RESONANCE

NEWS FOR ECE ILLINOIS ALUMNI AND FRIENDS
WINTER 2011

Groundbreaking ceremony held for new ECE building

Also in this issue:

New Assured Cloud Computing Center to be established at Illinois

Solar Decathlon: Helping students and the world

Alumnus Michael McCorquodale is the first ECE Engineer in Residence

ILLINOIS

Department of Electrical and Computer Engineering

Breaking ground on the future

Dear alumni and friends,

I have good news! The dream of a new building for our department, after many years of planning and anticipation, is now becoming a reality. Last month's groundbreaking of the new ECE building marks the beginning of a new era for our department, a department of global influence and impact, thanks to the excellence of its faculty and alumni. And it is this global impact that makes this groundbreaking special not only for our department, our college, our campus, and our university, but also for the state of Illinois, our nation, and the world.

Our faculty and our alumni have been among the pioneers of the major technological innovations that are the bedrock of today's computing and communication technologies. The marvel of the computing technology and the communications infrastructure we enjoy today, and its catalytic role in improving living standards around the globe, would not have been possible without John Bardeen's invention of the transistor or Jack Kilby's brilliant idea of the integrated circuit.

These Nobel Prize-winning innovations by two giants of the ECE ILLINOIS community have been followed by many more groundbreaking advances by ECE faculty and alumni, advances that inspire and drive our quest for a sustainable future for all.

Thanks to our faculty, our alumni, and our students, it is now within our reach to achieve smart agriculture, greater food safety, clean and reliable energy, preventive medicine, personalized and affordable health care, and efficient and safe transportation.

ECE faculty and students have been and continue to be among the key contributors to the brilliance of these internationally renowned research facilities. Thus, it is fitting to complete this fabric of groundbreaking research and innovation at the northernmost end of our campus with the addition of our new ECE building. A facility dedicated to attracting the best young talent, immersing them in the thrill of research at the frontiers of knowledge, empowering them to think big and innovate, and inspiring them to dream things that never were and make them happen.

I can think of nothing more important or more precious than the inquiring young mind. The only way to galvanize it and turn it into a fountain of creativity and driver of innovation is to challenge it to be daring yet ethical; diverse in its pursuits, yet focused on its objectives; respectful of humankind's anxiety about change, yet comfortable in the knowledge that true progress happens only through revolutions.

This is what ECE ILLINOIS is all about: the nourishment and empowerment of our talented students. Their revolutions will define our future; their successes will dictate our fortunes.

Thank you for being our steadfast partners in this important commitment.

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

ECE ILLINOIS

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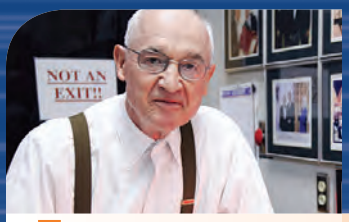

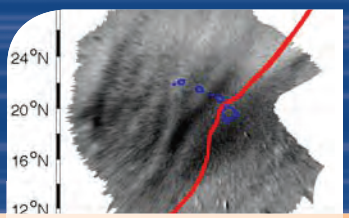

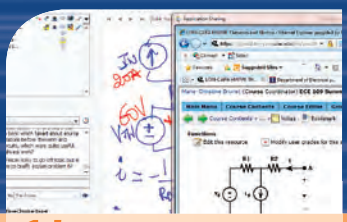

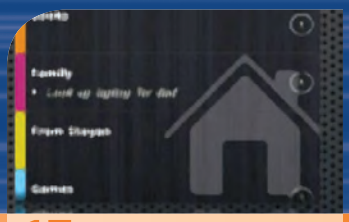

RESONANCE is published twice a year by the Department of Electrical and Computer Engineering (ECE) at the University of Illinois at Urbana-Champaign. Comments and suggestions are welcome. Contact Tom Moone, editor, at moone@illinois.edu or mail to the address at left.

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Illinois professor John A. Rogers receives $500,000 Lemelson-MIT Prize

John A. Rogers, the Lee J. Flory-Founder Chair in Engineering at Illinois, has won the 2011 Lemelson-MIT Prize. The annual award recognizes outstanding innovation and creativity. Rogers is a faculty affiliate in ECE.

Loui explores connection between ethics and work skills

ECE Professor Michael Loui is examining the connection between ethics training and technical skills through a two-year grant from the National Science Foundation. To conduct the study, Loui and his researchers are creating an experimental online course in computer science. Half of the students will be given ethics instruction early in the course. The other half will study ethics near the end. About two-thirds of the way through the course—before the second group of students receives ethics instruction—the researchers will administer a technical test and evaluate whether there is a statistically significant difference between the two groups.

Cangellaris receives Army Research Laboratory (ARL) Director's Coin

ECE Department Head Andreas C. Cangellaris recently received the Army Research Laboratory (ARL) Director's Coin. It was presented by Dr. Dev Palmer, the program manager for electromagnetics, microwaves, and power at the ARL's Army Research Office (ARO). This award is used by commanding officers and directors of military programs to honor, encourage, and reward individuals for personal and professional accomplishments. It is rarely given to civilians.

Leburton named associate member of Royal Academy of Belgium

ECE Professor Jean-Pierre Leburton has been elected to the Academy of Sciences, Letters, and Fine Arts of Belgium. Leburton, who is the Gregory Stillman Professor of Electrical and Computer Engineering at Illinois, is a renowned expert in nanostructure and device physics.

Self-cooling observed in graphene electronics

With the first observation of thermoelectric effects at graphene contacts, ECE Assistant Professor Eric Pop and his colleagues have found that graphene transistors have a nanoscale cooling effect that reduces their temperature. This research could lead the way to using graphene as a replacement for silicon in transistors.

Marie-Christine Brunet

Brunet receives award for support of women in engineering

ECE Lecturer and Chief Undergraduate Adviser Marie-Christine Brunet was named the fall 2010 recipient of the Amy L. Devine Award. The award was presented by the University's chapter of Alpha Omega Epsilon, a professional and social engineering sorority, in recognition of Brunet's contributions to the advancement of women in engineering and for being an outstanding faculty member at ECE.

Umberto Ravaioli awarded Campus Advising Excellence Award

By Shawn Adderly

After many years of advising and mentoring students, Senior Assistant Dean for Undergraduate Programs and ECE Professor Umberto Ravaioli was recognized for his efforts by being named a recipient of the 2011 Campus Award for Excellence in Undergraduate Advising. The award was presented at the Celebration of Teaching Excellence event sponsored by the Provost's office on April 26. Twenty-one other awards were given to faculty, instructors, and teaching assistants in recognition of excellence in teaching, advising, and mentoring students.

Umberto Ravaioli

"It was a great personal honor for me to receive the campus advising award," said Ravaioli, who is also a researcher in the Beckman Institute and affiliated with the Micro and Nanotechnology Lab and the Coordinated Science Lab. "But as senior assistant dean in the college, it was infinitely more gratifying to be also in the company of so many other engineering colleagues recognized for their dedication to our students. The evening clearly demonstrated that the College of Engineering is extraordinarily committed to the teaching and mentoring mission to a degree that is comparable to our commitment to excellence in research."

Ravaioli went on to say, "My advising philosophy is very simple: The most important thing is to listen to the students and take as much time as necessary to understand their issues."

Over the years, many students have recognized Ravaioli for his assistance in helping them succeed. He has been named to the Outstanding Advisors List in the College of Engineering seven times.

"I used to spend a lot of time with my ECE advisees to discuss career options," he said. "I keep doing the same when I have a chance in the college office, and maybe I spend some time dispelling myths, too," he joked.

Over the six years he has spent in the Engineering Undergraduate Programs office, Ravaioli has seen literally thousands of students. "Some come to me thinking it's the end of the world because they failed a class or because they are having a hard time in school," he said. "I always try to show them how to turn a weakness into strength or how to use a failure as the starting point for future success." Often students are unaware of the additional resources available to them, from the extra tutoring provided by the College of Engineering to campus resources such as the Counseling Center.

"I try to find out why the student is struggling," he said. "Some students might have problems with taking timed exams or simply need more help to learn the material and improve their studying skills."

> "Some come to me thinking it's the end of the world because they failed a class or because they are having a hard time in school. I always try to show them how to turn a weakness into strength or how to use a failure as the starting point for future success."
>
> –ECE Professor Umberto Ravaioli

While many students go see Ravaioli because they need help and guidance in improving their academic standing, these are not the only students on his radar. "Whenever I can, I try to engage also any of the students in good standing to make sure that they take full advantage of the astounding range of opportunities available at Illinois," Ravaioli said. "One of my personal goals is to increase even more the number of undergraduate students involved with research so that they are best prepared for graduate studies or for a professional career."

ECE ILLINOIS welcomes two new faculty members

By Heather Punke

This summer, ECE ILLINOIS welcomed two new faculty members: Assistant Professor Dan Wasserman and Professor Yuliy Baryshnikov.

Dan Wasserman

Dan Wasserman comes to Illinois from the University of Massachusetts, Lowell. His area of research is in optics and photonics. He works with light and focuses on the mid-infrared wavelength range.

He was attracted to ECE because, as he puts it, "The department is world-renowned. The faculty, facilities, and the research infrastructure in the department, and of course the students, are all just unmatchable. It's a wonderful opportunity," Wasserman said.

Dan Wasserman

The students at Illinois will play a major part in his research. "The students that work with me get to do real, hands-on research," Wasserman said. "They do all the hard work. They make the stuff, they test the stuff, and I'm just there to steer the boat, basically."

Wasserman's research has many applications in areas ranging from national security and defense to the environmental and medical fields. "[This research can help make] devices that can improve thermal-imaging systems, or that can lock into the thermal signal of something that's coming toward you or maybe something you're trying to find," he said of the security applications.

"And it also turns out that there are a lot of sensing applications. A lot of the molecules that people are very interested in sensing, whether it's for environmental or medical purposes, have very strong resonances in mid-infrared," Wasserman said.

Originally from Ann Arbor, Michigan, Wasserman is also excited to return to a college town. "I'm really looking forward to coming back to the environment of the Midwest," he said.

Yuliy Baryshnikov

Yuliy Baryshnikov is joining Illinois with a joint appointment in ECE and Mathematics. His area of expertise is in mathematics and its applications.

Baryshnikov is coming to the university from Bell Labs in Murray Hill, New Jersey, the research arm of Alcatel-Lucent. He made the switch to academia to "try something new," but he chose Illinois for a more specific reason. "I've known [the University of Illinois] for quite a while," he said. "For the past eight years, at any given point, I've had two or more collaborators here."

Yuliy Baryshnikov

Baryshnikov is looking forward to having students available to help him with his research. He lets the students choose what they want to focus on, instead of directly assigning them a task. "They are adults, and they understand what they like," he said.

Baryshnikov's current research includes developing mathematical models of social networks. He says that right now, no good models exist for how people interact in groups, but the industry needs one. "[Social networks] will be driving the next round of telecommunication expansion," he said.

People are buying phones for a reason, to interact, and they are often buying data plans to connect to their social networks. "So this social behavior—if it will be driving this business, we need to understand how it works."

His research could also have implications for social network platforms, such as Facebook and Twitter. Once such group interactions are understood, social network platforms could create improved business models.

Since he will teach in both the College of Engineering and the College of Liberal Arts and Sciences, Baryshnikov says he will do his best to connect the Mathematics department with ECE. "I want to work with people on both sides—create projects that people from both schools can participate in."

