RESONANCE

NEWS FOR ECE ILLINOIS ALUMNI AND FRIENDS
SPRING 2008

BLUE WATERS

finds a home at Illinois

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Letter from the Department Head

Dear Friends,

I hear all the time from alumni that a degree from ECE Illinois provided the foundation necessary for a successful career. Those careers often take place in the technology sector as electrical and computer engineers. But many times the foundation also helps our alumni find success as patent attorneys, business leaders, and academicians. No matter the environment, the skills learned here at Illinois are an important part of future success.

A major factor in having not just successful alumni, but successful research on campus is quality students. Competition for the best students is constantly increasing. For this reason, the department is in the process of initiating a campaign to tell the story of ECE Illinois in order to continue drawing the best of the best to Everitt Lab.

One tool in our arsenal is a new program, supported by the Grainger Foundation of Lake Forest, Illinois, that will lighten the burden for our incoming freshmen and hopefully provide further incentive to choose ECE Illinois. Starting in the fall, any freshman enrolling in electrical or computer engineering at Illinois who is a U.S. citizen or permanent resident will receive a $1,200 scholarship. I anticipate awarding this scholarship to almost 300 students each year. (Read more on page 16.)

ECE alumni and friends can help us tell our story and continue to attract outstanding students to ECE Illinois. All of our more than 20,000 living alumni are evidence that a degree from our department provides a solid foundation for future success. You are our greatest champions. Talking about your experiences here is a great way to let others know about the strength of our program. There are more ways to assist us starting on page 16. Alumni and corporate partners have the ability to make a difference for the next generation of ECE Illinois students.

Best Regards,

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

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ECE NEWS BRIEFS

NEW ANECHOIC CHAMBER BUILT ECE unveiled a new anechoic chamber on the fourth floor of Everitt Laboratory in September 2007. Created to help students and faculty design wireless protocols and test them against other protocols in the same environment, the new chamber is a protective room with absorbing foam cones on every inch of its inner walls. The cones serve as absorbers to prevent electromagnetic waves from reflecting. The room, which is 20 feet wide, 30 feet long, and 12 feet high, has a metal exterior.

"The primary goal is to establish an experimental test bed that is interdisciplinary," ECE Associate Professor Jennifer Bernhard said. "Instead of having people just study antennas, now we can actually study system performances. It's important because as systems get more complicated, they have more complex requirements put on them."

The old anechoic chamber, also located on the fourth floor of Everitt, is no longer in use.

STAMP HONORS BARDEEN A U.S. postage stamp commemorating the achievements of former ECE faculty member and two-time Nobel Prize winner John Bardeen (1908–1991) was unveiled at a ceremony on campus in March. Bardeen was recognized for his co-invention of the transistor and his contribution to the first fundamental explanation of superconductivity.

"Bardeen was arguably the greatest master ever of the quantum theory of the conductivity of solids, which is at the core, the very heart of all of electronics," said Nick Holonyak Jr., the John Bardeen Professor of Electrical and Computer Engineering and Physics.

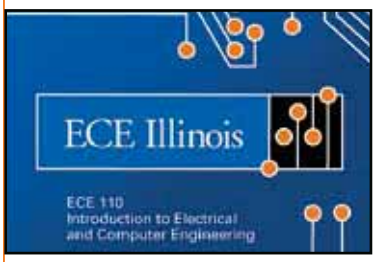
"Perhaps more vital to everyone on the planet is the transistor, and all it has spawned," Holonyak said. "No one sought so little for himself, gave so much, and was so generous and considerate of his fellow man."

ECE ACCREDITED FOR ANOTHER SIX YEARS Last fall, ECE renewed its stamp of approval from the Accreditation Board for Engineering and Technology (ABET), a federation of technical and professional societies that accredits undergraduate engineering degree programs in the U.S. on a six-year cycle.

Last summer, ECE submitted lengthy "self-study" reports for its undergrad programs, and the process wrapped up in the fall with the campus visit of the ABET evaluators, who toured facilities, interviewed faculty and students, and reviewed documentation prepared by the department.

Typically, programs that pass muster with ABET still must shore up areas of weakness identified by the inspection. But in ECE, the evaluators found no areas of weakness.

Associate Head Steve Bishop coordinated the ABET preparations in ECE. "They knew coming in that we were highly ranked," said Bishop. "And what they really appreciated was that we didn't tell them that. We let the quality of the faculty, students, and programs show them."



ECE LABS VIDEOS NOW ONLINE Short, introductory videos are now available online for eight ECE lab courses. The videos are meant to help with student recruitment but may also be useful for current students.

"These videos provide a quick and fun look at what actually happens during these labs," said Marie-Christine Brunet, ECE lecturer, ECE 110 course director, and undergraduate advisor. "They may even bring back some memories for alumni who took these classes years ago."

Footage for the videos was compiled a few years ago, and Ravi Thakkar (BS CompE '07) edited the video and sound prior to graduating. You can view the videos—which include ECE 110: Introduction to Electrical and Computer Engineering; ECE 444: IC Device Theory and Fabrication; and ECE 486: Control Theory—at **www.ece.uiuc.edu/video**.

ILLIAC PIONEER RAY DIES Sylvian Ray (MSEE '57, PhD '61), professor emeritus in the Computer Science Department at Illinois, passed away on December 12. Ray was a professor in the Electrical Engineering Department, predecessor to ECE, prior to the creation of the CS Department in 1964.

In his early career, Ray was involved in hardware-related research. He was a primary researcher on the ILLIAC III system, a fine-grained SIMD pattern recognition computer built at Illinois in 1966.

A chorusing crowd: frogs help researchers study hearing

By Lauren Eichmann

ECE Professor Doug Jones and Rama Ratnam, assistant professor in neurobiology at the University of Texas at San Antonio, have developed technology that further enables biologists to study frog chorusing behavior.

Jones said frogs call for two reasons: so females can find males, and so males can define their territory and threaten other males. "While biologists have been able to study the interaction between small numbers of frogs, they have not been able to reliably study the interaction between large numbers of frogs spread out over many hundred square meters," said Jones. "Ultimately the biologists want to understand frog chorusing behaviors. It sounds simple, but it's usually complex. Do they alternate; do they take turns [chirping]? How do they adjust their calling in the middle of a group when many frogs are calling at once?"

Ratnam said most researchers find it difficult to locate and extract the sound from individual frogs since doing so is impossible visually or manually. "Recent advances in technology can solve this problem, but most of the biologists studying frog chorusing are not engineers," he said. "It is not something most biologists can solve with conventional methods."

According to Ratnam, the new technology blends the two disciplines—engineering and biology—to help form a cohesive answer to some pressing questions regarding frog chorusing behavior. Although Jones is an engineer, he has an interest in the biological aspects of hearing in noise, and Ratnam's interests also lie in the signal processing aspects of hearing.

"How we are able to attend to one person talking when there are so many competing sounds is not known," said Ratnam. "In fact, how the brain is able to unscramble the sounds and extract the voice of one person from all the background noise is one of the major research areas in auditory neurobiology. This phenomenon is called the "cocktail-party effect." Female frogs trying to select mates from a chorus face the same situation. It turns out that many of the basic pathways for processing sounds in the frog's brain are similar to those of humans—and indeed to those of other vertebrates. Thus, they are a useful model system for studying the human cocktail-party problem."

Ratnam said he and other neurobiologists are interested in knowing why people with hearing loss perform poorly in cocktail-party situations. Understanding hearing in noisy environments by probing the neural mechanisms, particularly when there are many competing sounds—or talkers—in the background, may help them answer some of these questions, he said.

To test the equipment they developed, Jones and Ratnam spent a week last year at the Cibolo Nature Center in Bourne, Texas, where they set up a small camp. The location of the study, near San Antonio, was essentially a seven-meter square area that straddled a wetland. Four large posts, each equipped with a microphone, were placed around the square study site while one post was strategically placed in the center and contained a microphone array of four directional devices at the same location.

During their field study, signal processing techniques allowed the data from the microphones to identify where and when any frogs were chirping. Each sound clip could be transferred to a computer screen via a "sound movie" in which small boxes showed where frogs were visually spotted. These boxes helped to confirm the sound algorithm was correct in pinpointing location. Actual sound recordings from the microphones simultaneously visually recognized

> Illinois alumnus Rama Ratnam and ECE Professor Doug Jones merged engineering and biology in an attempt to better understand how frogs, and ultimately people, hear in a crowded space. *Photo courtesy of Margaret L. Jones*

where and to what extent the amphibians were calling. "In [the sound movie] you see where the frogs are without actually having a camera, and you can connect the calling to that," said Jones. "So we're basically seeing them with their sound."

People have used microphone arrays for a number of years to study frog chorusing behavior, but it has not been completely reliable, said Jones. "There were so many more frogs than the

practical number of microphones that the previous signal processing methods have not been able to figure out where the frogs are," Jones said. "So if we have two or more microphones, we can start to get some idea by looking at the differences of that signal as it reaches the different microphones. We can start to figure out precisely where the sounds are coming from."

The Gulf Coast Toads and cricket frogs, the primary subjects of the study, are active for several hours after dark until as late as dawn, said Jones. "You can't just observe them, since they come out at night and it's dark. They don't like any lights." Jones and Ratnam used only small flashlights to confirm frog positions with their data.

From the field study, Jones said the cricket frogs, which are very tiny, tended to call simultaneously with short chirps, as observed in the sound movie. The Gulf Coast Toad, in comparison, had a rather long, isolated call.

