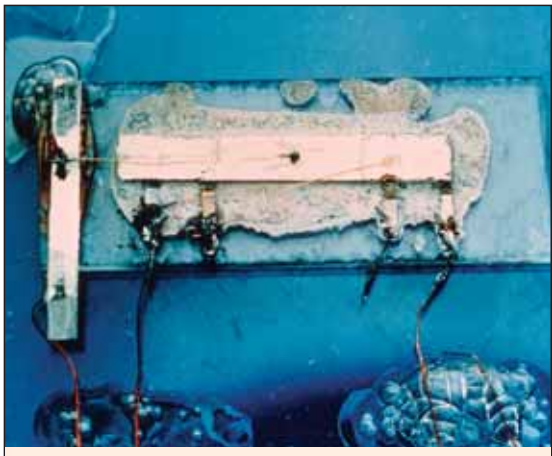
When Texas Instruments hired Kilby in May 1958, the company was committed to an Army–sponsored solution called the Micro-Module, which involved snapped-together components with built-in wires. That summer Kilby, who had yet to accumulate any time off, took advantage of the mostly vacated lab to sketch out a better solution that eliminated the interconnection problem altogether. Upon returning from vacation, Kilby's boss Willis Adcock greeted the monolithic idea skeptically, but allowed Kilby to see if he could build it. The integrated circuit was born.



Jack Kilby with products using integrated circuits. Jack Kilby's invention of the integrated circuit was the genesis of almost every electronic product used today. From cell phones, to modems, to Internet audio players, the chip has changed the world and enabled an entire industry to grow. *Photo courtesy of Texas Instruments*

A few months later the monolithic idea occurred, in nearly identical outline, to Robert Noyce working at Silicon Valley startup Fairchild Semiconductor. For the next decade, Texas Instruments and Fairchild battled in court over the right to profit from the integrated circuit. (At one point, U of I solid state physicist Robert Maurer testified on behalf of Kilby.) However, by 1970 when the U.S. Supreme Court finally denied Texas Instruments' request to review a patent appeals court opinion favoring Fairchild, the outcome didn't much matter. In 1966 the adversaries had already cut a deal by which each granted the other a license to its patent, while other competitors could purchase licenses through separate deals with both patent holders.

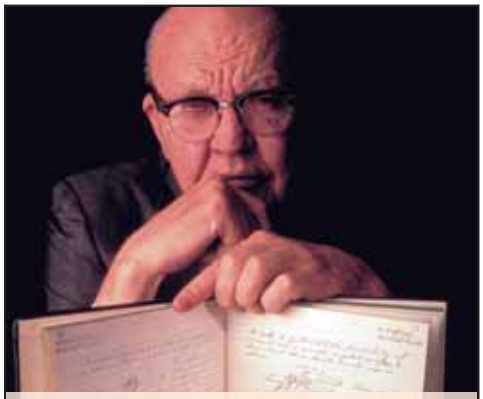
At first the electronics industry was slow to adopt integrated circuits, but minds changed after chips were successfully deployed in the Apollo moon mission and the Minuteman missile in the 1960s. In 1971 Texas Instruments released another Kilby invention, the Pocketronic, the world's first handheld calculator and the integrated circuit's first entry into the mass consumer market. Later that year Intel, which had been founded in 1968 by Noyce and fellow Fairchild expatriate Gordon Moore, released the first programmable microprocessor, the 4004, opening the way for the PC



First integrated circuit—Jack Kilby invented the integrated circuit at Texas Instruments in 1958. Comprised of only a transistor and other components on a slice of germanium, Kilby's invention, 7/16-by-1/16-inches in size, revolutionized the electronics industry. The roots of almost every electronic device we take for granted today can be traced back to Dallas 50 years ago. *Photo courtesy of Texas Instruments*

revolution, not to mention countless other "smart" chip-driven devices from traffic lights to musical instruments. Today the U.S. semiconductor industry is the country's second largest exporter with $256 billion in worldwide sales in 2007.

Personally, Kilby and Noyce shared the credit for their invention. They also shared the National Medal of Science and induction into the National Inventors Hall of Fame for inventing the chip. Noyce died in 1990 and so could not share the Nobel Prize in Physics, which was awarded to Kilby in 2000. Kilby's Nobel lecture acknowledged the contribution of his Silicon Valley rival. Kilby left Texas Instruments in 1970 for a career as an independent consultant and inventor, which he remained until his death in 2005.



Jack Kilby with his engineering notebook. Jack recorded the successful demonstration of the first integrated circuit in his engineering notebook. Signed "JS Kilby," the page in his notebook is dated September 12, 1958. *Photo courtesy of Texas Instruments*

Starting with Bardeen, then Kilby, the history of solid state technology can be told as the story of one ECE legend picking up where another left off. Working at Fairchild in 1963 with Frank Wanlass, ECE alumnus C. T. Sah developed CMOS (complementary metal-oxide semiconductor) which, owing to its high noise immunity and low power consumption, is still the predominant circuit technology used in chips today. Later Sah joined the ECE faculty and collaborated with ECE legend Karl Hess on solving problems of electron transport in semiconductors, work that Hess would build upon in the 1980s and 1990s. Today, faculty in ECE are pushing silicon and CMOS to their ultimate limits, while laying the groundwork for futuristic alter-natives like quantum computing.

Remembering the chip that changed the world

By Thanh Tran, Texas Instruments

Fifty years ago, Jack Kilby invented the integrated circuit, and practically everything we touch, do, and take for granted today has his fingerprint on it. It's hard to imagine life today—and tomorrow—without Jack's chip.

When I enrolled at the University of Illinois, I didn't know Mr. Kilby. At Illinois I learned the nuts and bolts of engineering. But I also learned Mr. Kilby's story, which inspired me to continue his legacy of creativity and seek ways to push his invention even further.

As an electrical engineer in the digital signal processor division at Texas Instruments and an inventor of many techniques implemented in personal computers and HDTVs, I am proud to be a part of Mr. Kilby's legacy. I regard him as a genuine hero. His invention changed the world.

ECE alumnus Thanh Tran

The worldwide demand for integrated circuits now represents a $250 billion-a-year industry. It continues to feed technological revolutions in every industry. Also, it is changing people's lives around the world, including those in such emerging economies such as my birth country of Vietnam.

Where will such innovations come from? Most will sprout from the imaginations of young graduates with degrees in science, technology, engineering, or mathematics. We must encourage our youth to follow in Mr. Kilby's footsteps, embrace his passion for problem-solving, and envision tomorrow's opportunities.

Just as Jack did.

Thanh Tran (BSEE '84) is an electrical engineer with Texas Instruments and a member of the ECE Alumni Board.

NEW FACULTY

Five new faculty join ECE

The ECE Department recently welcomed new faculty members: Alejandro Dominguez-Garcia, Matthew Gilbert, Gang Logan Liu, Sayan Mitra, and Shobha Vasudevan.

ECE Assistant Professor Alejandro Dominguez-Garcia

As a power engineer, Assistant Professor ALEJANDRO DOMINGUEZ-GARCIA is happy to be at Illinois. "We are the best power engineer program in the country," he said. "So it's the place to be."

Dominguez-Garcia has come a long way to get to Illinois. He received his master's degree in electrical engineering in 2001 from the University of Oviedo in Spain. He then spent a year there as an assistant professor. In 2002 he went to MIT to pursue his doctorate, completing it in 2007. He arrived at Illinois early this summer.

"My research interests lie in the interface of reliability and control, with a special emphasis on applications on power electronics and power systems," said Dominguez-Garcia. Some of his first research projects will include fault-tolerant power electronics design and dynamic safety assessment of power systems.

This fall he will be teaching ECE 430: Power Circuits and Electromechanics. "It's a very fun course to teach," he said, "because it covers the fundamentals of electrical energy systems from generation to transport and so on." He is currently developing a graduate course for the spring on dynamic systems reliability.

Though Champaign-Urbana is quite different from Spain, Dominguez-Garcia has been enjoying his time here. "Life here is quiet," he said. "It's a nice place to live and work. That is the most important."

ECE Visiting Lecturer Matthew Gilbert

With an interest in both electrical engineering and physics, Visiting Lecturer MATTHEW GILBERT was attracted to Illinois because of its strength in those areas. "Since I do the hybrid between the two subjects, I was very interested [in Illinois]," Gilbert said. "Also, the school has a good reputation for having excellent students and doing tremendous research."

Gilbert's research focuses on quantum transport theory in nanostructures, as he searches for new logic devices which operate with reduced power consumption. He is currently using correlated electron states in bilayer graphene to produce new multifunctional logic devices. He also has active research programs in ultra-scaled CMOS transistors, spin transport, and many-body theory.

Gilbert earned his bachelor's degree, master's degree, and PhD from Arizona State University in 2000, 2003, and 2005, respectively. Following his education, he completed his postdoctoral research at the University of Texas, Austin for one year. Prior to joining Illinois, Gilbert served as the assistant director of the South West Academy of Nanoelectronics through the University of Texas.

Gilbert is excited about teaching students at the University of Illinois. "I like working with young people. Each one has a different point of view and they always come up with interesting ways to look at problems," he said. "Research is a collaborative effort, and students keep me on my toes."

Gilbert will teach courses that deal with solid-state areas, electromagnetics, and physics. Eventually, he would like to create a cross-disciplinary course that focuses on quantum transport theory.

ECE Assistant Professor Gang Logan Liu

Assistant Professor GANG LOGAN LIU joins ECE after a postdoctoral position with Lawrence Livermore National Laboratory, where he studied nanofabrication techniques that he hopes to apply in his research in nano and bioengineering. For his dissertation work at the University of California, Berkeley, completed in 2006, Liu developed metallic nano-bio-photonic sensors used to detect chemical signals within living cells. After that, he did postdoctoral work at the University of California, San Francisco medical school before moving on to Livermore.

At Illinois, Liu will be based in the Micro and Nanotechnology Laboratory, but plans to collaborate with researchers campuswide in developing what he calls nano-hybrid "onics" systems. "I call them that because there are so many 'onics,' like electronics, photonics, bionics," said Liu. "I want to create something like a nanobionics system, which is really a nano-bio hybrid, that can be merged into the living biological system."

Liu hopes to teach classes ranging from the fundamental to the advanced. "I believe [introductory electromagnetism] is a very important fundamental class for all people interested in doing nanophotonics or nanoelectronic devices later," he said. "I'm also interested in developing some advanced grad-level classes such as molecular electronics or molecular photonics."