Documentary on Nick Holonyak and the LED premiered on BTN in July

By Rick Kubetz, College of Engineering

Some refer to ECE Professor Nick Holonyak, Jr. as the "Godfather" of light-emitting diodes (LEDs), but that was only one of his many contributions to modern electronics. A new documentary, *A Brilliant Idea: Nick Holonyak and the LED*, premiered on the Big Ten Network on July 28.

Nick Holonyak, Jr. in his office at the Micro and Nanotechnology Laboratory. The chart to the right illustrates the LED's developmental timeline.

"Nick's scientific career of almost six decades has changed the world," explained Ilesanmi Adesida, dean of the College of Engineering. "Everywhere you look, we all interact with Holonyak's inventions daily."

Technological advances that can be traced back to his laboratory at Illinois include lasers that run CD and DVD players, and fiber-optic communication networks, as well as groundbreaking transistor research.

Born the son of an immigrant coal miner in southern Illinois in 1928, Holonyak's story reflects the American Dream. He left the promise of back-breaking work on the Illinois Central Railroad to become the first in his family to attend college. He earned his bachelor's (1950), master's (1951), and PhD (1954) degrees in electrical engineering from Illinois, and he was the first graduate student of John Bardeen, two-time recipient of the Nobel Prize in Physics and co-inventor of the transistor.

After completing his studies at Illinois, Holonyak joined the GE Advanced Semiconductor Laboratory in Syracuse, New York, where he was credited with the invention of the dimmer switch, the first visible semiconductor laser (GaAs phosphide), and the first (red) LED. He returned to the University as a faculty member in 1963.

His research led to the practical development of the quantum well laser. That, in turn, led to the creation of lasers for fiber-optic communications and the Internet, CDs, DVDs, medical diagnosis, surgery, ophthalmology, and many other applications—along with improvements in vertical cavity surface-emitting lasers, and most recently, the transistor laser. He continues to conduct research in the Micro and Nanotechnology Lab.

As the John Bardeen Endowed Chair in Electrical and Computer Engineering and Physics, Holonyak 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 the John Scott Medal (1975), Charles Hard Townes Award (1992), National Academy of Sciences' Award for the Industrial Application of Science (1993), Japan Prize (1995), Frederic Ives Medal (2001), Global Energy Prize from Russia (2003), IEEE Medal of Honor (2003), and Laureate of the Lincoln Academy of Illinois (2005). In 2010, Holonyak and his mentor John Bardeen were among the inaugural class inducted into the Engineering at Illinois Hall of Fame. This year he was inducted into the Engineering and Science Hall of Fame.

Holonyak is a fellow of the American Academy of Arts and Sciences, the American Physical Society, the IEEE, and the Optical Society of America. He is a member of both the National Academy of Engineering and the National Academy of Science, and he is a foreign member of the Russian Academy of Sciences.

Boppart leads team receiving NIH grant to develop imaging technology for primary care physicians

By Greta Weiderman, Department of Bioengineering

Stephen Boppart

The National Institutes of Health (NIH) has awarded ECE and Bioengineering Professor Stephen Boppart a $5 million grant for a research partnership that will develop new handheld optical imaging technology for primary care providers.

"The result of this, if successful, could really reduce our health care costs and streamline our delivery of health care," said Boppart, a researcher at the Beckman Institute for Advanced Science and Technology and an affiliate of the Micro and Nanotechnology Lab.

Boppart's research team will partner with Carle Foundation Hospital in Urbana, the Eye Center in Champaign, Welch Allyn (the global leader in office-based diagnostic instruments), Texas Instruments, AdvancedMEMS, and Kyungpook National University in Korea.

The goal of the partnership is to create and test handheld devices capable of 3-D optical coherence tomography (OCT) that will allow primary care physicians to image the ear, eye, skin, cervix, and oral tissue.

The partnership will develop a new imaging system that integrates OCT imaging with the otoscope and ophthalmoscope, which can currently only magnify and light the surface of tissue.

"We are trying to build a small, handheld unit that has multiple tips," Boppart said. "What's collected is 3-D digital data that can image several millimeters into tissue at micron-scale resolution." These images could replace biopsies in some cases, providing a noninvasive diagnostic tool.

"The primary care physician is the best person to screen the general population for disease," Boppart said.

Better imaging and diagnostic tools will empower primary care physicians and will allow for earlier detection of diseases, quantitative measurements, ongoing monitoring of diseases, and better referrals.

Tests using the new technology will focus on two common patient problems—middle-ear infections and diabetic retinopathy.

The system will allow physicians to detect and quantify bacterial biofilms in the middle ear that are associated with chronic ear infections.

An early prototype of the handheld scanner has both OCT and video-imaging capabilities and interchangeable tips for the eyes, ears, skin, and oral tissue. As one example, the device images the retina and the anterior eye structures (bottom right).

"We think that it's going to completely change the way we treat ear infections," Boppart said.

It will also allow for earlier detection of diabetic retinopathy and quantify changes during treatment for that disease.

Boppart said the project will fund the research partnership for five years and could potentially be renewed for an additional five years. The goal for the next five years of the partnership is to demonstrate the technology and create a standardized prototype. Then larger clinical trials can begin, he said.

The project has already been under way for three years, and imaging of patients has been occurring for the past year and a half.

Li receives Young Investigator Award from Navy

By Nathaniel Lash

ECE Assistant Professor Xiuling Li recently received the Office of Naval Research (ONR) Young Investigator Award. The ONR Young Investigator Program (YIP) seeks to identify and support junior faculty members who show exceptional promise in creative research. Li's proposal, "Massively Parallel Planar III-V Nanowires and Rolled-Up Tubes: Novel Platforms for High-Linearity Electronics and Integrated Photonic Circuits," was selected as one of 21 proposals from more than 270 applications, according to a Navy press release. Li received a three-year, $560,000 research grant.

Li's proposal focuses on potential applications of discoveries she and her research group have made in nanotechnology. Her proposal zeros in on the Navy's need for high-dynamic-range, low-noise, power-efficient communication systems, which can be facilitated through high linearity III-V compound semiconductor nanowire-based electronics and photonics. Linearity means that the output signal is related to input signal by a simple scaling factor.

Li, who is a researcher in the Micro and Nanotechnology Lab (**http://mntl.illinois.edu/**) and an affiliate of both the Beckman Institute (**http://www.beckman.illinois.edu/index.aspx**) and the Materials Research Laboratory (**http://mrl.illinois.edu/**), has been working on III-V compound semiconductors that could enable the production of high-linearity electronics since joining ECE.

Traditionally, radio frequency (RF) amplifiers trade off improved linearity against higher power dissipation. Nanowire-based field effect transistors have been predicted to have much higher linearity characteristics with decreased power delay product. In theory, nanowires that are small enough can reach the quantum capacitance limit, where the wire behaves as if it were perfectly one dimensional (1-D), thereby providing the desired 1-D transport properties.

However, not all materials reach this limit at the same scales. Silicon, for example, must be six nanometers to behave this way. Li believes using III-V semiconductors will give successful results at greater sizes. Indium arsenide, for example, only needs to be in the range of 20 nanometers, which despite being 5,000 times thinner than a sheet of paper, is a size that Li calls "a technologically feasible dimension."

Her method for growing nanowires goes against conventional bottom-up nanowire processes. Rather than producing nanowires perpendicular to the plane from which they are grown, Li's method produces nanowires along the plane through the use of a metal catalyst. Growing wires parallel to the plane is an innovation that could enhance the potential for use in manufacturing nanowire devices.

"In production, you consider things that university research does not normally care about: uniformity and repeatability," Li said.

Manufacturability became one of Li's guiding principles when, prior to joining the Illinois faculty, she worked for six years at Champaign start-up EpiWorks, which manufactures semiconductor device structures.

The nature of her breakthrough in nanowire production provides for this sort of manufacturability.

"If you look at our nanowires, you can see these are all planar," Li said. "When we process these wires for devices, we use the same processing technology used at Intel for microelectronics. Our planar wire is exactly compatible with planar processing."

The planar geometry also improved the defect density in the nanowires, which has led to better device performance. Because of this ONR grant, this innovation will be applied to more technologically important materials and devices. Another minor effort the ONR grant will support is III-V tube-based nanophotonics.

Li said the ONR YIP is "absolutely critical" for her continued progress in this research area.

"I am fortunate to be in a place that has strong infrastructure and a supportive environment, but the type of research I do is very costly. Just the consumption of materials and supplies is quite big," said Li, whose graduate students cover all steps of the processing loop of a semiconductor device—from crystal growth to device characterization. "Even though it consumes more resources this way, the feedback loop goes a lot faster. This Navy grant is going to be very helpful in sustaining the research, which in turn will help us explore more challenges and lead to more discoveries and innovations."

Xiuling Li

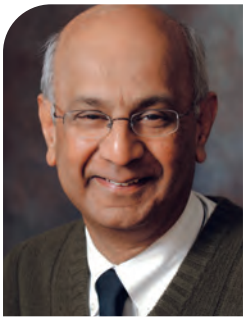
New Assured Cloud Computing Center to be established at Illinois

By Jenny Applequist, Information Trust Institute

The U.S. Air Force Research Laboratory Technology Directorate (AFRL) has announced plans to create a new $6 million "University Center of Excellence in Assured Cloud Computing," which will be a combined effort of AFRL, the Air Force Office of Scientific Research (AFOSR), and the University of Illinois.

The Assured Cloud Computing (ACC) Center, which will be housed in the University's Information Trust Institute (ITI), will perform research, provide technical exchange, and educate professionals and students in the secure cloud computing sciences and technologies that are needed to allow the Air Force to succeed in air, space, and cyberspace missions. The ACC's research activities will focus on developing technology for assured, mission-critical cloud computing across "blue" and/or "gray" networks that ensures the confidentiality and integrity of data and communications, job completion in the presence of cyber attacks and failures, and timely completion of jobs to meet mission requirements.


Roy Campbell


Ravi Iyer


David M. Nichol


William H. Sanders

The principal investigator for the ACC Center will be Roy Campbell, who is the Sohaib and Sara Abbasi Professor in the Department of Computer Science.

"Cloud computing" is computing in which a user accesses a shared, heterogeneous set of computing resources without necessarily having information on the configuration, location, or identity of those resources. A computational cloud used in military applications may include both blue and gray networks, where "blue" networks are U.S. military networks, which are considered secure, and "gray" networks are those in private hands or, perhaps, belonging to other nations, which are considered unsecure. In order to reach mission goals, it will sometimes be necessary to coordinate computation across a mixture of these blue and gray resources. Thus, cloud computing in a military context presents special security challenges. Specifically, assured mission-critical cloud computing across blue and/or gray networks requires the realization of "end-to-end" and "cross-layered" security, dependability, and timeliness.


Ilesanmi Adesida

Ilesanmi Adesida, the dean of the College of Engineering at Illinois, observed that the planned research has broad implications. "Although the new project will primarily benefit the Air Force over the short term, assured use of the cloud will be a tremendous benefit to humanity. Today, you can't really trust cloud computing because of the security issues that remain to be addressed," he explained. "No one has been able to use cloud computing in a task-oriented way before. The work of the Assured Cloud Computing Center will make it possible to deploy cloud computing in task-based, mission-oriented human activity. For that reason, this work will be groundbreaking."

In addition to Roy Campbell, the Center's research team includes faculty members Gul Agha, Masooda Bashir, Rakesh Bobba, Indranil Gupta, Ravi Iyer, Zbigniew Kalbarczyk, José Meseguer, David Nicol, and William H. Sanders, whose home departments include the Information Trust Institute, the Coordinated Science Laboratory, the Department of Computer Science, and the Department of Electrical and Computer Engineering in the College of Engineering.

