

RESONANCE

NEWS FOR ECE ILLINOIS ALUMNI AND FRIENDS
SUMMER 2009

Illinois opens research center in Singapore

ECE Professor Ben Wah
named director

Fusionopolis

Also in this issue:

Planning for a new ECE building

Let the computer look at
your face and tell your age

Jain elected to National Academy
of Engineering

Symposium celebrates Holonyak's
80th birthday

 ILLINOIS

Department of Electrical
and Computer Engineering



Advocate for Electrical and Computer Engineering

To alumni and friends of ECE ILLINOIS,

This is my first opportunity to write to you as interim department head for ECE ILLINOIS. In assuming this role it is a privilege to follow my colleague Richard Blahut, a visionary leader whose inspirational service has enhanced our department's international visibility and elevated its stature as a leading department in engineering education and foundational research.

ECE ILLINOIS established its fame through engineering innovations of transformational societal impact by both its faculty and its alumni. These innovations led to new technologies that have fueled new economies and improved our quality of life.

This tradition of excellence in engineering research and education continues vigorously today. I can think of only a handful of places in the world where so much talent is gathered together to generate new knowledge, inspire new ideas, and engage young minds in the excitement of service through innovation and entrepreneurship. And it is new knowledge that we must turn to now to combat the anxiety and sense of insecurity driven by the current global economic uncertainty. To borrow from Kurt Vonnegut, "new knowledge is the most valuable commodity on earth. The more truth we have to work with, the richer we become."

Generating and disseminating new knowledge is what ECE ILLINOIS does best. And yet, there are indications of a growing perception among high-school graduates and their parents that electrical and computer engineering is a profession with an uncertain future. We need to counteract this misinformed perception through our active engagement in raising public awareness of the pervasive role and the escalating importance of electrical and computer engineering technology.

The need for cutting-edge technology will only increase in the coming years. And one of the best things we do here is to inspire young people to change the world by immersing them in learning the transformational value of leading technology. Our world, now more than ever, needs the engineering talent trained in the tradition of Illinois.

I urge you, as our alumni and as our friends, to be advocates, not just for Illinois, but for the electrical and computer engineering profession as a whole. Tell young people about the unparalleled impact our profession has on our world, and instill in them the excitement of the technological advances made through engineering.

Working together, ECE ILLINOIS will remain the strong, vibrant force in engineering education that it is today.

Best Regards,

A handwritten signature in black ink, appearing to read 'AC Cangellaris'.

Andreas C. Cangellaris
Interim Department Head
M. E. Van Valkenburg Professor in Electrical and Computer Engineering

ECE ILLINOIS

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Cover photo courtesy of the Agency for Science, Technology and Research, Singapore.

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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 left.

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Star Challenge team claims bronze medal in Singapore

The Illinois Star Challenge team, made up of ECE graduate students and led by ECE faculty members Thomas Huang and Mark Hasegawa-Johnson, took third place in the Star Challenge, a multimedia retrieval competition held in Singapore that comprised more than 50 teams from around the globe. Participating Illinois students included (from left) Jui-Ting Huang, Dennis Lin, Xi Zhou, Yuxiao Hu, Xiaodan Zhuang, and Zhen Li.



ECE professors for now, Ironmen for life

In August, ECE Professors Andrew Singer (right) and Bruce Hajek completed the Ironman triathlon held in Louisville, Kentucky. The Ironman is a grueling test of endurance that includes a 2.4-mile open-water swim, a 112-mile bike ride, and a full 26.2-mile marathon, all completed in the same day. "It's kind of addictive, once you do one," said Singer, who has now participated in four Ironman triathlons. "It's one of those things that is addictive, but actually healthy for you."

four Ironman triathlons. "It's one of those things that is addictive, but actually healthy for you."

NSF grant establishes Illinois Cyber Security Scholar Program

The Information Trust Institute (ITI) on the Illinois campus received funding from the U.S. National Science Foundation (NSF) to support scholarships for undergraduate students who are working towards careers in information trust. The grant establishes the Illinois Cyber Security Scholar Program (ICSSP) at Illinois.

This was awarded by NSF's Federal Cyber Service: Scholarship for Service (SFS) program. ITI's director is ECE Professor William Sanders.



Honors course bridges gap between the sciences and humanities

ECE Professor Stephen Levinson designed a new honors course called "Scientific Discovery and the Reinvention of Identity." Levinson wanted the new course to be one that would bring together students

from sciences and humanities into an atmosphere where they could learn about and from the other disciplines. "I felt that there was a drastic misunderstanding of the sciences by the humanities," said Levinson. "And I felt that because of that, there is a real need to try to bring the two together and to try to repair the rift."

Micro and Nanotechnology Laboratory dedicated

On September 4, a dedication ceremony was held for the newly remodeled Micro and Nanotechnology Laboratory (MNTL).

The \$18 million, state-funded expansion project added new lab, research, classroom, and meeting space, creating one of the nation's premier and largest research laboratories in academia for micro and nanoelectronics, nanophotonics and optoelectronics, nanomedicine and bionanotechnology, and microelectromechanical systems (MEMS)/nanoelectromechanical systems (NEMS) and integrated systems research.



PURE program completes second semester

Promoting Undergraduate Research in ECE (PURE), a program developed by students in Eta Kappa Nu, is aimed at creating research opportunities for undergraduates, in particular freshmen and sophomores. PURE pairs undergraduates with graduate student mentors who collaborate with the undergraduate on a semester-long research project. 🔗



Planning for a new ECE building

By Tom Moone

Everitt Lab, the current home of ECE ILLINOIS, held its first classes within its walls in 1948. The building has seen and been the home to great innovations in electrical and computer engineering. After more than 60 years of service, the building is showing its age. It was built in the days before the advent of the personal computer and other high-tech innovations that the subsequent decades have seen.

It has long been recognized that ECE ILLINOIS needs a new home, one that will better enable it to continue to house the technological innovations that will enhance and change the future and how people interact with their world.

The State of Illinois has also recognized the importance of ECE and of maintaining its prominence in the field of electrical and computer engineering. For this purpose, funds have been released to secure an architect to develop plans for a new building.

After a search for an architecture firm that could design the state-of-the-art building needed to support the innovations ECE is known for, the University of Illinois signed an agreement in October with SmithGroup. SmithGroup is the oldest continuously practicing architectural firm in the United States and a leader in sustainable design. The new ECE building will be built in a space adjacent to the Beckman Institute at the north end of campus.

A department committee was formed in January 2008 to set guidelines for the new building. ECE Professor Philip Krein, who serves as the committee's chair, said he and the other members mapped out what the department's needs will be in terms of office, lab, and classroom space, essentially designing the building from the inside out. "SmithGroup will then take these guidelines to design the building from the outside in," said Krein.

One goal, said Krein, is to create a building that will be "an anchor in completing this part of campus, and bringing it into the educational mission of the University as well as the research mission." To achieve this goal, the design will include space for independent student projects, large team projects, and the department's leading teaching labs.



During a planning meeting, members of the ECE Building Ad Hoc Committee and architects from SmithGroup spent time at the site of the new ECE building, which will be located to the west of the Coordinated Science Lab (CSL) on the north engineering quad.

SmithGroup has been a leader in developing buildings that are Leadership in Energy and Environmental Design (LEED) certified. Krein said that the new ECE building will showcase advanced technology and energy efficiency. "Our intent is to achieve as high a LEED rating as we can economically," said Krein.

ECE ILLINOIS has set up a Web site dedicated to the campaign for this new building. A video and more information are available at <http://www.ece.illinois.edu/buildingcampaign/>. 

The design will include space for independent student projects, large team projects, and the department's leading teaching labs.

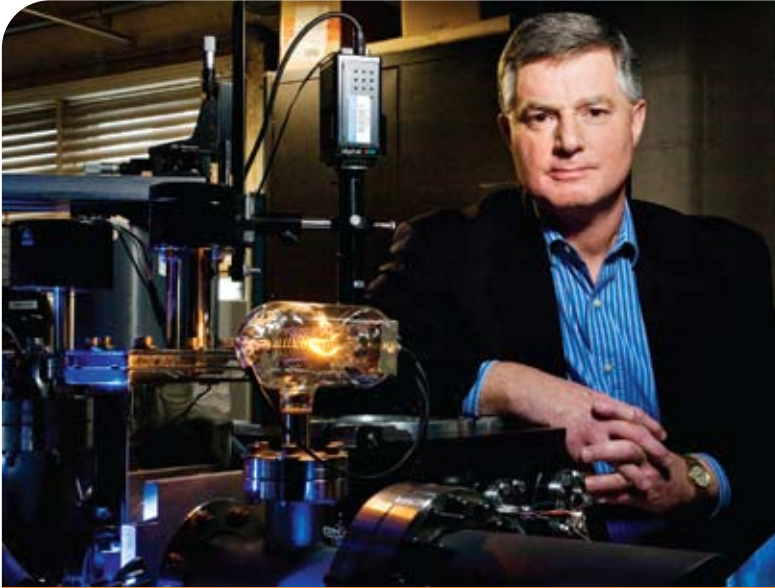


The new ECE building will be built in a space adjacent to the Beckman Institute at the north end of campus.

New plasma transistor could create sharper displays

BY JAMES E. KLOEPEL, U OF I NEWS BUREAU

By integrating a solid-state electron emitter and a microcavity plasma device, ECE researchers have created a plasma transistor that could be used to make lighter, less expensive, and higher resolution flat-panel displays.



Gary Eden, a professor of electrical and computer engineering at Illinois, and colleagues have created a plasma transistor that could be used to make lighter, less expensive and higher resolution flat-panel displays. The researchers have applied for a patent. *Photo by L. Brian Stauffer*

“The new device is capable of controlling both the plasma conduction current and the light emission with an emitter voltage of five volts or less,” said ECE Professor Gary Eden, who is director of the Laboratory for Optical Physics and Engineering (lope.ece.uiuc.edu) at Illinois.

Microcavity plasma

At the heart of the plasma transistor is a microcavity plasma, an electronic-photon device in which an electrically charged gas (a plasma) is contained within a microscopic cavity. Power is supplied by two electrodes at voltages of up to 200 volts.

Eden and graduate student Kuo-Feng (Kevin) Chen fabricated the plasma transistor from copper-clad laminate into which a microcavity 500 microns in diameter was produced by standard photolithographic techniques. The solid-state electron emitter was made from a silicon wafer, topped with a thin layer of silicon dioxide.

The microcavity is approximately the diameter of a human hair, and is filled with a small amount of gas. When excited by electrons, atoms in the plasma radiate light. The color of light depends on what gas is placed in the microcavity.

Around the plasma is a thin boundary layer called the sheath. Within the sheath, electrical current is carried not by negatively charged electrons, but by positively charged ions. Much heavier than electrons and therefore harder to accelerate, the ions require a large electric field generated by a large voltage drop across the sheath.

The intense electric field within the plasma sheath also promotes electron transport, said Eden, who also is a researcher at the University’s Coordinated Science Laboratory and at the Micro and Nanotechnology Laboratory. “By injecting electrons from the emitter into the sheath, we can significantly increase the flow of electrons through the plasma, which increases the plasma’s conductivity and light emission.”

While the microcavity plasma still requires up to 200 volts to emit light and conduct current, the current and light emission can be controlled by an electron emitter operating at five volts or less, Eden said.

Practical applications

In previous work, Eden’s team created flat-panel plasma lamps out of two sheets of aluminum foil separated by a thin dielectric layer of clear aluminum oxide. More than 250,000 lamps can be packed into a single panel. And, because microcavity plasmas operate at atmospheric pressure, thick pieces of glass are not needed to seal them. The lightweight plasma panels are less than one millimeter thick.

“Being able to control each microcavity plasma independently could turn our plasma panel into a less expensive and higher resolution plasma display,” Eden said. “The plasma transistor also could be used in applications where you want to use a small voltage to control a great deal of power.”

Eden and Chen described the plasma transistor in the journal *Applied Physics Letters*. The researchers have applied for a patent.

The work was supported by the U.S. Air Force Office of Scientific Research. [🔗](#)

Photonic crystal biosensors detect protein-DNA interactions

BY JAMES E. KLOEPEL, U OF I NEWS BUREAU

Scientists at the University of Illinois have developed a new class of disposable, microplate-based optical biosensors capable of detecting protein-DNA interactions. Based on the properties of photonic crystals, the biosensors are suitable for the rapid identification of inhibitors of protein-nucleic acid and protein-protein interactions.

“Protein-DNA interactions are essential for fundamental cellular processes such as transcription, DNA damage repair and apoptosis,” said Paul Hergenrother, an associate professor of chemistry and an affiliate of the University’s Institute for Genomic Biology. “Screening for compounds that inhibit particular kinds of protein-DNA binding is a very important step in drug development.”