"I can't wait to get more familiar with the campus," he said. "Through collaborations we can create something really useful to benefit everybody."

ECE Assistant Professor Sayan Mitra

After earning his PhD in 2007 from MIT, Assistant Professor SAYAN MITRA spent last year as a post-doctoral researcher at Caltech applying new modeling and verification techniques to real world systems like "Alice," Caltech's entry in the Defense Advanced Research Projects Agency (DARPA) Urban Challenge for autonomous vehicles. The new techniques grew out of Mitra's dissertation research. "I developed a mathematical framework for modeling such systems and a set of software tools for rigorously proving their correctness," he said.

At Illinois Mitra will continue developing mathematical techniques for improving software systems, especially "cyber-physical" systems, which involve interaction with the physical world. "Modeling and analysis of such systems is important for many engineering systems and poses some challenging research questions," said Mitra, pointing to automobile dynamic stability controllers as one example. "The correctness of such a complex system relies both on the behavior of the car—its velocity, acceleration, etc.—and the behavior of the controller—a piece of software."

This fall Mitra will teach a section of ECE 598: Modeling and Verification of Real-Time and Hybrid Systems. "This is my first time teaching such a class and I am very excited about it."

Through collaborators like ECE Associate Professor Daniel Liberzon, Mitra already knows a lot about Illinois. "I have come to know of the stimulating environment at UIUC for doing research, particularly interdisciplinary research," he said. "I look forward to being a part of this great community."

ECE Assistant Professor Shobha Vasudevan

Assistant Professor SHOBHA VASUDEVAN said she decided to teach at Illinois because it is one of the most prestigious academic institutions today. "ECE, in particular, is home to many existing and potential world leaders in technology," she said. "Alumni from this department have blazed trails in the industrial landscape as well as peer academic institutions. It is very exciting for me to be a part of the vibrant, challenging intellectual atmosphere offered by this department, and the University at large."

After obtaining her bachelor's degree from the University of Mumbai, India, in 2001, Vasudevan went on to receive her master's and PhD in electrical and computer engineering from the University of Texas, Austin, in 2003 and 2007, respectively. While earning her graduate degrees, Vasudevan worked as a research assistant and teaching assistant. She also held internships with Intel, Motorola, and Qualcomm.

In addition to teaching, Vasudevan gives talks on alternate methods for hardware verification and promoting the use of formal methods in an industrial context.

"These talks are important because Illinois has not had a prominent presence in hardware verification so far," she said. "Overall, I am hoping that the seminars help in building an integrated research environment in Illinois [electrical and computer engineering and computer science] to solve verification challenges faced by hardware and systems on chips."

Vasudevan is involved in joint collaborations with electrical and computer engineering and computer science professors and their research groups. She plans to start her own research group for formal verification of hardware and embedded systems in the near future.

FACULTY NEWS

JENNIFER BERNHARD was promoted to professor.

STEPHEN BOPPART was promoted to professor.

MARIE-CHRISTINE BRUNET received the 2008 Campus Award for Excellence in Undergraduate Teaching.

WENG C. CHEW received the 2008 Chen-To Tai Distinguished Educator Award of the IEEE Antennas and Propagation Society "for outstanding contributions to education in the fields of electromagnetic theory and computational electromagnetics."

KENT CHOQUETTE has been named a Fellow of SPIE (International Society for Optical Engineering). He has also been named the recipient of the 2008 IEEE/LEOS Engineering Achievement Award.

SHUN LIEN CHUANG, the Robert C. MacClinchie Distinguished Professor in Electrical and Computer Engineering, received a 2008 Humboldt Research Award for Senior U.S. Scientists.

JAMES COLEMAN, Intel Alumni Endowed Chair in Electrical and Computer Engineering, and former PhD student S. David Roh recently earned a United States patent for their research and development of the dual distributed Bragg reflector (DBR) grating semiconductor laser.

BRIAN CUNNINGHAM received a 2008 Xerox Award for Faculty Research. He was one of four associate professors in the College of Engineering to receive the award, which honors faculty members for outstanding research.

MINH DO was promoted to associate professor.

MATTHEW FRANK received a Faculty Early Career Development (CAREER) Award from the National Science Foundation (NSF).

Holonyak inducted into National Inventors Hall of Fame

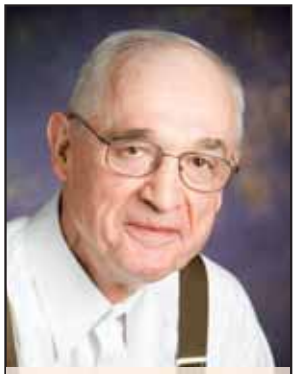
By Lauren Eichmann

John Bardeen Professor of Electrical and Computer Engineering and Physics, Nick Holonyak, Jr., was inducted into the National Inventors Hall of Fame in May. Holonyak was honored primarily for his invention of the first practical light-emitting diode (LED).

The National Inventors Hall of Fame was founded by the U.S. Patent and Trademark Office and the National Council of Intellectual Property Law Associations in 1973 to recognize, honor, and encourage invention and creativity.

Holonyak developed the first practical LED in 1962 while working at General Electric (GE). Today, these long-lasting, low-heat light sources illuminate everything from alarm clocks to the NASDAQ billboard in New York's Times Square.

"Nick Holonyak's inventions, like all great works of scientific inspiration, have changed our world," said Richard Herman, chancellor of the Urbana campus. "Honoring Nick Holonyak's inventions is yet one more recognition of the extraordinary significance of his work."



> ECE Professor Nick Holonyak, Jr.

Holonyak earned his bachelor's degree in 1950, his master's degree in 1951, and his doctorate in 1954, all in electrical engineering from Illinois. Holonyak was the first graduate student of two-time Nobel laureate John Bardeen, an Illinois professor who invented the transistor.

Since joining the faculty at Illinois in 1963, Holonyak and his students developed the quantum-well laser, creating a practical laser for fiber-optic communications, compact disc players, medical diagnosis, surgery, ophthalmology, and many other applications.

Among Holonyak's many awards are the Lemelson-MIT Prize, Global Energy Prize from Russia, the IEEE Medal of Honor, the U.S. National Medal of Technology, the Frederic Ives Medal of the Optical Society of America, the Japan Prize, the National Academy of Sciences' Award for the Industrial Application of Science, the Optical Society's Charles Hard Townes Award, and the U.S. National Medal of Science.

KANTI JAIN received the prestigious David Richardson Medal from the Optical Society of America for achievements in the field of optical engineering. The award is presented each year to one individual chosen for his "dedication, ingenuity, and perseverance in attaining the highest level of scientific achievement in their chosen fields."

PHILIP KREIN, Grainger Endowed Director's Chair Professor in Electric Machinery and Electromechanics, received the IEEE Power Electronics Society's 2008 Distinguished Service Award.

N. NARAYANA RAO's new textbook, *Fundamentals of Electromagnetics*, was recently published by Prentice Hall.

ANDREW SINGER was promoted to professor.

MARK SPONG has been named the new dean of the Erik Jonsson School of Engineering and Computer Science at the University of Texas at Dallas.

GREG TIMP and BRUCE WHEELER (pictured) have been named IEEE fellows for the class of 2008. The title of IEEE fellow recognizes unusual distinction in the profession and accomplishments that have significantly added to "the advancement or application of engineering, science, and technology."

Retired ECE Lecturer RICARDO URIBE received the Wiener Gold Medal of the American Society for Cybernetics "for outstanding and profound lifelong contributions to the nurturing of cybernetics."

Indiana Jones and the incredible Continuum Fingerboard

By Lauren Eichmann

There's a new character in the latest Indiana Jones movie, one with Illinois roots. But you won't see this character on screen. The Continuum Fingerboard, a unique musical instrument designed and built by ECE Illinois alumnus and lecturer Lippold Haken, plays an important role in the movie's music.

ECE Lecturer Lippold Haken

The movie, *Indiana Jones and the Kingdom of the Crystal Skull*, integrates Haken's unique electronic instrument—often described as a fretless keyboard—into one of its soundtrack's recurring themes. Although it has previously been used for sound effects in movies including *Superman Returns* and *War of the Worlds*, the instrument is being used in a revolutionary way as part of John Williams' orchestra.

"The Continuum is now a real member of the orchestra, as opposed to ambient sound," said Haken of its use in *Indiana Jones*. "The Continuum has reached a level of maturity where it's no longer like, 'Hey, look at this weird widget.' It's being taken seriously as a real orchestral instrument. And that's very exciting."

Haken started working on the design of the Continuum Fingerboard as a graduate student at Illinois in the early '80s in Donald Bitzer's Computer-based Education Research Lab (CERL) on the Urbana campus. He later finished the preliminary design in the mid-'90s and officially released the Continuum Fingerboard in 2000. Haken currently teaches ECE 395: Advanced Digital Projects Laboratory at Illinois. He often incorporates the Continuum Fingerboard into his classroom activities.

Built by hand at Haken Audio in Champaign, Illinois, each Continuum is made of thick metal with a soft, red nylon-over-neoprene surface. As a non-traditional keyboard, it has no keys and only markings indicate finger placement. Players are able to generate different sounds, pitches, and volume by sliding their fingers across horizontally, vertically, or by applying pressure to the surface.

John Paul Jones, bass guitarist and keyboardist with Led Zeppelin, keyboardist Terry Lawless of U2, Jordan Rudess of progressive metal band Dream Theater, and famous Indian composer A. R. Rahman have all purchased the Continuum and are either still experimenting or performing with the instrument already, said Haken.

ECE students critical to SAE racing team

By Bridget Maiellaro

The University of Illinois' Formula Society of Automotive Engineers (SAE) team was recently ranked third out of 53 teams at the Virginia International Raceway competition and finished 13th out of 104 teams at this year's Michigan International Speedway event. While the group includes and recruits its team members from across campus, ECE students have played an integral role in its continued success.

> ECE students were an integral part of the success of the Illinois Formula SAE car, seen here at the Virginia International Raceway.

"It is important for Formula SAE to have a strong ECE team because racecars have complex electrical systems that require a lot of design and maintenance," said recent ECE graduate and Formula SAE team member Jacob Foster (BSEE '08).

Throughout his membership, Foster worked on the car's electrical system. He was responsible for its wiring, data acquisition, and electrical durability. Foster said that his experiences in ECE labs helped him apply his knowledge of electrical systems and electronic components throughout the designing, building, and debugging stages.