The Center's website is assured-cloud-computing.illinois.edu.

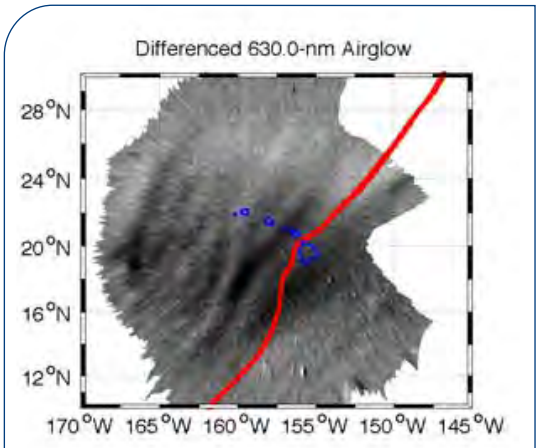
Tsunami airglow signature could lead to early detection system

By Kim Gudeman, Coordinated Science Lab

Researchers at Illinois, led by ECE Associate Professor Jonathan Makela, were the first to record an airglow signature produced by a tsunami in the upper atmosphere. The activity was observed using a camera system based in Maui, Hawaii.

The signature, caused by the March 11 earthquake that devastated Japan, was observed in an airglow layer 250 kilometers above the earth's surface. It preceded the tsunami by one hour, suggesting that the technology could be used as an early-warning system in the future.

The observation confirms a theory developed in the 1970s that the signature of tsunamis could be observed in the upper atmosphere, specifically the ionosphere. Until now, it had only been demonstrated using radio signals broadcast by satellites.



Tsunami signature in the airglow.

"Imaging the response using the airglow is much more difficult because the window of opportunity for making the observations is so narrow, and had never been achieved before," said Makela, a researcher in the Coordinated Science Laboratory. "Our camera happened to be in the right place at the right time."

Tsunamis can generate appreciable wave amplitudes in the upper atmosphere—in this case, the airglow layer. As a tsunami moves across the ocean, it produces atmospheric gravity waves forced by centimeter-level surface undulations. The amplitude of the waves can reach several kilometers where the neutral atmosphere coexists with the plasma in the ionosphere, causing perturbations that can be imaged.

On the night of the tsunami, conditions above Hawaii were optimal for viewing the airglow signature. It was approaching dawn (nearly 2 a.m. local time), with no sun, moon, or clouds obstructing the view. Along with ECE graduate student Thomas Gehrels, Makela analyzed the images and was able to isolate specific wave periods and orientations.

In collaboration with researchers at the Institut de Physique du Globe de Paris, CEA-DAMDIF in France, Instituto Nacional de Pesquisais Espaciais (INPE) in Brazil, Cornell University in Ithaca, New York, and NOVELTIS in France, the researchers found that the wave properties matched those in the ocean-level tsunami measurements, confirming that the pattern originated from the tsunami. The team also cross-checked their data against theoretical models and measurements made using GPS receivers.

Makela believes that camera systems could be a significant aid in creating an early warning system for tsunamis. Currently, scientists rely on ocean-based buoys and models to track and predict the path of a tsunami.


Jonathan Makela

Previous upper atmospheric measurements of a tsunami signature relied on GPS measurements, which are limited by the number of data points that can be obtained, making it difficult to create an image. It would take more than 1,000 GPS receivers to capture data comparable to that of one camera system. In addition, some areas, such as Hawaii, do not have enough landmass to accumulate the number of GPS units it would take to image horizon to horizon.

In contrast, one camera can image the entire sky. However, the sun, moon, and clouds can limit the utility of camera measurements from the ground. By flying a camera system on a geo-stationary satellite in space, scientists would be able to avoid these limitations while simultaneously imaging a much larger region of the earth.

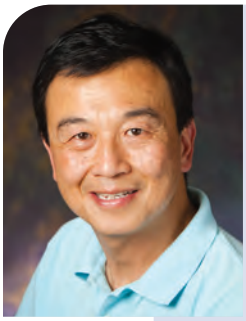
To create a reliable system, Makela says that scientists would have to develop algorithms capable of analyzing and filtering data in real-time. The best solution would also include a network of ground-based cameras and GPS receivers working with the satellite-based system to combine the individual strengths of each measurement technique.

"This is a reminder of how interconnected our environment is," Makela said. "This technique provides a powerful new tool to study the coupling of the ocean and atmosphere, and how tsunamis propagate across the open ocean."

Hwu to elevate computing performance with $2.6 million Department of Energy exascale project

By April Dahlquist, Coordinated Science Lab

ECE Professor Wen-mei Hwu will participate in a three-year project to design a next-generation software infrastructure for productive heterogeneous exascale computing. The project is funded by a $2.6 million grant from the Department of Energy and includes team members from Oak Ridge National Laboratory, the University of Oregon, and Georgia Tech.



Wen-mei Hwu

> "If we are really successful, it will be a lot easier for scientists and engineers to port their applications to GPU-based systems, which can raise application performance by 20 times or more."
>
> –ECE Professor Wen-mei Hwu

Dubbed Vancouver, the project will address multiple challenges on the road to a high-performance exascale computing architecture. The challenges include the persistent issues of realized performance, scalability, and programming productivity.

Exascale computing will be faster and more energy efficient than petascale computing and may give the U.S. scientific community a global competitive advantage. Vancouver will involve porting applications such as simulations of new energy sources and more efficient engines for aircraft and vehicles from petascale to exascale platforms. The goal is to reduce the computation time from as much as six months to a year down to a few days.

A significant portion of the improvement will come from new computing devices, such as graphics-processing units (GPUs). Hwu, the AMD Jerry Sanders Chair in Electrical and Computer Engineering and a researcher in the Coordinated Science Lab, is a leading expert in designing and programming these devices. He recently led a joint Illinois-NVIDIA project for constructing and programming the EcoG GPU cluster computer that took the number three spot on the November Green500 List. EcoG is one of the three most energy-efficient supercomputers in the world today.

However, programming GPUs is currently difficult and time consuming, which has been a major stumbling block. Hwu and Illinois faculty have been working to address the human side of the problem through courses and summer programs, which have drawn programmers from around the world. Hwu's participation in Vancouver will focus on new programming tools that will greatly reduce the difficulty in programming GPUs and other types of parallel processors.

"If we are really successful, it will be a lot easier for scientists and engineers to port their applications to GPU-based systems, which can raise application performance by 20 times or more," Hwu said. "Using these tools, scientists and engineers can instantly increase processing speed and reduce power consumption using the GPU hardware, without long programming delays."

Goddard and Mitra receive NSF CAREER Awards

By Jenny Applequist, Information Trust Institute, and Reema Amin

ECE Assistant Professors Lynford Goddard and Sayan Mitra were recipients of National Science Foundation (NSF) CAREER Awards. These awards are among the most prestigious awards given to young faculty.

Lynford Goddard


Lynford Goddard

Goddard's project is titled "Theory and Application of Reflective Microring Resonators." The project was first conceived in 2008 when Goddard and his graduate students studied ways to create photonic devices with smaller footprints. "Our main motivation was to develop simple closed-form solutions to be able to design the functionality of reflective microring-based devices," he said.

Goddard's project deals with this new kind of photonic device and may help communications systems—like the Internet—function better. Conventional communications lasers have linear grating mirrors for the light to reflect. But Goddard said his proposed device would be shaped into a ring, allowing the grating to create a better reflection spectrum profile.

"Light enters the ring. It builds up in strength and, while circling, is reflected bit by bit by the grating. The ring shrinks the [linear] device by a factor of about 100," Goddard said.

Over the next two years, Goddard and his team will develop and characterize the basic device. During the final three years of the grant, they will apply the device to make lasers and on-chip absorption sensors.

Goddard has been with ECE since 2007. Much of his research interests are in the field of photonics, such as photonics-based sensors and photonic integrated circuits.

Goddard has received numerous honors, including the Presidential Early Career Award for Scientists and Engineers (PECASE) and, most recently, the American Association for the Advancement of Science (AAAS) Early Career Award for Public Engagement with Science and Technology.

Sayan Mitra

Mitra's project is titled "Algorithms and Verification for Reliable Distributed Cyber-Physical Systems." He has a strong research interest in the reliability of cyber-physical systems (CPS), which are systems that involve close coordination among computers that interact with the outside world by means of sensors and actuators. The CAREER award will allow him to address the reliability of a special class of CPS, namely, distributed cyber-physical systems (DCPS). DCPS involve multiple system components that are not all sitting in one place. As a result, on top of the general problems of CPS, DCPS present additional challenges, such as unreliable communication and undetected failures.


Sayan Mitra

"Designing reliable CPSs is challenging, because writing correct computer programs itself is hard, and now you are making these programs manipulate the physical world," explained Mitra. "So how do you design and analyze these systems?"

As an example of a cyber-physical system that most people use on a daily basis, Mitra points to various driver-assistance systems in the current generation of automobiles, such as anti-lock brakes and electronic stability control. Today, such cyber-physical systems are created ad hoc because the current development process is not scalable, and adequate general principles and tools are not yet available. Thus, everyone who needs to make such a system is forced to build it, to a great extent, from the ground up. Mitra's research will address this problem by working to identify appropriate "algorithmic building blocks" that can be assembled to build such systems more easily, while meeting certain reliability guarantees.

NARENDRA AHUJA has received a grant from the National Science Foundation (NSF) to improve high-performance category modeling.

TAMER BAŞAR and **VENUGOPAL VEERAVALLI** are part of a research team that has received a National Science Foundation grant to study controlled sensing, distributed signal processing, and decision making in networks.

JENNIFER BERNHARD is the 2011 recipient of the Ronald W. Pratt Faculty Outstanding Teaching Award.

The 2011 class of IEEE Fellows includes three ECE ILLINOIS professors: **STEPHEN BOPPART**, **JOSEPH LYDING**, and **ELYSE ROSENBAUM**.

JAMES COLEMAN recently received the 2011 Technology Achievement Award from SPIE—International Society for Optics and Photonics. He was recognized for "seminal contributions to the methods, designs, and demonstrations of selectively grown discrete and monolithically integrated compound semiconductor lasers and photonic devices."

BRIAN CUNNINGHAM has received National Science Foundation grants to perform research on external cavity laser biosensors and photonic crystal enhanced microscopy.

ALEJANDRO DOMINGUEZ-GARCIA and **SEAN MEYN** have received a grant from the National Science Foundation for research on smart power systems of the future.


Tamer Başar


Jianming Jin


Jennifer Bernhard


Kevin Kim


James Coleman


Zhi-Pei Liang


Mark Hasegawa-Johnson


Jean-Pierre Leburton

MARK HASEGAWA-JOHNSON has been named Fellow of the Acoustical Society of America.

THOMAS HUANG received a three-year collaborative research grant from the National Science Foundation to use information technology to monitor the activity of wildlife.

JIANMING JIN's new book, *Theory and Computation of Electromagnetic Fields*, was recently published by Wiley-IEEE Press.

KEVIN KIM has received a grant from Science Applications International Corporation (SAI) to study applied materials optical fibers.

RAKESH KUMAR received the Best Paper Award at the International Symposium on Compilers, Architecture, and Synthesis for Embedded Systems.

ZHI-PEI LIANG has received a grant from the National Institutes of Health to study faster dynamic MRI with sparse sampling.