Jones became interested in what he considers some fundamental scientific questions about frog behavior ecology after he met Ratnam. They were both working on an advanced hearing aid project at the Beckman Institute for Advanced Science and Technology at Illinois and had been talking about the possibility of the frog chorusing study for two or three years.

"We've developed techniques [at Beckman] that were originally aimed at hearing aids and similar applications, but based on biological inspiration from the animals," said Jones. "So in some sense, we're taking these techniques back to the domain of the animals again, and in another sense trying to figure out what *they're* trying to figure out in the environment."

> Study participant: a Gulf Coast Toad was a "participant" in research done to study frog chorusing behavior. *Photo courtesy of Margaret L. Jones*

According to Jones, their goal with the frog study is to build a permanent automated data analysis system and study site to record every night, all night long. They also plan to advance the technology so biologists and researchers can see the sound movies in real-time, and possibly even introduce their own frog sounds to experiments.

Jones and Ratnam hope to secure two permanent sites to study frogs near San Antonio: the Cibolo Nature Center and a location in the protected wetlands of Mitchell Lake. A more controlled site, equipped with an observation room, is already established in Panama. Ratnam said they hope to model the two U.S. sites after the Panama location. According to Ratnam, Texas has a longer breeding period for frogs than other locations, which allows for an extended period of study. "For the first time we have the capabilities to really answer these questions with real frogs, in a real environment," said Jones.

But funding is crucial and the equipment is fairly expensive, said Ratnam. They are continuing their work and applying for funding as opportunities arise.

Ratnam also plans to establish a workshop for frog chorusing, where researchers would study frogs in the wild once a year in the spring. The initiation of the workshop, however, is contingent upon receiving funding.

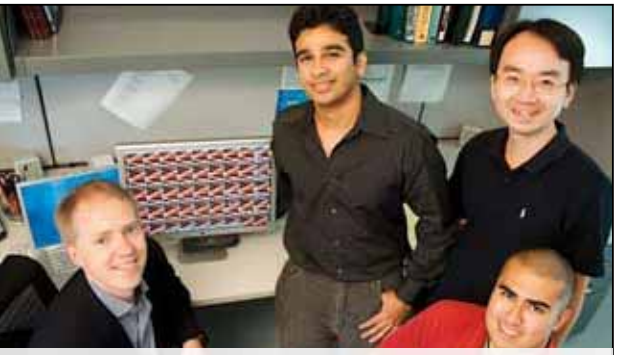
Ratnam received his bachelor's degree in chemical engineering from the Indian Institute of Technology in Delhi, and his PhD from Illinois in biophysics and computational biology. Jones earned his bachelor's and master's degrees, as well as his PhD, all in electrical engineering from Rice University. In addition to being a professor, Jones is currently a researcher with the Coordinated Science Laboratory and the Beckman Institute NeuroTech group. He works with faculty from various disciplines to develop computer-based systems that aid in the study of brain organization and function.

See and hear the sound movie Jones and Ratnam produced at ***www.ece.uiuc.edu/news/resonance.***

Researchers set new record for **brightness of quantum dots**

By James E. Kloeppel, U of I News Bureau

By placing quantum dots on a specially designed photonic crystal, ECE Illinois researchers have demonstrated enhanced fluorescence intensity by a factor of up to 108. Potential applications include high-brightness light-emitting diodes, optical switches, and personalized, high-sensitivity biosensors.



ECE Associate Professor Brian Cunningham and graduate students, from left, Nikhil Ganesh, Wei Zhang, and Patrick Mathias have set a new record for brightness of quantum dots. *Photo by L. Brian Stauffer*

"We are using photonic crystals in a new way," said Brian Cunningham, ECE associate professor and corresponding author of a paper published in the August 2007 issue of the journal *Nature Nanotechnology.* "We tune them to the specific wavelength of a laser used to stimulate the quantum dots, which couples the energy more efficiently and increases the brightness."

A quantum dot is a tiny piece of semiconductor material 2 to 10 nanometers in diameter (a nanometer is 1 billionth of a meter). When illuminated with invisible ultraviolet light, a quantum dot will fluoresce with visible light.

To enhance the fluorescence, Cunningham and his colleagues begin by creating plastic sheets of photonic crystal using a technique called "replica molding." Then they fasten commercially available quantum dots to the surface of the plastic.

"We designed the photonic crystal to efficiently capture the light from an ultraviolet laser and to concentrate its intensity right within the surface where the quantum dots are located," said Cunningham, who also is affiliated with the University's Beckman Institute, Micro and Nanotechnology Laboratory, and Institute for Genomic Biology. "Enhanced absorption by the quantum dots is the first improvement we made."

Enhanced, directed emission from the quantum dots is the second improvement. Quantum dots normally give off light in all directions. However, because the researchers' quantum dots are sitting on a photonic crystal, the energy can be channeled in a preferred direction—toward a detector, for example.

While the researchers report an enhancement of fluorescence intensity by a factor of up to 108 compared with quantum dots on an unpatterned surface, more recent (unpublished) work has exceeded a factor of 550.

"The enhanced brightness makes it feasible to use photonic crystals and quantum dots in biosensing applications from detecting DNA and other biomolecules, to detecting cancer cells, spores, and viruses," Cunningham said. "More exotic applications, such as personalized medicine based on an individual's genetic profile, may also be possible."

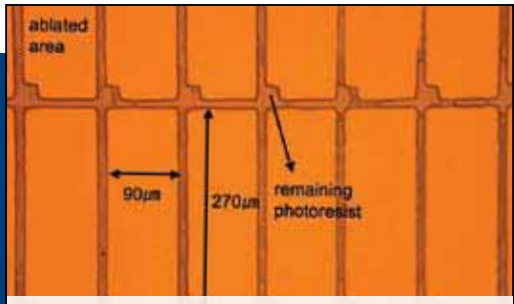
Funding was provided by the National Science Foundation and SRU Biosystems. Part of the work was carried out in the University's Center for Microanalysis of Materials, which is partially supported by the U.S. Department of Energy.

New flat-panel display fabrication technique

By Brad Petersen

ECE Professor Kanti Jain and postdoctoral researcher Junghun Chae have devised a new technique for patterning indium tin oxide films, a component of flat-panel displays, which simplifies the current manufacturing process and could save money. The technique uses laser-driven photoablation and lift off instead of the multistep, traditional microlithography process.

"In the conventional fabrication method, many processes are required to make a pattern, including deposition of material, photoresist coating and baking, exposure, developing, etching, and photoresist stripping," Jain explained. "Using our innovative process, the developing and etching processes are not required anymore."



The process of patterning indium tin oxide film (pictured), a component of flat-panel displays, has been improved by ECE Illinois researchers.

The use of photoablation in patterning is not new. However, Jain and Chae believe they can eliminate problems that have limited its use in patterning inorganic materials, including rough edges and high fluence requirements, by using a liftoff technique.

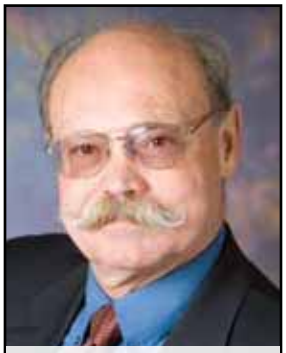
Cancer-detecting ultrasound **under development**

By Roxana Ryan and Brad Petersen

ECE Professor William D. O'Brien, Jr., and Assistant Professor Michael L. Oelze, along with collaborators from Illinois and the University of Wisconsin, Madison, were awarded a 5-year, $5.2 million Bioengineering Research Partnership grant from the National Institutes of Health's National Cancer Institute for their project "Quantitative Ultrasonic Imaging of the Breast." The research seeks to discover new ways of detecting and diagnosing cancer using ultrasound technology.

Although ultrasound has been used to image the body for more than 50 years, typical ultrasonic images are qualitative rather than quantitative. O'Brien and Oelze have been working to detect breast cancer using quantitative ultrasound imaging. "Our preliminary data indicate that it is feasible to detect and distinguish different types of cancer, such as benign tumors and cysts from malignant ones," said Oelze. "Our technique uses quantitative ultrasound to estimate properties of the microstructure of the tissue from the ultrasonic backscatter."

Oelze said he is excited about the research because ultrasound is safer, faster, less expensive, and more portable than current cancer detection techniques. "We will be able to actually extract information about the underlying tissue microstructure so it will complement or even replace techniques like mammography," Oelze said.



ECE Professor William D. O'Brien, Jr.

ECE Assistant Professor Michael L. Oelze

Another benefit of ultrasound is that it uses non-ionizing radiation, unlike mammography. Other methods, such as MRI, work well, but are expensive and not as portable.

The ultrasound detection method could also help reduce the need for biopsy. "Our hope is that someday using our technique, a patient could come to the doctor with a suspicious lump and walk out the same day knowing it was benign without resorting to biopsy," Oelze explained.

In addition to being ECE faculty, O'Brien, a Donald Biggar Willett Professor in Engineering, and Oelze are affiliated with the Beckman Institute for Advanced Science and Technology and the Coordinated Science Lab.