ECE senior and team member Kieran Levin said the club has given opportunities and training that he doesn't think he could have learned anywhere else.

"So far, as part of this club I have done a lot of hands-on engineering and learned a lot of really useful, practical things…from basic machining, to some carbon fiber work, to troubleshooting automotive electronics," Levin said. "I don't think there is any class that you can find as broad a range of practical knowledge as the formula program."

The Illinois Formula SAE team, which was founded in 1987, works together on designing, building, and developing a small formula-style racing car each year. Upon completion, the car competes in various races against cars designed by students from other universities and colleges throughout the world.

The Virginia International Raceway competition took place from April 25 to April 28 in Alton, Virginia, while the Michigan International began May 14 and ended May 18 in Brooklyn, Michigan. Foster said that for Illinois Formula SAE, Virginia was practice for Michigan, which was the final competition for the Formula SAE World Cup. Even though Levin had hopes of the team finishing in the top three at Michigan, Illinois was still ranked higher than they were at the 2007 challenge, where they finished 36th out of 136 teams.

The team's mission is to maintain a strong program and to keep improving its cars. In addition, participants agree that the experiences on SAE will help them succeed in the future.

"It really helps to show employers that you can work on an actual successful project," Levin said. "Many employers are looking for engineers who have experience right out of school, and SAE really gives you a major advantage in this respect. Everyone who graduates has a piece of paper that says they have a degree, but not too many people can point to something like a car and say, 'I designed, built, and tested that.'"

Illinois SAE, which is open to all students, aims to provide its members with numerous educational, professional, and social activities and opportunities related to vehicles of all types, according to its Web site. For more information and updates, visit **www.mechse.uiuc.edu/clubs/sae**.

ECE student gains popularity **on YouTube**

By Bridget Maiellaro

ECE student Steve Ward's interest in electricity has helped him gain celebrity via the online video-sharing Web site, YouTube. A video clip entitled "Singing Tesla Coil at Duckon 2007" featuring a seven-foot tall Tesla coil built and owned by Ward has had more than 1,281,000 views within one year.

ECE senior Steve Ward has built dozens of Tesla coils, and videos of the coils have become popular on YouTube. *Photo courtesy of Steve Ward*

Additionally, a second video of Ward's work, entitled "Twin Musical Tesla Coils playing Mario Bros," has been viewed more than 490,000 times.

Ward, a senior majoring in electrical engineering, built his first Tesla coil the summer before his freshman year of high school. He said he was inspired by a friend, Illinois alumnus Steve Klec (ACES '07), who built a coil with his older brother for an eighth grade science project.

"Ever since then, I've wanted to capture effective lightning on a small scale," Ward said. Over the years, Ward said he probably has made more than 50 Tesla coils. The coils, which have taken him anywhere from a day to almost three years to design, range from six inches to seven feet in height.

The original video clip featuring Ward's work was recorded mid-June 2007 at DucKon, an annual science fiction convention held in the Chicagoland area. Ward said that he was invited to attend the event and run his coil by Jeff Larson, a friend whom he met at an annual teslathon earlier that year.

Prior to the event, Ward was experimenting with generating musical sequences with the coils. After several months of organizing the music, the "singing" coils debuted at DucKon. Music included the theme songs from the Super Mario Brothers and Tetris video games, which were programmed to run on 10-second loops.

ECE student Steve Ward

Ward, a native of Oak Forest, Illinois, said he is able to imitate the songs by managing the rates at which the fire sparks out of the coil. He does this through the use of a controller and his laptop. After the songs are programmed into the laptop, it commands the controller to play a certain note for a certain period of time.

"It works similar to a miniature lightning strike," he said. "It's all about repeating a snapping sound fast enough to make it sound like a note."

Since the debut, Ward has been able to take industry standard songs that have a MIDI format and program them into his system. He has also compiled his own medleys of artists and written his own MIDI formats. In fact, he has files of songs loaded onto the coil. While the tracks are longer, Ward said he only uses about 10 to 20 seconds of each song.

Overall, Ward said the performances are great because everyone can hear the coils, and they demand attention. However, each device is as dangerous as any high power electrical device.

"If you are a safe distance away, then there is no danger," Ward said. "But it's as dangerous as grabbing live electrical wiring if you get too close. If those sparks were to hit a person, from a small coil they would just be painful and likely not to cause any permanent harm. But from the large coils, I have no idea… it's best to avoid them!"

ECE congratulates its **PhD recipients**

STUDENT	ADVISOR	DISSERTATION
OCTOBER 2007		
Al Hokayem, Peter	Spong, M.	Reliable Control of Multi-Agent Systems
Athanasopoulou, Eleftheria	Hadjicostis, C.	Diagnosis of Finite State Models Under Partial or Unreliable Observations
Cao, Min	Kumar, P.	Analysis and Cross-Layer Design of Medium Access and Scheduling in Wireless Mesh Networks
Chatterjee, Debasish	Liberzon, D.	Studies on Stability and Stabilization of Randomly Switched Systems
Chuang, Yu-Ju	Feng, M.	Dynamic Range Analysis and High-Speed Integrated Circuit Designs Using INP HBT Technology
Chu-Kung, Benjamin	Feng, M.	Compound Semiconductor Power Heterojunction Bipolar Transistor Technology
Chung, In Jae	Cangellaris, A.	Modeling and Hybrid Simulation of On-Chip Power Delivery Network Using an Unconditionally Stable Electromagnetic Field Solver
Deng, Liang	Wong, M.	VLSI Physical Design for Manufacturability and Reliability
Drost, Robert	Singer, A.	Equalization Using Graphical Models
Kashyap, Akshay	Basar, M.	Sensing with Communication Restraints
Kondratko, Piotr	Chuang, S.	Slow and Fast Light Using Quantum-Dot and Quantum-Well Semiconductor Optical Amplifiers
Kwasinski, Alexis	Krein, P.	A Microgrid Architecture with Multiple-Input DC/DC Converters: Applications, Reliability, System Operation, and Control
Liu, Shao	Srikant, R.	Congestion Control Protocols for the Evolving Internet
Lu, Yue	Do, M.	Multidimensional Geometical Signal Representation: Constructions and Applications
Mou, Shin	Chuang, S.	Theory and Experiment of Antimony-Based Type-II Superlattice Infrared Photodetectors
Nguyen, Ha Thai	Do, M.	Multisensor Signal Processing: Theory and Algorithms for Image-Based Rendering and Multichannel Sampling
Phatak, Sandeep	Allen, J.	Phone Confusion Analysis and Its Application
Qu, Liyan	Chapman, P.	Reduction of Dynamic Nonlinear Models of Magnetic Devices
Raghunathan, Vivek	Kumar, P.	Physical-Layer Aware Algorithms and Protocols for Wireless Networks
Robinson, Stephen	Tucker, J.	Fabrication and Transport Properties of Silicon Nanoelectronic Devices
Takos, Georgios	Hadjicostis, C.	Sparse Solutions to Structured Underdetermined Systems in the Presence of Small Noise
Touri, Rouzbeh	Hadjicostis, C.	Perfect Reconstruction of Digital Transmission through Channels with Bounded Additive Noise
Tsai, Chiun-Lung	Cheng, K.	Indium-Gallium-Arsenide Quantum Wire Infrared Photodetectors
Wang, Hua	Viswanath, P.	Topics in Network Information Representation and Communication
Xiao, Yan	Eden, J.	Probing the Dissociation of the Rubidium Dimer by Wavepackets and Parametric Four-Wave Mixing
Yang, Sichao	Hajek, B.	Reduced Complexity Mechanisms for Network Resource Allocation
Ying, Lei	Srikant, R.	Wireless Networks for Communication and Sensing
DECEMBER 2007		
Arora, Himanshu	Ahuja, N.	Modeling Objects Using Interest Points, Edges, and Regions
Benavides, Nicholas	Chapman, P.	Mass Minimization of DC-DC Converters in Portable Electrical Energy Sources
Ganguli, Anurag	Hutchinson, S.	Motion Coordination for Mobile Robotic Networks with Visibility Sensors
George, Ashvin	Bresler, Y.	Algorithms for Tomographic Reconstruction: Fast Back Projection and Cardiac Computed Tomography
Hesford, Andrew	Chew, W.	Parallel Methods for the Solution of Large-Scale Radiation and Inverse Scattering Problems
Kimball, Jonathan	Krein, P.	Digital Control Techniques for Switching Power Converters
Lee, Jeffrey	Kamalabadi, F.	3D Tomographic Imaging of the Ionosphere Using Global Positioning System Measurements
Li, Maokun	Chew, W.	Studies on Applying the Equivalence Principle Algorithm on Multiscale Problems
Liu, Yuan	Chew, W.	Recent Development in Low Frequency Integral Equation Method
Mao, Kaiyun	Jin, J.	Finite Element Analysis Of Multilayer Transmission Lines and Circuit Components
Mekonnen, Yidnekachew	Schutt-Aine, J.	Broadband Macromodeling Techniques for Interconnects and Electronic Packages
Nee, Brett	Chapman, P.	Integration of Filter Elements in Electric Drives
Niu, Penglin	Chapman, P.	Biomechanical Energy Conversion
Shaikh, Kashan	Liu, C.	Design and Development of A Portable Microfluidic System for Medical Diagnostics
Tu, Jilin	Huang, T.	Visual Face Tracking and Its Applications
Vu, Linh	Liberzon, D.	Invertibility and Input-to-State Stability of Switched Systems and Applications in Adaptive Control
Weaver, Wayne	Krein, P.	Geometric and Game-Theoretic Control of Energy Assets in Small-Scale Power Systems
Xu, Dan	Liang, Z.	Design of Multidimensional Large-Tip-Angle Radio Frequency Pulses for Parallel Transmission in Magnetic Resonance Imaging
Zhang, Zhuohui	Bernhard, J.	Analysis and Design of a Broadband Antenna for Software Defined Radio
MAY 2007		
Chen, Guang	Adesida, I.	Gallium Nitride-Based HEMTS Devices Modeling and Performance Characterization
Chen, Kuo-Feng	Eden, J.	Microplasma Transistor with A Quasi Metal-Oxide-Semiconductor (MOS)/Metal-Insulator-Metal (MIM) Electron Emitter
Davis, Clayton	Chew, W.	Reduced-Cost CEM Problems through Model Simplification and A-Priori Information
Kim, Dong Hyung	Adesida, I.	Process Development and Device Characteristics of AlGaN/GaN HEMTs for High Frequency Applications
Lakshmikantha, Ashvin	Srikant, R.	An End-User QOS View of Buffer Sizing and Bandwidth Sharing Protocols
Liu, Ming	Huang, T.	Probabilistic Correspondence Mapping for Audio-Visual Speaker Modeling
Maitre, Matthieu	Do, M.	"Traveling Without Moving," A Study on the Reconstruction, Compression, and Rendering of 3D Environments for Telepresence
Mallik, Siddhartha	Koetter, R.	Coding Strategies For Combating Interference On Point-to-Point And Multiple Access Channels
Ryoo, Shane	Hwu, W.	Program Optimization Strategies for Data-Parallel Many-Core Processors
Sun, Jin	Carney, S.	Near-Field Scanning Optical Tomography
Varatkar, Girish	Shanbhag, N.	Energy-Efficient and Error-Tolerant Design
Woo, Anne	Cangellaris, A.	Passive Rational Fitting of A Passive Network Transfer Function from Its Real Part
Zhang, Zhenqiu	Huang, T.	Joint Face Detection and Tracking In 3D Space
Zhong, Yu	Wong, M.	Fast Algorithms for the Design and Analysis of Large Power Grids

Many approaches exist for supporting ECE Illinois

By Jonathan Hill, Director of Development

Our department has a long and illustrious history, and the stories we are able to print in *Resonance* are just a sample of the great things that the faculty, students, and alumni of ECE Illinois take part in every day.