JEAN-PIERRE LEBURTON has received a grant from the U.S. Army Research Office to study self-consistent ambipolar transport and high-frequency oscillatory transients in graphene electronics

JOSEPH LYDING published an invited News and Views article analyzing a potential breakthrough in *Nature Chemistry*, one of the field's highest-impact journals.

JONATHAN MAKELA is the 2011 recipient of the IEEE Education Society's Mac Van Valkenburg Award. The award goes to teachers within their first 10 years following the receipt of their PhD who have "made outstanding contributions to teaching unusually early in their professional careers."

M. A. Pai

Naresh Shanbhag

Paris Smaragdis

Shobha Vasudevan

Professor Emeritus **M. A. PAI** has co-edited a new book recently published by Oxford University Press (India) examining the impact of Dr. Homi Bhabha on the computer revolution in India.

Computing Science Department Head Rob Rutenbar and ECE faculty members **NARESH SHANBHAG** and **PARIS SMARAGDIS** will be investigating machine learning and perception through stochastic computation as part of a new Intel-funded center on embedded computing.

SHOBHA VASUDEVAN recently received the YWCA Leadership Award in Science. She was one of six female leaders who were honored by the YWCA chapter of Champaign-Urbana in their first annual leadership award ceremony.

Two ECE faculty retire

Stepen Bishop

Stephen Bishop came to Illinois to serve as director of MNTL (then called the Microelectronics Lab) from 1989 to 2000. From 2000 to 2004, he was a faculty fellow and associate vice president in the Office of the Vice President for Technology and Economic Development. He returned to teaching and research at ECE in 2004, and in 2006 he became the department's associate head for Administrative and Instructional Affairs. In this position Bishop has guided ECE through successful accreditation and consulting reviews while overseeing a variety of departmental functions, including teaching assignments.

Stephen Bishop

"It means more to me than I can express to see these generations of faculty and staff," said Bishop as he looked out on the audience of young and old colleagues who had gathered on May 4 to thank him and wish him well in his retirement.

P.R. Kumar

P.R. Kumar

P. R. Kumar retired after 26 years of service. Kumar, the Franklin W. Woeltge Professor of Electrical and Computer Engineering and a researcher in the Coordinated Science Lab, joined the ECE faculty in 1984. Since then, Kumar has distinguished himself in both research and education in the field of systems, which includes control, communications, and computing.

Kumar's research focused on the fields of wireless networks, sensor networks, and network-embedded control systems. "I've been interested in the convergence of several areas within electrical and computer engineering," he said.

After retiring from Illinois, Kumar will take a faculty position at Texas A&M University. He is looking forward to the warmer climate farther south in Texas but will miss the warm atmosphere of the University of Illinois, as well as its students and faculty.

ECE 109 accelerates the education of transfer students

BY NATHANIEL LASH

Now into its second year, an online course for transfer students designed by ECE Lecturer and Chief Adviser Marie-Christine Brunet has proved a success. ECE 109: Introduction to Electrical and Digital Circuits helps transfer students catch up with their electrical and computer engineering studies.

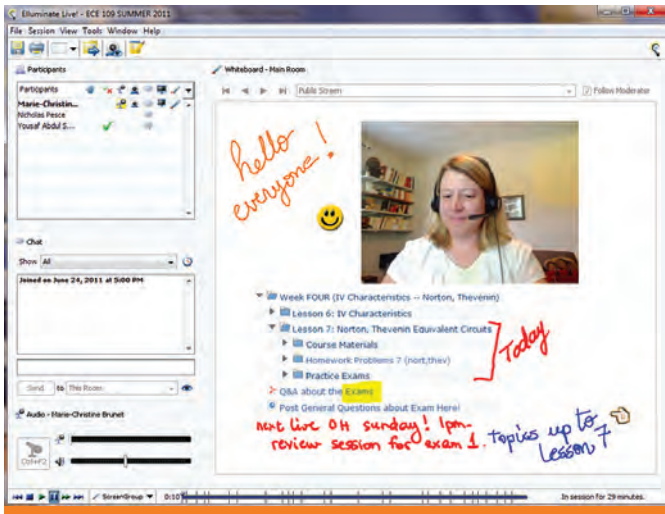
Currently offered only in the summer, the online class serves as an introduction to ECE and takes the place of the lecture portion of ECE 110, providing the foundation for many of the classes taken for an ECE degree. The lecture portion of ECE 110 is a prerequisite for many higher-level classes, which can set back incoming transfer students who previously would take the class alongside freshmen during their first semester before being able to take more advanced coursework.

Transfer students can now have that lecture requirement filled before they arrive on campus—although they would still have to fulfill the lab portion of ECE 110. Nevertheless, they will have a leg up and will be able to take higher-level courses, such as ECE 210: Analog Signal Processing or ECE 290: Computer Engineering I, both of which are required in an ECE student's first two years of study.

"ECE 109 is definitely a great online course and an excellent choice for transfer students," said Zhongdong Zhu, an ECE junior who transferred in fall 2010. "I have many friends who now regret not taking it."

Brunet's class integrates video lectures produced on her tablet PC with Camtasia, which allows audio to be added to video of her computer's screen. Using the program Elluminate, sessions are recorded and uploaded for students unable to make the online meetings.

"This is by far the most popular aspect of the class," Brunet said. "It's very interactive, and they just love it."



ECE 109 is an online course that allows incoming transfer students to fulfill the lecture portion of the ECE 110 course requirement. The students regularly interact with course director Marie-Christine Brunet online.

College of Engineering consolidates information technology

BY REEMA AMIN

Information technology (IT) services for faculty, staff, and students in the College of Engineering now comes from one unified organization: Engineering IT.

The College of Engineering administration has taken all of the separate IT operations—previously dedicated to each department of engineering—and consolidated them into a single unit in the college.

Joshua Potts (MSEE '99), manager for the Web, Application and Information Services (WAIS) division of Engineering IT, said the consolidation of all the IT departments was an initiative to provide better support service and save money.

The consolidation has saved the ECE Department more than $160,000 annually.

The college began the consolidation process in February 2010. In July, the college officially established Engineering IT, which has been divided into four parts: user services, infrastructure, Web application information services, and the multimedia technologies group. The four divisions allow the new organization to efficiently support the research and instruction enterprise.

Potts said that most of the employees who worked for individual departments continue to work at Engineering IT. Although organizational changes have been made, Potts emphasized that engineering affiliates should not fear having to deal with a completely new staff.

"People are unaware of the changes that have been made. We're all here, and [faculty and students] can still all talk to the same familiar people," Potts said.

Class helps students create smartphone apps

By Nathaniel Lash, ECE ILLINOIS

ECE students capped off their undergraduate careers in computer engineering by developing smartphone applications that utilized cloud computing. ECE 498HP: Extending Mobile Computing Through Cloud Computing was a new class spearheaded by ECE Professor Constantine Polychronopoulos and ECE Assistant Professor Yih-Chun Hu. Students learned how to extend cloud computing resources to mobile smartphone users.

Microsoft provided access to its Windows Phone 7 devices and Windows Azure cloud services for the course. "From Microsoft's standpoint, the phone is the next big computing platform," Hu said. As people become more reliant on their smartphones for energy-draining tasks, cloud computing becomes an important option.

ECE 498 provided students with experience in developing applications using the growing remote computing technology. Of the five apps developed during the course, three received special recognition and cash prizes sponsored by Microsoft.

Mapster: Cloudiest Application

ECE juniors Adarsh Hasija, Pratch Piyawongwisal, and Sahil Handa used the cloud to integrate social media outlets to make the world a safer place. They integrated Twitter and Bing Maps to create Mapster, a mobile app that enables rapid communication during emergencies by identifying the time, location, and type of emergency event.

Geotagged tweets are combined with weather data in the cloud to enable another user to view the emergency as it unfolds via a spatiotemporal animation that shows the data change over time in Bing Maps. According to Piyawongwisal, this has a number of applications in addition to emergency reporting.

"We can make it social network, or we can use it solely for research purposes," Piyawongwisal said.

The group worked with researchers from the National Center for Supercomputing Applications (NCSA) on the app, which they're calling a "citizen event reporting system."

Illinois Phone: Most Innovative Application

A group of seniors used cloud computing to tackle issues in the Thomas M. Siebel Center for Computer Science. Illinois Phone, developed by ECE senior Amey Chaugule and computer science students Joe Fernandez and Abhishek Pradhan, is meant to streamline the University's authentication system for reserving and opening rooms in the center. It combines a smartphone's GPS system and QR-code reader with the center's lock and room reservation system.

Pradhan said the current system does not allow for ad hoc meetings. Undergraduates have to reserve a room in advance, and when they fail to do so, they have to turn to graduate students to open room doors for them.

"This puts everyone in quite an awkward situation, since everyone's been told not to let people into these rooms," Pradhan said.

Illinois Phone solves this problem by creating a system that grants access to classrooms when students need them, while keeping a dependable log of who is using which room and when.

TaskPop: Best Overall Application

ECE senior Stan Idesis worked with longtime friend Stoyan Gaydarov on TaskPop, a task-managing application that streamlines collaboration between people with a shared to-do list.

"We made the app a lot more social than personal," Idesis said. "Now, I can create a task, share it with a friend, and when he completes it, I'll know."

The app was voted "Student Choice" by those in the class.

"It's an app that a lot of us could see ourselves using," Hu said.

The Future

Though the class (and, for most, college) has ended, students are still hard at work putting their apps on the market.

Hu believes the course was a success. He did say that the class was intended for like-minded individuals interested in creating their own products. "This is a course that's geared toward people who want to build a lot of stuff and are not afraid to put in the hours to do it."

During the spring 2011 semester, students in ECE 498HP: Extending Mobile Computing Through Cloud Computing were able to develop their own smartphone apps. The image above shows a screenshot aof the TaskPop app.

Some of the leading dignitaries who broke ground on October 7 were (from left) College of Engineering Ilesanmi Adesida, University of Illinois President Michael Hogan, Chancellor Phyllis Wise, Illinois Governor Pat Quinn, ECE Department Head Andreas Cangellaris, and ECE Professor Philip Krein, chair of the ECE Building Committee. *All photos by Thompson-McClellan.*

Groundbreaking ceremony held for new ECE building

BY TOM MOONE

On October 7, a ceremony was held to break ground for a new building that will be headquarters to the Department of Electrical and Computer Engineering (ECE) at the University of Illinois at Urbana-Champaign.

Illinois Governor Pat Quinn joined University of Illinois President Michael Hogan, Vice President of the University of Illinois and Chancellor of the University of Illinois at Urbana-Champaign Phyllis Wise, College of Engineering Dean Ilesanmi Adesida, and ECE Department Head Andreas Cangellaris to launch the construction of the building.

"Today is a very special day in the history of the Department of Electrical and Computer Engineering, as we celebrate a dream that, after many years of planning and anticipation, is now becoming a reality," said Cangellaris in his opening remarks at the ceremony.

"The University of Illinois is home to some of the best and brightest minds in our state, and we want to make sure they have the most cutting-edge technology available to them," said Governor Quinn. "Updated and energy-efficient higher education resources are vital to the success of our state's innovation and economic development."

Donations provide half of funding

State funds for the building had been part of a capital bill signed by Governor Quinn in 2009. The state funds will provide $47.5 million toward the project. That is half of the $95 million total cost to build and furnish what will be a major addition to the Urbana campus.