Developed by ECE Associate Professor Brian Cunningham, the photonic crystal biosensors consist of a low-refractive-index polymer grating coated with a film of high-refractive-index titanium oxide, attached to the bottom of a standard 384-well microplate. Each well functions as a tiny test tube with a biosensor in the bottom.

Detection at the molecular level

“First, we selectively attach a biomolecule, such as DNA, to the bottom of each well. Then we see how that biomolecule interacts with other molecules, including drugs,” said Cunningham, who also is affiliated with the Beckman Institute, Micro and Nanotechnology Laboratory, and Institute for Genomic Biology.

By examining the light reflected from the photonic crystal, the researchers can tell when molecules are added to, or removed from, the crystal surface. The measurement technique can be used, for example, in a high-throughput screening mode to rapidly identify molecules and compounds that prevent DNA-protein binding.

The researchers demonstrated the new technology by examining two very different protein-DNA interactions. The first was the bacterial toxin-antitoxin system mazEF, which binds to DNA in a sequence-specific manner and is thought to be responsible for the maintenance of resistance-encoding plasmids in certain infectious bacteria. The second was the human apoptosis-inducing factor (AIF), a protein that binds to chromosomal DNA in a DNA-sequence-independent manner.

The photonic crystal biosensor technology was further utilized in a screen for inhibitors of the AIF-DNA inter-



ECE Associate Professor Brian Cunningham (right) and Paul Hergenrother, associate professor of chemistry, hold biosensors they’ve developed that are capable of detecting protein-DNA interactions. Photo by L. Brian Stauffer

action, and through this screen aurin tricarboxylic acid was identified as the first *in vitro* inhibitor of AIF.

Research potential is large

While the photonic crystal biosensor was demonstrated only for protein-DNA interactions, analogous experiments with protein-RNA interactions, and protein-protein interactions are also possible, Cunningham said. “We also could grow cancer cells on the photonic crystal surface, and see how different drugs affect cell growth.”

The researchers describe their work in the journal *ACS Chemical Biology*. With Cunningham and Hergenrother, the paper’s co-authors are graduate student and lead author Leo Chan, and graduate students Maria Pineda and James Heeres.

The work was funded by the National Institutes of Health. 

Step right up, let the computer look at your face and tell you your age

BY JAMES E. KLOEPEL, U OF I NEWS BUREAU

People who hope to keep their age a secret won't want to go near a computer running this software.

Like an age-guesser at a carnival, computer software under development at the University of Illinois can fairly accurately estimate a person's age. But, unlike age-guessers, who can view a person's body, the software works by examining only the person's face.

"Age-estimation software is useful in applications where you don't need to specifically identify someone, such as a government employee, but would like to know their age," said ECE Professor Thomas S. Huang, the William L. Everitt Distinguished Professor of Electrical and Computer Engineering.

For example, age-recognition algorithms could stop underage drinkers from entering bars, prevent minors from purchasing tobacco products from vending machines, and deny children access to adult Web sites, said Huang, who leads the Image Formation and Processing group at the Beckman Institute.

Estimating someone's age is not an easy task, even for a computer. That's partly because the aging process is determined not only by a person's genetic makeup, but also by many other factors, including health, location, and living conditions.

"Human faces do convey a significant amount of information, however, and provide important visual cues for estimating age," Huang said. "Facial attributes, such as expression, gender, and ethnic origin, play a crucial role in our image analysis."

Consisting of three modules—face detection, discriminative manifold learning, and multiple linear regression—the researchers' age-estimation software was trained on a database containing photos of 1,600 faces.

The software can estimate ages from one year to 93 years. The software's accuracy ranges from about 50 percent when estimating ages to within five years, to more than 80 percent when estimating ages to within 10 years. The accuracy can be improved by additional training on larger databases of faces, Huang said.

In addition to performing tasks such as security control and surveillance monitoring, age-estimation software

also could be used for electronic customer relationship management.

For example, a camera snapping photos of customers could collect demographic data, such as how many adult men and women buy burgers, or what percentage of teenagers purchase a particular soft drink.



In addition to performing tasks such as security control and surveillance monitoring, age-estimation software also could be used for electronic customer relationship management or to target specific audiences with advertising, said Thomas S. Huang, the William L. Everitt Distinguished Professor of Electrical and Computer Engineering.
Photo by L. Brian Stauffer

Or, combined with algorithms that identify a person's sex, age-estimation software could help target specific audiences for advertisements. For example, a store display might advertise a new automobile or boat as a man walks by, or new clothing or cosmetics as a woman walks by.

"All of this can be done without violating anyone's privacy," Huang said. "Our software does not identify specific individuals. It just estimates their ages."

Huang is also affiliated with the University's Center for Advanced Study, Coordinated Science Laboratory, Information Trust Institute, and Department of Computer Science.

Funding was provided by the National Science Foundation and the Intelligence Advanced Research Projects Activity. The researchers published their findings in the two journals *IEEE Transactions on Multimedia* and *IEEE Transactions on Image Processing* in 2008. 🔗

"Age-estimation software is useful in applications where you don't need to specifically identify someone, such as a government employee, but would like to know their age."

Carbon nanotube avalanche process nearly doubles current

BY JAMES E. KLOEPPPEL, U OF I NEWS BUREAU

By pushing carbon nanotubes close to their breaking point, ECE researchers have demonstrated a remarkable increase in the current-carrying capacity of the nanotubes, well beyond what was previously thought possible.

The researchers drove semiconducting carbon nanotubes into an avalanche process that carries more electrons down more paths, similar to the way a multi-lane highway carries more traffic than a one-lane road.

“Single-wall carbon nanotubes are already known to carry current densities up to 100 times higher than the best metals like copper,” said ECE Assistant Professor Eric Pop. “We now show that semiconducting nanotubes can carry nearly twice as much current as previously thought.”

As reported in the journal *Physical Review Letters*, the researchers found that at high electric fields (10 volts per micron), energetic electrons and holes can create additional electron-hole pairs, leading to an avalanche effect where the free carriers multiply and the current rapidly increases until the nanotube breaks down.

The sharp increase in current, Pop said, is due to the onset of avalanche impact ionization, a phenomenon observed in certain semiconductor diodes and transistors at high electric fields, but not previously seen in nanotubes.

While the maximum current carrying capacity for metallic nanotubes has been measured at about 25 microamps, the maximum current-carrying capacity for semiconducting nanotubes is less established. Previous theoretical predictions suggested a similar limit for single-band conduction in semiconducting nanotubes.

To study current behavior, Pop, graduate student Albert Liao, and undergraduate student Yang Zhao first grew single-wall carbon nanotubes by chemical vapor deposition from a patterned iron catalyst. Palladium contacts were used for measurement purposes. The researchers then pushed the nanotubes close to their breaking point in an oxygen-free environment.

“We found that the current first plateaus near 25 microamps, and then sharply increases at higher electric fields,” said Pop, who also is affiliated with the Beckman Institute and the Micro and Nanotechnology Laboratory.

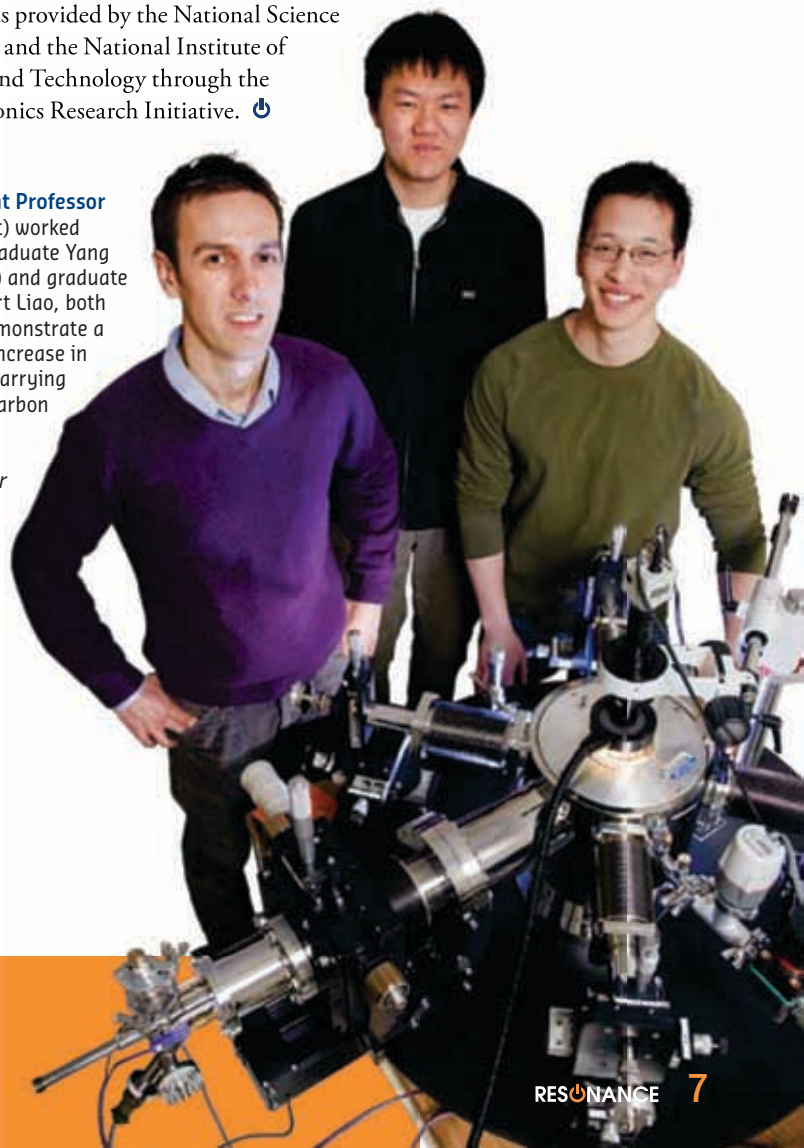
“We performed repeated measurements, obtaining currents of up to 40 microamps, nearly twice those of previous reports.”

By inducing very high electric fields in the nanotubes, the researchers drove some of the charge carriers into nearby subbands, as part of the avalanche process. Instead of being in just one “lane,” the electrons and holes could occupy several available lanes, resulting in much greater current.

The avalanche process, which cannot be observed in metallic carbon nanotubes because an energy gap is required for electron-hole multiplication, offers additional functionality to semiconducting nanotubes, Pop said. “Our results suggest that avalanche-driven devices with highly nonlinear turn-on characteristics can be fashioned from semiconducting single wall nanotubes.”

Funding was provided by the National Science Foundation and the National Institute of Standards and Technology through the Nanoelectronics Research Initiative. [u](#)

ECE Assistant Professor Eric Pop (left) worked with undergraduate Yang Zhao (center) and graduate student Albert Liao, both in ECE, to demonstrate a remarkable increase in the current-carrying capacity of carbon nanotubes.
Photo by L. Brian Stauffer



Jain elected to the National Academy of Engineering

BY JAMES E. KLOEPEL, U OF I NEWS BUREAU, AND TOM MOONE

ECE Professor Kanti Jain (MSEE '70, PhD '75) has been elected to membership in the National Academy of Engineering. He was among 65 engineers selected this year for membership in the NAE, which was established in 1964 under a charter from the National Academy of Sciences as a parallel organization of outstanding engineers.



ECE Professor Kanti Jain

Election to the NAE is among the highest professional distinctions in engineering. The current NAE membership includes 2,246 U.S. engineers and 197 foreign associates. Ten ECE faculty are NAE members.

Jain was cited “for contributions to the development of high-resolution, deep-ultraviolet excimer lithography for microelectronic fabrication.”

“This is really a great honor,” said Jain. “I feel that being recognized by your peers who are so eminent in their fields is really great. And it is also rewarding because this recognition is for my work that has had a broad impact in the industry.”

Richard Herman, the chancellor of the Urbana campus, said, “This prestigious honor is an indication of professor Jain’s pioneering contributions to the field of optical engineering. We are extremely proud of his accomplishments, which are emblematic of the continuing legacy of excellence of our University.”

Jain’s research focuses on developing novel micro- and nano-fabrication technologies that enable the patterning and microstructuring of a variety of organic and inorganic materials (including new polymers, semiconductors,

metals, biological materials, and producing structures, devices, and systems previously not deemed possible).

His broad research objectives include advancing state-of-the-art microelectronic, optoelectronic, and microsystem devices using novel large-area, high-resolution fabrication techniques.