One of the most enjoyable parts of my job is meeting ECE alumni who are proud graduates and supporters of this department. I believe their pride is well founded when you look at the impact that our alumni, faculty, and students have on the world every day.

In their support of ECE Illinois, most gifts we receive from alumni and friends are monetary. For most people, this type of gift is their regular and best means of supporting the department and its educational goals. But there are a few other options that may be advantageous to the donor while also providing support to ECE.

One such option I'd like to mention is a gift of appreciated stock. For some donors, this is a way to make an impact on the department while incurring substantially reduced cost. This cost reduction is the result of the double tax benefit.

For example: suppose you decide to give 100 shares of stock with a current fair market value of $5,000. You bought the stock for only $1,000 more than a year ago. Today you can deduct the full $5,000 on this year's income tax return. The $4,000 capital gain is not taxed, even though it has "inflated" your charitable deduction. Avoiding the capital gain makes it possible to give stock at a lower actual cost to you rather than making a cash gift.

Often the stocks that work best for this kind of giving are those that have the greatest amount of appreciation. Another topic to consider is how such a gift of stock would facilitate an adjustment of an investment portfolio.

Stocks may also be a means for creating a source of regular income during retirement by setting up a charitable remainder unitrust (CRUT), a trust that can include stocks as well as other assets, and that can pay a variable income for life or a set term of years. Our featured donor in this issue, Rod Parks, is someone who has chosen this as a way to provide for an endowed scholarship for the department.

These are just a few of the many gift plans that can be made to benefit ECE Illinois. I welcome the opportunity to talk to you about these or other giving options to the department and encourage you to contact me at **jonahill@illinois.edu** or by calling me at (217) 265-6285.

Emma Marshall

Emma L. Marshall Scholarship achieves funding goal

Last summer we announced the establishment of the Emma L. Marshall Scholarship Fund. The ECE Alumni Association board wanted to recognize the dedicated service Emma provided to the Alumni Association during her 15 years as student and alumni relations coordinator. The fund was announced in recognition of Emma's retirement from the ECE Department.

The generosity of alumni who remember Emma and her hard work has been outstanding. The fund has already achieved its funding goal, and will begin providing scholarships to students in 2009.

The scholarship will be awarded to students who exemplify Emma's work ethic and commitment; a daunting task, as those who know Emma also know how tirelessly she has worked in support of ECE alumni.

Though this scholarship has achieved its initial funding goal, contributions to this fund will still be accepted. Donations can be made via the ECE Web site at **www.ece.uiuc.edu** or by contacting Jonathan Hill.

DONOR PROFILE

Giving support where he found support

By Tom Moone

For Rod Parks (BSEE '70), one of the greatest benefits he received from the ECE Department—though at the time it was still the EE Department—was support. Not financial support, but personal support. It was the personal support of the faculty in the department that enabled Parks to complete his degree and move on to a successful career at Hewlett Packard.

A native of Paxton, Illinois, Parks received an associate degree from DeVry University in Chicago in 1962. Wanting to continue his education, he returned to the area with a job as a technician in the Physics Department at the University of Illinois. While there he started taking courses part time. In 1964, he started working for the EE Department. "I really enjoyed the work," he said. "I had a lot of interaction with students and the faculty. The faculty members were incredibly supportive of me going on and finishing my engineering education."

ECE alumnus Rod Parks

Working full time taking two courses a semester and one in the summer, Parks finished his undergraduate degree eight years after joining the University. When he received his diploma, he also received a letter from the department signed by most of the faculty members. "There were a number of luminaries who signed it," he said. "In many ways, I treasured that letter even more than the diploma."

After finishing his bachelor's degree, Parks began working in the marketing department of Hewlett Packard in Loveland, Colorado. He went on to management positions in a variety of areas within the company, including technical support, sales support, and product marketing. Parks was able to see a major change in the company as HP grew to the major computing company it is today. "During my time, the company really flipped from being a test and measurement instrumentation company with some computer business to a computer company that also had some adjunct businesses," he said. Shortly after Parks retired from HP in 1996, the test and measurement portion of the company was spun off as Agilent Technologies.

"HP was a great place to work," said Parks of his time there. The company was growing fast and had a strong company culture. Parks said the company would even give his kids Christmas presents. His job enabled him to live a year each in Germany and France doing work for HP. "It was a great privilege," said Parks.

Since leaving HP in 1996, Parks has worked with a couple of startup companies, one a software company and another that provided ISP service to rural areas in Colorado. Between working for these two companies, he did some consulting work for HP and Agilent.

Parks now considers himself truly retired, and spends time volunteering with Habitat for Humanity and doing some activities he enjoys, including skiing, golf, and traveling.

Throughout his career at HP, Parks had been acquiring stock in the company. Parks and his wife Sharon set up a charitable remainder unitrust (CRUT) with his stock assets. With a trustee overseeing the portfolio, Parks and his wife receive a regular income based on the portfolio's performance. After their death, the assets remaining in the CRUT will be distributed to designated beneficiaries, one of which is ECE. "I have a soft spot in my heart for the University of Illinois, particularly electrical engineering," he said. "I want to leave some money here."

The funds given to ECE will then be used to establish a scholarship to benefit a student deserving of support. "I was working full time, married, and had two children, so I took classes over an extended period to get my degree" he said. "So my goal is that the scholarship be given to a student who is deserving of support to continue their education."

Summing up his education and engineering career, Parks said, "It's a long trip from Paxton, Illinois, to Colorado and all the things we've been able to do, and all the opportunities we've had. Without a good education, which started here, I wouldn't have been able to experience all these things. It's been a great ride."

Donor Honor Roll

January 2008 through June 2008

ECE is grateful to the alumni, friends, and partners who have made contributions to the department. This list includes financial donations, but we are just as grateful for the ongoing support you lend in other ways. ECE could not maintain its position as a great educational and research institution without you.

The following list includes charitable gifts designated for ECE and received between January 1, 2008, and June 31, 2008. Gifts to other campus units may be recognized in other campus publications.

We strive to make this list as accurate as possible. If your name is listed incorrectly or omitted, please accept our apologies. To report an error or omission, or for information about making a gift, please contact Jonathan Hill, director of development, at (217) 265-6567 or **jonahill@uiuc.edu**.

Corporate and Foundation Donors

Advanced Materials Technology
Advanced Micro Devices, Inc.
Agilent Technologies, Inc.
Ameren
American Electric Power Company
American Transmission Co. LLC
AstraZeneca Pharmaceuticals, LP
AT&T Foundation
The Ayco Charitable Foundation
Bitrode Corporation
The Boeing Gift Matching Program
CambridgeSoft Corporation
Caterpillar Foundation
Cisco Foundation
ConocoPhillips Company
Crowe, Chizek and Company LLC
Eastman Kodak Company
Emerson Electric Company
Exelon
GE Foundation
General Dynamics Decision Systems Inc.
The Grainger Foundation Inc.
IBM Matching Grants Program
Institute of Electrical & Electronic Engineers
Intel Corporation
Intel Foundation
International Business Machines Corporation
J. P. Morgan Chase Foundation
Lockheed Martin Corporation Foundation
Mattel Children's Foundation
The Medtronic Foundation
Mentor Graphics Corporation
Microsoft
Motorola Foundation
National City Bank Corporation
National Semiconductor Corporation
Northrop Grumman Foundation
NVIDIA Corporation
PBM Nutritionals, LLC
Phonak AG
Progress Energy, Inc.
Qualcomm Incorporated
Raytheon Company
Rockwell Automation Charitable Corporation
S&C Foundation
Salutron, Inc.
Sargent & Lundy LLC
SC Johnson Fund, Inc.
Starbucks
State Farm Companies Foundation
State Farm Mutual Automobile
Synopsys Foundation
TAC, LLC
Tektronix, Inc.
Telekom Research & Development Sdn. Bhd.
Texas Instruments
Texas Instruments Foundation
Timo Technology Company, Ltd.
Twelfth Root
UDASOFT, LLC
United Technologies Corporation
Verizon Foundation

Major Gifts

Grainger, David W.
Dunning, Wendell R. and Rita
Bahl, Lalit R. and Kavita Kinra
Welch, Allyn
Warren, Annette E. Trust (Deceased)
Major, Jo S. Jr. and Diann M.