In addition to the state funding, the University to date has successfully secured $37.5 million in private support for this important project. Private support for this building has come from many generous friends and donors of the College of Engineering. The College of Engineering and the ECE Department are working to raise the remaining funds to reach the final target of $47.5 million in private support prior to the project's completion.

President Hogan emphasized at the ceremony that the partnership between the state and University in raising funds for the

Illinois Governor Pat Quinn joined dignitaries from Champaign-Urbana and the University at the groundbreaking ceremony.

Clockwise from upper left: ECE Professor Pete Sauer (center) joined current and former ECE department heads Andreas Cangellaris (left), Richard Blahut, George Swenson, and Tim Trick for a turn at the shovel. Students from the Integrated Circuit Fabrication Lab course showed off their bunny suits during the ceremony. University of Illinois President Michael Hogan spoke at the ceremony. A lunch reception followed the event. College of Engineering Dean Ilesanmi Adesida spoke at the ceremony. Chancellor Phyllis Wise (left), Dean Adesida, and President Hogan await the arrival of the governor. Student members of the ECE Student Advancement Committee take a turn at the shovels.

From left: Illinois Animal Sciences Professor Robert Easter (center), who served as interim chancellor of the University from 2009 to 2011, poses with ECE Department Head Andreas Cangellaris and Dean Ilesanmi Adeisda. Cangellaris provided welcoming remarks at the ceremony. Chancellor Phyllis Wise spoke at the ceremony, one her first activities as chancellor.

project has "ensured that this great University will remain a world leader in high-tech innovation and education for generations to come."

Building to be a showcase

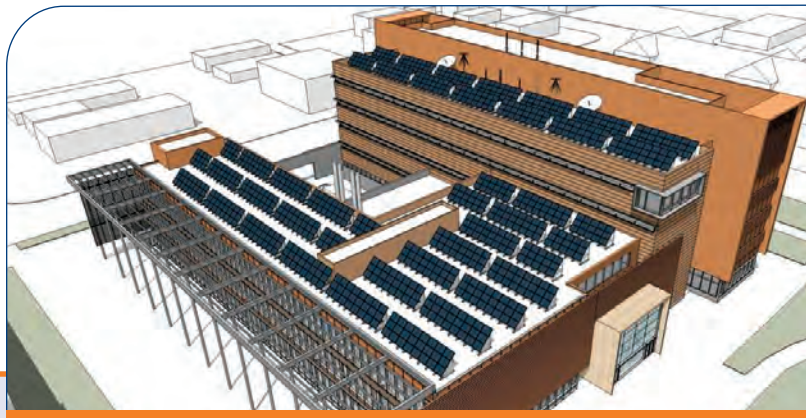
The new ECE building will comprise 230,000 square feet of instructional, research, and office space, with an emphasis on student learning spaces. The building has the goal of achieving LEED platinum certification, which indicates the highest level of building efficiency. The 21 instructional labs will make up 28% of the total space. Spaces for students include an undergraduate lounge, a graduate student lounge, student organization offices, and 11 teaching assistant meeting rooms and study rooms. Twenty research labs for faculty and graduate students will support seven research groups.

The auditorium will have 400 seats, making it one of the largest gathering spots on campus. It will also enable ECE to hold gatherings for an entire class of students at one time.

The building was designed by the architectural firm SmithGroup, the same firm that designed the Beckman Institute for Advanced Science and Technology. Andy Vazzano, the leader of SmithGroup's Science and Technology Practice, said, "It's exciting to be working alongside our client to create a new building where future innovations and sustainable research practices are imagined and refined. The ECE building will not only support the University's unique mix of traditional and modern teaching and research methods, but will create a vibrant and energetic environment where students and faculty can share ideas that truly shape our world."

The facility is targeted for completion in spring 2014.

More information can be found at the website for the Building Campaign for ECE ILLINOIS: **www.ece.illinois.edu/buildingcampaign**.



This bird's-eye view of the new ECE building shows the solar panels that will be placed on its roof.

Net-zero energy

By Heather Punke

The new ECE building is on track to be the largest building in the United States with net-zero energy characteristics. That means its energy bill will even out to be $0 for the entire year.

"[Net-zero energy] doesn't mean it's not connected to the grid, it's just that the bill over a year is basically zero," explained ECE Professor Philip Krein, chair of the ECE New Building Committee.

The net-zero energy goal will be achieved in a number of ways. First, the building will have better insulation than older campus buildings. It will also utilize passive solar concepts, which means the building will make use of daylight when possible.

Arguably the most exciting way this building will achieve net-zero energy is through solar energy. Solar panels will be installed on the building itself, and are also in the works for the parking garage that is east of the Beckman Institute.

Not only will the energy-efficient aspect of the building benefit the ECE Department, it will also bring value to the campus as a whole. Krein said, "One of the things people have talked about is having a living laboratory for various kinds of studies, and one of those indeed was energy in facilities."

All the technology benefits aside, Professor Krein has one hope for the building. "Students are going to love it," he said. "It's going to be a tremendously fun place to work and learn. It's really designed for students."

Solar Decathlon: Helping students and the world

By Heather Punke

This fall, a team of Illinois students made a cross-country trip. Along with the essentials, they brought something a little different with them—a house.

They were the University of Illinois Solar Decathlon team, and they traveled to Washington, D.C., with their contest entry, the Re_home.

ECE students joined forces with peers from many different disciplines and majors to take part in this biannual competition, sponsored by the U.S. Department of Energy. The team's objective was to design, build, and operate a solar-powered, energy-efficient home.

"Basically, they want the students to design homes to showcase technology that people can actually use, to minimize energy usage," ECE graduate student Stanton Cady explained. "And also showcase things like solar energy—things that people might not normally have." Cady was the electrical engineering team leader for the Illinois team.

This was the third time that Illinois entered the contest. Cady was a part of the 2009 competition, where Illinois placed second out of 20 national and international teams.

The electrical engineering students on the Solar Decathlon team played a major role in the functionality of the home. "[We] handled everything that has to do with anything electrical or electronic in the house," Cady explained.

This included the solar panel arrays on the home. This year's entry had two arrays, one on the roof and one shading the porch.

One of Cady's favorite things the ECE team did this year was the controls and monitoring system, which was completely student designed and produced.

"We have an iPad that can be used to interface with the system. From there you can monitor energy usage, temperature and humidity, water usage, and how much energy we're producing," Cady said. "You can also control things like the lights."

Even minor components, such as small as a light switch, can help make a house more energy efficient, and Illinois' home has a very unique light switch system. "Normally you have a light switch in the wall and have AC wiring going to the switch, and then from the switch to the light itself. We found switches that are completely wireless," Cady explained. "In addition to being wireless, they don't require an energy source."

The energy needed to send the wireless signal to the corresponding light is taken from someone actually depressing the switch. "It's a really cool system; you don't need any batteries and you don't need to run any wires to the switch," Cady said.

The competition is called a decathlon because there are 10 separate competitions. Each house is judged on architecture, market appeal, engineering, communications, and affordability. The physical competitions include comfort zone, hot water, appliances, home entertainment, and energy balance contests, according to the Solar Decathlon website.

Re_home was the University of Illinois entry in the 2011 Solar Decathlon. The Illinois team finished seventh overall. *Photo by Stefano Paltera/U.S. Department of Energy Solar Decathlon.*

The physical competitions try to simulate someone actually living in the home.

"[The competition] is a really fun time, it makes all the hard work worth it," Cady said.

But he got more out of being on the Solar Decathlon team than just a good time.

"I think one of the biggest things [I got out of it] is working with other disciplines," he said. He explained that engineers usually just work with other engineers, but the competition allowed him to work with architecture students and other disciplines. "I guess it's a good opportunity to see how other people think."

The overall experience of the Solar Decathlon helped Cady gain experience, and will one day influence the future of solar energy in our homes.

This year, Illinois did not fare as well as it had in 2009. The final standings put the Illinois team in seventh place. For more information on this year's competition, visit **www.solardecathlon.gov.**

Donor Honor Roll January through December 2010

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

The following list includes charitable gifts designated for ECE and received between January 1, 2010, and December 31, 2010. Gifts to other campus units may be recognized in other campus publications.

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

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Alumni share leadership expertise on campus

By Reema Amin and Tom Moone

A university the size of Illinois needs the involvement of its alumni and friends to remain a strong, vibrant institution. Typically that involvement takes the shape of financial contributions. These are, of course, essential for the continued success of the University. But alumni can also get involved in ways that enhance the educational experience and maintain the excellence of graduates from the University of Illinois.

ECE alumni David Geier and Gene Jend visited Illinois in the spring to participate in Imprint, a one-day program sponsored by the Illinois Leadership Center.

ECE alumni David Geier (BSEE '77) and Gene Jend (BSEE '86) both visited Illinois during the spring 2011 semester to participate in Imprint, a one-day program sponsored by the Illinois Leadership Center. Imprint was designed to provide students with important leadership skills for life after college and other similarly momentous transitions. Imprint is one of several programs sponsored by the Illinois Leadership Center over the course of the academic year. The Illinois Leadership Center strives to provide opportunities for Illinois students to develop their leadership skills.

"[Imprint] is really set up to talk about transitions, coaching, and mentoring," said Geier, who traveled from San Diego, where he is vice president of operations at San Diego Gas & Electric. "As a person goes through their career or life, these are all skills that will help them be successful."

"[Imprint] is very exciting because the energy level of the students is very high," said Jend, who is department head for test equipment design at Rolls Royce Aerospace in Indianapolis. "Many of [the participants] had taken communications classes, where they had already prepared their elevator speech. I was pleasantly surprised at that."

Geier used the example of his move from Illinois to California to illustrate how students could remain successful while transitioning. He also gave personal examples of working at an expert level at one job and transitioning to a job he knew virtually nothing about.

Both Geier and Jend agreed that learning how to communicate effectively is extremely important for success after college. This can be especially true for engineers.

"If you want to be a leader in an engineering program, you have to be able to communicate your ideas," said Geier. "I talk to different types of workers, from field workers to construction workers to the mayor of San Diego."

"I would say [communication] is essential, because engineers especially tend to be introverts," said Jend. "They are very good at problem solving and mathematics, but when it comes to the soft skills, that is often not their strong suit."

Jend said that participating in Imprint or a similar program from the Illinois Leadership Center would be beneficial to any ECE student. "The Illinois Leadership Center provides the skills to help round out engineers and make them better communicators and make them self-aware. And that is all good," he said.

Geier agreed: "If you get a degree from the University of Illinois, you can do anything you want to. But these leadership skills will really help you along the way."

More information on the Illinois Leadership Center, as well as Imprint and its other programs can be found at **www.illinoisleadership.uiuc.edu**.

What goes into educating today's young people? What makes a high-caliber engineer? What tools can a university provide to help its students succeed? Can a building impact the learning environment?

Research has shown that the physical environment in which students learn has a significant impact on their learning. More students and faculty can be invigorated by a modern, flexible learning environment than by an old, outdated, dark building (with all due respect to Professor Everitt and his 1947 classes by candlelight). State-of-the-art facilities at MIT and other institutions have helped to keep their students and faculty energized and their rankings high.

Recently, we held a groundbreaking ceremony for our own new building. It was an exciting and inspirational event attended by Governor Pat Quinn, University of Illinois President Michael Hogan, Chancellor Phyllis Wise, and many faculty, students, and alumni. Our new ECE building will provide an environment for concentration and listening in the classroom, experimentation in the labs, and collaboration in study and meeting spaces while serving as a technological showcase to the world. Our new building is designed to be on the cutting edge, featuring technologies developed at Illinois by its alumni and by other leading innovators in architecture, design, and education.