Timothy J. Hall, a professor in the Department of Medical Physics at the University of Wisconsin, Madison, and O'Brien are the project's principal investigators. Co-investigators for this project from Illinois are Sandhya Sarwate, MD, pathologist, and Douglas G. Simpson, professor and chair in the Department of Statistics. University of Wisconsin co-investigators are James A. Zagzebski, Ernest L. Madsen, and Tomy Varghese from the Department of Medical Physics; Gale A. Sisney, MD, and Elizabeth S. Burnside, MD, professors of radiology breast imaging; Frederick Kelcz, MD, associate professor of radiology; and Josephine M. Harter, MD, assistant professor of pathology.

In the new fabrication technique, a layer of photoresist is first cured and then, using photoablation, patterned. The process of photoablation uses a laser to remove in one step unwanted material by photofragmentation of long-chain polymeric molecules. Next, a layer of indium tin oxide is applied. Finally, the remaining photoresist is stripped away, essentially lifting off with it any unwanted indium tin oxide and leaving behind the desired pattern of indium tin oxide. Jain and Chae have demonstrated clean patterning using a small enough fluence, or concentration of laser radiation, for photoablation so as to avoid harming any structures below the indium tin oxide layer and also to enable high processing throughput.

According to Jain, the technique could be used in manufacturing any microelectronic device from flat-panel displays to nanoscale semiconductor devices. The greatest benefit may be realized with process steps that are expensive and used in devices produced in high volumes. The benefits include lowered cost from reduced chemical usage and waste management. Plus, with fewer steps involved, overall production time can be decreased.

Jain and his colleagues described their new method in a paper published in the June 25, 2007, issue of *Applied Physics Letters.* Collaborators in the research also include scientists from Anvik Corporation of Hawthorne, New York, a manufacturer of microlithography and photoablation systems.

Blue Waters finds a home at **Illinois**

Petascale supercomputing system to go online in 2011

By Tom Moone

Since the 1950s, the University of Illinois has been a leader in computing technology. In 1952, construction was completed on the ORDVAC and ILLIAC computers on the Illinois campus. ORDVAC went on to the Army Ordnance Corps at the Aberdeen Proving Ground in Maryland. ILLIAC remained at home at Illinois, and with it, the University became one of the first educational institutions to own its own computer.

In its day, ILLIAC represented the leading edge of computer technology, and demonstrated numerous advances in computer technology. Since then, Illinois has remained a leader in computer research and advancement, and is home to the National Center for Supercomputing Applications (NCSA).

Last August, the University's leadership was again recognized when the National Science Foundation (NSF) named Illinois the home for a new petascale supercomputing system. Named Blue Waters, the system is scheduled to be completed in 2011. Under the direction of NCSA, Blue Waters is being developed together with IBM, Illinois faculty, and the Great Lakes Consortium for Petascale Computation, which will be a resource for tapping into the expertise of researchers from across the country.

The size of Blue Waters is astounding. This petascale computer system will sustain performance of more than a quadrillion floating point operations (a petaflop) per second. This means that, when completed, Blue Waters will have computing power equivalent to nearly one million PCs of the type currently on the market.

Blue Waters will be used for a vast array of advanced scientific research. In its initial proposal solicitation, the NSF listed a large number of potential research areas for such a computing system, including molecular dynamics simulation (modeling the interactions of large molecules over a large amount of time), fluid dynamics, formation and evolution of galaxies, and design of molecular electronic devices, to name just a few.

The size of Blue Waters is astounding. This petascale computer system will sustain performance of more than a quadrillion floating point operations (a petaflop) per second.

A project of this scope requires input and expertise from a number of departments across the University, and one of those departments is ECE. ECE Professor Wen-mei Hwu, a member of the Blue Waters leadership team, has been interacting closely with IBM on the design of the processors for this system, helping determine the features for Blue Waters. Hwu, who holds the AMD Jerry Sanders Chair in Electrical and Computer Engineering, has been particularly interested in using accelerator technology, which will exploit fine-grained data parallelism to achieve increased performance but at lower power consumption. "We are more and more power limited," explained Hwu. An ability to decrease power demands where practical will be a vital part of this project.

ECE Associate Professor Steve Lumetta is working on aspects of the operating system and the interconnect, the network between and within various individual parts of the computer system. "I'll be looking at how one reduces the footprint of the operating system, yet basically retains the functionality of the high-end processors," he said.

CSL Research Professor Zbigniew Kalbarczyk and ECE Professor Ravi Iyer have been working on a reliability, serviceability, and availability (RSA) analysis for Blue Waters to help determine the reliability of the system. With so many components within the system, failure is almost inevitable on a day-to-day basis. "Failure of a component does not mean it is badly designed," said Kalbarczyk, who teaches a number of ECE courses. "It's in the nature of the components." The goal is to minimize the impact of the failure through the use of well-established checkpoints, which will allow the system to preserve the machine and application state at regular intervals, enabling a restart of the application without necessitating starting from scratch.

Furthermore, the reliability mechanisms must be strategically placed within the system to deliver continuous operation. As Kalbarczyk explained, one aspect to be determined is "what features are provided by the processor itself to detect application errors and

enable recovery, and what techniques are provided at the system level."

There will be some additional benefits to the University from having this computing system on campus. "Having Blue Waters on campus is going to have some indirect benefit for ECE in the future," said Hwu. "It will add to our competitiveness." With Blue Waters located here, the University will have a greater impact on the world of computing.

The program solicitation for the petascale computing system was announced by NSF in 2006. The NSF received several proposals for hosting this petascale computer system from major players in the computing field, but in the end, the strength of the system proposed by the Illinois team won out. "Our system is well balanced," said Lumetta of the Illinois proposal, meaning that the Blue Waters system will be "more likely to run a broader range of applications."

The technological achievements that will be possible with the Blue Waters petascale computer system will not be available only to researchers and scientists. There will also be interactions with business and industry, as well as educational outreach programs. The goal is to ensure that the full potential of Blue Waters will be available to users across the country. In addition, a far-reaching educational and workforce development program connected to Blue Waters will have an impact on students from kindergarten up through postgraduate education, and it will reach out to geographical areas and populations underrepresented in supercomputing.

For resources of this size and complexity, reaching and nurturing future users is essential. At the undergraduate level, the program will educate the next generation of graduate students, K–12 teachers, future technical staff, and the informed public. At the graduate and postgraduate levels, the program will educate and train the next generation of researchers.

Lumetta pointed out that these types of educational outreach programs can reach students and "hopefully get them on the road to becoming people who write programs that would run on supercomputers."

Though the physical machine is several years away, researchers are already working on a number of software aspects of the system. As Lumetta explained, "Building applications to run on a machine that is a hundred times faster than anything you've run on before will take effort. Years of effort."

When Blue Waters goes online in 2011, the completion of ILLIAC will be nearly six decades in the past. Some aspects of our lives have not changed all that much in that amount of time (Frosted Flakes and Mr. Potato Head also first appeared in 1952). The change in computer technology, however, is staggering. Exciting research was enabled because of ILLIAC. The research that will soon be possible with Blue Waters would have been almost unimaginable those 60 years ago.

BLUE WATERS

GREAT LAKES CONSORTIUM

FOR PETASCALE COMPUTATION

IBM NCSA

Cangellaris invested as **Van Valkenburg Professor**

By Tom Moone

"It is almost impossible to overstate the importance of the faculty to this University," said Illinois Provost and ECE Professor Linda Katehi on September 26, 2007. She was speaking at the ceremony investing ECE Professor Andreas Cangellaris as the Mac Van Valkenburg Professor in Electrical and Computer Engineering. Katehi went on to say that "the highest honor that a college can bestow upon a faculty member is to invest that person in a named chair or professorship."

ECE Professor Andreas Cangellaris

This professorship honors the memory of Mac E. Van Valkenburg, who was a member of the ECE faculty from 1955 to 1966 and then from 1972 to 1984. In 1984 he became dean of the College of Engineering, serving in that post until his retirement in 1988. He received his bachelor's degree from the University of Utah in 1943, his master's from MIT in 1946, and his PhD from Stanford University in 1952, all in electrical engineering. From 1966 to 1974, he served as head of electrical engineering at Princeton University.

Van Valkenburg was widely known as an excellent teacher and an author of influential textbooks in electrical engineering. He was a member of the National Academy of Engineering, a recipient of the Lamme Medal (the highest honor of the American Society for Engineering Education), the George Westinghouse Award, the Education Medal of the IEEE, and the Halliburton Engineering Education Leadership Award of the College of Engineering. Van Valkenburg died in Orem, Utah, on March 13, 1997.

The Van Valkenburg Professorship was endowed by a sizeable group of his students, friends, and colleagues who have ensured that his impact on Illinois will continue for years to come.

Many who spoke at the investiture noted telling similarities between Van Valkenburg and Cangellaris. ECE Professor Emeritus Tim Trick, who provided some reminiscences of Van Valkenburg, remarked on the many hours Cangellaris spends working with students, saying that this indicated for him that "it is fitting that Andreas Cangellaris was chosen to receive this honor." ECE Professor Jianming Jin said, "We know that [Mac Van Valkenburg] was a man of great leadership, great teaching, and great accomplishments. And we are seeing the same thing in Professor Andreas Cangellaris."

Cangellaris, who received his master's and PhD degrees from the University of California, Berkeley, in 1983 and 1985, respectively, joined ECE in 1997. His research focuses on the area of theoretical and applied electromagnetism with special focus on the advancement of modeling methodologies and the development of computer-aided design tools in support of performance analysis and noise-aware design of high-frequency, high-speed integrated electronic components, circuits, and systems.