A reception was held in Jain’s honor in Everitt Lab on February 6. There, College of Engineering Dean Ilesanmi Adesida said, “For the college, for the department, and for the University, this is a big honor. We are very happy to congratulate you, Kanti. We value your work. We value you as a colleague. And we value your contributions to society.”

Having earned his master’s degree and PhD in ECE, Jain noted, “I sat in some of these classrooms where I teach now. This department is a part of my heart.” He joined the Illinois faculty in 2006.

Jain’s many honors and recognitions include the David Richardson Medal of the Optical Society of America (2008) and Outstanding Innovation Awards by IBM (1985 and 1988). He is a Fellow of the IEEE, the Optical Society of America, and the International Society for Optical Engineering. He holds 68 patents, including inventions of core lithography technologies for integrated circuits and displays.

Also receiving election to the NAE this year was ECE alumnus Gurindar Sohi (MSEE '83, PhD '85). Recognized by NAE “for contributions to the design of high-performance, superscalar computer architectures,” Sohi is the John P. Morgridge Professor and E. David Cronon Professor of Computer Sciences at the University of Wisconsin–Madison. He teaches in the Departments of Computer Science and Electrical and Computer Engineering. [u](#)

ECE ranks high on U.S. News & World Report annual survey

In the 2009 annual survey by *U.S. News & World Report*, ECE ILLINOIS and the College of Engineering continued to show the strength of their curricula.

For undergraduate electrical engineering, ECE ranked third, up one spot from the 2008 rankings. First and second went, respectively, to MIT and Stanford University, both private universities.

For undergraduate computer engineering, ECE retained its ranking of fifth from the 2008 rankings. The top four

Scientists prove graphene's edge structure affects electronic properties

BY JAMES E. KLOEPEL, U OF I NEWS BUREAU

Graphene, a single-atom-thick sheet of carbon, holds remarkable promise for future nanoelectronics applications. Whether graphene actually cuts it in industry, however, depends upon how graphene is cut, according to ECE researchers.

Graphene consists of a hexagonal lattice of carbon atoms. While scientists have predicted that the orientation of atoms along the edges of the lattice would affect the material's electronic properties, the prediction had not been proven experimentally.

Now, researchers at Illinois say they have proof.

"Our experimental results show, without a doubt, that the crystallographic orientation of the graphene edges significantly influences the electronic properties," said ECE Professor Joseph Lyding. "To utilize nanometer-size pieces of graphene in future nanoelectronics, atomically precise control of the geometry of these structures will be required."

Lyding and graduate student Kyle Ritter (now at Micron Technology, Inc., in Boise, Idaho) report their findings in a paper accepted for publication in *Nature Materials*. The paper was posted on the journal's Web site on February 15.

To carry out their work, the researchers developed a method for cutting and depositing nanometer-size bits of graphene on atomically clean semiconductor surfaces like silicon.

Then they used a scanning tunneling microscope to probe the electronic structure of the graphene with atomic-scale resolution.

"From this emerged a clear picture that edges with so-called zigzag orientation exhibited a strong edge state, whereas edges with armchair orientation did not," said Lyding,

who also is affiliated with the University's Beckman Institute and the Micro and Nanotechnology Laboratory.

"We found that pieces of graphene smaller than about ten nanometers with predominately zigzag edges exhibited metallic behavior rather than the semiconducting behavior expected from size alone," Lyding said. "This has major implications in that semiconducting behavior is mandatory for transistor fabrication."

Unlike carbon nanotubes, graphene is a flat sheet, and therefore compatible with conventional fabrication processes used by today's chipmakers. But, based on the researchers' experimental results, controlled engineering of the graphene edge structure will be required for obtaining uniform performance among graphene-based nanoelectronic devices.



ECE Professor Joseph Lyding

"Even a tiny section of zigzag orientation on a five-nanometer piece of graphene will change the material from a semiconductor into a metal," Lyding said. "And a transistor based on that will not work. Period."

The Office of Naval Research and the National Science Foundation funded the work. 🔗

schools in this category were MIT, Stanford University, Carnegie Mellon University, and the University of California—Berkeley.

Overall, the undergraduate programs in the Illinois College of Engineering ranked fourth in the survey. Ten Illinois engineering programs were ranked in the top ten. Civil, agricultural, and materials engineering were ranked first in the nation. 🔗

Rankings for individual departments

Rank	Department
6	Aerospace
1	Agricultural
22	Biomedical
8	Chemical
1	Civil
5	Computer Engineering
3	Electrical/Electronic/Communications
4	Engineering Physics
2	Environmental/Environmental Health
11	Industrial/Manufacturing
1	Materials
6	Mechanical
4	Nuclear (from 2007; nuclear engineering is ranked every other year.)



Narendra Ahuja

NARENDRA AHUJA won the TA Stewart-Dyer/Frederick Trevithick Prize. He also received an HP Labs Innovation Research Program Award for his proposal “3D Reconstruction of Dynamic Real-World Objects and 3D Motion Aided Gesture Recognition.”

TAMER BAŞAR has been named the interim director of the Beckman Institute for Advanced Science and Technology at the University of Illinois. The Beckman Institute is an interdisciplinary research

institute devoted to basic research in the physical sciences, computation, engineering, biology, behavior, and cognition.

RASHID BASHIR was named a Fellow of IEEE and of the American Institute for Medical and Biological Engineering (AIMBE).

STEPHEN BOPPART was named Fellow of SPIE and the Optical Society of America.



Deming Chen

DEMING CHEN received a best paper award at ASPDAC '09 for his paper “Fast Yield: Variation-Aware, Layout-Driven Simultaneous Binding and Module Selection for Performance Yield Optimization.”

KENT CHOQUETTE received the 2008 Engineering Achievement Award from the Lasers and Electro-Optics Society (LEOS), a society within IEEE. Choquette received this award for development of the

monolithic selectively oxidized vertical cavity surface-emitting laser (VCSEL).

JAMES COLEMAN received the IEEE David Sarnoff Award, the IEEE LEOS Distinguished Service Award, and is president-elect for LEOS in 2009.

MINH DO received a best paper award for “The Contourlet Transform: An Efficient Directional Multiresolution Image Representation.”

ECE Professor Emeritus **FLOYD DUNN** (BSEE '49, MSEE '51, PhD '56) received the William J. and Francis J. Fry Award given by the International Society for Therapeutic Ultrasound.



Minh Do

GARY EDEN was named a Fellow of the American Association for the Advancement of Science.

MILTON FENG has been appointed a Center for Advanced Study Associate for one semester of the 2009–10 year.

MARK HASEGAWA-JOHNSON became a member of the Articulograph International Steering Committee (AISC), a group of volunteers trying to provide standard human subjects safety information for new users of the Electromagnetic Articulograph.

THOMAS HUANG was recently named a 2008 Academician by Academia Sinica, a preeminent academic institution in the Republic of China (Taiwan).

WEN-MEI HWU was named principal investigator of the world's first CUDA Center of Excellence, which will be sponsored by NVIDIA Corporation.

It is with great sadness that ECE ILLINOIS notes the



ECE Professor Emeritus Ed Ernst

ECE Professor Emeritus **EDWARD ERNST** (BSEE '49, MSEE '50, PhD '55) died November 14, 2008. He was 84. Ernst was a member of the ECE ILLINOIS faculty from 1958 to 1989. In 1990, he joined the University of South Carolina as the Allied Signal Professor of Engineering, and he retired from that position in 2000.



ECE Professor Emeritus Philip Bauman

ECE Professor Emeritus **PHILIP BAUMAN** died January 27, 2009. He was 90. He was a faculty member of ECE ILLINOIS from 1946 to 1976.

RAVI IYER received a 2008 IBM Faculty Fellow Award.

ECE Professor Emeritus **SUNG-MO (STEVE) KANG** was named to the Silicon Valley Engineering Hall of Fame.

P. R. KUMAR received an honorary doctorate from the Swiss Federal Institute of Technology in Zurich (ETH Zurich).

JEAN PIERRE LEBURTON was named a Fellow of the Institute of Physics (IOP). Based in London, the IOP is devoted to increasing the understanding and application of physics.



Jonathan Makela

JONATHAN MAKELA received the Zeldovich Medal from the Committee on Space Research and the Russian Academy of Sciences. This medal is granted to scientists under the age of 36 in each of the Committee on Space Research and the Russian Academy of Sciences' eight scientific commissions every two years. Makela also received the International Union of Radio Scientists United States National Committee Henry G. Booker Fellowship. The award is given triennially to an outstanding young radio scientist in North America.

A paper co-authored by **DAVID M. NICOL** and his student Nabil Schear received the Best Paper award from the 22nd ACM/IEEE/SCS Workshop on Principles of Advanced and Distributed Simulation.

WILLIAM O'BRIEN received the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society's Rayleigh Award for 2008. The Rayleigh Award is the highest Society-wide award presented to a member in special recognition of a career of outstanding technical achievements.


ERIC POP received a DARPA Young Faculty Award (YFA). This is the second year for the program, which is sponsored and promoted within the Microsystems Technology Office (MTO) that funds proposed research by young faculty from around the country.

WILLIAM H. SANDERS has been named acting director of the Coordinated Science Laboratory (CSL) at the University of Illinois. He replaces Ravi K. Iyer, who was recently appointed Illinois's interim vice chancellor for research.

ANDREW SINGER received the Special-Topic Evening Session Award at the International Solid State Circuits Conference (ISSCC). He was also selected to participate in the National Academy of Engineering's 14th annual U.S. Frontiers of Engineering Symposium. He was one of 82 rising engineers chosen from more than 230 applicants.



Andrew Singer

BEN WAH and his student Chih-Wei Hsu received the Best Temporal Satisficing Planner Award in the Deterministic Track of the Sixth International Planning Competition. 

death of three of our faculty members.



ECE Adjunct Associate Professor Ralf Koetter

ECE Adjunct Associate Professor **RALF KOETTER** died February 2, 2009. He was 45. He joined the faculty in 1999. In 2006 he joined the faculty of the Technische Universität München as the head of the Institute for Communications Engineering, but he remained an adjunct at ECE ILLINOIS.

The ECE Department has established the Ralf Koetter Memorial Fund in Electrical and Computer Engineering, which will provide support to ECE students and faculty. Donations to this fund can be made to the University of Illinois Foundation. Questions about donations to this new fund should be directed to Jonathan Hill, ECE director of development, at jonahill@illinois.edu or (217) 265-6285.

Shanbhag and Rosenbaum spend sabbaticals in Taiwan

By TOM MOONE

Though it covers an area of just less than 14,000 square miles (just slightly larger than the state of Maryland), the Republic of China (Taiwan) has become a major force in fabricating integrated circuits (ICs). Recently, Taiwan has also been gaining prestige for its chip design as well. It is this prominence in the field of circuits that has made Taiwan a destination of choice for some ECE faculty to spend their sabbaticals.

ECE Professor Naresh Shanbhag spent the Fall 2007 semester in Taiwan, and ECE Professor Elyse Rosenbaum went there for the Fall 2008 semester. Shanbhag spent his sabbatical at National Taiwan University in Taipei, and Rosenbaum was based at National Chiao Tung University in Hsinchu.

The draw of Taiwan

Shanbhag and Rosenbaum are both involved in designing integrated circuits. Shanbhag went to Taiwan seeking to grow his skills, particularly mixed signal design, which contains both analog and digital components. “I design communication ICs,” said Shanbhag. “I wanted to learn and expand my level of expertise in mixed signal design.”

Rosenbaum wanted to study how the IC manufacturers in Taiwan addressed electrostatic discharge (ESD) concerns. “My own research is in IC circuit reliability and design,” she said. “I visited the foundries and design houses and asked them about their customers’ demands for system-level reliability and how they ask the component manufacturers to help them build in the system-level reliability.”

The sabbatical experience

For both professors, their sabbaticals often consisted of workshops, lectures, and interactions with faculty and students at the host universities. “I grew a lot because I was exposed to these mixed signal designers,” Shanbhag said. He also gave seminars and interacted with researchers at IC design companies such as MediaTek and RealTek, government labs such as the Industrial Technology Research Institute (ITRI), and the Chip Implementation Center (CIC).

Rosenbaum has strong memories of the students she met. “I met with a number of undergraduate students who are interested in coming to Illinois for graduate study,” she said.



ECE Professor Elyse Rosenbaum (center) and her daughter at a hotpot restaurant during Rosenbaum's sabbatical stay in Taiwan. Professor Ming-Dou Ker of National Chiao Tung University is to Rosenbaum's left.

“I talked to many of them and advised them, so we may have some of them coming here.”

Bringing something back to Illinois

Rosenbaum, who returned to Illinois just weeks before the beginning of the spring semester, noted that she gained a lot of knowledge of how Taiwan is performing within the IC field. “You see what other people are working on, and what the industry in different parts of the world see as their critical challenges for the near future,” she said.