This is our new building—a gift made to enrich the present and the future. We, as alumni, can take pride it in and utilize it. I encourage you also to support it. While the state has released its portion of the building funds, private donations are still needed to reach the total fundraising goal for the project.

As fellow alumni of the ECE Department, your ECE Alumni Advisory Board encourages you to join us in doing our part to complete this fundraising effort. Information, updates, and donation information for the ECE Building Campaign can be found at **www.ece.illinois.edu/buildingcampaign**.

Sincerely,

Christopher N. George (BSCompE '97, MSEE '99, JD '02)
ECE Alumni Association
Board of Directors President

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ECE Alumni Board welcomes three new members

By Heather Punke and Tom Moone

This year, the ECE Alumni Board welcomed three new members: Richard Chan, Vamshidhar Kommineni, and Alek Tziortzis.

Richard Chan

Vamshidhar Kommineni

Alek Tziortzis

RICHARD CHAN (BSEE '01, MSEE '02, PhD '05) is a recent alumnus working for BAE Systems, a defense contractor in New Hampshire, designing defense electronics.

He said one of the most rewarding aspects of the job is solving problems. "It's like in graduate school, but with a lot of flexibility," he said.

While he got his bachelor's, master's, and PhD from ECE ILLINOIS, graduate school is one of Chan's favorite memories from being at ECE.

"Undergraduate is a good experience to give you all the theories, but the best thing about graduate school was learning how to do the problem solving on your own, rather than relying on somebody else," Chan explained. "I would say that was the best experience and the best memory I got out of my years in the ECE department."

In his first year on the board, Chan hopes to help ECE interact with alumni and looks forward to getting to know other board members and alumni. "I'm excited to see all of the board members," Chan said.

When Chan is not busy working, he enjoys kayaking during the New England summer.

VAMSHIDHAR KOMMINENI (BSCompE '01) is a senior program manager at Microsoft, where he has been employed since graduating from Illinois.

He works on the Windows Azure platform. As the program manager, he defines the direction for the product, providing the vision and strategy, and coordinates the release of the parts of the product he works on.

Kommineni credits his Illinois education for the success he has had in his professional career, and it was a desire to give back to the department that led Kommineni to become a member of the Alumni Board. "Whatever I am in my professional career and whatever I will be, I owe to Illinois. I definitely feel a deep sense of gratitude for the education I got there and the experience I had," said Kommineni. "When I was asked to be on the board, I felt that was one way I could contribute back to the department."

ALEK TZIORTZIS (BSEE '91, MSEE '93) is an intellectual property manager at Research in Motion, a position he's had for nearly three years.

In his current position, Tziortzis oversees several patent committees for the company and is in charge of portfolio management for those patents. Since joining Research in Motion, he has also become a patent agent, which is useful in his position. "I make sure that we patent the key technologies within our programs as they're developed," he said.

And now Tziortzis is able to bring the wisdom and experience he has gained in industry back to ECE through the alumni board. "I am very fond of U of I," he said. "I think it's a stellar engineering program. For me to be able to help the program or give insight into directions it might go appealed to me."

Tziortzis hopes that his tenure on the board will help encourage entrepreneurship. "Getting students up to speed to apply their knowledge to real-world problems and to go on to entrepreneurial ventures would be of interest to me," he said.

Brian Renwick: Ensuring opportunities for future ECE generations

By Tom Moone

When Brian Renwick (BSEE '73, MSEE '75) talks about his experience at the University of Illinois, a word that keeps popping up is "opportunity." He describes his time at the University of Illinois as "a great opportunity, a great education."

Brian Renwick

It was this educational opportunity that led to his career with Sargent & Lundy, a Chicago-based engineering consulting firm specializing in power plant and transmission design. Renwick went to work for Sargent & Lundy right after obtaining his master's degree from Illinois, and has remained there ever since. Renwick is currently an executive vice president and chief nuclear officer. In his position, he oversees all work at Sargent & Lundy related to nuclear power.

In addition to educational opportunities, Renwick looks upon his University experience as one that gave him opportunities for personal growth. During his time at Illinois, he became a member of a fraternity, and in his senior year, he was a dorm advisor at one of the residence halls. The latter experience was a great "opportunity to learn and grow, because there were other seniors who were wondering, 'How could this senior guy be their dorm advisor?'" said Renwick. "So I had to prove myself in that role."

Renwick's father started as an overhead line electrician and eventually became an electrical distribution supervisor for ComEd. Consequently, his older brother, Bruce, attended and graduated from ECE ILLINOIS. This helps to explain Renwick's interest in the power area of electrical engineering. But he was raised in a fairly modest household. He believes that the education he received at Illinois was a major factor in enabling him to achieve the career success he has had. "I felt that I came from a humble background and through great opportunities from a great engineering school, I subsequently landed a job with a great company," said Renwick.

Having had that success, which started with the opportunities he had at Illinois, Renwick decided that he wanted to "make sure those opportunities continued for other Americans who come from humble origins," he said.

One way that Renwick and his wife have assisted others in achieving these opportunities is through the Barbara H. and Brian L. Renwick Electrical Engineering Scholarship, which they have endowed. This scholarship provides funding to undergraduate ECE students in their studies.

Another way that he helps provide opportunities for future generations is through his support of the building campaign for ECE ILLINOIS. "Illinois has one of the best ECE programs in the United States. And we're working out of an ECE building that's very old. It's no longer the high-caliber facility that can appropriately support our top-quality program into the future," said Renwick.

In fact, Renwick recalls his days in Everitt Lab in the 1970s. Even then he thought that the building was very old. "I just felt that it was important for the University to have the right facilities to sustain their high standing."

For Renwick, it has come full circle from an opportunity to receive a top education to an opportunity to provide the means for others to receive a similar education. When the new ECE building is completed, future generations of ECE students will be able to achieve success through the generosity of those alumni, like Brian Renwick, who contributed to this campaign.

ECE alumni honored by College of Engineering

By Jennifer La Montaigne, Computer Science, and Heather Punke

On April 16, ECE alumni Prithviraj Banerjee (MSEE '83, PhD '85) and Richard T. Cheng (MSEE '69) were among those honored at the College of Engineering Student and Alumni Awards Ceremony. They each received the Alumni Award for Distinguished Service.

Prith Banerjee (left) was recognized by the College of Engineering for contributions in parallel algorithms for VLSI CAD and compilers for parallel and heterogeneous computing. He was presented with his award by College of Engineering Dean Ilesanmi Adesida. *Photo by Thompson-McClellan.*

Prithviraj Banerjee

Banerjee, who is senior vice president of research at Hewlett Packard and director of HP Labs, was recognized for his contributions in parallel algorithms for VLSI CAD and compilers for parallel and heterogeneous computing, and for visionary leadership in engineering research and education.

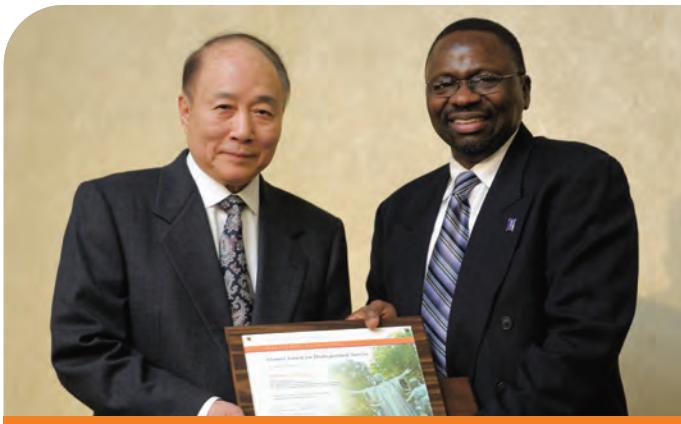
Before he went to work for HP, Banerjee was an ECE ILLINOIS faculty member, chairman of electrical and computer engineering at Northwestern University, and dean of the College of Engineering at the University of Illinois at Chicago. He spent nearly 22 years in academia.

Banerjee made the switch from academia to HP because he felt he could have more of an influence in the computer engineering world. "Working for one of the largest computer companies in the world, I could have a real impact on transferring research ideas into real profits," he said.

In addition to this award, Banerjee has received the IEEE Taylor L. Booth Education Award, The American Society for Engineering Education Terman Award, and the NSF Presidential Young Investigator Award. He is a Fellow of the American Association for the Advancement of Science, the Association for Computing Machinery, and IEEE. In 2007, he received the Distinguished Alumni Award from ECE ILLINOIS.

Richard T. Cheng

Cheng was recognized for "pioneering and outstanding leadership" in education and in business. Cheng is the founder and president of ECI Systems.



Richard Cheng was recognized by the College of Engineering for pioneering and outstanding leadership in education and business. *Photo by Thompson-McClellan.*

After completing his master's degree in ECE, Cheng continued his education in the Department of Computer Science, earning a PhD in 1971. He received one of the first graduate degrees from that department. He went on to found computer science programs at the University of Wisconsin–Whitewater, Hunter College, the Rochester Institute of Technology, and Old Dominion University.

He retired from his career in academia in 1985 to concentrate on running ECI, a highly successful, award-winning company he founded in 1980 with a former graduate student as his first employee. The company focused on research and development in computing in native foreign languages, including Chinese. Because of this expertise, ECI successfully competed for a multimillion-dollar contract for the United States Information Agency's worldwide computer network in 1983. ECI grew into a leading integrated-systems provider for the U.S. military and government. In 2002, Cheng retired, and ECI went through several mergers.

Cheng has made several endowments to support computer science, including the Richard T. Cheng Endowed Fellowship in the Department of Computer Science at Illinois. He has also been active in the Chinese-American community, having founded the Organization of Chinese Americans, Eastern Virginia Chapter, and becoming a member of the Committee of 100, an organization that seeks stronger relations between the United States and China.

Lachman honors friend through scholarship

By Tom Moone

"I'm still a bit numb and just overwhelmed," said Brad Griffis (BSEE '01, MSEE '03). "No words, really. Just stunned. Certainly honored. I'm still just totally shocked."

Many people have great friends from their college days. Birthdays are remembered with cards or small gifts. Phone calls and emails are exchanged. In these and other ways, people remember those friends who had an important influence and impact on their lives as they went through college.

Few people would do what Phillip Lachman (BSEE '04) did for his friend Brad Griffis: Lachman endowed an ECE scholarship in his name.

"I was having this urge to give back to the University," said Lachman, "and all of the sudden, the scholarship idea just kind of came to me."

Although he wanted to give back to the department, Lachman was not concerned with naming the scholarship after himself. "The one person who probably had the most profound influence on me during my undergraduate years was Brad," explained Lachman, "We'd seen each other as an RA, as a TA, as a roommate. So Brad kind of encompassed all aspects of my college experience. So it became very logical for me."

Lachman and Griffis met when Lachman was a freshman and Griffis was one of the dorm resident advisers (RAs). Lachman had not received a spot in the engineering program and was looking for some advice and guidance on how he could meet the requirements to get in. Griffis welcomed the opportunity to help.

"When Phillip came strolling into my room, I thought, 'Okay, here's a key opportunity to give back some of what had already been given to me,'" said Griffis. "So I tried to help him in terms of getting started in electrical engineering."

The two quickly became friends. Griffis was Lachman's teaching assistant (TA) for ECE 210: Analog Signal Processing, and they later shared an apartment for a year while Griffis was finishing up his graduate student career at ECE and Lachman was nearing the end of his undergraduate career.