Gifts of $1,000 to $5,000

Andideh, Ebrahim
Beanblossom, Todd M.
Borth, David Edward
Bruckmann, Guenter and Sarah Margaret
Campbell, Edna M.
Chan, Lisa
Chow, Doris W.
Hong, Se June
Kiesling, Robert W.
Mitchell, Joan L.
Newman, Leon A.
Pesavento, David R.
Plofsky, Jordan and Jo-Ann Moretti
Radnik, Robert C.
Smolik, Kenneth F.
Sterling, Jennifer T.
Tolli, Dominic M. and Natalie J.
Wang, Yi-Min and Pi-Yu Chung
Wang, Zhonghui A. and Liping J.
Weichsel, George H.
Yaru, Nicholas and Rosemary

Gifts of $250 to $999

Alvarez, Francisco
Baits, Paul G.
Beall, Charles W.
Bennett, William S.
Blevins, Jack L.
Chicoine, Michael R. and Caroline G.
Cochran, Paul L.
DeGregorio, Gary L.
Dickmann, James W.
Erickson, Paul M.
Green, Philip B. and Barbara
Iffland, Charles F. and Elizabeth J.
Kreer, John B. and Vivienne M.
Kuhlman, Mary A. and Robert P. Wiegand
Labiak, William G. and Mabel
Lachman, Phillip M.
Meeker, Donald J. and Gabrielle B.
Mueller, Thomas O.
Owdom, Ronald S.
Parks, John F.
Schmitt, Ross A.
Simaan, Rita
Sohail, Faysal A.
Stahl, Alan L.
Strack, Jan Jeffry
Tomasic, Michael G.
Trick, Michael T.
Turic, Carlos and Denise M.
Veatch, Mark S.
Waldrop, Park D.
Werner, William D.
West, Leslie Joe
Wolson, Raymond D. III
Zillman, Daniel C.

Gifts up to $249

Adkisson, Robert A.
Ahn, James J.
Aksamit, Randy J.
Amaya, Luis E. and Alexandra Ortiz
Anderson, Arne D.
Anderson, Steven K.
Aprille, Thomas J.
Arisman, Mark T.
Arndt, Jonathan M.
Assar, Mahmud
Atwood, Michael L. and Karen M.
Baca, Richard J.
Balasaygun, Mehmet C.
Balzarini, Dennis L.
Banerjee, Amit
Beck, Robert W.
Bertetti, David D.
Birnbaum, Joshua and Jessie
Boughton, Kristin G.
Brearley, Harrington C. Jr.
Breeding, Juliann B.
Bunch, Steve R.
Burns, Patrick G. and Tracy H.
Chan, Chi K.
Chen, David T.
Chu, Michael J.
Cleveland, George M.
Davis, Robert L.
Davis, Charles E.
Dougherty, Mack X.
Eichelkraut, Craig A.
Emery, Edith R.

Erlebacher, Seth A.
Etzel, Mark H.
Farmer, Daniel E.
Fong, Peter H.
Gartner, Todd H. and Leonora J.
Gerber, Howard L.
Gerstenberger, Jeffrey S.
Graff, Timothy E. and Therese C.
Graham, Richard A.
Greenwood, Andrew D.
Greer, James A. and Beth A.
Hajic, Earl J.
Hall, Douglas C.
Halla, John B.
Halttunen, Martin Armas (Deceased)
Hanes, Larry L.
Hansen, Timothy R.
Hart, Gerald W.
Haruch, John and Constance Y.
Haskins, Robert E.
Hill, Michael L. and Colleen M.
Hill, Will J.
Hodel, A. S.
Hoover, Keith E. and Judith M.
Huh, David K.
Huitema, Richard L.
Johnson, Gary W.
Jones, Edwin C. Jr.
Kaliski, Robert W.
Katz, Richard H.
Kenyon, Richard Jay and Lois B.
Kotecki, Donald K.
Krames, Michael R.
Kroll, Gregory A. and Cynthia A.
Kruger, Deborah J.
Kudlich, Robert A.
Lange, David A. and Rise R.
Langlois, William M.
Laursen, Robert L.
Layman, Roger S.
Layno, John H.
Lee, Jong R.
Lee, Jeffrey J.
Lomelino, Dale L.
Longley, Lester A.
Ludwig, Paul D. and Jennifer L.
Maddock, James B.
Maher, Robert C.
Mahoney, Gerald W.
Mata, Donnell
McCloskey, Lyle D.
McCurdy, Duane D.
McKinstry, Robert B.
Messinger, Erica
Meyer, Michael G.
Milano, Raymond A.
Moehn, David M.
Moore, John S.
Moreira, Jose E.
Munson, Bill A.
Myers, William J.
Nagel, Jeffrey M.
Nealon, Mark J.
Nelson, Mark W.
Neuhalfen, Andrew J.
Neuhalfen, Michael A.
Ng, Spencer W.
Nichols, JeanAnn
O'Brien, James D.
Ohnemus, Scott J.
O'Mahoney, Michael A. and Julie A.
Parikh, Mitesh M.
Patriarca, Rodolfo
Plano, Mary A.
Polesky, Richard W.
Polson, Duane R.
Potter, Lee C.
Presser, Leon
Ray, Howard K.
Redfern, Elwin M.
Richter, John P.
Rosa, Albert J.
Ruby, Robert A.
Saari, Brian A.
Samp, Michael K.
Sander, Benjamin T. and Nancy Ann
Schrock, Anthony M.
Schwartz, Alan M.
Scott, Michael J. and Melanie M.
Shemroske, Peter M.
Siljenberg, David W.
Sipinski, Gene
Skulina, Richard J.
Slutter, Andrew B.
Speltz, Stephen Eugene
Squire, John S.
Stapleton, Jim
Stocks, John C.
Struzinski, William Andrew
Sumrall, George E.
Swim, Alan D.
Tang, Ju-Ho
Torkildsen, Robert A.
Turkowski, Kenneth E.
Umeki, Russell
Vanarsdall, Kurtis D. and Margaret M.
Vaughn, Matthew W.
Waineo, Douglas K.
Walker, Michael E.
Webb, David B. and Jennifer L. Harmon
Webb, George B.
Webb, James A. and Becky Ann
Wegehenkel, Chris L.
Welbourne, G. Bruce
Wenda, Ronald L.
Whiteman, Michael L.
Wilson, Glenn Edward
Winograd, Shmuel and Elaine
Wirth, Robert D.
Wytmar, Richard J. III
Young, Richard C.
Yu, Gilbert S. and Mabel L.
Ziffra, Scott A.

ECE Alumni Awards

CALL FOR NOMINATIONS!

Do you know a fellow ECE Illinois alumnus deserving of recognition for his or her accomplishments? *Then we want to hear from you!*

Please submit nominations no later than January 3, 2009!

ECE Illinois has nearly 20,000 alumni worldwide making contributions in engineering, business, government, and academia. Help us identify those alumni deserving of recognition for their outstanding work by completing a nomination form for one of the following awards:

- **ECE Distinguished Alumni Award** honors ECE graduates who have made professional and technical contributions that bring distinction to the department and University. *Anyone with an ECE degree from the University of Illinois at Urbana-Champaign who is not a current faculty or ECE Alumni Board member is eligible.*
- **ECE Young Alumni Achievement Award** recognizes young alumni who have made outstanding professional contributions to their field. *Anyone with an ECE degree from the University of Illinois at Urbana-Champaign who will be under 40 years old on April 1, 2009 is eligible.*

For more information and to submit a nomination online for either award (with the new & easy automated system!), please go to **www.ece.uiuc.edu/alumni/.**

Questions/comments: Jill Jarboe • ECE Alumni and Student Relations Coordinator
55 Everitt Lab, 1406 W. Green Street, MC-702, Urbana, IL 61801 • jjarboe@illinois.edu • PH: 217.333.5817 • FAX: 217.265.6499

President's Letter

Letter from the ECE Alumni Association Board of Directors President

Dear Fellow ECE Alumni,

A great way to keep ECE Illinois in the media, to raise the awareness and status of the department, and to make us all look good, is to win nationally and internationally recognized awards. Of course, in order to win we must compete, and in order to compete we must be nominated. The department and faculty are recipients of many prestigious awards. Our alumni at large are not, but should be.

The awards are sponsored by professional organizations, societies, foundations, governments, and corporations. The ECE Department maintains a list of awards and ECE winners, and monthly posts will be made to the Electrical and Computer Engineering Alumni Group on *Always Illinois* (**www.alwaysillinois.org/**) to alert you of upcoming nomination deadlines. There are nearly 200 annual awards for ECE in academia, government, industry, and service. Our ECE department has helped develop our sensational talents. It is a shame for our worthy ECE alumni not to be recognized for their accomplishments. Please join *Always Illinois* to keep up on upcoming award possibilities.

To facilitate an increase in alumni nominations, we are asking you to notify us of deserving ECE graduates. Do you have an ECE colleague or friend who should be recognized for his or her achievements? Or do you satisfy the criteria for a particular award but need a nominator? Please, let us know!

The department, alumni board members, and ECE alumni volunteers are available to help complete nominations, so don't put it off because of other more pressing tasks. Contact the department today and help us get the recognition we deserve.

Sincerely,

Denise Turic

Denise Turic (BSEE '88)
ECE Alumni Association
Board of Directors President

ECE ALUMNI ASSOCIATION BOARD OF DIRECTORS

PRESIDENT
Denise M. Turic (BSEE '88)
Microchip Technology

MIDWEST VICE PRESIDENT
Kenneth F. Smolik (BSEE '69, MSEE '70)
Banner & Witcoff

WESTERN VICE PRESIDENT
Ebrahim Andideh (PhD '90)
Intel Corporation (retired)

EASTERN VICE PRESIDENT
David Yeh (BSCompE '83, MSEE '85, PhD '90)
Texas Instruments, Inc.

TREASURER
Erica Messinger (BSEE '99)
Agilent Technologies, Inc.

PRESIDENT-ELECT
Chris George (BSCompE '97, MSEE '99)
Hanley, Flight and Zimmerman, LLC

PAST PRESIDENT
Sherel D. Horsley (BSEE '64, MSEE '65)
Texas Instruments (retired)

MEMBERS
Karen Coperich Branch (MSEE '96, PhD '01)
Sandia National Laboratories

Phillip Lachman (BSEE '04)
Lockheed Martin Space Systems

Ben Sander (BSEE '93, MSEE '95)
Advanced Micro Devices (AMD)

Thanh Tran (BSEE '84)
Texas Instruments, Inc.

Christy Westendorf (BSEE '00)
Patrick Engineering

John Woythal (BSEE '56)
The Boeing Company (retired)

Steve Sample: A study in leadership

By Tom Moone

In his 2002 book *The Contrarian's Guide to Leadership*, Steve Sample (BSEE '62, MSEE '63, PhD '65) writes, "It's hard to define [leadership] in a way that is satisfactory to everyone, although most people believe they know it when they see it."

Looking at Sample's career, with 17 years as president of the University of Southern California and nine years as president of the State University of New York at Buffalo before that, one could certainly see that leadership, and know it.

ECE alumnus Steve Sample

Sample's career started out following a typical path. After completing his PhD in 1965, he went to work for Melpar, a small aerospace firm in Falls Church, Virginia. However, he quickly felt a draw to academia that was stronger than the draw of industry. In 1966 he returned to the classroom as an assistant professor at Purdue University.