When Shanbhag returned from his Fall 2007 sabbatical, he began designing a new course around some of the insights he had gained. The resulting course was ECE 598SB: High-Speed Clock and Data Recovery Circuits and Systems, which he co-taught with his former PhD student Dr. Hyeon-Min Bae, who was working at Finisar Corporation in Champaign. “It is a mix of academic research and practical experience,” said Shanbhag. “It brought valuable industrial experience into our curriculum. And the students really liked it a lot.”

Cultural experience

Of course, a major benefit of a sabbatical of this nature is the cultural exposure. Both faculty members traveled with their families. And both put their children in schools where Chinese was used at least part of the time. Shanbhag said, “My children are still in touch with friends they made there.” And Rosenbaum noted that her children “wanted to finish the school year there, but it wasn't feasible.”

For both Shanbhag and Rosenbaum, the sabbatical in Taiwan was a personally and intellectually rewarding experience. [🔗](#)



ECE Professor Naresh Shanbhag and his family visit a traditional Taiwanese market during one of their sightseeing trips while in Taiwan for Shanbhag's sabbatical visit.

Students design an out-of-this-world class project

BY LAUREL BOLLINGER

“Our two grad students were asked to give a seminar to NASA’s Aeronomy of Ice in the Mesosphere (AIM) small satellite group. So they were impressed with our little satellite,” said ECE ILLINOIS Professor Gary Swenson proudly. The two graduate students had gone to California Polytechnic State University in April to give a seminar on the small satellite they were building with 18 other students.

That’s right. A satellite. University of Illinois juniors and seniors in all areas of engineering are coming together for a yearlong class focused around building a satellite that will eventually go into orbit. The course is ENG 491CU1: Interdisciplinary Design Project. The satellite project they are designing is called a CubeSat. Teams from more than 40 international universities are creating CubeSats. The name refers to the fact that each satellite is a ten-centimeter cube. The Illinois satellite is a double CubeSat, so it is 20 centimeters long. ECE Professor Gary Swenson, along with Aeronautical Engineering Professor Victoria Coverstone, began developing the Illinois CubeSat class in 2001.

When the first Illinois satellite, ION 1 (which stands for Illinois Observing Nanosat), was launched by a Russian spacecraft on July 26, 2006, hopes ran high. But, about a minute after launch, their dreams were dashed when the spacecraft exploded.

“We’ve been working on ION 2 since July 26, 2006, the day the other blew up,” said Swenson.

ION 2 is scheduled to have a December 2010 launch. Current students in the class are working hard to make sure it is ready on time. This semester, students are working on the design for the bus, the physical and electrical structure that the satellite will ride in.

“Our students have attacked this job quite aggressively, and this will be a very elegant bus,” said Swenson. “The status is that we’re expecting to finish the bus by May.”

Once it is launched, ION 2 will track upper atmospheric emissions. The data will be received by an antenna on top of Everitt Lab. The little satellite, if it makes it into orbit, will circle Earth 16 times a day, or about once every hour and a half.

But even more incredible than the satellite is the experience and collaboration the students are involved in. There are 20 students in the class, divided into six teams. Swenson

says that he and Coverstone, as well as a few graduate students, are there to help steer the students and to answer questions, but they let the students do all the problem-solving on their own.

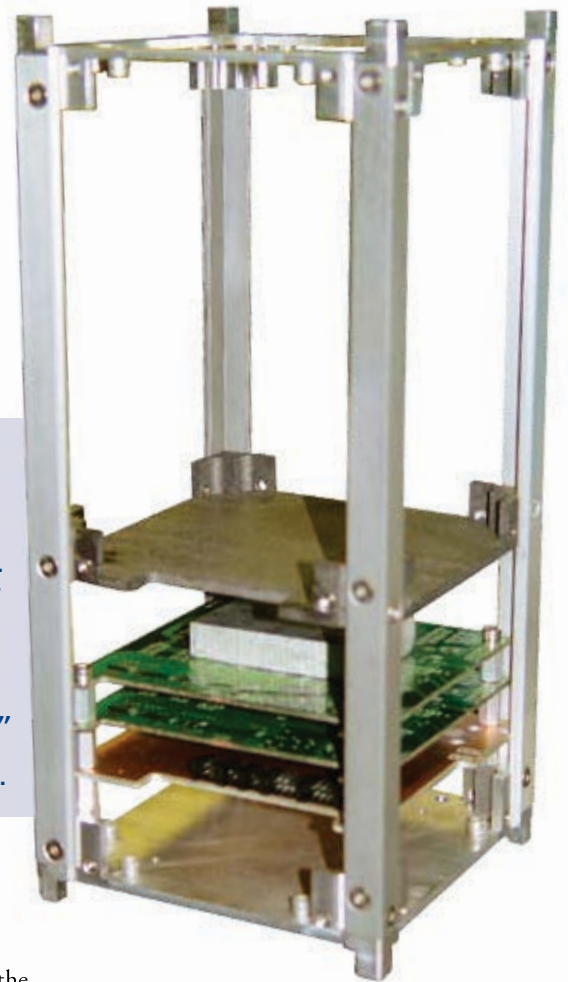
“We never take away the responsibility to solve their problems. That is the privilege of the engineer, who deserves the satisfaction of what it is solved,” said Swenson.

“We never take away the responsibility to solve their problems. That is the privilege of the engineer, who deserves the satisfaction of what it is solved,” said Swenson. “That’s part of the class reward—learning the process.”

The students are aided in their problems through a tight-knit national community of other engineers from all over the United States. They send e-mail to and collaborate with students from Berkeley, Cornell, the University of Montana, and other universities.

Swenson said that this class comes at a great time for students. They are able to take advantage of the latest technologies and electrical components, and become more familiar working with them.

“It’s very exciting to use that technology and build a new system that can do different things in a small package,” said Swenson. “So the challenges are quite large, but it’s very straightforward to put the students together and get it accomplished.”



The ION 2 satellite is currently being assembled in preparation for a December 2010 launch.

Suchko revels in robotics

By CHARLIE JOHNSON

“If you want a robot, just talk to me,” said Alex Suchko.

And Suchko, a freshman in electrical engineering, is not joking around. Prior to entering the University, the 18-year-old from Cathedral High School in Indianapolis competed in a robot building and driving competition called FIRST Robotics. FIRST is an acronym for “For Inspiration and Recognition of Science and Technology.” The competition, which is made possible through corporate sponsorships and private donations, brings teams of young inventors and their robots together to compete in events that test a team’s ability to conceive, fabricate, and program their robot to complete specific tasks while navigating a series of obstacles. Worldwide, 2,000 teams competed, involving more than 100,000 students. The international championship

became so large that last year it was held on the playing field of the Georgia Dome.

Competition began when teams were given a series of standardized parts, including motors, speed controllers, and batteries, that were required to be incorporated into the robot’s design. “There are certain safety components that you must use,” said Suchko, “but other than that, you do whatever you want. You start from a blank slate. The teams then conceive, design, program, and construct the robot they think will best complete the challenge.”

The challenge itself changes from year to year. In the most recent competition, during Suchko’s senior year, teams raced their robots around an oval track about the size of a basketball court. Suspended about six feet above the track, and similar to a highway overpass, was a metal rack holding 40-inch diameter balls. Teams were awarded points for completing laps around the track, as well as for knocking balls off of the suspended rack, and then either throwing those balls over the rack or bouncing them underneath it.

Suchko’s specialty is programming. The international championship competition began with a 15-second period



Part of the FIRST Robotics competition involved manipulating 40-inch diameter balls.

during which the robot had to move based solely on programming—no human interaction. For his software design for this portion, Suchko received the Rockwell Automation Innovation in Control Award. Being able to complete tasks such as knocking the balls off the rack or running laps around the track during the automation period scored Suchko’s team big points, and the team received “World Semi-Finalist” honors, placing them in the top 0.04 percent of teams worldwide.

However, despite winning the programming award, that was not Suchko’s favorite part of the competition. “I have to be honest, I had the opportunity to drive the robot this year, and that was my absolute favorite [part],” he said.

Suchko chose to attend Illinois for a variety of reasons. “A lot of people in my neighborhood went to Illinois,” he said. “There’s lots more opportunities for research. And the departments are a lot better coordinated here, and it’s easier to get funding for projects here.”

Even though there is no FIRST Robotics team at the University, Suchko plans to continue robotics projects through IEEE and the Promoting Undergraduate Research in ECE (PURE) program, which allows undergraduates to complete individual research projects with the help of a graduate student mentor.

And Suchko remains an enthusiastic advocate for robotics. “Don’t be afraid of it,” is his advice to any hesitant participant. “No matter what discipline you’re in, there is definitely something in robotics you can get involved with.”



ECE freshman Alex Suchko participated in the FIRST Robotics competition during his senior year in high school, where he won the Rockwell Automation Innovation in Control Award. He plans to continue working on robotics projects while at Illinois.

ECE student wins gaming gold

BY LAUREL BOLLINGER

“The time I was most nervous was when I won my first game because I kind of realized that I had a very good chance to take myself to the top two. So that was when it hit me and I got really nervous.”

This isn't a football or basketball player talking. These are the words of ECE student Ryan Mancl, who spent November 6–9 in Cologne, Germany, competing on the USA team in the World Cyber Games (WCG). Mancl has been involved in gaming for the past three years, the last two at a competitive level.

His expertise is in a game called *Age of Empires III: The Asian Dynasties*, a game of tactics and quick thinking. In a competition setting, it is all about becoming stronger than another empire. “In *Age of Empires* you both start out with the same setup on two different sides of a map and you basically build up your economy until you get enough resources so that you can have an army at the same time,” he said. “And then it's just kind of balancing little attacks on their economy while having big fights between the armies. It's a lot of back and forth. There's a lot of strategy to it too, and a lot of decision making.”

His expertise showed as Mancl found himself in the finals competing against the 2007 WCG champion for this game. They battled for the championship and the top prize of \$10,000. When it was over, Mancl had won.

“My strategy was mainly to adapt to my opponents because most of them tend to do the same thing,” said Mancl. “They have a set style that I kind of knew about. So I played more to adapt to them instead of playing to my own style.”

Mancl not only adapted, he spent many hours practicing and going through the game using different strategies. “Basically, for this tournament I played with one person who I knew very well, and we tested out all the different strategies to figure out which would be the best. Once we had that, we practiced it against each other over and over again to get the more specific tactics down,” said Mancl.

Mancl put many hours into prepping for the Cyber Games. He would play at least one or two hours a day during school, and then six to eight hours a day the week before the finals.

So important was this competition that Mancl chose to take a chemistry exam early and then came home to two



ECE student Ryan Mancl (on center dais) won a gold medal at the 2008 World Cyber Games held in Cologne, Germany. Photo courtesy of Ryan Mancl



midterms and a research paper. “It was not the most relaxing week to come back to, but it was worth it in the end,” said Mancl.

Besides the competition, Mancl had the opportunity to see some sights and also meet friends through these online games. “The most exciting part was meeting all the people that I've played games with over the past two years,” he said. “That was really the biggest part of the trip for me.”

Now that he is back at the U of I, he has time to focus on his studies and also his future. Mancl said he would like to have a future in competitive gaming, but that market is an uncertain one. “A future like that depends on what game you're playing, and the biggest thing is finding a sponsor because, just like anything, like in professional sports, you're getting paid by the team,” he said. “So it's really about finding the right team that can provide both a salary and a good playing environment.”

If that doesn't work out, Mancl said he is interested in following in his father's footsteps and becoming an engineer for IBM. But he is not shutting out the idea of going to grad school to continue his education. He is early in his ECE career, and he said it just depends on what is available when graduation approaches. 🔌



Illinois opens research center in Singapore

Ben Wah named first director

BY TOM MOONE AND BRIDGET MAIELLARO



Ben Wah, Franklin W. Woeltge Professor of Electrical and Computer Engineering

A*STAR Chairman Lim Chuan Poh (left), Senior Minister of State for Trade and Industry **S. Iswaran**, and Illinois Chancellor **Richard Herman** stand outside the Fusionopolis building in Singapore after the February 12 opening ceremony for the Advanced Digital Sciences Center.



Photos courtesy of the Agency for Science, Technology and Research, Singapore

The University of Illinois has greatly expanded its horizons with the establishment of a new research center in Singapore. The Advanced Digital Sciences Center (ADSC) will be part of Singapore's new science and technology complex, Fusionopolis, which began operation in October and had its official opening ceremonies on February 12.