An author of numerous journal and conference papers, Cangellaris is co-author of the book *Multigrid Finite Element Methods for Electromagnetic Field Modeling.* He is the recipient of the Humboldt Research Award, the Best Paper Award at the 1999 IEEE Topical Meeting on Electrical Performance of Electronic Packaging, and an IBM Faculty Partnership Award. In 2001 he received the ECE Faculty Outstanding Teaching Award. He is a Fellow of the IEEE.

"The recognition of a professorship named in honor of Professor Van Valkenburg is more than a gratifying experience," said Cangellaris. "It is a humbling honor."

And much like Van Valkenburg would have done, Cangellaris made special recognition of his students: "Very special thanks go to my students. Our excellence reflects their talent, and I'm sure that's why it shines so bright."

NEW FACULTY

Four new faculty members join ECE

ECE welcomed four new faculty members this academic year: Rashid Bashir, Lynford L. Goddard, Olgica Milenkovic, and Gabriel Popescu.

ECE Professor Rashid Bashir

RASHID BASHIR was named the director of the Micro and Nanotechnology Laboratory (MNTL) and holds a Bliss Professorship. He holds appointments in ECE and the Department of Bioengineering.

"I am very pleased to join the University of Illinois and the MNTL," Bashir said at the time of his hiring. "The faculty affiliated with MNTL have made legendary contributions to microelectronics, optoelectronics, and related fields. I look forward to working with the faculty, staff, and nanotechnology researchers at Illinois [to] build interdisciplinary bridges across campus and beyond in the area of micro and nanotechnology."

Bashir came to Illinois from Purdue University. His research interests include biomedical microelectromechanical systems (BioMEMS), MEMS, nano-biotechnology, and applications of semiconductor fabrication to biomedical engineering, all applied to solve biomedical problems.

Bashir has authored or co-authored over 140 journal and conference papers, over 50 invited talks, and has 29 patents in the areas of microelectronics, microfabrication, and microelectromechanics. He received the NSF Career Award for his work in biosensors and bioMEMS, the Joel and Spira Outstanding Teaching award at Purdue, and the Technology Translation Award from the 2001 BioMEMS and Nanobiotechnology World Congress Meeting. He was selected by the National Academy of Engineering to attend the Frontiers in Engineering Workshop in Fall 2003. He was also a finalist for the *Small Times* magazine "2005 Innovator of the Year Award."

Bashir earned his BSEE summa cum laude from Texas Tech University in Lubbock and his MSEE and PhD degrees from Purdue. Before joining the Purdue faculty in 1998, he was a senior engineering manager in the Process Technology Development Group at National Semiconductor.

ECE Assistant Professor Lynford L. Goddard

LYNFORD L. GODDARD joined the department after completing his PhD in physics at Stanford University. He had been there throughout his academic career, earning bachelor's degrees in physics and math, and his master's in electrical engineering. For his doctoral dissertation he studied the characteristics of 1.5-micron semiconductor lasers on gallium arsenide. After receiving his PhD, Goddard did postdoctoral work at Lawrence Livermore Lab, where he studied photonic integrated circuits. Here at Illinois, he has founded a research group called the Photonic Systems Lab.

"The facilities in [the MNTL] are spectacular," he said, describing what attracted him to Illinois. "I'm really excited about being able to do research at such a great university."

Goddard will teach courses in the areas of photonic devices, optoelectronics, and semiconductors. And teaching has always been something Goddard enjoyed. "When I was at Lawrence Livermore, I really missed the teaching part of it," he said. In fact, beginning with his undergraduate years, Goddard had run a private tutoring company for high school students in the areas of math and physics.

ECE Assistant Professor Olgica Milenkovic

Describing what attracted her to Illinois, OLGICA MILENKOVIC said, "I saw really great students graduating from [Illinois]. If you don't have good students, very ambitious research projects don't take off. So here, I figured I can be very ambitious and the students can follow easily."

NEW FACULTY
continued on page 13

FACULTY NEWS

JONT ALLEN, associate professor, was granted tenure.

M. TAMER BASAR was invested as a Swanlund Chair, the highest endowed title at the University. This honor recognizes faculty members across the Urbana campus who have made outstanding contributions in their fields. Basar was also named president-elect of the American Automatic Control Council (AACC) for the two-year period 2008–2009 and will serve as president for 2010–2011.

P. SCOTT CARNEY was promoted to associate professor.

PATRICK L. CHAPMAN was promoted to associate professor.

DEMING CHEN received an NSF CAREER Award to research "Nano-centric design methodology for nanoscale FPGAs."

K.Y. NORMAN CHENG received the MBE Innovator Award, which acknowledges individuals whose innovative work has significantly advanced the field of molecular beam epitaxy (MBE). Cheng was cited for "outstanding contributions to the development of InGaAs-based heterostructures for ultra-high-speed devices and pioneering work in III-V dilute nitride semiconductor alloys in addition to his invention of rotating substrate holder used in MBE systems."

BRIAN T. CUNNINGHAM, associate professor, was granted tenure.

MINH N. DO and his graduate student Yue Lu received the IBM Student Paper Award at the 2007 IEEE International Conference on Image Processing. Their paper is entitled "Finding Optimal Integral Sampling Lattices for a Given Frequency Support in Multidimensions."

GEORGE GROSS partook in a special broadcast on WILL-TV called "For the People: Primary Focus." The four-part series, presented by WILL and the Institute of Government and Public Affairs, provided discussion of key topics leading up to the Illinois presidential primary on February 5. Gross appeared on the installment dedicated to energy. Watch a clip at **www.ece.uiuc.edu/news/resonance**.

NICK HOLONYAK, JR., the John Bardeen Endowed Chair in Electrical and Computer Engineering and Physics, and MILTON FENG, the Nick Holonyak, Jr., Chair in Electrical and Computer Engineering, along with postdoctoral researcher Gabriel Walter and former postdoctoral researcher Richard Chan, received a second patent for their invention of the world's first transistor laser.

THOMAS S. HUANG, the William L. Everitt Distinguished Endowed Professor in Electrical and Computer Engineering, and students Yun Fu and Xi Zhou received the 2007 DoCoMo USA Labs Innovative Paper Award at the IEEE International conference on Image Processing for their paper, "LAPLACIAN Affinity Propagation for Semi-Supervised Object Classification."

PHILIP T. KREIN and his graduate student Alexis Kwasinski's (MSEE '05, PhD '07) research paper on preparing telecommunication companies for sudden disasters was named best technical paper at the 2007 International Telecommunications Energy Conference (INTELEC).

JEAN-PIERRE LEBURTON, the Gregory Stillman Professor of Electrical and Computer Engineering, and postdoctoral research associate Maria Gracheva were named Best Paper Finalists at the Seventh International Conference on Nanotechnology for their paper entitled "Simulation of Electrically Tunable Semiconductor Nanopores for DNA Sequencing."

XIULING LI received an NSF CAREER Award. The objective of her research is to "establish a new type of nanotechnology building block, III-V semiconductor nanotube, and its functionalities."

SEAN P. MEYN completed his second book, entitled *Control Techniques for Complex Networks.* The book focuses on trying to bring complex networks down to a manageable size in order to visualize behavior and simplify the construction of control solutions.

UMBERTO RAVAIOLI and grad student Zlatan Aksamija received a First Place Outstanding Paper award from the IEEE Region 4 Conference Committee for their paper, "Joule Heating and Phonon Transport in Nanoscale Silicon MOSFETs."

MARK W. SPONG, a Donald Biggar Willett Professor of Engineering, was named the first recipient of the Intelligent Robotics and Systems (IROS) Fumio Harashima Award for Innovative Technologies, an honor created to recognize outstanding contributions to the IROS community. Spong also received a patent from the U.S. Patent Office for his invention entitled "Method and System of Compensating Wave Reflections in Transmission Lines."

GREGORY L. TIMP was elected as a Fellow of the American Association for the Advancement of Science (AAAS), an international nonprofit organization dedicated to advancing science around the world, for "meritorious efforts to advance science or its applications."

NITIN H. VAIDYA and Vartika Bhandari, a computer science graduate student, received the Best Student Paper Award at the 2007 ACM MobiHoc conference in Montreal, Quebec, Canada, for their paper entitled "Capacity of Multi-channel Wireless Networks with Random (c, f) Assignment."

NEW FACULTY

Continued from Page 9

Prior to joining ECE, Milenkovic was a faculty member at the University of Colorado, Boulder. It was the chance to have the type of students that Illinois prepares that made the decision to come here an easy one.

Milenkovic received her PhD from the University of Michigan in 2002. Her research interests are in signal processing, information theory, and coding applied to problems in bioengineering and bioinformatics.

Milenkovic will teach courses in the areas of communication and signal processing, and she would like to develop a course on the theory of bioinformatics.

ECE Assistant Professor Gabriel Popescu

A native or Romania, GABRIEL POPESCU received his PhD in 1997 from the Center for Research and Education in Optics and Lasers (CREOL) in Orlando, Florida. He had been interested in optics since his undergraduate days, when he received his bachelor's degree in physics.

"My interests are in developing new optical imaging techniques for biology and medicine," said Popescu. "I apply these new technologies to basic studies of cell structure and dynamics." In addition, he would like to examine clinical applications. "I would like to be able to better understand cancer cells and cancer tissue in terms of their structure and dynamics with respect to normal cells."