Sample enjoyed teaching, but "I wasn't really that oriented to academic research," he said. A colleague eventually suggested Sample consider going into administration.

A fellowship from the American Council of Education allowed him to spend a year as an administrative intern in the office of the president at Purdue. "I loved it," said Sample. "It was at that point that my wife and I decided that I should be a university president." Sample then proceeded to fulfill that goal.

He served as deputy director on the Illinois Board of Higher Education from 1971 to 1974. Although he did not find the work with the IBHE as satisfying as working at a university, "I learned a lot about politics," said Sample.

In 1974 Sample became provost and executive vice president of the University of Nebraska. Then Sample began achieving presidency positions in higher education. In 1982 he became the president of SUNY Buffalo. And then, in 1991, he became the tenth president of the University of Southern California, and has held this post ever since. "I have really loved it," he said.

Under Sample's leadership, USC has continued to grow in renown and influence. USC has received national recognition for its community outreach programs, and it has become known as one of the nation's leading research institutions. In 2000, USC was named College of the Year by *Time* magazine.

It was after he came to USC that Sample became interested in leadership as a topic of study. At USC, Sample met Warren Bennis, a pioneer in leadership studies. Together, they created a course for juniors and seniors called "The Art and Adventure of Leadership." For the course's 40 available slots, over 300 students typically apply each year. "It's now the most sought-after course at this university," said Sample.

A result of his involvement with this course was *The Contrarian's Guide to Leadership.* Sample analyzed leaders of countries and kingdoms as well as leaders in academia and industry to develop his insights. "I came up with concepts or principles that maybe even I wouldn't have held until I got into teaching this class and got into observing and studying real leaders," he said.

It is worth noting that Sample donates royalties collected from the sale of this book to a scholarship fund for USC undergraduates.

Sample has received numerous awards throughout his career. In 1998, he was elected to the National Academy of Engineering "for contributions to consumer electronics and leadership in interdisciplinary research and education." In 2003 he was elected to the American Academy of Arts and Sciences in recognition of his accomplishments as a university president. In 2005, he became an Eminent Member in Eta Kappa Nu honor society, an honor conferred upon those whose attainments and contributions to society through engineering leadership have resulted in significant benefits to humanity. And earlier this year Sample was named a recipient of the IEEE Founders Medal "for leadership in higher education and the engineering profession, and for pioneering contributions to consumer electronics."

Alumnus' unusual research got an **engineering start**

By Jamie Hutchinson

From age five, ECE alumnus Dean Radin (MSEE '75) seemed headed for a career as a concert violinist. But he also excelled at science and math, read voraciously in many subjects, and enjoyed taking apart gadgets and putting them together again.

What's a prodigious polymath to do?

Radin consulted with family and friends, who gave him the advice he now gives to others: "I always tell people now that if you're interested in a huge range of topics…first learn how to do engineering so you can know how to do something." He majored in electrical engineering at the University of Massachusetts, then picked Illinois for grad school.

In many ways, Radin's resume since leaving ECE looks like those of the department's other most successful and interesting alumni. He earned a PhD and went on to hold positions in prestigious labs and think tanks; he worked in a Silicon Valley startup for one of the giants of the tech industry; and his research and publications have made him a big name in his field.

But the similarities end there, and the differences originate in another of Radin's boyhood interests. "When I was a kid and I learned that it was possible to apply some science towards verifying whether psychic phenomena were true or not, I couldn't think of anything more interesting to do."

Today Radin is a senior scientist at the Institute of Noetic Sciences in Petaluma, California. Arguing from the results of his own well-known research on psychic phenomena (or "psi"), as well as his command of psi research worldwide, Radin fiercely defends the evidence for human potentials like psychokinesis, clairvoyance, telepathy, and precognition.

ECE alumnus Dean Radin

Radin's books, *The Conscious Universe* (1997, HarperCollins) and *Entangled Minds* (2006, Simon & Schuster), are available as mass-market paperbacks. He's been interviewed by Oprah and Larry King, profiled by the *New York Times*, and featured in the award-winning documentary *What the BLEEP Do We Know!?* He draws huge crowds for talks at venues ranging from Cambridge University's Cavendish Laboratory to Google. And he's all over the Internet.

After earning his PhD in educational psychology at Illinois, Radin worked at Bell Labs in Columbus, Ohio, where he used discretionary research time to study psi. His next job was with the famed think tank, SRI International, which performed classified psi research for the Pentagon. At SRI, Radin conducted experiments, reviewed translations of Russian and Chinese psi literature, and interviewed defecting scientists from those countries.

In the late 1990s Radin worked at Microsoft co-founder Paul Allen's Interval Research Corp., and he has long been interested in the possibility of psi-based technologies. He points to several new patents or patents pending for devices that exploit the effects of mental intention on circuitry.

"Somebody somewhere thinks there's money to be made," said Radin. "The closest analogy to things we have today are brain-activated technologies, and this would be the next step, which would be pure mind-controlled technologies."

Radin shares the engineering community's optimism about nano and biotechnology, if for slightly different reasons. "The effects that we see in mind-matter interactions tend to be very small and very statistical," he said. "That suggests that the smaller the system, or the easier it is for the system to be 'pushed,' the better the results might be."

Radin and other psi researchers often use the Internet for networked experiments, an area Radin has explored since his student days at Illinois, when he posted a precognition test on the PLATO network. "Nothing very spectacular to report about it," he said. "But it was fun."

ALUMNI CLASS NOTES

1950s

Glenn Jacobs (BSEE '58) and his wife Eileen celebrated their 50th wedding anniversary in June. He retired from GTE in 1992 after 34 years in the engineering and service departments.

1960s

William Wulf (BS Engr. Physics '61, MSEE '63) received an honorary degree from Missouri University of Science and Technology in May. He gave the address at the commencement ceremonies for the university.

1970s

William Bielby (BSEE '70) has joined the sociology faculty at the University of Illinois—Chicago.

John Day (BSEE '70, MSEE '76) received the Roger Deveau Award for Excellence in Teaching by Part-Time Faculty from Boston University, Metropolitan College.

Neal J. Keating (BSEE '78) has been named the president and chief executive officer of Kaman Corp. Kaman conducts business in the aerospace and industrial distribution markets.

Robert Kennedy (BSEE '78) was named the 2008 DC Illini of the Year by the Washington, DC, Illini Club. He is copresident of C-SPAN.

John Orr (BSEE '69, PhD '77) was appointed provost and senior vice president for Worcester Polytechnic Institute in Worcester, Massachusetts.

Yahya Rahmat-Samii (MSEE '72, PhD '75) was elected to the National Academy of Engineering. He is a professor of electrical engineering at UCLA.

William J. Sudlow (BSEE '71) was appointed senior vice president of engineering for Xactly Corporation. Xactly is a leader in on-demand sales performance management.

1980s

Christina Brazdziunas (BSCompE '89) was named chief technology officer for Verso Technologies, Inc., a global provider of next generation network solutions.

David P. Freese (BSCompE '89) was named CEO of Generation5, a company that provides predictions of customer behavior, attitudes, and purchase potential to help marketers reach customers more effectively.

Mario de la Huerga (BSEE '82) was named network administrator for Grubb & Ellis—New Mexico, which is one of the largest full-service commercial real estate companies in New Mexico.

Dirk Meyer (BSCompE '83) was named chief executive officer of Advanced Micro Devices.

Scott McMullen (BSEE '85) has been named vice president of engineering for Medsphere Systems Corporation. Medsphere Systems is a leading provider of open source software for the healthcare industry.

Chuck Stancil (BSCompE '84, MSEE '85) was recently appointed chief technologist for business PCs at Hewlett Packard.

Norman Tien (MSEE '85) was named a recipient of the Chang-Lin Tien Education Leadership Award. Tien is the dean and Nord Professor of Engineering at Case Western Reserve University's Case School of Engineering. He is also the Ohio Eminent Scholar in Condensed Matter Physics. The Tien Awards program recognizes the accomplishments of rising Asian American leaders in higher education.

Ben Tsai (MSEE '82, PhD '84) was elected to serve on the board of directors of Varian Semiconductor Equipment Associates, Inc. Varian is the leading supplier of ion implant equipment to semiconductor manufacturers.

Steve Whealon (BSEE '83) is currently enrolled in medical school in the Caribbean at Saba University School of Medicine on the island of Saba, Netherlands Antilles.

David Yen (MSEE '77, PhD '80) has been named executive vice president for emerging technologies at Juniper Networks, Inc. Juniper Networks is a leader in high-performance networking.

1990s

Bradley Bishop (MSEE '94, PhD '97) has been named Instructor of the Year at the U.S. Naval Academy in Annapolis, Maryland.

Eric Chamberlain (BSCompE '97) is the cofounder and chief operating officer of RingFree, a San Francisco-based company focusing on the development of software and services that allow mobile telephone devices to converge Internet and traditional calling.

Richard Kapusta (BSCompE '92) was appointed vice president of marketing and business development for Actel Corporation. Actel designs, develops, and markets field-programmable gate arrays (FPGAs) and programmable system chip solutions for power-efficient design.

Chris Koopmans (BSCompE '99) was named vice president for product development for Bytemobile, Inc. Bytemobile is a leader in mobile Internet solutions for network operators.

Jeff R. Lamb (BSCompE '96) has been hired as president by DOmedia. DOmedia is an online marketplace for buyers and sellers of alternative and unique advertising media.

Mark Stout (BSEE '90) was named director of renewable technology

HAVE NEWS TO SHARE?

Visit **www.ece.uiuc.edu/alumni** and complete our "Keep in Touch" form.

planning at Cleantech America, Inc. Cleantech develops utility-scale clean energy alternatives for sale to utilities, municipalities, and other customers.

Oliver Valente (BSEE '91) was named executive vice president and chief operating officer for ExteNet Systems, Inc., a company that develops innovative distributed antenna systems networks for wireless service providers.

2000s

Harish Agarwal (BSCompE '02) is a co-founder of Octopart, a search engine for electronic parts.

Ryan Harbaugh (BSEE '01) passed the professional engineer exam in Indiana.

Karen Hauck (BSCompE '06) and **Matthew Zwier** (MS Physical Chemistry '05) were married December 29, 2007, in Champaign. Matthew works for the University of Illinois Chemistry Department as a scientific computer programmer, and Karen is a PhD student in the history and philosophy of science at the University of Pittsburgh.