"By having our presence there, it would allow us to have a close interaction and a link to many companies and researchers in Singapore," said ECE Professor Ben Wah, director of the new facility. "This is an excellent opportunity to start our research and establish a beachhead in Asia."

"The Advanced Digital Sciences Center continues our legacy of leading in technological innovation. The Center will be an indispensable tool for researchers in Singapore, Illinois, and around the world."

—Richard Herman

a particular focus on fields essential to Singapore's manufacturing industry and new growth industries.

The ADSC project was conceived by ECE faculty in the Information Trust Institute (ITI) and the Coordinated Science Laboratory (CSL), both located on the University of Illinois campus. ADSC will be led by faculty in the College of Engineering and jointly managed by ITI and CSL. Faculty for the center will come from ECE, Computer Science, and other departments across campus. Wah will direct the new center in Singapore for the first two years. Ravi Iyer, vice chancellor for research, and William H. Sanders, director of ITI and acting director of CSL, will serve as co-directors.

Wah, the Franklin W. Woeltge Professor of Electrical and Computer Engineering, believes that the initial years are the most critical when ensuring the Center's overall success. "We need to set up the

infrastructure, the laboratory space, hiring the faculty and post docs, and getting the administrative facilities to be established over there," he said.

When ADSC is in full operation, Wah expects to have about 25 post-doctoral researchers and 40 graduate students from around the world participate in the research, as well as local researchers from Singapore. All graduate students will work toward University of Illinois PhDs. In addition, four permanent faculty members would be hired to work in Singapore, while 14 College of Engineering faculty will work on collaborative research projects funded through the contract.

ADSC's first development will be the Human Sixth Sense project, which focuses on the interactions between humans and computers. The research will examine the mechanisms and utilities for humans to interact with the environment, allowing humans to be in the loop when they try to sense the environment, Wah said. In order to accomplish this task, the researchers will investigate the hardware, software, multimedia capabilities, human-computer interfaces, and real-time networking capabilities as a way to obtain high-speed processing, security, and analysis of the information.

"We anticipate that in a few years we will be able to connect with other industrial partners and other agencies in Singapore to set up similar research centers there," said Wah. "The initial presence and the initial infrastructure is the most important for us to set up. ... It's hoped to become a launching pad for our faculty to work with researchers both in academia and industry in Singapore."

The result of a 15-year relationship, ADSC will nurture research teams, foster interaction with local and multinational companies, and train graduate students and post-doctoral researchers in Singapore and at Illinois.

In a speech delivered at the opening of the center, Illinois Chancellor Richard Herman said, "The Advanced Digital Sciences Center continues our legacy of leading in technological innovation. The Center will be an indispensable tool for researchers in Singapore, Illinois, and around the world, opening doors to a new level of scientific and engineering discoveries. Discoveries that serve the public good."

"This is something other universities are trying. But as far as universities are concerned, we are one of the first few universities to set up research centers over there," said Wah. "Hopefully in the near future, we will be able to establish with other industry partners and other agencies in Singapore and start new research activities." 

New murals adorn the Fab Lab

BY LAUREL BOLLINGER

The Fabrication Laboratory on the ground floor of Everitt Lab is the highlight of every College of Engineering tour that comes through the building as well as a grand source of pride for ECE ILLINOIS. Many of today's current leaders in engineering have passed through its doors, with new generations continuing to use its impressive resources.

However, the lab itself was rather plain. The walls were stark white and almost completely bare. All that has changed. Now as you walk down the first set of stairs upon entering Everitt Lab, you notice something new on the walls of the lab. They are no longer bare and white; they are now emblazoned with three influential men and their formulas and notes. These three men helped make the Fabrication Laboratory possible.

“The connections between our distinguished past and our exciting future come together in that simple but elegant mural.”



The new Fab Lab mural celebrates the influence and achievements of John Bardeen, Jack Kilby, and George Anner.



It took six hours to install the mural. Workers used torches to soften the mural and stretch it around doors and other items that remained on the wall.

“We thought the murals were important because in electrical engineering, people usually do not get immortalized. And we wanted to change that,” said Dane Sievers, ECE engineering lab teaching specialist. Sievers came up with this idea during the renovation of the lab over the summer. He talked to Brad Petersen, assistant director of communications, and ECE Professor Jim Coleman, director of the Fab Lab, and the journey to beautify and immortalize began. Upon its completion some months later, Sievers felt the final project was a success.

“When it was finished my first reaction was, ‘that’s really cool.’ I mean, it turns it into more than a lab—the mural makes it a showcase. It’s very nice and I think it looks really good,” said Sievers.

The three men who adorn the mural walls are of utmost importance to the Fab Lab. On the left of the mural is John Bardeen, who received the Nobel Prize in Physics in 1956 for the invention of the transistor and 1972 for the fundamental theory of superconductivity. Joining him is Jack Kilby (BSEE '47), inventor of the integrated

circuit and a recipient of the 2000 Nobel Prize in Physics. Completing the trio is George Anner, who pioneered the establishment of the Fab Lab during his time on the ECE faculty.

The benefits of this new mural are many. The Fab Lab was one of the first labs of its kind and is a selling point to potential engineering freshmen. Sievers said that it gives the lab more depth in its history.

“The murals add a historical perspective by using real equations and notes from these men,” said Sievers. “It helps students realize where this all came from. It also makes the lab a showcase. We are always giving lab tours and this makes it just a little more special.”

The material used for the mural is a special material made by 3M. It took about six hours to put up and torches had to be used because the material was heat activated.

Professor Coleman uses the lab daily for his classes and says that the mural now provides current students with a source of information, as well as a bridge to generations past and the potential of the future.

“Each year we teach the technology in this laboratory to more than a hundred young people who will create the next generation,” said Coleman. “The connections between our distinguished past and our exciting future come together in that simple but elegant mural.”



The **Gable Home**, the Illinois entry in the 2009 Solar Decathlon, is designed to look like an Illinois farmhouse while at the same time demonstrating state-of-the-art efficiency and innovation.

2009 Solar Decathlon house under way

By **TOM MOONE**

The Solar Decathlon is a competition sponsored by the U.S. Department of Energy to bring attention to the challenge of the increasing need for energy. Participants design, build, and operate an energy efficient solar-powered house. The 2009 competition will be the fourth Solar Decathlon competition. The first was in 2002, and it has been taking place every two years since 2005. In 2007, Illinois's entry, Element House, earned top honors in the Market Viability and Comfort Zone categories and placed ninth overall.

Once the Illinois proposal for 2009 was selected to compete, professors in the School of Architecture designed a class to design the house for the project. Though the design for the 2007 competition had a very modern feel, the selected 2009 design reflects the area where it is being built. "It's called the Gable Home, and it looks more like a farmhouse," said ECE Associate Professor Chapman, director of the project. "In fact, it's a very Illinois-style house." The goal is to design something that is innovative while also reflecting the character and heritage of Illinois.

School of Architecture Assistant Professor Mark Taylor, who is the project manager for building the house in collaboration with a local modular home manufacturer, said, "The unique approach we have for the roof assembly is what gives the house its character, but it will be a challenge to integrate the technology we need as seamlessly as possible into the building's architecture."

The Illinois team has been working through the fall semester to bring the design for the Illinois house into final form. "The first accomplishment was to get everyone to agree to the overall design of the house," said Chapman. "And this last semester, we had architecture and industrial design students working on refinement of that design and actually working on converting the more aesthetic designs to a set of construction documents."

One of the goals for the Illinois house is to achieve the passive house standard, which is 15 kilowatt hours per square meter for heating and cooling—an extremely small amount. For the Illinois house, which is about 450 square feet, that would be approximately \$75 worth of electricity to heat and cool the house for an entire year.

Some funding for the project has come from the Department of Energy. In addition, the group has also received funding from Texas Instruments and the Grainger Center for Electric Machinery and Electromechanics. Recent grants have also been received from the Illinois Clean Energy Community Foundation and the National Renewable Energy Lab of the Department of Energy. Several companies have offered equipment for the project. Monetary and in-kind donations are still being pursued.

Information about the 2009 Solar Decathlon and the Illinois house is available at www.solardecathlon.uiuc.edu. 

Symposium celebrates Holonyak's 80th birthday

By Tom Moone

On Friday, October 24, a symposium and dinner were held in honor of ECE ILLINOIS Professor Nick Holonyak Jr. (BSEE '50, MSEE '51, PhD '54) on the occasion of his 80th birthday. Friends, colleagues, and former students gathered in the auditorium of the Beckman Institute to celebrate the life of the prolific inventor, and to present a glimpse of the influence his work has had in industry and scientific research.



At the dinner held following the symposium, Holonyak showed that he can still enthrall an audience.

Holonyak was born in Ziegler, Illinois, and was the first member of his family to attend college. He received his bachelor's, master's, and PhD degrees, all in electrical engineering, from Illinois. He was the first graduate student of John Bardeen, legendary professor and two-time winner of the Nobel Prize in Physics.

Holonyak developed the first visible spectrum light-emitting diode

(LED) while working at General Electric in 1962. He joined the faculty of the University of Illinois in 1963. Since then he has gone on to develop the quantum well laser, improvements for vertical cavity surface-emitting lasers, and most recently, the transistor laser.

At the symposium, former students of Holonyak described the work they performed with Holonyak as graduate students, and went on to describe how they have furthered their graduate research in their subsequent careers. Throughout the event, the attendees noted that Holonyak had been a great influence in their lives.

Robert Kolbas, who is a professor of electrical and computer engineering at North Carolina State University, said that he had learned three primary lessons while in Holonyak's lab: "He taught us how to be thinkers. He saw things that others couldn't see. And he made experiments happen with extremely simple tools."

Don Scifres, managing director of SDL Ventures, noted that he saw firsthand in Holonyak's lab how "a small group can take on a big problem and really have impact around the world."

A dinner was held in the evening following the symposium at the Champaign Country Club. There it was announced that funds had been pledged to support a graduate student award in honor of Holonyak and his wife, Katherine. In addition, Holonyak was presented with a shadow box celebrating his many accomplishments and a birthday cake lit by LED candles.

Over the course of his career, Holonyak has been the recipient of numerous awards and recognitions. He is one of only 13 Americans to have won both the National Medal of Science (1990) and the National Medal of Technology (2002). In 2004, he won the Lemelson-MIT Prize—the world's largest single cash prize for invention. He was inducted into the National Inventors Hall of Fame in 2008.

His other awards include Laureate of the Lincoln Academy of Illinois, 2005; Global Energy Prize from Russia, 2003; IEEE Medal of Honor, 2003; Frederic Ives Medal, 2001; Japan Prize, 1995; National Academy of Sciences' Award for the Industrial Application of Science, 1993; and Charles Hard Townes Award, 1992.

He is a fellow of the American Academy of Arts and Sciences, the American Physical Society, the IEEE, and the Optical Society of America, and he is a foreign member of the Russian Academy of Sciences. [u](#)



ECE Professor
Nick Holonyak Jr.

Nick Holonyak Jr. Graduate Student Award Fund

If you would like to contribute to the Nick Holonyak Jr. Graduate Student Award Fund in particular, or if you would like to provide support to ECE in general, you can find information at www.ece.illinois.edu/give.asp.

If you have any questions about any of the ECE giving opportunities, you can contact Jonathan Hill, director of development, by e-mail at jonahill@illinois.edu or by phone at (217) 265-6285.



○ Honoring a mentor

BY JONATHAN HILL, DIRECTOR OF DEVELOPMENT

Throughout our lives we have all known people beyond our families who have had a major impact on our lives and careers—mentors, teachers, and friends. I am sure that for many of you, your time at Illinois brought you in touch with many of those kinds of people.

And perhaps you met someone here who has embodied all those aspects of being teacher, mentor, and friend. I want to talk to you about ways you can recognize and honor that type of relationship.

Throughout this issue of *Resonance* there have been stories about the latest goings on in the department that feature some of the major figures in our department.

Nick Holonyak Jr. recently celebrated his 80th birthday. As noted in that article, students and colleagues had worked together to set up a fund in Nick's name that would support graduate students.

We've previously mentioned that a fund was set up by former students of George Anner in his honor. The George Anner Fund now provides assistance to deserving students and faculty members working in the Fabrication Lab.

Both the Holonyak and Anner funds continue to accept donations in any amount, and anyone who has been positively affected by interactions with either of these individuals can support these funds through our online support site at www.ece.illinois.edu/give.asp.

But your options for giving back are endless. Larry Weber (see article p. 24) made a unique donation to an established fund named for his mentors.

So, you do not need to feel that you are restricted by the list on our online giving page. I encourage you to consider providing donations in any amount in honor of any mentor, teacher, or friend you have had at Illinois. It is a valuable means to remember those people who have assisted you in any way in your career, and it will provide funds that can be used to mentor and teach the next generation of ground-breaking engineers.