"Even while we were rooming together, Brad provided me guidance on what classes to take, and help with technical questions," said Lachman. "He was a great sounding board."

Even though Griffis was a great help to Lachman in his academic career, they chose different paths within ECE. Lachman concentrated on electromagnetics and now works for Lockheed Martin in California. Griffis focused on signal processing and works for Texas Instruments in the Chicago area.

Over the years, the two stayed in touch, with regular phone calls and occasional visits. It is a testament to their friendship and trust that when Lachman invited (nay, insisted) Griffis to come to Champaign on April 28 (coincidentally the day of the ECE Student Awards Banquet), Griffis showed up not really knowing why. It was that afternoon that Lachman revealed to Griffis that he had endowed the scholarship.

Phillip Lachman (left) presents Brad Griffis with a certificate commemorating the new Bradley J. Griffis Endowed Scholarship in Electrical and Computer Engineering. Lachman endowed the scholarship in honor of Griffis, his friend and a mentor during Lachman's undergraduate career.

"I had no idea, right up to when he sprang it on me," said Griffis.

"The secret was kept safe until it had to be revealed," said Lachman.

With the scholarship, Lachman wants to provide assistance to students who have demonstrated the guidance and leadership that he saw in Griffis. "Very much how Brad was the one who guided me and was my mentor, the scholarship is focused on people who embody those principles toward their undergraduate counterparts," said Lachman.

The first recipient of the Bradley J. Griffis Endowed Scholarship in Electrical and Computer Engineering was Tong Cheng, a senior in ECE. He was recognized at the Student Awards Banquet that evening.

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**.

You can also mail your photos to:

Tom Moone
56 Everitt Laboratory
1406 W. Green St.
Urbana, IL 61801

1940s

SHERRE LOVICK (BSEE '48) published a book titled *Radar Man*. The book recounts experiences Lovick had while working on top-secret aircraft for stealth reconnaissance.

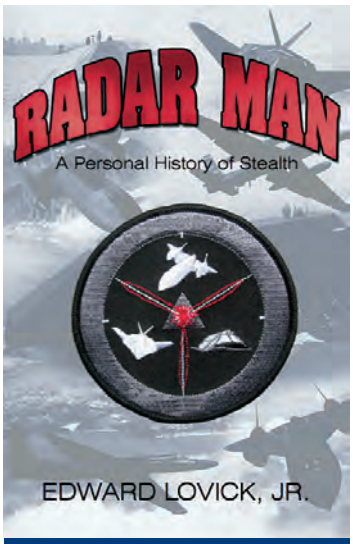
SORAB K. GHANDHI (MSEE '48, PhD '51) was the 2010 Education Award Recipient from the Electron Devices Society. The award recognizes distinguished contributions to education in the fields of interest of the IEEE Electron Devices Society. Ghandhi is a professor emeritus at the Rensselaer Polytechnic Institute.

1950s

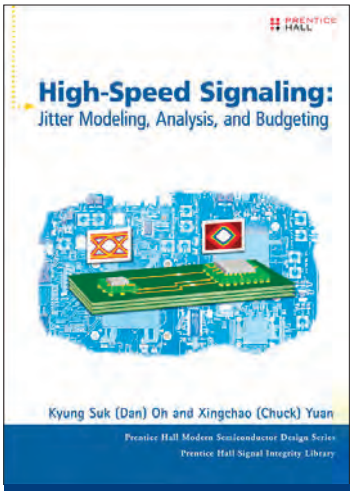
HITEN GHOSH (MSEE '59, PhD '62) received the Pravasi Achievers Gold Medal in 2010. He is the vice president and chief quality officer of Hughes Network Systems.

1960s

JOHN ORR (BSEE '69, PhD '77) received the Electrical and Computer Engineering Distinguished Educator Award from the American Society for Engineering Education. It recognizes significant contributions to engineering education. Orr is a professor at Worcester Polytechnic Institute.



Sherre Lovick (BSEE '48) published *Radar Man*.



Kyung Suk (Dan) Oh (BSEE '90, MSEE '92) published *High-Speed Signaling: Jitter Modeling, Analysis, and Budgeting*.

1970s

JIM QUIRIN (BSEE '70, MSEE '71) retired from his senior staff electrical engineer position with Lockheed Martin Space Systems after 29 years in the space shuttle program at NASA's Michoud Assembly Facility in New Orleans. He continues with his research and publications on popular music with Chartmasters, a company he and Barry Cohen (Mathematics '75) founded in 1975.

YAHYA RAHMAT-SAMII (MSEE '72, PhD '75) received the IEEE Electromagnetics Award for fundamental contributions to reflector antennas, near-field measurements and diagnostics, antenna and human interactions, and optimization algorithms in electromagnetics. Rahmat-Samii is a professor at UCLA.

JIM WEST (MSEE '77) was named executive vice president of engineering and operations for Precision Airconvey Corp. He is a past director of the Society of Manufacturing Engineers, president of the Machine Vision Association, a former chief technology officer for Faro Technologies, and chief operating officer for Asyst Automation, Inc.

JOHN CIOFFI (BSEE '78) published a blog entry on *Forbes.com* titled "Engineers: Ignore Critics, Follow Your Dreams, Change The World." Cioffi is the CEO and chairman of Assia.

ED SAWAN (PhD EE '79) gave a $300,000 gift to Wichita State University to fund the largest single general graduate fellowship at WSU. Sawan is a professor emeritus in electrical engineering and computer science at WSU.

1980s

DIANA SANGALLI (BSEE '83), a patent attorney, joined Duane Morris LLP as special counsel in Houston.

SELIM UNLU (MSEE '88, PhD '92) developed a scientific method that makes it possible to detect numerous viruses in a single blood test. He is a recognized expert on photodetectors and nanophotonics and a professor at Boston University.

1990s

KYUNG SUK (DAN) OH (BSEE '91, MSEE '92, PhD '95) co-authored *High-Speed Signaling: Jitter Modeling, Analysis, and Budgeting*. It is a volume in the Prentice Hall Modern Semiconductor Design Series. Dan is a senior principal engineer at Rambus Inc., where he leads signal integrity analysis for various products including serial, parallel, and memory interfaces.

BHARAT RAO (MSEE '89, PhD '93) received ACM SKIKDD's service award for "service to society" through "pioneering applications of data mining to develop health care products that reduce costs and improve the quality of patient care." Rao is the senior director and head of the knowledge solutions group for the health services business unit at Siemens.

HEMANT CHASKAR (PhD '99) was promoted to the vice president of technology at AirTight Networks. He has been responsible for technology innovation, product strategy, and intellectual property management there for the past seven years.

2000s

ERIK HOWELL (BSCompE '02) was named a principal to the Cumberland Consulting Group. He has been with Cumberland since 2004.

ROBERT BALOG JR (MSEE '02, PhD '06) received the 2011 Rutgers School of Engineering Award for "developing efficient and effective electrical energy conversion methods for use in the emerging field of solar energy." He is an assistant professor at Texas A&M.

SUHAIL BAROT (BSEE '06, MSEE '09) was featured in the "Campus Leaders" special issue of the *Daily Illini*. He is the chair for the Student Sustainability Committee and the treasurer for the YMCA Student Board.

In Memoriam:

THOMAS C. SHEDD (BSEE '40). He was an editor at *Telephony Magazine* and *Modern Railroads* in Chicago. He also held memberships in the American Railway Engineering Association and the American Institute of Electrical Engineers.

FRED LUX (BSEE '46) died January 15. Lux owned and operated his family farm and became a pilot as a hobby.

JOE HENDRICK CAVEGLIA (BSEE '47) died November 27, 2010. He was a U.S. Army veteran, serving in World War II in the China/Burma theatre.

NORMAN FARRELL (MSEE '50) died December 6, 2010. Farrell had a degree from the United States Military Academy and served in Korea at the end of World War II where he was in charge of the American forces. He was also stationed in Austria, Germany, Italy, and Iran throughout his career.

VERNON DALE PECKHAM (BSEE '52, MSEE '53) died January 17. He worked as an electrical engineer in the aerospace/defense industry for almost 40 years.

GEORGE WEBB (BSEE '57) died February 10. Webb was employed at General Electric for 44 years, working on computer systems components and drives. He retired as manager of engineering standards.

CARL WANG (BSEE '58, MSEE '59, PhD '64) died January 1. He had worked as the president of Medical Instruments Development Laboratory in San Leandro, California, and was a recipient of the ECE Distinguished Alumni award in 2004.

WILLIAM GUFFEY (BSEE '59) died November 2, 2010. He was a Navy veteran and served in the Korean War.

DONALD K. KOTECKI (BSEE '60) died January 27. He was a U.S. Air Force veteran, serving from 1952 to 1955 in Germany and France. After receiving his degree, he spent 38 years doing government service as the director of engineering for the U.S. Army Armament Research Development and Engineering Center (ARDEC).

MURRAY HAROLD BOLT (MSEE '62) died October 19. He spent 20 years at IBM and, in that time, gained seven patents and received multiple awards. After leaving IBM, he became vice president of network control products at the Codex Corporation. He then became president and CEO of ZTEL Corporation. He retired in 2005.

MELVIN DALE HASSEBROCK (BSEE '63) died January 26 in Pasco, WA.

RICHARD RAGO (BSEE '67) died March 28, 2010. He was a retired engineer with Vapor Corp and taught electronics and computer science at the high school and college levels.

DAN DANCEY (BSEE '72) died March 9. He served in the U.S. Army in Korea before getting a degree. After, he worked in the power construction industry in Illinois and on the construction of nuclear plants in Alabama. He later joined the Abbott Power Plant at the University of Illinois, and was with Illinois until he retired in 2008.

JOHN NICKOLLS (BSEE '72) died August 13. He worked for NVIDIA, where he was instrumental in the development of the GPU chip and CUDA.

NANCY WULF (BSEE '86) died July 1. She was a longtime executive at Emerson/InSinkErator.

McCorquodale is first ECE Engineer in Residence

By Shawn Adderly

On March 9, ECE ILLINOIS alumnus Michael McCorquodale (BSEE '97) inaugurated ECE's Engineer in Residence program when he spoke to a packed room of engineering students, staff, and faculty about his experiences of founding his then start-up company, Mobius Microsystems. The following day, McCorquodale held office hours to allow students to speak with him one on one about anything related to his business endeavors or career as an engineer.

Michael McCorquodale

> "A lot of people look at entrepreneurship and think it is an easy thing to go out and start your own business, but in reality, it is quite a challenge, and at times can be very stressful."
>
> – Alumnus and Engineer in Residence Michael McCorquodale

The Engineer in Residence program enables students to interact with and gain insight from individuals who have had substantial success using an ECE degree or in an ECE-related field. The department plans to invite at least one Engineer in Residence to campus each semester to spend one or two days in the ECE Department. Each Engineer in Residence will give a talk and hold office hours during his or her stay.

In his talk, McCorquodale outlined a litany of challenges his company faced, including building a good core team, procuring venture capital funding, and standing out in the market by attempting to develop a silicon-based replacement for quartz crystal resonators and oscillators.

"A lot of people look at entrepreneurship and think it is an easy thing to go out and start your own business, but in reality, it is quite a challenge, and at times can be very stressful," McCorquodale said. Even after McCorquodale's company succeeded in selling more than 10 million CMOS (complementary metal–oxide–semiconductor) oscillators, the company needed to find a way to continue to innovate in order to turn a profit.