Nicholas Soldner (MSEE '06) has returned to Connecticut after spending a year working in Shanghai, China. He is interested in meeting Illinois alumni in the New York City area.

Nathan Schweighart (BSEE '01) married Pamela Armata on April 12, 2008. He works as a senior engineer for the Tennessee Valley Authority and is pursuing a master's degree in business administration.

Anlin Xiong (MSEE '05), the vice president of Sinoenergy Corporation, has been appointed as board secretary to the company. Sinoenergy is a manufacturer of compressed natural gas vehicle and gas station equipment in China.

IN MEMORIAM

Samuel D. Wright (BSEE '47) died December 3, 2007. He was 86. He served in the Army during World War II. He started his career with Central Illinois Public Service. Later he worked for Niagara Mohawk Power Corporation and then Duke Power Company, from which he retired in 1994.

Edward H. Scharres (BSEE '48) died May 10, 2008. He was 88. Scharres served with the Army in World War II. He was assigned to the Oak Ridge (Tennessee) Atomic Bomb Project where he performed technical work. He was employed by General Electric and then Illinois Institute of Technology Research Institute, where he carried out a variety of projects, including some for NASA.

John K. Giles (MSEE '49) died October 2, 2007. He was 83. During World War II he served in the Navy. In 1976 he retired from the U.S. Postal Service where he had worked as an electrical engineer.

L. Wayne Stevens (BSEE '49) died November 29, 2007. He was 83. He served with the Marines in World War II. He worked with Shell Oil in Canada and later with PanCanadian Petroleum. In the 1970s he joined Amerada Hess in Calgary as vice president for exploration. He moved to Denver and headed L.W. Stevens and Associates until his retirement.

Clyde "Cotton" Wilson, Jr. (BSEE '49) died March 28, 2008. He was 86. He served with the Marine Corps during World War II. Wilson worked for Emerson Electric and later for Missouri Utilities Co. At the time of his retirement from Missouri Utilities Co. in 1984, he was the vice president of electrical operations.

Harry Cerbin (BSEE '50) died April 21, 2008.

Martin A. Halttunen (BSEE '50) died March 18, 2008. He was 82. He served in the Army during World War II and was awarded the Purple Heart. He worked at General Electric for 37 years until his retirement in 1987.

Deane C. Leonard (BSEE '50) died December 23, 2007. He was 88. He served in World War II with the U.S. Army Medical Corps in Europe. He was employed by Caterpillar until his retirement in 1981.

Gerald E. Peterson (BSEE '51) died May 13, 2008. He was 82. He served with the Army Air Corps during World War II. He retired from Commonwealth Edison after 37 years of service.

Paul DiSalvo (BSEE '53) died June 16, 2008. He was 78.

Robert F. Hoyt (BSEE '53) died November 29, 2007. He was 79. He served in the Air Force from 1946 to 1949. He was employed by Caterpillar, Motorola, and Honeywell.

Rolland L. Heien (BSEE '58) died June 10, 2008. He was 72. Heien was an electrical engineer for McDonnell Douglas-Boeing until his retirement.

Lynn D. McNames (BSEE '59) died December 12, 2007. He was 76. He served with the U.S. Army during the Korean War. He was employed by Lockheed-Martin and later by the Department of Defense in the Civil Service before his retirement.

Raymond Belmonte (BSEE '59) died in April 2008. He was 76. He had retired from Motorola after 37 years of service.

Timothy Roethemeyer (BSEE '93, MSEE '95) died September 6, 2007.

Control, Thy Passion

The story of an eminent Illinois lab

By Jamie Hutchinson

The Decision and Control Laboratory (DCL) at Illinois traces its origins to an "adaptive systems" research group established in the Coordinated Science Laboratory (CSL) in 1959 by CSL associate director Mac Van Valkenburg. The group consisted of just two people: Van Valkenburg and his freshly graduated advisee, José Cruz (PhD 1959), whose dissertation extended traditional circuit theory to address systems with time-varying components, introducing ideas from the emerging field of automatic control.

Nearly 50 years later, the DCL claims 20 faculty from five departments and enjoys a reputation second to none in the world of control, now a mature, highly interdisciplinary research field. Those who remember the early days of the Illinois group attribute its success to the style and philosophy of its founder. "His philosophy was the same as [then ECE department head] Ed Jordan," said Cruz of Van Valkenburg. "Hire the very best you can find, and leave them alone."

William Perkins finished his PhD at Stanford in 1961 and joined the group that year, initiating a productive collaboration with Cruz in the area of sensitivity theory, which addresses uncertainty in a system and its environment. "As a measure of feedback to cope with these uncertainties, we introduced a mathematical concept known as sensitivity," said Perkins, who retired from the ECE faculty in 2005. "It measures the change in performance due to changing parameters or environments. Illinois became the center of this activity."

In 1965 Petar Kokotovic, who had met Van Valkenburg the previous year at a conference in Yugoslavia, joined the Illinois control group and quickly established himself as a leader in "singular perturbation" theory, which addresses the control of complex, dynamic systems whose behavior evolves in two or more time scales. Meanwhile, Cruz took the lead in applying theory of "differential games" to systems where multiple controllers, or players, seek to realize divergent goals. In the 1970s these two lines of research would merge into a highly successful, Department of Energy-sponsored methodology for large-scale systems control.

Mac Van Valkenburg

José Cruz

The new control ideas percolating at Illinois had broad applications, and W. Dale Compton, CSL director from 1965 to 1970, spurred the group on to more interdisciplinary work. One such effort, led by urban and regional planning professor Jerrold Voss, drew upon control theory to achieve dynamic, interactive models of urban growth useful to planners. Other applications included economic policy and electric power systems.

Beginning in 1981 with the hiring of Tamer Başar, the group's ranks began to fill with a new generation of faculty who are today the senior members of the DCL. Before coming to Illinois, Başar had already coauthored a book on noncooperative game theory that has since become a classic in applied mathematics. At Illinois, he has spearheaded research in the cutting-edge area of "H-infinity optimal control," which addresses the old sensitivity issue from a new angle incorporating game theory. "You formulate it as a problem where the controller is playing a game against the uncertainty viewed as an adversary," said Başar. "That way, you safeguard yourself against the worst that can happen." In 1991 Başar coauthored a bestselling book on the subject, and today the book is still a standard text in the field.

In 1984 Kokotovic attended a conference in San Antonio at which a University of Maryland mathematician, P. R. Kumar, gave a talk about self-tuning regulators. "Wherever Petar is, all roads go through," reflected Kumar, who, thanks to that encounter, joined the

Illinois control group in January 1985. Kumar began to study manufacturing systems and developed scheduling policies for semiconductor fabrication that have been implemented at IBM's Burlington, Vermont, plant. Later Kumar turned his attention to wireless and mobile networks, developing some of the fundamental theory about the scaling of such networks. He and his students have written two of the most highly cited papers in that field.

In 1989 Sean Meyn joined the group. His expertise, like Kumar's, lay primarily in the area of adaptive control, in which the control law for a system can change as more is learned about the system function and its environment. Meyn's work on nonlinear and stochastic systems led to a coauthored monograph that the current president of the American Economics Institute has called "the bible for economists who use Markov models." Recently Meyn collaborated with U of I economics professor In-Koo Cho to improve the power market models and analyses used by economists.

The early work on sensitivity has been reanimated in recent decades with the thriving field of "robust control," where the engineer derives a strict control law that will function for an established range of system parameters. Perkins and Başar provided the control expertise for a recent NASA-funded project to develop smart icing systems for small aircraft. "Icing changes the dynamics of the aircraft," said Perkins. "We looked at sensitivity coefficients and monitored those online, and used those to decide when icing was occurring." The project included faculty in aeronautical engineering and (because of the human factors involved in piloting) psychology.

The DCL has supplied people as well as ideas to research institutions nationwide. Cruz retired from Illinois in 1986 and became dean of engineering at Ohio State. After 25 years at Illinois, Kokotovic retired to become director of the Center for Control, Dynamical Systems, and Computation at the University of California—Santa Barbara. This fall, robotics expert Mark Spong, a DCL member since 1984 and ECE faculty member since 2005, became engineering dean at the University of Texas at Dallas.

No story about the Illinois control group would be complete without mention of the Allerton Conference on Communication, Control, and Computing, which originated in 1963 as the Allerton Conference on Circuit and System Theory. The annual gatherings, founded by Van Valkenburg, Perkins, and Cruz, have grown to encompass a broad range of engineering disciplines, attracting top researchers from around the world to enjoy—for a few a days in the beautiful setting of Allerton Park—the collegiality that Van Valkenburg established at DCL and that prevails in the lab to this day.

William Perkins

Petar Kokotovic (right) and his PhD advisor Yakov Tsypkin at Allerton

Though less dominant than in past years, ECE faculty have continued to form a strong contingent within an increasingly interdisciplinary DCL. The newest ECE members of the lab are Christoforos Hadjicostis (1999), Daniel Liberzon (2000), Yi Ma (2000), and Seth Hutchinson (2007), an ECE faculty member since 1989 who adds to the group's expertise in robotics.

Meanwhile, the non-ECE group within the DCL has grown to become a majority. For many years it consisted solely of Spong and large-scale systems expert Juraj Medanic, both of whom were affiliated with the Department of General Engineering until its reorganization in 2005. The 1990s brought strong non-ECE hires such as Petros Voulgaris (Aeronautical Engineering), Andrew Alleyne (Mechanical Science and Engineering [MSE]), Geir Dullerud (MSE), and Carolyn Beck (Industrial and Enterprise Systems Engineering), and the trend has continued into this decade. "It has been great to see a real blossoming of interdisciplinary activity in the general area of decision and control," said Alleyne. He remarked on the lab's engagement with new classes of physical systems like networked vehicles, biophysical systems, and hybrid systems, as well as new applications in areas such as safety and security.

Meyn, who is the current director of the DCL, wants to continue the conversation with researchers from a broad range of fields. "For example, biology has all sorts of beautiful puzzles," he said. "Like understanding the regulation of insulin and glucose—it's all a control problem." He's optimistic about the possibilities: "With computers being so fast, you can come up with the craziest ideas and try them out. It's never been a more exciting time for research."

Death to the slide rule! Long live the slide rule! Emeriti turn 90

By Jamie Hutchinson

Colleagues, friends, and family recently celebrated the 90th birthdays of ECE professors emeriti Paul D. Coleman and Daniel F. Hang. Coleman was feted with a roast at the Champaign Country Club on May 30. Hang marked the occasion with an open house in the lobby of the Krannert Center for the Performing Arts on June 14.