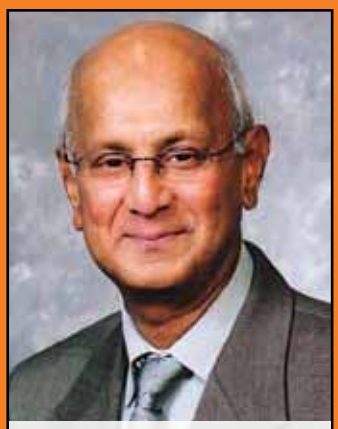
Popescu expects to be involved with teaching a variety of courses on optics and medical imaging.

"I've always admired the University and the department," he said. "You can say it's my dream job. I really wanted to be here."

For more information about these and other faculty members, visit ***www.ece.uiuc.edu*** *and select "Faculty."*

RESEARCHERS AWARDED GRANT TO STUDY EFFECTS OF BLAST EXPOSURE

By Kim Gudeman, Coordinated Science Laboratory



ECE Professor Ravi Iyer

ECE Professor Ravi Iyer is part of a group of researchers who will develop and test a modified battlefield helmet integrated with sensors to record the effects of blast injuries in real time. Using wireless communication, the data will be up-loadable to first responders using small cell phone-like devices to assess injury status.

Iyer, the director of the Coordinated Science Laboratory, and Speech and Hearing Science professor Kenneth Watkin are the principal investigators of the project, entitled "Helmet Integrated Nanosensors, Signal Processing, and Wireless Real Time Data Communication for Monitoring Blast Exposure to Battlefield Personnel."

The researchers will design and test a modified battlefield helmet integrated with smart nanotechnology sensors to record and analyze in real time oxygen saturation, cortical EEG, pressure, acceleration, and other vital signs using a system embedded within helmet straps and head bands.

"The idea is to use a patch to instantly analyze body fluids and provide a quick summary to physicians," Iyer said. "This technology has far-reaching implications even beyond the battlefield and could, for example, be used in remote areas to quickly predict the spread of a disease and develop containment strategies in advance of an outbreak."

Watkin added, "Our novel approach focuses directly on helmet-based recording and on real-time, transparent, highly reliable algorithms that predict the level of blast injury and simultaneously provide vital information profiles."

The research is funded by the Department of Defense Post-Traumatic Stress Disorder/Traumatic Brain Injury Research Program of the Office of the Congressionally Directed Medical Research Programs (CDMRP).

ECE students take up residence on the National Mall

By Lauren Eichmann

The University of Illinois "Elementhouse" was featured along with 20 other solar-powered houses on the National Mall in Washington, D.C., last fall during the Solar Decathlon. An estimated 120,000 people witnessed the competition, which lasted eight days starting October 12 and had an awards ceremony October 20. Illinois placed ninth out of the 20 international teams that competed.

Each team was ranked in 10 categories: architecture, engineering, market viability, communications, comfort zone, appliances, hot water, lighting, energy balance, and getting around. Illinois placed first in market viability and comfort zone.

"Since we were the only team that won two of the ten individual contests, I thought we might place higher overall," explained Ty Newell, an emeritus professor in mechanical science and engineering and one of the faculty advisers for the Illinois team. "We were very pleased to win the market viability contest, which reflects the practical aspects of our design. Winning the comfort zone contest really demonstrated that all of the individual comfort-related principles we chose for our system were considered the best."

Market viability evaluates the ease of living in the house and its potential to do well to accommodate different homeowner needs, while comfort zone analyzes the ability of the house to maintain a comfortable temperature level and humidity throughout.

More than 100 Illinois students, including several from ECE, participated in the 2007 Solar Decathlon, a competition to build the best solar-powered house, culminating with a display on the National Mall in Washington, D.C. *Photos courtesy of Kaye Evans-Lutterodt, Solar Decathlon*

"We were proudest of the market viability contest because that was the contest we kind of set out to win," said ECE Associate Professor Patrick Chapman, who served as an adviser on the project. "All along we wanted to stay in the spirit of the competition to build a marketable house, so we were able to keep our costs low and yet keep the house very nice and modern but with a broader appeal."

For Trishan Esram, an ECE graduate student and the electrical engineering project team leader, the market viability contest win was the most important. "Most people walked in and said, 'This is actually a real house,'" he said. "A lot of the other homes were just prototypes for the future."

Chapman said the Illinois house differed from others through its flexible, modular design. "Each module could be repeated as many times as we liked, and we showed all these different layouts and floor plans built around the same module," said Chapman. "Different builders have the ability to custom design homes and add a different bedroom later that is just a different module."

Although this was the third Solar Decathlon, Illinois participated for the first time. After reviewing the school proposals, 20 competitors were awarded $100,000 in seed money by the Department of Energy to begin the project, with teams raising all other necessary funds on their own. The Illinois house cost $150,000 to build and had a total budget of $450,000.

Each self-sustaining home was required to provide enough electricity to light, heat, and cool the house to maintain a designated temperature range, as well as provide hot running water and operate any electronics or appliances.

University of Illinois team leaders, standing, left to right: faculty adviser and Mechanical Science and Engineering Professor Emeritus Ty Newell, Luis Martinez, ECE grad student Trishan Esram, Donna Murray Tiedge, Brigid Johnson, Bob Kinsey, Nora Wang, Jason Wheeler, and Ben Barnes. Kneeling, left to right: Susan McKenna and faculty adviser and Associate Professor of Architecture Mike McCulley. *Photo courtesy of Susan McKenna, U of I College of Communications*

Teams also had to be able to power a commercially available electric car supplied by the competition.

Esram said winning the comfort zone category shows the team was innovative because they were continuously attempting to alter specific items. "But I had high expectations for our team," he said. "Being in the top half for our first competition is pretty good. We were new to how things were run, so we were still learning. But we were well prepared."

According to Esram, the team had a strong start and was the first to have its house set up and the electrical system working after the approval and inspection. "The inspectors were happy to see we had our system up-to-date," said Esram. "The modularity of the house made things a lot faster because all electrical aspects were individual to each module." Modules had their own cooling and heating, as well as custom solar panels.

The Illinois team in fact won a BP Innovation Award, a private-sector sponsor of the competition, for its use and application of the panels.

Chapman said the team also did not use any powered equipment to reconstruct the house. "I think it impressed people that we had this rail system that was kind of consistent with the whole eco-green thing," said Chapman. "We didn't have any gas burning or diesel burning cranes out there."

The team was told its passive design was one of the best in the competition. "If we turned off the electricity completely, our house would do the best with just the sun and the nighttime energy basically keeping the house at a good temperature and using the least amount of energy to regulate. So we got a lot of credit for [comfort zone]."

The team did, however, run into some difficulties. The water heater was not heating very efficiently, so the team did poorly on the hot water heating contest. Chapman said they wasted a lot of energy trying to fix it, which thus detracted from their possible advantage in other contests as well.

Chapman said the electrical engineering component of the house involved "everything from as simple as basic household wiring, to how to specify, select, and configure solar panels, and then picking out the power electronics that are used to manage those modules to interact with the power grid of the house."

According to Chapman, in terms of dollars spent per point received in the competition, Illinois was probably first or close to the top. In the future, Illinois may have a full-time employee at the University run the project, as well as put more of an emphasis on fundraising.

The first-place overall award went to a German team from Technische Universität Darmstadt, and second-and third-place recipients were the University of Maryland and a California team from Santa Clara University, respectively.

After being disassembled in Washington, Illinois' solar house was displayed at the Chicago Center for Green Technology in November during the Greenbuild International Conference and Exposition.

"I enjoyed seeing all these homes, each with different technologies and approaches to building a solar house," said Esram. "We learned teamwork as well. Other teams were impressed how we worked well together. We had a really good time."

Chapman agreed. "The teamwork was pretty good considering the diversity of the talents the students had and the fact that they are just students, and they're not experienced in management or projects or execution or anything like that," he said.

Esram said the team is excited to get started on the next solar house and has already been selected by the Department of Energy to participate.

To see more pictures from the event visit ***www.ece.uiuc.edu/news/resonance***.

Supporting ECE Illinois students

By Jonathan Hill, Director of Development

In the 10-year period from the 1996–1997 school year to the 2006–2007 year, undergraduate enrollment in ECE Illinois has dropped 21 percent from 1,620 to 1,275. A myriad of theories may explain this drop, with outsourcing of engineering jobs, increasing tuition, and increased competition for the most promising students likely chief among them.

Data from Engineering Careers Services (ECS) at Illinois indicates that demand for our students is as high as ever. According to ECS, 720 employers recruited ECE students during the 2006–2007 academic year with more than 1,800 job postings during the same period. ECS also noted that starting salaries for graduates with a B.S. in computer or electrical engineering ranged from $40,000 to $92,000, with the mean eclipsing the National Association of Colleges and Employers average for both specialties.

The department is working to reverse the downward trend in enrollment, and one way to attract more top students and ease the burden of rising tuition is via student scholarships. While the Grainger Freshman Scholarship (see below) provides great incentives and assistance for incoming freshmen, additional scholarships are needed to provide support for students throughout their undergraduate education.

An endowed scholarship can be established for as little as $25,000. If you or your company is interested in creating a scholarship in ECE Illinois, please contact me for more information. Scholarships not only create opportunities for the next generation of engineers, but they help individual donors leave a lasting imprint on the department and provide corporations additional exposure to our students.

Contributions to existing scholarships are always welcome. You can contribute the tax-deductible amount of your choice via the ECE Web site. Go to **www.ece.uiuc.edu** and select "Donating to ECE."