"Revenue was coming in, but we found ourselves having to redesign based on specific requirements for each customer," he said. "It just wasn't a sustainable business model."

Looking to change their business model, McCorquodale moved his company to Silicon Valley, where things seemingly got worse. A so-called experienced management team was brought in to bring direction to the company, but it seemed to create new problems rather than solving old ones.

The board of directors remained supportive of McCorquodale, though, a decision that paid off as the CMOS oscillator McCorquodale and his team designed became the most accurate silicon oscillator ever built.

In 2010, Mobius was acquired by Integrated Device Technology, a major publicly traded tech company, in a very "clean" acquisition.

"Many acquisitions go poorly, but in this case the entire company was almost seamlessly integrated into a much larger company," McCorquodale said.

McCorquodale now serves as the general manager of the Silicon Frequency Control (SFC) business unit, and is still continuing to build more accurate CMOS oscillator and other IC-based frequency control products that ship in the millions of units per month.

Near the end of his talk, McCorquodale said that he hoped students could learn from his experiences and avoid some amateur mistakes.

"A new technology business is often a push, not a pull," he said. "You need to think very carefully about a product and its value."

He also added that his outlook on life has changed.

"I consider myself an optimist, but now I'm also realistic," he said. "This business is not glamorous. Sometimes it's just awful. But if you know how to manage risk and be confident, you can succeed in this arena."

McCorquodale ended by quoting Orison Swett Marden: "Genius, that power which dazzles mortal eyes, is oft but perseverance in disguise."

Bragiel nurtures young tech companies

By Tom Moone

It doesn't take long to realize that ECE ILLINOIS alumnus Paul Bragiel (BSCompE '99) likes a bit of excitement in his life. His hobbies include rock climbing and snowboarding—not activities for the faint of heart. Clearly, this is someone who enjoys some risk.

Most of his career has been spent taking risks. He became an entrepreneur just five months after graduating from Illinois, founding a gaming studio called Paragon 5. His company made games for clients such as Sega, Atari, and Nintendo before being sold to a larger company.

Bragiel went on to found two Internet-focused companies: Meetro and Lefora. Then, Bragiel got together with Jim Young, Ashwin Navin, and Aber Whitcomb—all prominent veterans of tech companies in the Bay Area. Together they created I/O Ventures, a program designed to provide assistance to people, like themselves, who have entrepreneurial ambitions and enjoy taking risks.

According to its website, "I/O Ventures is an early-stage startup program that focuses heavily on mentorship."

Bragiel explained, "When we sat down, we asked ourselves, 'what would we have liked when we were starting up our first company 10–15 years ago?' We were looking for two things. One, we want to avoid making a lot of mistakes that we did. So one thing we want to make these companies do is learn from our idiocy—I guess—but also from the things we did really well. And two, having really great mentors around."

I/O Ventures provides each company in its program with $25,000 in startup funds. Throughout the three-month program, fledgling companies take part in a series of events and gatherings designed to help them become better established. In addition, representatives from venture capital groups, as well as executives and founders of leading tech companies, come to the facility to meet with the participants and to provide advice and feedback. The list of mentors includes founders of companies such as BitTorrent, MySpace, YouTube, TechCrunch, and Mint.

On Thursdays and Fridays, they have their own version of office hours. Bragiel explained, "Kind of like you would meet your professor at U of I to ask them any question, only here, instead of a professor, you're hanging out with the founder of MySpace, or hanging out with the founder of PayPal."

Of course, I/O Ventures cannot do this all for free. "We're still capitalists," Bragiel said with a laugh. In return for their investment of time and money, I/O Ventures acquires an eight percent stake in each company it helps.

ECE alumnus Paul Bragiel is one of the founders of I/O Ventures, an early stage start-up program for young tech companies.

Bragiel and his partners began mapping out their vision for I/O Ventures in 2008. Office space was acquired and refurbished, and the first group of fledgling companies entered the program during the summer of 2010. With two mentorship cycles completed, the program is proving successful. "Of the six companies in the first group, four of them went on to get financing, and the other two got acquired," said Bragiel. "So a pretty good ratio there."

One thing Bragiel feels is missing from the mix is more Illinois involvement. "It's kind of a crying shame that I get applications from companies with graduates from Stanford, Berkeley, or Carnegie-Mellon, and we've never had one U of I graduate apply," he said. "I want to see a whole bunch of students just graduating, or even a couple years out of college, applying to I/O. And actually, a lot of our mentors *are* U of I guys. Some of the big names—YouTube and PayPal—those are friends of mine from when we were in college together. So [Illinois students] should come out here and leverage us."

More information on the I/O Ventures program and how to apply can be found at its website: **http://www.ventures.io.**

Bill and Frank Fry: Innovators and pioneers

By Tom Moone

As World War II came to a close, many in the College of Engineering had the foresight to start hiring top scientists and move the University toward a research-oriented institution. William Everitt in the Electrical Engineering Department was one of these visionaries.

Among the researchers Everitt brought to Illinois was William Fry. During World War II, Fry was at the Naval Research Laboratory working on sonar systems. He came to Illinois in 1946 ready to carry on similar research topics dealing with ultrasound.

By the late 1950s, ultrasound had advanced to the point where it could be used in surgery.

His younger brother, Frank, followed him to Illinois. Bill Fry had studied theoretical physics, and Frank had studied electrical engineering. Their backgrounds prior to Illinois were similarly complementary. While Bill was at the Naval Research Laboratory during World War II, Frank was working for the Westinghouse Electric Corporation. His division was a contractor for the Manhattan Project, so he spent considerable time during the war at the Radiation Laboratory at Berkeley and at Oak Ridge, Tenn.

These experiences made for a productive working relationship. Throughout their careers at Illinois, Bill would envision a new approach, and Frank would design the means to make it happen. As ECE Professor William O'Brien (BSEE '66, MSEE '68, PhD '70) said, "Bill was the idea person, but you couldn't dismiss the creativity and innovation of the builder."

In 1948, Bill Fry organized what was then known formally as the Bioacoustics Laboratory. This lab continues to this day as the Bioacoustics Research Lab (BRL). The work the brothers began in ultrasound quickly showed important results. The Fry brothers began their research by studying the biological effects of ultrasound on animal tissue. Through this research, they learned that ultrasound had an effect on all types of tissues, that the effects could be permanent or temporary, and that repeated exposure to ultrasound that was below the threshold level of permanent damage would not adversely affect the tissues.

Because the lab was so unique in its research, many of the instruments needed for the research had to be invented and produced by the lab. In an interview in 2003, ECE Professor Emeritus Floyd Dunn (BSEE '49, MSEE '51, PhD '56) recalled, "We designed and fabricated ultrasonic instruments in the lab. We had to make everything ourselves." All the equipment to create, detect, and analyze ultrasound was built from scratch. Although, as Dunn noted, "Many of the materials used now were not available in those days," this did not adversely affect the research. "We had an exceptional and superb laboratory," he said.

Frank Fry proved to be a talented craftsman, and many of the successful designs and executions of these new devices could be attributed to his efforts. It was not unusual to find Frank carrying around his yellow pad of paper on which he would regularly be sketching out a needed design.

One of the key research areas of the lab was the use of ultrasound for disease therapies. This type of research came to fruition in the case of using ultrasound for surgery. Bill Fry had been interested early on in developing ultrasound so that it could be used as an alternative method for neurosurgery. By the mid-1950s, research had advanced to the point where surgical methods using ultrasound were ready to be tested. In 1958, an operation using ultrasound was performed in Iowa on a patient who had Parkinson's disease. Over the next four years, said Dunn, "Our lab sent people for two weeks of every month to oversee and conduct the procedures." This surgical research eventually ended, and the lab's main focus returned to mapping brain structures and studying the biological effects of ultrasound.

In 1968, Bill Fry died, and Frank soon left Illinois and moved to Indianapolis to work at the Indiana University Medical Center. Frank Fry continued innovative research on ultrasound. In the 1970s, he began research on the effects of ultrasound on the fetus. The results of this research had a great impact on the use of diagnostic ultrasound.

Together, Bill and Frank Fry developed a new avenue and use for electrical engineering and provided Illinois with one of the early examples of biomedical applications of the research done at ECE and the University of Illinois.

Phyllis M. Wise to lead Urbana campus

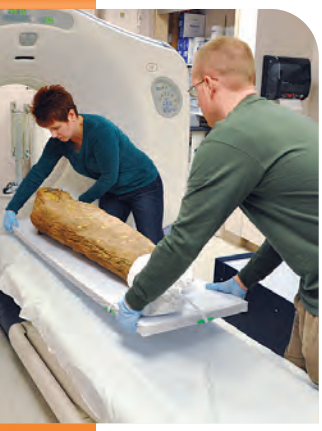
Phyllis M. Wise has been selected as chancellor of the Urbana campus and will serve as a UI vice president. Wise, who was provost and executive vice president at the University of Washington, assumed her duties Oct. 1.

Trustees vote to close Institute of Aviation

At the July 21 meeting of the UI Board of Trustees, university trustees voted 6-2 to close the Institute of Aviation and end the undergraduate degree program. The Institute, which opened in 1945, will likely close its doors at the end of the 2013–14 school year, after all current students have completed the program.

Corpse plant blooms

Illinois's titan arum—also called the corpse flower—finally bloomed on July 15 following a 10-year wait. The plant is difficult to cultivate and blooms unpredictably. When it does bloom, it exudes a rotting-meat odor that attracts insect pollinators. Needless to say, its blooming attracted hundreds of visitors eager to smell it.



CT scan of Egyptian mummy

On March 29, the Spurlock Museum's 2,000-year-old mummy of a child was taken to Carle Foundation Hospital where it received a CT scan. Among other information, researchers hope the CT scan will enable them to determine the cause of the child's death.

Illinois entomology professor May Berenbaum receives 2011 Tyler Prize

UI entomology professor and department head May Berenbaum received the 2011 Tyler Prize for Environmental Achievement, an international award that recognizes "those individuals who have contributed in an outstanding manner to scientific knowledge and public leadership to preserve and enhance the environment of the world."

Rare insect fossil reveals 100 million years of evolutionary stasis

Researchers have discovered the 100-million-year-old ancestor of a group of large, carnivorous, cricket-like insects that still live today in southern Asia, northern Indochina and Africa. The new find, from a limestone fossil bed in northeastern Brazil, corrects the mistaken classification of another fossil of this type and reveals that the genus has undergone very little evolutionary change since the Early Cretaceous Period, a time of dinosaurs just before the breakup of the supercontinent Gondwana.

NCSA, Cray partner on Blue Waters project

The National Center for Supercomputing Applications (NCSA) at the University of Illinois has finalized a contract with Cray Inc., to provide the supercomputer for the National Science Foundation's Blue Waters project. This new Cray supercomputer will support significant research advances in a broad range of science and engineering domains, meeting the needs of the most compute-intensive, memory-intensive, and data-intensive applications.

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

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ECE Alumni Awards

Call for nominations!

Do you know a fellow ECE ILLINOIS alumnus deserving of recognition for his or her accomplishments?

Then we want to hear from you!

- **ECE Distinguished Alumni Award** honors ECE graduates who have made professional and technical contributions that bring distinction to the department and University.
- **ECE Young Alumni Achievement Award** recognizes young alumni who have made outstanding professional contributions to their fields.

For more information and to submit a nomination online for either award, please go to **www.ece.illinois.edu/alumni**.

Please submit nominations no later than Thursday, January 26, 2012!