Jonathan Hill
 Director of Development
 University of Illinois at Urbana-Champaign
 Department of Electrical and Computer Engineering

ECE ILLINOIS

ECE is grateful for the support it receives from alumni and friends. Your monetary donations help ensure our students have the best learning experience possible. View the funds you can support online at www.ece.illinois.edu/give.asp.

Donor Honor Roll July 2008 through December 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 July 1, 2008, and December 31, 2008. Gifts to other campus units may be recognized in other campus publications.

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Weber's plasma display honored by IEEE

By CHARLIE JOHNSON

There's almost nothing better to a Fighting Illini fan than watching an orange and blue jersey fly over opponents on his way to the basket for a slam-dunk. But when the detail on your TV is so sharp that you can make out the individual stitches in the team name emblazoned across the front of that jersey, well, that's about as sweet as it gets.

Larry Weber has been involved in plasma display research since its inception at Illinois.



who have won it before.” Past winners from Illinois include Professor Nick Holonyak Jr., Russell Dupuis, and M. George Craford.

The award came with a \$10,000 cash prize, which Weber has donated to the University along with an additional \$15,000 gift for the Endowment for Donald L. Bitzer and H. Gene Slottow Creativity Award. The Bitzer-Slottow Award is presented annually to ECE undergraduate students who demonstrate superb creativity in a project they have completed.

“When I was an undergraduate at Illinois, I did a lot of Engineering Open House projects, and I thought it was appropriate to try to continue to stimulate that type of creativity in the undergraduate community,” said Weber. “I learned so much at Illinois and it prepared me in a way that is very hard to describe. I do so many things because of what I learned from all my friends at Illinois.”

The plasma display was first conceived at Illinois by Professors Donald Bitzer (BSEE '55, MSEE '56, PhD '60) and Gene Slottow (PhD '64), for whom the above award is named. Weber began working on improving the plasma display with Bitzer and Slottow as part of his master's thesis, eventually parlaying the plasma into a PhD thesis and 17 years of university research.

What makes it even sweeter for Illini faithful is the knowledge that the plasma display that provides such a crisp picture and big screen was pioneered at Illinois in the Department of Electrical and Computer Engineering. Having been involved in the early days of plasma display technology, former Professor Larry Weber (BSEE '69, MSEE '71, PhD '75) has gone on to refine the plasma screen into the television sensation it has become today. For his efforts, Weber was recently awarded the 2009 IEEE Daniel E. Noble Award, presented annually to those who make “outstanding contributions to emerging technologies.”

“It's a great honor to have received this award,” said Weber. “The best part is to be in the company of such great people

Weber left Illinois in 1987 to found Plasmaco in Highland, New York. Plasmaco struggled for much of its first decade, almost going out of business in 1994. But Weber and Plasmaco persevered. In 1996, Panasonic purchased Plasmaco as a wholly owned subsidiary for \$14 million.

Weber stayed on as President of Plasmaco from 1996 until 2004, when he retired to New Paltz, New York. Weber served as the president of the Society for Information Display until May 2008. In retirement, Weber has spent time doing volunteer work and continuing to improve the plasma display by improving the efficiency of the display. With improved efficiency, he hopes that plasma screens will be able to move into markets beyond television, such as computer monitors and smaller display screens. “The best is yet to come,” said Weber. [🔗](#)



Lending a hand to ECE

I'm sure that many of you have thought about reconnecting with our ECE Department from time to time, but have been unsure of how to begin or worried about the commitment that will be required. I'd like to share my own recent experience with hope that I can relieve your fears and encourage you to consider working, in some way, with ECE ILLINOIS.

In September 2008, I learned that some ECE students were working on an Engineering Open House (EOH) project that included some devices made by my current employer. I immediately offered my contact information and help, if needed. I received an e-mail message a few weeks later explaining the project, the difficulties the students had in preparing for EOH 2008, and a request for me to provide some training—before winter break—to improve their odds for successfully completing the project for EOH 2009. Given my belief in education, a “no” response was not an option. Luckily, we have a trainer based in the Chicago area who felt the same way when I approached him with the request.

On December 3, 2008, the Women in Electrical and Computer Engineering (WECE) and the Association of Computing Machinery (ACM) hosted the workshop.

Jun Jiang, president of WECE, sent me this message after the training: “The workshop went very well yesterday! Fifty people showed up and although not all of them could stay for the entire duration, I got good feedback from everyone. ... A lot of people would like to see this workshop again next semester!”

Our trainer found it to be “pure joy” to teach a group that “picked it up quickly.” Our hosts did much of the work and a fantastic job of advertising and providing a great room for the event.

I share this with you to let you know that there are many ways to contribute to the department. I challenge you to discover ways you can lend a hand. ECE ILLINOIS has many student organizations that appreciate the support of alumni to make their missions possible. Our department's alumni relations coordinator and our director of external relations are available to help facilitate your collaboration with ECE ILLINOIS. Go to www.ece.illinois.edu/alumni to start getting involved.

Sincerely,

Denise Turic (BSEE '88)
ECE Alumni Association
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2008 Distinguished Alumni Awards

BY CHARLIE JOHNSON

On September 5, 2008, ECE honored accomplished alumni at the annual Distinguished Alumni Awards Banquet. The awards recognized the contributions of ECE Alumni in the academic and industrial fields, and also recognized their continued service to Illinois.



Receiving an award at the 2008 Distinguished Alumni Awards Banquet were (from left) Ho Kyoong Chung, David Yen, Martin Eberhard, Mark Laufenberg, Alan Bovik, Michael Winberg, and Samit Basu.

Distinguished Alumni Award

The Distinguished Alumni Award honors ECE alumni who have made professional and technical contributions that bring distinction to the department, the University, and themselves.

ALAN BOVIK (BSCompE '80, MSEE '82, PhD '84) was recognized for fundamental contributions to the field of digital image and video processing. Bovik is currently a professor in the Department of Electrical and Computer Engineering at the University of Texas at Austin where he holds the Keys and Joan Curry/Cullen Trust Endowed Chair and serves as the director of the Laboratory for Image and Video Technology. The Distinguished Alumni Award joins a long list of achievements for Bovik. He is the recipient of the IEEE Third Millennium Medal and is a fellow of the IEEE, Optical Society of America, and the Society of Photo-Optical and Instrumentation Engineers.

Bovik credits many of his achievements to the education he received at ECE ILLINOIS. "The atmosphere at Illinois is unlike any I can think of. It's an environment that fosters people's success," said Bovik.

HO KYOON CHUNG (PhD '81) enjoyed recognition for his leadership in the worldwide display industry and the commercialization of plasma and organic LED displays. Chung has been the executive vice president and head of corporate research and development for Samsung SDI in South Korea since 2006. Prior to being promoted to executive vice president, Chung led the development of Active Matrix OLED for which he has received numerous awards and recognitions. He has also been the recipient of the National Medal of Honor presented by the government of South Korea for his contribution to the development of Korean science and technology.

"I would like to express my deepest gratitude to the alumni board," said Chung.

MARTIN EBERHARD (BSCompE '82, MSEE '84) received the Distinguished Alumni Award for his leadership in creating high performance electric cars that combine efficiency with great driving performance. Eberhard's work on the Tesla Roadster, a car whose beauty and speed is only surpassed by its environmental efficiency, has turned the conception of electric cars as miniature, low-speed lemons upside down. The Tesla Roadster is capable of going from 0–60 mph in less than four seconds and can travel around 220 miles on a single charge. Eberhard has also founded several other technology firms, including Nuvo Media, which was sold to Gemstar/TV Guide in 2000.

"I feel like the University has earned this award as much as I have," said Eberhard.

DAVID YEN (MSEE '77, PhD '80) was acknowledged for his strategic, technical, and business leadership in the microprocessor and storage industry. Before becoming the executive vice president of Juniper Networks, Yen enjoyed a 20-year tenure at Sun Microsystems where he served in a variety of technical and management roles. Yen also co-founded and directed hardware development for Cydrome, Inc., a supercomputer start-up, and has served in engineering roles at TRW, Inc., and IBM Research. Yen holds three U.S. patents.

"This place set the foundation for my career. I am deeply honored," said Yen.

Young Alumni Achievement Award

The Young Alumni Achievement Award recognizes alumni less than 40 years old who have made outstanding professional contributions to their field.

SAMIT BASU (BSEE '98, PhD '00) was recognized for his years of research and development in the field of Computed Tomography (CT) imaging and reconstruction. Basu has led multimillion-dollar projects at GE's

Global Research Center, developing CT scanners for a variety of applications, and is currently developing a CT scanner for luggage inspection. In addition to his work at GE, Basu has played an integral role in the formation of InstaRecon, Inc., and has written an open source software called FreeMat, which provides free access for students and professionals to data analysis and reduction tools. In 2001, Basu was the recipient of the IEEE Signal Processing Society Young Author Best Paper Award and has published close to a dozen journal papers. He holds 23 patents.

"I am truly awestruck to be here," said Basu. "The one-on-one mentoring I received at Illinois made all the difference in my life."

MARK LAUFENBERG (BSCompE '92, MSEE '93, PhD '97) was honored for his contributions to the electric power industry and for providing entrepreneurial vision and leadership to the electric power community. Laufenberg is co-founder and president of PowerWorld Corporation, which develops and commercializes technology originally developed in ECE. Laufenberg specializes in the development and distribution of software for the electric energy industry, as well as managing the day-to-day operations of the company, which has more than 500 corporate entities and sells products in 57 countries around the world. Laufenberg also served as a visiting professor from 2000 to 2003, teaching a course on technical entrepreneurship.

"It's very gratifying to be recognized by people you respect," said Laufenberg.

Marcia Peterman Award

The Marcia Peterman Award was established by the ECE Alumni Association in honor of the late Marcia Peterman. The award is presented annually to a former ECE Alumni Board Member for dedicated service as a member of the Board.

MICHAEL WINBERG (BSEE '83) received the Marcia Peterman Award for his dedicated service to the University of Illinois and the Alumni Association. Winberg served on the ECE Alumni Board from 2001 to 2006, during which time he participated in the freshmen calling program, student receptions, and mock interviews. Winberg also enjoyed a 24-year career at Texas Instruments where he began as a product engineer and worked his way up to global operations manager. Winberg continues to be a passionate advocate of ECE and its students, and has been a key liaison between Texas Instruments and Illinois for many years.

"I've enjoyed my time on the Board. I've found it fulfilling and rewarding," said Winberg. 🔗

Alumni Board welcomes new members

BY LAUREL BOLLINGER

The ECE Alumni Board welcomed three new members this year: Karen Coperich Branch, Phillip Lachman, and Thanh Tran.

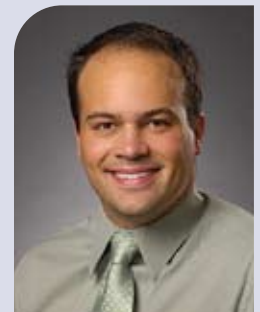


ECE Alumna Karen Coperich Branch

KAREN COPERICH BRANCH (MSEE '96, PhD '01) is the principal member of the technical staff in the Synthetic Aperture Radar Sensor Technologies Department at Sandia National Laboratories in Albuquerque, New Mexico. She is the principal investigator on a Grand Challenge Laboratory Directed Research and Development project titled "Featureless Tagging, Tracking, and Locating." Her work has entailed a variety of electromagnetic applications including design, modeling, measurement, and analysis of topics ranging from antennas, electronic packaging, and RF materials to RCS signatures.

Looking back at her time at the University of Illinois, she said that being able to teach and lecture was a great opportunity. "Education has been, and always will be, a big part of my life," she said. "As an engineer at a national laboratory, I feel I should be supporting engineering/science/math education, at all levels."

PHILLIP LACHMAN (BSEE '04) began his career at Lockheed Martin Space Systems as a systems engineer. At the same time, he began a master's degree in electrical engineering at Stanford University part-time, which he completed in June 2007. During his more than four years at Lockheed Martin, he has completed a variety of technical rotational assignments as part of the Engineering Leadership Development Program. Through this he has gained experiences that stretch through systems, design, test, and integration, spanning both missile defense and satellite platforms. He currently serves as a project



ECE Alumna Phillip Lachman

See **ALUMNI BOARD**, continued on next page.

Identity in the UK

BY BRAD PETERSEN

“I think what’s great about the University of Illinois is the diversity. I love its size. I love the education. I liked the fact that you could be normal there.”