ECE Professor Emeritus Paul D. Coleman

"They did make some nice remarks about me, but the emphasis was to have fun and kid Uncle Paul," said Coleman. "I had a lot of influence on them, but everybody's forgiven me."

The roast was cohosted by Coleman's alma mater, Susquehanna University, which will soon break ground on the Paul D. Coleman Physics Center, made possible by funds from Coleman and his former students at Illinois. Coleman's students and colleagues have already established a graduate student research award in Coleman's name in ECE.

Coleman was born in Stoystown, Pennsylvania, a village of 250 people, to parents with only an eighth grade education. During World War II he won the Air Force Meritorious Civilian Award for his electronics countermeasures work at Wright Field, Ohio. After the war, he did his PhD in physics at MIT under John Slater, the noted physicist. "That's a million to one shot," reflected Coleman on his rise from humble beginnings. "And that required the help of a lot of people."

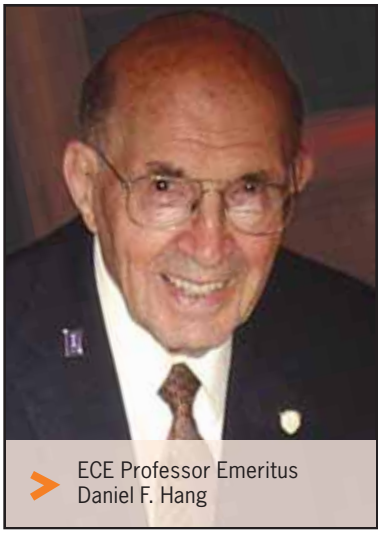
Coleman joined the ECE faculty as an associate professor in 1951, establishing the Electro-Physics Laboratory. His early research focused on megavolt electronics, harmonic generation, and electron beam interaction. Later he worked on problems in lasers and optics. He advised nearly 50 doctoral and 75 master's students, 13 of whom have won the ECE Distinguished Alumni Award. "You'll never know how dear that is to my heart," he said.

Officially retired since 1988, Coleman remained active in the lab for another 15 years, and he still sifts through his files at home, looking for old problems that were left unsolved when, around 1960, federal research dollars were redirected from physical electronics to lasers. "With a computer and Mathematica, I can solve a lot of problems on vacuum tubes that I could never even touch with a slide rule."

Hang (BSEE '41, MSEE '49) was born in Cleveland, Ohio, and worked for General Electric between his undergraduate and graduate student days at Illinois. He joined the ECE faculty as an assistant professor in 1947 and a decade later helped found the nuclear engineering program at Illinois. He retired in 1984 from ECE and the Department of Nuclear, Plasma, and Radiological Engineering (NPRE), and has stayed busy with teaching, consulting, and volunteering.

Hang's research in electrical engineering has emphasized the economics of electric power generation and distribution, while his nuclear expertise lies in management of the nuclear fuel cycle. In 1978 he cofounded SHTH Associates and he has served as the company's president ever since. SHTH provides software to enhance nuclear fuel management.

"Getting into teaching is what I'm most proud of," said Hang. "You get to know the students, and they come back and thank you." One former student, John Hughes, cofounded SHTH Associates and is still with the company. In ECE Hang taught courses in circuits, electric machines, and engineering economy, in addition to his responsibilities with NPRE.



ECE Professor Emeritus Daniel F. Hang

A banner and cake created for the birthday open house told parts of Hang's life story in pictures. The banner featured a light bulb with an atom symbol inside—representing Hang's two departmental affiliations—and a scout representing Hang's longtime involvement in Boy Scouts. The cake was decorated as a slide rule.

CAMPUS ROUNDUP



Photos courtesy of Kalev Leetaru

URBANA CAMPUS BRANDING INITIATIVE UNDER WAY

As part of the branding initiative aimed at standardizing the Urbana campus's identity as "Illinois," the campus is in the midst of transitioning to the **www.illinois.edu** Web domain.

To help in this move, the Urbana campus has a new e-mail address. Since May 13, students, faculty, and staff have been able to use "@illinois.edu" e-mail addresses. The first step in that process is establishing new addresses for Urbana campus e-mail users.

In addition, new logo standards have been established. Most campus unit logos will be phased out, with a standard use of the campus logo taking that place. The only exceptions are campus units that are identified as subbrands, independent brands, consortia, and external partnerships.

ILLINOIS STATE SCIENTIFIC SURVEYS BECOME PART OF U OF I

The four state scientific surveys—the Illinois State Geological Survey, the Illinois Natural History Survey, the Illinois Waste Management and Research Center, and the Illinois State Water Survey—have become part of the University of Illinois's Urbana campus, under a measure signed by Governor Rod Blagojevich. The surveys will be organized as a new unit, the Institute for Natural Sciences and Sustainability.

The institute will take advantage of the surveys' complementary goals and mission of providing the scientific underpinnings for energy, sustainability, environmental policy, and natural resource management, ensuring that the natural environment is developed to enhance the well-being of the citizens of Illinois and the state's economic viability.

IDOT PLEDGES $15 MILLION TO THE ILLINOIS CENTER FOR TRANSPORTATION

The Illinois Department of Transportation (IDOT) will invest more than $15 million over the next three years to continue innovative transportation research conducted by the Illinois Center for Transportation (ICT) at the University of Illinois at Urbana-Champaign. This new agreement comes as ICT continues to conduct ground-breaking transportation research in a variety of focus areas.

Since its 2005 inception, ICT has grown to become one of the leading transportation centers in the nation. ICT's varied research includes developing better designs for pavements that use recycled materials, improving work zone safety, implementing technologies to improve bridge safety and monitoring, and utilizing alternative energy sources such as wind. Visit the ICT web site, **www.ict.uiuc.edu**, for more information about the ICT's research activities.

CHANCELLOR, CHEMIST ELECTED TO AMERICAN ACADEMY OF ARTS AND SCIENCES

Richard Herman, the chancellor of the Urbana campus of the University of Illinois, and Jeffrey Moore, the Murchison-Mallory Professor of Chemistry at Illinois, have been elected to the American Academy of Arts and Sciences. They and the other 191 newly elected fellows will be honored at the annual Induction Ceremony on October 11 at academy headquarters in Cambridge, Mass.

Founded in 1780 by John Adams, James Bowdoin, John Hancock, and other scholar-patriots, the American Academy of Arts and Sciences has elected as members the finest minds and most influential leaders from each generation, including George Washington and Benjamin Franklin in the eighteenth century, Daniel Webster and Ralph Waldo Emerson in the nineteenth, and Albert Einstein and Winston Churchill in the twentieth. The current membership includes some 200 Nobel laureates and more than 60 Pulitzer Prize winners.

CAMPUS LOOKS TO ALTERNATIVE VEHICLES AND FUELS

The Garage and Car Pool in Facilities and Services is exploring fuel-efficient and eco-friendly vehicles. Two e-ride utility trucks have been added to the service fleet. Powered by nine eight-volt batteries, the all-electric trucks produce no ozone-depleting emissions and don't require hazardous chemicals such as antifreeze, oil, and other liquids.

In addition, Campus Mail, the Paint Shop, the Locksmith Shop and several other units have been test driving eight mini trucks from several different manufacturers to gauge their suitability and durability as service vehicles. Although the mini trucks are gas-powered, they have smaller engines than full-size utility trucks and offer better fuel economy.

*To read campus news as it happens, visit UI Now at **www.illinois.edu/uiNow**.*

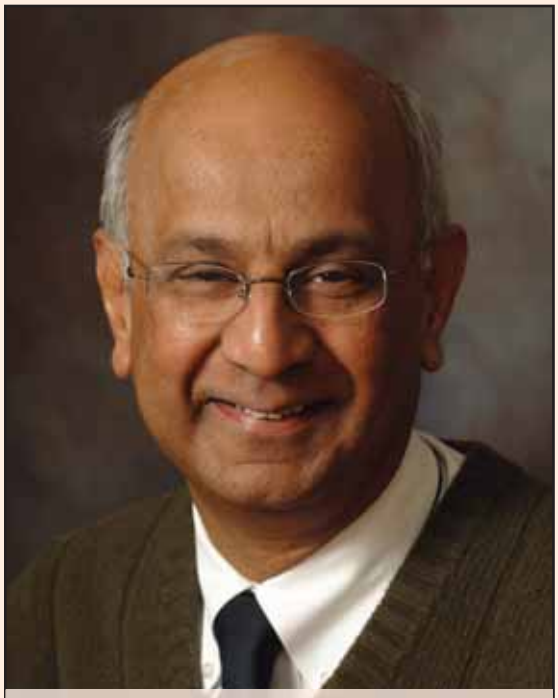
Iyer chosen as Vice Chancellor for Research

By Rick Kubetz, College of Engineering

ECE Professor Ravishankar ("Ravi") Iyer, the George and Ann Fisher Distinguished Professor of Engineering and director of the Coordinated Science Laboratory (CSL), has been chosen to serve as interim vice chancellor for research for the University of Illinois at Urbana-Champaign, pending approval of the Board of Trustees.

"Ravi is well known for his leadership skills and I am delighted to have him as part of the campus leadership team," stated Chancellor Richard Herman. "CSL is characterized by its outreach across campus and the promotion of large multidisciplinary projects, and as its director, (Ravi) has taken the laboratory to a level of visibility and multidisciplinary excellence, characteristic of the best on this campus and indeed, the nation."

The vice chancellor for research is the senior campus officer with responsibility for advancing research at Illinois. His office works with college deans, department heads, faculty, and graduate students, as well as external agencies and groups, on behalf of the university's research and graduate programs.



ECE Professor Ravishankar ("Ravi") Iyer

Iyer, who has served as CSL director since 2000, is also an affiliate professor of the Department of Computer Science, director of the Motorola Center for Communication, and co-director of the Center for Reliable and High-performance Computing. For his own research, Iyer has been recognized as having made fundamental and pioneering contributions to the design and validation of reliable and secure computing systems.

Iyer replaces Charles ("Chip") Zukoski, who has served as the vice chancellor for research since June 2002. Zukoski, who is the William H. and Janet G. Lycan Professor in the Department of Chemical and Biomolecular Engineering, is planning to return to the faculty.

Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign
53 Everitt Laboratory
1406 W. Green Street
Urbana, IL 61801

Return Service Requested