ECE scholarship to benefit **incoming freshmen**

Thanks to a $1.5 million donation from The Grainger Foundation, Lake Forest, Illinois, scholarships will be given to freshmen enrolling in electrical or computer engineering at the University of Illinois at Urbana-Champaign starting with the Fall 2008 semester. The Grainger Freshman Scholarship program was created to help ECE Illinois continue its long tradition of attracting outstanding students.

"The Grainger Foundation strongly believes in the importance of engineering and the need to encourage young people to enter this vital profession," ECE Department Head Richard Blahut said. "The demand from industry for our graduates is very high, and this gift provides one more reason for students to choose to enroll in electrical or computer engineering at Illinois."

For the next four years, all U.S. citizens or permanent residents who are admitted and enroll in the ECE program at Illinois as freshmen will receive the scholarship. Each will receive a one-time award of $1,200 during the fall semester to assist with educational expenses. The department expects to award approximately 300 scholarships each academic year.

For information about other scholarships offered through the ECE Department, visit the Undergraduate Scholarships and Awards page at **www.ece.uiuc.edu/current/ugrad/scholarships**.

Any questions about this scholarship should be directed to Kara MacGregor, ECE scholarship coordinator, at kmacgreg@uiuc.edu or (217) 333-9706.

Interested in helping to support students at Illinois?

To schedule an informal appointment, please contact:

Jonathan Hill
Director of Development
53 Everitt Laboratory
1406 W. Green St.
Urbana, IL 61801
(217) 265-6567
jonahill@uiuc.edu

Contributions can also be made via secure Internet transaction at **www.ece.uiuc.edu**.

DONOR PROFILE

Helping, one individual at a time

By Brad Petersen

Mike Kaskowitz (BSEE '80) knows that success is not guaranteed. Growing up in a lower-middle class family first in Melrose Park and then DeKalb, Illinois, he shouldered the burden of paying his way through college. As if the ECE curriculum wasn't challenging enough!

Because of his experience as a student, and the success he's made for himself, Kaskowitz has become a committed supporter of the ECE Department and University as a whole.

"Some of the brightest minds may come from underprivileged economic backgrounds. Scholarships allow these individuals academic opportunities that would otherwise be unavailable," Kaskowitz explained. "This, in turn, helps to raise the value of our society one individual at a time."

Illinois alumnus Mike Kaskowitz

Kaskowitz, who himself benefited from a scholarship during his time at Illinois, has committed to providing similar support to current students. In 2007 he established the Kaskowitz Family Scholarship. Kaskowitz said he would like the scholarship to help high achieving undergraduates. It will be offered for the first time during the 2008–2009 school year.

"Now that I have achieved some measure of success in my career, I believe that it is important to recognize the ECE Department for its contributions in my education, which enabled me to excel in my career," Kaskowitz said. "By continuing to support ECE, in some manner I am 'giving back' with hopes of bettering the University and its students for the years ahead."

Kaskowitz's success has been anything but measured. He's held leadership positions at numerous high-tech companies, including vice president of engineering at Cadence Design Systems, vice president of engineering at Sensory, Inc., and vice president and general manager of the Intellectual Property Division at Mentor Graphics. Most recently, Kaskowitz served as vice president of semiconductor IP for Mosaid Technology Corporation.

Last year, Kaskowitz presided over Mosaid's sale of its IP business and is now tackling his next challenge, a startup. Kaskowitz said he's "working on establishing a new company in either the semiconductor or 'green energy' space."

In addition to helping lead high-tech companies, Kaskowitz shared his expertise with the VSI Alliance (VSIA), serving as the organization's president from February 2003 to April 2006. VSIA was an international organization dedicated to setting semiconductor IP standards. Although VSIA ceased operation in 2007, the standards it developed continue to benefit the industry.

Kaskowitz said he chose to attend Illinois mainly because of the College of Engineering's outstanding reputation. The cost of in-state tuition was also a factor. "The environment at U of I was outstanding. I liked the college town atmosphere. Although it was a big campus, I was able to find a peer group and find my way. Above all, [my time at Illinois] taught me to problem solve. I also learned the importance of writing and communication in addition to engineering, and this is something that I have found to be extremely valuable in my career."

The impact of the Kaskowitz Family Scholarship will be felt for years to come. But Kaskowitz hopes students remember to have balance and find time for fun. "Study hard, but don't forget to enjoy your college life! When you are finished with your education, consider taking six months off to travel and see the world. This is something that is more popular in other countries and I believe it is a wonderful and enriching experience."

Kaskowitz resides in San Jose, California, with his daughter, Amy. He is an avid collector of wine and19th century U.S. postage stamps.

Donor Honor Roll

July 2007 through December 2007

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

The following list includes charitable gifts designated for ECE and received between July 1, 2007, and December 31, 2007. Gifts to other campus units may be recognized in other campus publications.

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

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Clark, Thomas T.
Cleveland, George M.
Cocking, Lyle A.
Collins, Dean Robert
Cowling, David H.
Cox, Edward W.
Dahlgren, John W.
Darsch, Arnold P.
Davis, Charles E. and
Kimberly E. Wright
Davis, Richard C. and Janice R.
Dayton, James A. Jr. and Carol O.
DeVries, Charles A.
Diekman, W. Michael
Doshi, Hiten J.
Dougherty, Mack X.
Dunbar, Mark E.
Dunn, Floyd and Elsa
Dykstra, Roger E. and Sandra R.
Dyson, Austin A. R.
Eakman, Stephen L.
Edson, Donald T.
Eilts, Larry E.
Eisenmann, Bradley D.
Erickson, Timothy K.
Erlenborn, Mark J.
Escovedo, Darcy T.
Etter, Phillip J. and Susan M.
Eustice, Robert W.
Evett, Ronald C.
Faber, John P.
Ferguson, Merton W.
Ferrara, Jeffrey F.
Flaig, George G.
Flucke, James M.
Formeister, Richard B.
Freie, Michael L.
Ganley, James T.
Gao, David Si-Wei
Gardner, Chester S. and Nancy C.
Geschwind, David P.
Gibbons, Jon C.
Gibby, Gordon L.
Gibes, Joseph G.
Gilbert, Ted B.
Glazer, Marvin A.
Granzow, Kenneth D.
Grebliunas, John R.
Grebner, Frank W. Jr.
Green, Samuel I.
Greer, Leonard D. and Sonnie G.
Gregorich, Joseph E.
Grodzinsky, Stephen E.
Gromm, Bradley J.
Hajek, Bruce
Hallman, Kenneth B.
Halm, Martin J.
Halttunen, Martin A.
Handler, Michael L.
Hanley, Joseph R.
Hanshaw, David A.
Hanson, Allen W. and Christine M.
Hassler, Kerry W.
Helix, Max J.
Herbener, Stephen R.
Herman, John M. III
Higgins, William E. and Margaret R.
Ho, William W.
Honickman, Harris
Houpis, Constantine H.
Howard, John F.
Howland, Dennis R.
Hruska, Jean M.
Huemiller, Timothy G. and Laura Damon
Huh, David K.
Hurwich, Robert I.
Iturrieta, Arnaldo J.
Jablonski, Robert C.
Jablonsky, Joseph G.
James, John T.
Jansen, James M. Jr.
Jha, Niraj K. and Shubha Govind
Johnson, Christopher L.
Johnson, Douglas K.
Johnson, Newton E.
Jones, Christopher S. and Barbara J.
Jones, Robert Lee
Jung, John and Cathy
Kafka, Robert W.
Kamikawa, Neil T.
Katz, Richard H. and Victoria L.
Kennedy, John J.
Kenyon, Richard Jay and Lois Belle
Kerr, J. Stephenson
Kessler, Lawrence W.
Khalil, Hassan K.
Kielar, Kenneth L.
Kilty, Roger S.
Kinter, Thomas M.
Kirk, Donald E.
Kirkpatrick, George M.
Klein, Charles A. and Irene T.
Klein, Michael D.
Klenske, David Charles
Klockenga, Michael E.
Kochan, David A.
Kochanny, William F.
Kohlrus, Karl E.
Konrad, Steven Scott
Kopec, Stanley J. Jr.
Korb, Harold and Anne
Kothe, Lisa L.
Krebs, William H.
Krieger, William A.
Krueger, Dirk
Kruzinski, Philip J.
Kuckertz, Thomas H.
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Langlois, William M.
Laska, Ehud D.
Launer, William H.
Layman, Roger S.
Layman, Terry J.
Lee, Taek and Heather A.
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Lehmann, Robert A.
Lemein, Gregg D. and Carolyn A.
Lerner, Jeffrey D.
Lewandowski, Richard L.
Lim, Hock-Beng
Lim, Tian S.
Lindberg, Andrew C.
Lindstedt, Brock S.
Link, Jonathan D. and Michelle L.
Liu, Sam Sheng-Hsien and Jessica Lu-Lu
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Lyons, Barry W.
Ma, Victor M.
Maddock, James B.
Mahoney, Gerald W.
Manning, Patrick F.
Maranowski, Steven A.
Marinello, Gerald J.
Martin, Ronald G.
Martina, Mark L.
Maslov, Robert A.
Mason, Jerry L.
Mazawa, Robert J.
McCarthy, Thomas G. and Elizabeth L.
McCrory, Kevin S.
McMurry, Michael B.
Messer, Stephen C.
Minerva, Vincent A.
Misthos, George E.
Mitra, Samir G.
Mitzel, Kevin R.
Moreira, Jose E.
Mueller, Christopher M.
Mueller, Vernon C.
Mueller, William E.
Myer, Jeffrey W.
Nakagawa, Robert Y.
Nelson, Mark W.
Ng, Spencer W.
Nguyen, Viet Q.
Nichols, JeanAnn
Noonan, John R. and Patricia K.
Nordstrom, Gregory M.
Nuspl, Stephen J.
O'Connell, Robert M.
Ohnemus, Scott J.
Olaniran, Qudus B.
Oldani, James L.
Olp, Kenneth J.
O'Mahoney, Michael A. and Julie A.
Orr, John A.
Owens, William R.
Padgitt, David G.
Panneton, Robert J.
Parikh, Mitesh M.
Park, Keundo
Parks, Rodney T.
Patriarca, Rodolfo C. and Amy Chen
Percival, Nell C.
Perry, John S.
Petchenik, Bernard
Petersen, W. Brad
Peterson, Andrew F.
Peterson, David W. and Cynthia S.
Peterson, Kathryn A.
Petta, John L. and Alveratta
Phalen, Dennis T.
Phillips, Edward V.
Poeschel, Robert L.
Porter, Jeffrey S.
Price, Jeffrey U.
Priddy, Nathern B.
Printz, Daniel M.
Rajagopalan, Chithra
Ray, Howard K. and Ruth
Resman, John B.
Richardson, Michael A.
Ritt, Mack A.
Ritter, Frank E. and Colleen C.
Rogers, David M.
Rogers, Gregory P.
Rollenhagen, David C.
Romanelli, John
Rose, Gerald C.
Rosenski, Joseph J.
Ross, Monte
Rothlisberger, David P.
Rotolo, Michael
Rust, Charles L. Jr.
Ruwe, Alan L.
Ruwe, Ryan L.
Sacco, Gilbert F.
Sale, Matthew D.
Salemo, Chuck
Saletore, Vikram A.
Samp, Michael K.
Sanford, Allen M.
Schad Family Trust
Schad, Virgal L. Jr.
Schaeffer, Thomas G.
Schafer, Wayne F.
Schaffner, James A.
Schellinger, Michael W.
Schmars, William T.
Schmidt, John W.
Schrock, Anthony W.
Schultz, Joseph G.
Schulze, Erwin E. Jr.
Schutt-Aine, Jose E.
Scontras, Stanley A. and Mary A.
Scott, Grant J.
Seinfeld, Robert D.
Seth, Sharad C.
Shah, Ketu K. and Priti
Sheehan, John P.
Shively, Richard R.
Siljenberg, David W.
Sipinski, Gene
Skulina, Richard J.
Slutsky, Gary S.
Slutter, Andrew B.
Smale, William B. Jr.
Smith, LeRoy J.
Snedeker, D. E.
Snyder, Timothy M.
Sommers, Peter B.
Sparacino, Michael J.
Sparrow, Victor W.
Spohn, Gregory L.
Srinath, Mandyam D.
Stapleton, Jim
Stephens, Kenneth Leon
Stephenson, David T.
Stern, Carl M.
Stigall, James R.
Sukhaphadhana, Christopher T.
Swenson, George W. Jr. and Janice Joy
Swim, Alan D.
Taggart, Donald K.
Tate, James E.
Taylor, Javin M.
Terdina, James M.
Thatte, Satish M.
Thompson, Bernard G. and Karen A.
Thompson, Bradley A.
Toomey, Patrick J.
Trahan, Jerry L. and Suzanne G.
Trainor, Drew R.
Tremain, Tim A.
Trimble, Philip K.
Turczyn, Paul J.
Tyne, Jay R.
Vedder, Dietrich
Veihl, Jonathon C.
Vogel, Frederick M.
Voll, Parker J.
Waldrop, Park D.
Walker, Winston K.
Westendorf, Mark W.
Whitacre, Richard J.
Whitson, Roger M. and June D.
Wilhelm, Andrew L.
Williams, Robert W. and Jan M.
Wilson, Charles H.
Wiseman, Robert S.
Wojnowiak, Paul
Wong, Ki
Wozniak, Michael R.
Wytmar, Richard J. III
Yang, Kevin J.
Yost, Jeffery B.
Young, Douglas A.
Yuan, Li-Pen
Ziffra, Scott A. and Lori L.
Zinschlag, Howard P.
Zivney, Terry L.
Zurawski, Robert J.
Zysk, Adam M. and Carrie A.