It’s a long way from Aurora, Illinois, to London. Throw in a stop in Urbana-Champaign and you begin to see the path Katie Davis’s life has taken—geographically, at least. Davis (BSEE ’87) climbed the ranks at Arthur Andersen and then Accenture, eventually finding herself across the globe in England, where she now helps direct the National Identity Scheme for the British Government, a position with increased importance given the heightened awareness of terrorism around the world.



ECE Alumna Katie Davis

Yankee leadership

As executive director of strategy for the Identity and Passport Service (IPS)—part of the Home Office, the British equivalent of the U.S. Department of Homeland Security—Davis helps safeguard people’s identities. The office is primarily known for issuing passports to British citizens. But Davis is involved in implementing the National Identity Scheme. This massive project seeks to lock each individual’s identity using biographical and biometric information. The overall goal is better protection of everyone’s identity by having a single, convenient form of identity that has a very high level of integrity.

“We need a way of making sure that people are who they say they are, whether that’s for the purpose of making sure they receive the benefits to which they are entitled or making sure they are not able to use multiple identities, whether that’s to commit fraud or do something more serious like commit terrorism,” Davis explained.

The National Identity Scheme project is one of the largest IT-enabled business change programs in the world. Complicating the effort, the project must provide data access and coordination across many government agencies while at the same time protecting people’s civil liberties and rights. “As you can imagine, the idea of such a

scheme concerns some people because they are worried about their civil liberties and don’t want to have to carry a card to prove they are who they say they are,” said Davis.

An ECE ILLINOIS foundation

Davis said her ECE ILLINOIS degree has proven invaluable, even if it may not seem applicable given her position as a policy driver and administrator. “Do I use it on a day-to-day basis? No. Has it been really important to my career? Absolutely. If I didn’t have the technical background that

I have, I wouldn’t necessarily understand some of the implications of the policy and strategy I’m developing. That’s when policymakers get into trouble.”

During her time at Illinois, Davis completed a work study program with McDonnell Douglas and General Dynamics. These experiences helped her determine the right path for her career.

“They helped me to figure out where I didn’t want to be, as much as where I did want to be. I’ve always been very keen to see the results of what I do,” she said. “The ability to directly influence outcomes in the real world is what moved me towards management consultancy.”

Davis has now been in the UK for 20 years and, although she displays a discernable British accent, she said she sounds very American to those around her. She still has family in Illinois, however, and continues to believe in the University.

“I think what’s great about the University of Illinois is the diversity. I love its size. I love the education. I liked the fact that you could be normal there,” Davis asserted. “I think I was lucky and would love my kids to be able to have the experience that I had.”

ALUMNI BOARD, continued from previous page.

integration lead for Nuclear Weapons Security, part of the Fleet Ballistic Missile Program.

Lachman said that being on the Board was a product of his college days as the undergraduate alumni student representative, a position that allowed for direct inter-action with the Alumni Board of Directors, administration, and student body. “After graduation, I stayed closely connected with the department. Through regular meetings with officials both on campus and off, I stayed engaged with

departmental activities and news,” said Lachman. “It was through this continued dialogue that I was offered a position on the Alumni Board of Directors.”

In February 2008, Lachman began a not-for-profit math tutoring company called Euclidean Disciples, www.euclidean-disciples.com. Its goal is to show grade school students in the San Francisco Bay area the wonders of mathematics.

THANH TRAN (BSEE ’84) is CTO and manager of HD video communications systems at Texas Instruments. Tran

ECE alumnus Dirk Meyer named AMD chief executive officer

By Tom Moone

In July 2008, ECE alumnus Dirk Meyer (BSEE '83) was named chief executive officer of Advanced Micro Devices (AMD). Meyer has been at AMD since 1995, when he joined the company as the director of engineering for what eventually became known as the Athlon microprocessor, a processor that had a major impact on the computing world.

In 1999, Meyer became vice president of engineering for AMD's microprocessor area.

In 2001, he became the general manager of AMD's microprocessor business, overseeing all aspects of that segment of the company's operations. Then in 2006, he was named president and chief operating officer. He remains president in addition to his new role as chief executive officer.

Prior to AMD, Meyer had positions with Intel, where he designed the 80C51 and 80C196 microcontrollers, and Digital Equipment Corporation, where he was involved in CPU design and system architecture development.

"We're in an important and interesting business—that is, microprocessors," said Meyer. AMD and Intel are the two companies that work in that field, and Meyer feels strongly that, though Intel has a dominant position in the industry, it is important for the modern economy that there not be just a single company providing those types of products. And that belief is what provides Meyer with some of his drive. "The idea of introducing real competition into this industry I find very motivating," he said.

One of Meyer's goals as CEO is to get AMD to what he calls a "state of consistent profitability." He will be focusing on the core of AMD's business, which includes IT, servers, and PCs. The company is also in the midst of



ECE Alumnus Dirk Meyer

restructuring and changing the manufacturing strategy that supports its microprocessor business.

Though he left the University of Illinois more than 25 years ago, Meyer has a strong appreciation for what he gained there. "The education there did two things. One, an engineering education in general teaches you how to think," he said. The second thing ECE did for him was to equip him with a strong background in laboratory work. "It is particularly effective in prepar-

ing you for what you encounter in the entry-level jobs in the electronics business," he said of this lab work. "So I think that early on I was really effective because of the lab-based learning." Meyer served on the ECE Alumni Board from 2004 to 2007.

AMD was co-founded in 1969 by ECE alumnus W. J. "Jerry" Sanders III (BSEE '58). Over the years, the company has grown to become a leading global provider of innovative processing solutions in the computing and graphics markets.

Meyer said that there are two quotes by Jerry Sanders that he keeps in mind throughout his day-to-day activities. The first is: "People first. Products and profits will follow." And the second is: "Our customer's success is our success."

In 2000, Meyer received the Maurice Wilkes Award for his significant architectural contributions to Alpha and X86 processor designs. The Wilkes Award is given annually by the Association of Computing Machinery for outstanding contributions to computer architecture. Meyer also has more than 40 patents to his name. 🔗

"[ECE] is particularly effective in preparing you for what you encounter in the entry-level jobs in the electronics business."

is also an IEEE senior member. His career encompasses more than 24 years of experience in audio, video, computer, and communication systems, and system-on-a-chip design and management. He is an adjunct faculty member at Rice University where he teaches digital/analog audio, video, and embedded systems design courses.

Tran said that before becoming a Board member he frequently visited the University to recruit and lecture. "I was recruited by another Board member," he said, "and because I do like to come back to campus, I saw it as the


best way for me to help prepare and mentor students and give back to the University."

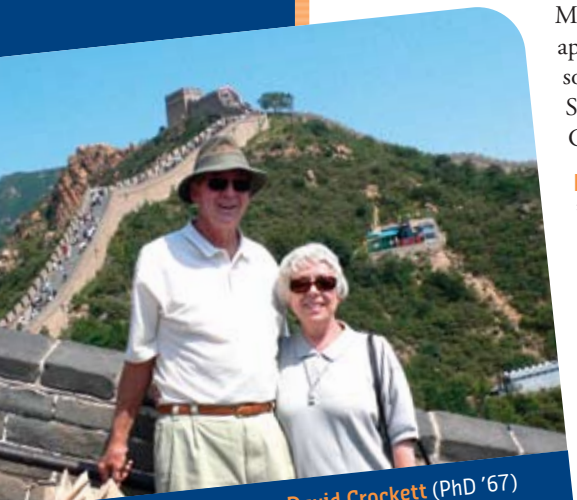
While Tran said there are many fond memories of his days as a student here, it is the fact that he met his wife Nga Diep-Tran (BSEE '86) on this campus that sticks out above all else. "We both were electrical engineering students there and I cannot think of any happier memory than meeting her." 🔗



ECE Alumnus Thanh Tran

Do you have a photo of yourself at work or at play that you'd like to share?

If so, please send these photos along to Tom Moone, editor, at moone@illinois.edu. Though we'll only be able to print a few in each issue, you can see these and other submissions from our alumni at www.ece.illinois.edu/news/resonance. 



ALUMNI AT PLAY: Alumnus David Crockett (PhD '67) and his wife Ann visit the Great Wall of China.

1940s

FLOYD DUNN (BSEE '49, MSEE '51, PhD '56) received the William J. and Francis J. Fry Award for his contributions to the general area of biophysics and bioeffects of ultrasound by the International Society on Therapeutic Ultrasound.

1950s

MAHMOUD MELEHY (PhD '52) received the Distinguished Engineering Service Award from the University of Connecticut's School of Engineering where he is a professor emeritus of electrical and computer engineering.

1970s

JAMES "JIM" KESARIS (BSEE '71) has been named to Sunrise Solar Company's Board of Directors. He will be responsible for designing the company's internal financial control procedures and establishing the audit and compensation committees.

PRAMOD VARSHNEY (BSEE '72, MSEE '74, PhD '76) has been appointed as a distinguished professor in Syracuse University's L. C. Smith College of Engineering and Computer Science.

PALLAB CHATTERJEE (MSEE '74, PhD '76) recently joined the Board of Advisors for Zynerzip, a dual-shore Agile software product partner for small companies.

FAYÉ BRIGGS (PhD '77) is an Intel Fellow director of scalable server architecture for the Digital Enterprise Group. He is responsible for ensuring that Intel's multi-core and many-core-based server architectures achieve world-class performance.

SUPRIYO DATTA (MSEE '77, PhD '79) was the recipient of the 2008 IEEE Leon K. Kirchmayer Graduate Teaching Award for innovative approach to the concepts of nanoelectronics and non-equilibrium quantum statistical mechanics.

1980s

VIKRAM SAKSENA (MSEE '80, PhD '82) was the keynote speaker at the Internet Telephony Conference and Expo (ITEXPO). He was also named CTO at Sonus. Sonus Networks, Inc., is a market leader in IP communications infrastructure for wireline and wireless service providers.

BRUCE DIAMOND (BSEE '82) was appointed president and CEO of Discera. Discera is a leader in CMOS MEMS oscillators, resonators, and provider of next-generation timing solutions.

DAVID BLAKENEY (BSEE '83) has been named vice president of research and development at Tollgrade.

STEVE CASTILLO (MSEE '84, PhD '87) was named one of the most important Hispanics in technology by *Hispanic Engineer & Information Technology* magazine.

ROB PULLEN (BSEE '85) was named CEO of Tellabs, Inc., on March 1, 2008. Tellabs is a global supplier to the telecommunications industry.

RAY GHANBARI (BSEE '87) has been named executive vice president of strategy and products for Vital Images. Vital Images is a leading provider of enterprise-wide advanced visualization and analysis solutions. Ghanbari will be responsible for product strategy and marketing, corporate development, and strategic business planning.

1990s

MARK KUROWSKI (BSEE '90) has opened an office of I Take the Lead, a company that helps build businesses by generating professional business leads and referral systems.

ERIC KLINKER (BSEE '91) has been appointed CEO of BitTorrent, a company setting the standard for delivering high-quality files over the Internet.

FRED KERR (BSCompE '93) married India Jensen on July 20, 2008. He is a senior BIOS software engineer at Intel Corp. in Hillsboro, Ore.

DOUGLAS BROWN (BSEE '94) is the new major projects development manager for City, Water, Lights, and Power in Springfield, Ill. He has been there for 14 years.

MICHAEL GRISWOLD (MSEE '99) married Margaret Honemann on June 7 in Geneva, Ill.

2000s

CHARLIE WOLFE (BSEE '00) began an annual award of \$12,500 to be given directly to any graduate student conducting research on diabetes at the University of Illinois.

ERIC DUNN (MSEE '00, PhD '05) married Stephanie Alix Meyer in December. Dunn is an electrical engineer for Science Applications International Corporation of San Diego in Washington, D.C.

MATTHEW HONG (BSCompE '01) married Erica LaVan on September 13, 2008.

STEVEN JUDD (BSEE '06, MSEE '08) was hired at ISO New England as an associate engineer in transmission planning in Holyoke, Mass. The job entails system planning for the electric power grid in New England.

AKSHAY NAHETA (BSEE '03) married Emily Lynn Montgomery in December. Naheta is vice president in Hong Kong for Deutsche Bank where he trades stocks and other securities.

CATHERINE WAH (BSEE '08) is currently working on her PhD in computer science at the University of California San Diego.

IN MEMORIAM

ELMER EBERSOL (BSEE '39) died January 3, 2009.

GEORGE SCHIFF (BSEE '46) died April 5, 2008. He served in the United States Army during World War II and attained the rank of major. He worked as an engineer for the Raytheon Company and, after he retired, spent 14 years volunteering and installing computers and networks in his local schools.

MARK SHEPHERD, JR. (MSEE '47) died February 4, 2009. Shepherd served in the Navy as a lieutenant specializing in radar and electronics maintenance during World War II. He began work at Texas Instruments in 1948 and was chairman from 1976 to 1988. He remained a general director until 1993.

DONALD RICHARDSON (BSEE '48) died February 4, 2008. Richardson served in World War II as a corporal in the Army Air Force and was the NCO in charge of the transmitter station on Ascension Island. After the war he received his bachelor's degree in electrical engineering from the University of Illinois. He began his career in 1948 at Phillips Petroleum Company and retired in 1985 as the branch manager of electrical design.

WENDELL KELLEY (BSEE '49) passed away October 25, 2008. He spent most of his career with Illinois Power Company, eventually becoming chairman of the board. He spent two years as president of the U of I ECE Alumni Association from 1969–1971.

H. BEN ELLICOTT (BSEE '50) died October 23, 2008. Ellicott served in the U.S. Navy during World War II in the South Pacific.

EDWIN HUGHES (MSEE '50) died January 10. He served with the Army in Europe during World War II, earning two Bronze Stars. At Illinois he worked on the research and development of the ORDVAC and ILLIAC computers. He received the Distinguished Alumni Award from ECE ILLINOIS in 1984.

CALVIN "BILL" SHURTLEFF (BSEE '50) died February 27, 2008. He joined the U.S. Army and went into the 42nd Rainbow Division, 242nd Regiment, I Company. He was stationed in Marseilles, France, during World War II. He worked for Motorola designing and selling telecommunications networks and later worked for Rockwell International. He retired in 1991 and became a volunteer for the Richardson Network of Community Service.

EDWARD OLENDZKI (BSEE '50) died June 2008.

HOWARD KNOEBEL (BSEE '50) died November 19, 2008. After he completed his degree at the U of I, he spent the rest of his career as a researcher and professor. He developed equipment that led to the discovery of the nuclear magnetic resonance spin echo which contributed to magnetic resonance imaging (MRI).

ROBERT FAIRBANKS (BSEE '53) died January 28, 2008. Fairbanks served in the Air Force Reserves and the United States Army where he was assigned to the Army's Office of

Strategic Weapons Development. He spent 34 years at IBM and retired in 1994.

RUDOLPH MAROVEC (BSEE '53) died November 2008.

RICHARD SWENSON (BSEE '53) died August 2008.

MELVIN KLEIN (BSEE '55) died April 10, 2008. Klein retired as president of a company that did private computer consulting for private industry and the military.

BURTON GERHARDT (BSEE '56) died April 21, 2008. He had served in the U.S. Army.

RICHARD SHIVELY (BSEE '56, MSEE '57, PhD EE '63) died August 15, 2008.

He was an electrical engineer at Bell Labs for 39 years and

patented the first

hardware implementation

of J.W. Tukey's fast Fourier transform algorithm. He was an IEEE Fellow and active in the Institute of Electrical and Electronics Engineers.

JOHN "JACK" WILLIS (MSEE '57) died July 18, 2008. Willis was an Air Force major, a Tuskegee airman stationed in the United States during World War II. He held a variety of jobs, including heading a computer training school in Montserrat, in the British West Indies.

LARRY MEOLI (BSEE '60) died November 30, 2008. He retired in 2007 after more than 40 years with IBM.

DUANE MEALEY (BSEE '61) died December 7, 2008. Over the course of his career, he worked for Boeing, General Dynamics, and Martin Marietta. In all, he spent 35 years in the aerospace industry.

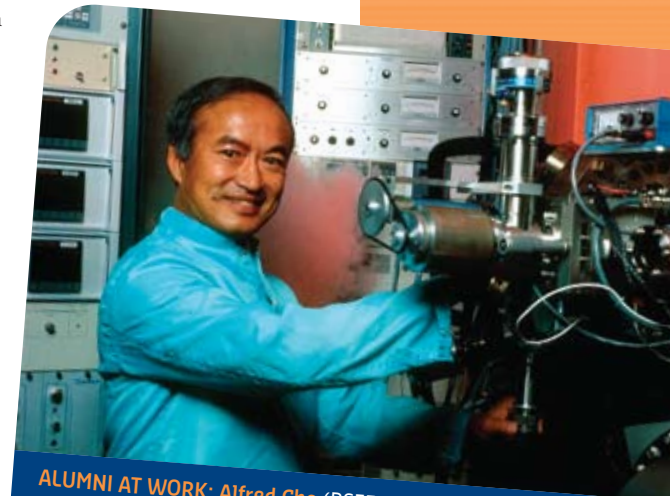
C. RICHARD HANKINS, SR. (BSEE '68) died August 2008.

ROY HUNNINGHAUS (BSEE '70, MSEE '71) died July 2008.

THOMAS BRENNAN (BSCompE '72) died August 30, 2008. He was 58. He worked for the Illinois Department of Transportation as a computer engineer and was also a former partner in ELLR Consulting.

DOUGLAS KENNEDY (MSEE '82) died May 12, 2008. He had worked as a design engineer for the Department of Defense.

PEI LIN "ANNE" DY (BSEE '89) died December 6, 2008. She spent several years working at AT&T Labs. ☺



ALUMNI AT WORK: Alfred Cho (BSEE '60, MSEE '61, PhD '68) working at a molecular beam epitaxy MBE system. Cho was recently named to the Inventors Hall of Fame for his MBE work.

For George Swenson, retirement is for the birds

By Tom Moone

ECE Professor Emeritus George Swenson retired from the University in 1988 after more than 30 years of service to ECE and Illinois. Yet, despite having officially retired more than 20 years ago, he is regularly found at the Coordinated Science Lab, where he maintains an office and is still active in research.

At a time in his life when many of his peers might choose to sit out back and watch the birds fly by, Swenson is hard at work creating a tool to determine what direction those birds are coming from, where they have been, and where they are going.

In fact, for more than 40 years Swenson has been assisting biologists studying habits of birds and other wildlife. The interest started back in the 1950s when his research included tracking satellites. Bill Cochran (BSEE '67), an undergraduate student working with Swenson on research projects tracking satellites, was also involved at the Illinois Natural History Survey. "He thought that if we could track satellites, we could track wild animals," said Swenson.

and the receiver switching antennas and frequencies to receive a signal from each animal in turn, "In practice, you only get a bearing about every two minutes." In that amount of time, animals could move some distance or go underground.



ECE Professor Emeritus George Swenson

Recently, the U.S. Army became interested in tracking desert tortoises on one of the Army bases in California. The Army found the standard system too slow. Because Swenson works part time at the Army Construction Engineering Research Center (CERL), he was asked to see if he could devise a faster system.

Swenson soon realized that the standard setup needed to be changed. The new system has four antennae, each with its own receiver. Researchers could now receive target pulses every second, rather than every twelve seconds, and a bearing can be computed for every pulse. And more

targets could be tracked simultaneously. "It was a new concept in antennas for this purpose," said Swenson.

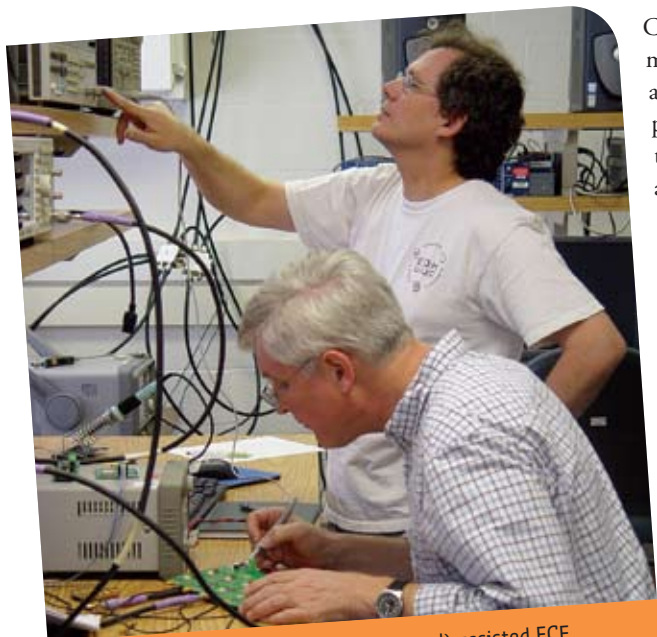
Of course, this is a team effort. ECE Professor Steve Franke designed the radio receivers needed for this project. Graduate Assistant (now Visiting Research Engineer) Todd Borrowman developed the algorithms and conducted all the testing and computer simulations. The U.S. Army CERL supported the project financially for two years during the research phase.

When word got out about this new system, there was immediate interest from biologists in the field of wildlife tracking. The Max Planck Institute for Ornithology (Germany) gave a major gift to support manufacturing design. The ECE Electronics Shop has received permission to manufacture up to 30 units in-house to help meet demand and is busy building the first few to be deployed to Germany.

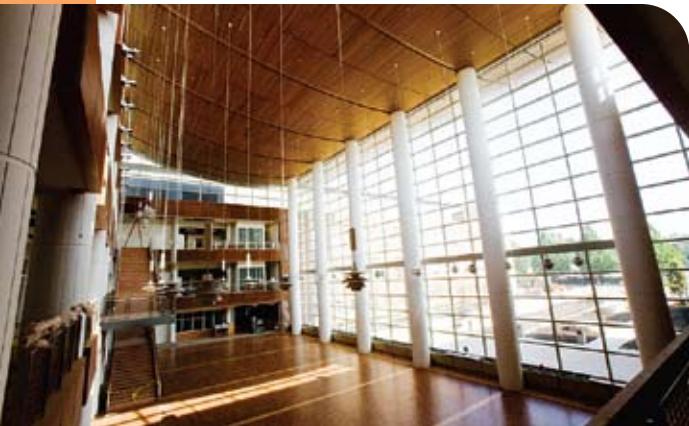
"We hope to find a manufacturer who can do this, commercially," said Swenson. "It's a special niche for instrumentation, and it has to be done fairly economically, because wildlife biologists typically don't have much money." [🔗](#)

Cochran devised a method for tracking animals that is still practiced: a radio transmitter on an animal and a directional antenna/receiver system permit the animal to be located. Over the years, this system has evolved into an automatic direction finder with several antennas.

This process, however, can be extremely slow and laborious. As Swenson explained, with six antennae placed around a receiver,



ECE Professor Steve Franke (foreground) assisted ECE Professor Emeritus George Swenson with the design of the radio receivers for tracking wildlife. He and Dan Mast, manager of systems and services in ECE, are shown testing the circuits built for the receiver.



Business Instructional Facility opens

University of Illinois business students began studying last fall in a new, \$60-million-plus building filled with high-tech classrooms, counseling and career services, and a state-of-the-art laboratory that simulates real-time market trading. But officials say there's also a lesson built into the earth-friendly design of the newly finished Business Instructional Facility, the first "green" building in the University's 141-year history, achieving LEED (Leadership in Energy and Environmental Design) certification.



Illinois rated "Top Wired College"

PC Magazine recognized Illinois as the "top wired college" in the nation for 2008. Illinois had been ranked sixth in the 2006 rankings. The rankings were compiled by *PC Magazine* in conjunction with

The Princeton Review. Illinois was particularly noted for the strength of its courses on parallel computing and data mining.

I-Hotel and Conference Center opens

One of the newest hotels in the Urbana-Champaign area is the new I-Hotel and Conference Center, which celebrated its grand opening on August 11, 2008. The 38,000-square-foot conference center can provide banquet seating for 30–500 people or theater seating for up to 700. The hotel has 124 guest rooms and two luxury suites.



Carnegie Foundation recognizes U of I for community-engagement efforts

The University of Illinois at Urbana-Champaign has been selected by the Carnegie Foundation for the Advancement of Teaching in the foundation's 2008 Community Engagement classification. Illinois was selected in the Curricular Engagement and Outreach & Partnerships category, which honors institutions with substantial commitments to teaching, learning, and scholarship that engage faculty, students, and community in "mutually beneficial and respectful collaboration," the foundation said.

Mark Cowan/UI Sports Information



Memorial Stadium renovation completed

On September 6, 2008, the Fighting Illini played Eastern Illinois University for the first time in the newly renovated Memorial Stadium. New features include luxury seating, an expanded press box, and upgraded restrooms.

Japan House celebrates tenth anniversary

The Japan House celebrated its tenth anniversary at its present location, 2000 S. Lincoln Ave., Urbana, with a series of special events. Japan House is an educational facility that fosters the study of Japanese arts and culture through courses, seminars, community outreach programs, and visiting artist programs. The 3,120-square-foot facility opened in June 1998 and houses three tea rooms, two of which were donated by the Urasenke Tea School in Kyoto. ☺

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



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