President's Letter

Letter from the ECE Alumni Association Board of Directors President

Dear Fellow ECE Alumni,

One of the newest benefits for Illinois alumni is the online networking site, Always Illinois (**www.alwaysillinois.org**). I registered on the site a year ago, expecting to use it to expand and maintain my contact with ECE alumni. To my surprise, the site provides much more, and I have been investigating other ways in which ECE alumni may find it useful.

Setting up your profile on Always Illinois is easy and includes very flexible privacy settings so you can choose which information you share with others. The site does a great job of organizing and presenting information you may find interesting based on your profile. For example, when I browse people, it shows alumni living in my area, working in my industry, and colleagues at my company. The advanced search can be a very powerful tool. Are you looking to hire new college graduates in CompE? My search for 2008 graduates with degrees in computer engineering provided 50 students to contact. Need to locate an EE with a PhD? There are too many to contact. Narrowing your search to those working in semiconductors results in a manageable list. Interested in continuing your telecom career in Dallas, Texas? Your fellow alumni can offer advice. For job seekers, there is a whole career section where you can post jobs and search for opportunities.

I've found that groups, which are communities built around a club, industry, organization, location, or interest, simplify communication and connections to organizations and interests that are important to me. I encourage all ECE alumni to join the Electrical and Computer Engineering Alumni Group on Always Illinois. Members can add events or post information, and everyone in the group is notified. The ECE Department posts calls for nominations for ECE alumni awards and events to our group. Most groups are open to anyone interested, and you can read posts and contact members of these groups. You can also create groups with restricted membership. For example, I have created such a group for ECE alumni board members to provide an area where we can connect and collaborate easily.

To our new alumni graduating this spring and summer, congratulations! I hope you were already connecting with ECE alumni as a student and encourage you to use Always Illinois as a tool to stay in touch with classmates, students, faculty, administrators, and fellow alumni. To my fellow, more seasoned alumni, I hope my suggestions will encourage you to register, invite your friends, and help you find value in our online network. As with any community, our active participation in Always Illinois is what will make it thrive.

Sincerely,

Denise Turic

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

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

Christy Westendorf (BSEE '00)
Patrick Engineering

DON'T MISS AN ISSUE!

Resonance is the best way to stay up-to-date on ECE Illinois department and alumni news. Alumni who join the University of Illinois Alumni Association (UIAA) automatically receive this magazine. If you're not already a member of the UIAA, visit the Alumni section of the ECE Web site at **www.ece.uiuc.edu**. A portion of your membership dues goes directly to ECE to help support the department.

New **alumni board members** named

By Bridget Maiellaro

In June 2007, three ECE alumni were named members of the ECE Alumni Board of Directors. David Yeh, Christy Westendorf, and Ben Sander accepted their positions as board members and attended their first meeting last fall, bringing their many skills and talents back to the department.

David Yeh

Yeh (BSCompE '83, MSEE '85, PhD '90) works at Semiconductor Research Corporation, an industry consortium that funds university research on behalf of its members, through Texas Instruments.

As the director of Integrated Circuit and Systems Science at the company, Yeh works to fund and manage precompetitive university-based research in the design of advanced integrated circuits.

Yeh said the main challenge he faced within the industry was broadening his area of specialization. While the Champaign-Urbana native began to achieve this feat through his different responsibilities and positions at Texas Instruments, he will be able to further this accomplishment as a board member.

Yeh had several reactions after he was named a new board member. "Mostly, I was honored to be asked and humbled that someone had nominated me," he said.

Christy Westendorf

Westendorf (BSEE '00) said that when she was a student, she was very involved with the University. In fact, she even served as an undergraduate representative to the ECE Alumni Board.

"I was extremely excited to be given this wonderful opportunity to reconnect with the ECE Department," Westendorf, a Springfield native, said. "I have a great sense of pride in the University and would like to do whatever I can to help the department grow and continue to be one of the best ECE departments in the nation."

As a board member, Westendorf works to maintain open communication between the University, alumni members, and professionals within the department. She said she also wants to be a resource for current and potential students in preparing them for their futures.

Westendorf is a power consulting engineer at Patrick Engineering, Inc., a growing engineering and construction company. She said that in her position, she works on a wide variety of projects, sometimes with fellow alumni. In addition, Westendorf said many clients have commented on the quality of education and/or reputation of the University of Illinois.

Ben Sander

Sander (BSEE '93, MSEE '95) said he became curious after discovering he was named an alumni board member. "I wasn't sure what exactly I was getting myself into," he said.

Months into his new role, Sander, who works for Advanced Micro Devices (AMD), said his main responsibility is to provide industry feedback on where the ECE Department's focus should be. Sander said that lately the alumni board has been focused on helping the department attract more students to the ECE program.

"[It] is an area where we do not have enough engineers in the pipeline to fill the huge demand for ECE graduates," he said.

At AMD, a worldwide provider of microprocessor and graphics solutions, Sander leads the Global Performance Group. He said the group centers around microprocessor performance, owning its own performance modeling, simulation, and customer relationships.

Due to his experience in the field, Sander, a St. Louis native, said he knows what skill sets to look for when recruiting students and appreciates how the University prepares its students for industry work after graduation.

Distinguished alumni class includes educators, industry leaders

By Tom Moone

On September 28, 2007, a banquet was held in the Alice Campbell Alumni Center to honor outstanding ECE alumni with the Distinguished Alumni Award, Young Alumni Achievement Awards, and the Marcia Peterman Award.

The Distinguished Alumni Award honors ECE alumni who have made professional and technical contributions that bring distinction to themselves, the department, and the University. This year's recipients were Prithviraj Banerjee, Joseph W. Beyers, William M. Holt, and Arvind Krishna.

PRITHVIRAJ BANERJEE (MSEE '82, PhD '85) was recognized for contributions to VLSI computer-aided design, leadership in engineering education, and entrepreneurship. As senior vice president of research at Hewlett-Packard (HP) and director of HP Labs, Banerjee assists the HP executive vice president of strategy and technology in charting technical strategies for the company, and he heads HP Labs, which has seven locations worldwide. Banerjee had previously founded two companies: Binachip, Inc., and AccellChip, Inc. (which was sold in 2006 to Xilinx, Inc.).

Banerjee is a fellow of the American Association for the Advancement of Science, ACM, and IEEE and a recipient of the 1996 American Society for Engineering Education Terman Award and the 1987 National Science Foundation Presidential Young Investigator Award.

Outstanding alumni recognized: Richard K. Williams, Mark C. Hersam, Scott A. Mahlke, Prithviraj Banerjee, William M. Holt, Joseph W. Beyers, and Arvind Krishna

JOSEPH W. BEYERS (BSCompE '74, MSEE '75) was honored for contributions to the development of VLSI systems and to the development and management of high technology ventures. As vice president of intellectual property licensing for HP, Beyers is responsible for creating and driving HP intellectual property strategy and initiatives. Beyers is also the author of a chapter in *Making Innovation Pay,* a book on intellectual property licensing.

Beyers has had a wide variety of roles while at HP. His first assignment was development of the operating system for HP's first desktop computer. He initiated HP's first reduced instruction set architecture (RISC) VLSI chip design, which today is the basis of HP's PA-RISC microprocessors. He also served as vice president and general manager of HP's Internet Business Unit.

WILLIAM M. HOLT (BSEE '74) was recognized for technical contributions to the development of Intel technologies and leadership in the microelectronics industry. In his role as senior vice president and general manager of Intel Corporation's Technology and Manufacturing Group (TMG), Holt shares responsibility with Bob Baker for managing Intel's technology development and manufacturing activities.

Holt joined Intel in 1974 and worked as technical contributor or manager in DRAM development until 1985. During this time he worked in product engineering, test engineering, circuit design, and CAD tool development.

Holt was the program manager for the development of Intel's first BiCMOS process. He also managed factory automation development for the 0.35 µm generation. He became the co-general manager of TMG in March 2005.

ARVIND KRISHNA (MSEE '87, PhD '91) was recognized for technical management in the areas of network and computer security, and mobile and distributed computing. In addition to serving as vice president for database servers within Information Management for the IBM Software Group, Krishna has responsibility for world-wide development of information management software.

Krishna joined IBM in 1990 and has held executive, product management, and technical research positions. Previously, he was the vice president for technical and business strategy for the IBM Software Group. He also previously served as the vice president of provisioning and security development for Tivoli Software within IBM's Software Group. Prior to these roles, Krishna was the director of Internet infrastructure and computing utilities research at IBM's Thomas J. Watson Research Center.

The Young Alumni Achievement Award recognizes young alumni (less than 40 years old) who have made outstanding professional contributions to their field since graduating from ECE. This year, Mark C. Hersam and Scott A. Mahlke received this award.

MARK C. HERSAM (BSEE '96, PhD '00) was honored for his interdisciplinary research and education in the field of nanoelectronic materials and devices. Hersam is a professor of materials science and engineering and chemistry at Northwestern University. His research interests include single molecule devices, nanofabrication, scanning probe microscopy, semi-conductor surfaces, and carbon nanotubes.

Hersam has received the Arnold and Mabel Beckman Young Investigator Award, National Science Foundation CAREER Award, Searle Center for Teaching Excellence Fellowship, Army Research Office Young Investigator Award, Office of Naval Research Young Investigator Award, Presidential Early Career Award for Scientists and Engineers, TMS Robert Lansing Hardy Award, and AVS Peter Mark Award.

In 2007, Hersam cofounded NanoIntegris, a startup company focused on supplying high-performance carbon nanotube materials.

SCOTT A. MAHLKE (BSCompE '88, MSEE '91, PhD '97) received his award in recognition of his technical contributions to computer architecture and compiler techniques for instruction-level parallel-processing compilers. Mahlke heads the Compilers Creating Custom Processors Group in the Electrical Engineering Computer Science Department at the University of Michigan. His work focuses on designing high-performance, low-power computer systems using application-specific technologies.

Mahlke has been recognized for his outstanding work with several awards, including the Morris Wellman Faculty Development Assistant Professor Award in 2004 to recognize outstanding contributions in teaching and research; the International Symposium on Computer Architecture Influential Paper Award in 2006, which recognizes the paper 15 years earlier that has had the most impact on computer architecture; and a National Science Foundation CAREER Award in 2003 for his research in designing application-specific computer systems.

The Marcia Peterman ECE Award was established by the ECE Alumni Association to honor the memory of Marcia Peterman, former ECE supervisor of clerical staff and secretary and adviser to four department heads. The award is presented annually to a former ECE Alumni Board Member for dedicated service as a member of the board. The recipient for 2007 was RICHARD K. WILLIAMS (BSEE '80).

An acknowledged device physics expert in power management and IC technology, Williams has invented many landmark products. Prior to cofounding AnalogicTech in 1998, he was at Siliconix, where he was senior director of device concept and design. He invented and developed several milestone devices, including an airbag controller IC for Mercedes-Benz, a lithium-ion battery disconnect switch for Sony and Apple Computer, and the first production Trench Power MOSFET.

Williams holds more than 200 U.S. patents in device, process, package, circuit, system, and application methods and apparatus. He is a member of IEEE.

Williams served on the ECE Alumni Association Board of Directors from July 1996 to July 2006. He was the western region vice president for his second and third terms, starting in July 1999.

Nominations are now being accepted for 2009 awards. Nominate a deserving alumnus at **www.ece.uiuc.edu/alumni**.

Alumnus uses ECE skills to **make it big**

By Bridget Maiellaro

After graduating from the University of Illinois, Jordan Plofsky (BSEE '83) said he used the education he received to his advantage. In fact, the Westchester, Illinois, native strongly believes the University played a vital role in helping him end up where he is today.

"It kind of paved the way. It wasn't one of those things where you're working very hard and can't see the light at the end of the tunnel," said Plofsky, now the vice president of marketing for Altera Corporation, a leading supplier of programmable logic devices. "The light at the end of the tunnel was very bright. You knew there was gonna be something there."

Alumnus Jordan Plofsky is the senior vice president of marketing for the Altera Corporation.

Plofsky began working in the semiconductor division of the Harris Corporation, an international communications and information technology company located in Florida, shortly after graduating. He said he was the semiconductor division's first college recruit. After completing the company's nine-month, Chicago-based training program in 1983, Plofsky was transferred to California. He has lived there ever since.

After leaving Harris, Plofsky worked for Analog Devices from 1990 to 1996 and LSI Logic from 1996 to 2001. He joined the Altera Corporation in February 2001 as senior vice president of vertical markets and embedded processor products. He was later named senior vice president of applications business groups in March 2002 and was promoted to senior vice president of marketing in November 2004.

Plofsky, who leads 500 to 550 employees, said that the real strength Illinois gave him was on the technical side, which complemented his already strong work ethic. In fact, his work ethic seems to have a lasting effect on his employees, 11 of whom have become CEOs or work for CEOs.

"Somewhere in their career, they learn something from their dealings with me that allow them to be CEOs or work for CEOs today," he said. "None of those were promoted to that level from me."

In addition, Plofsky was recently recognized as one of the "good bosses" in "Bad Bosses," a TV news segment that ran in the Bay Area, for his exceptional work at Altera.

Today, the Altera Corporation, founded in 1983 by Robert Hartmann, Michael Magranet, Paul Newhagen, and Jim Sansbury, employs approximately 2,600 people in 19 countries, according to the company's Web site. In 2007 alone, Altera made several technological advances, including the industry's first low-cost, transceiver-based, and protocol-optimized field programmable gate arrays (FPGAs).

A number of other Illinois graduates work at Altera. In fact, the company has a program to ensure that universities throughout the world use their tools and development kits in the classroom. For each of their top university prospects, executives are hired to drive the tools. Plofsky is the executive sponsor for Illinois.

"I contribute back to the University because I think that it provided me with something that was valuable," he said.

Plofsky spoke at the University in September 2002 on the "Costs and Challenges Ahead for System on a Programmable Chip (SOPC) Design" and in November 2007, informing students about developments at Altera.

In his free time, Plofsky enjoys attending concerts, reading, home remodeling and woodworking, car repair, and Sudoku. He also spends time with Jo-Ann Morretti, his long-time companion.

Alumnus' new book takes networkers back to school

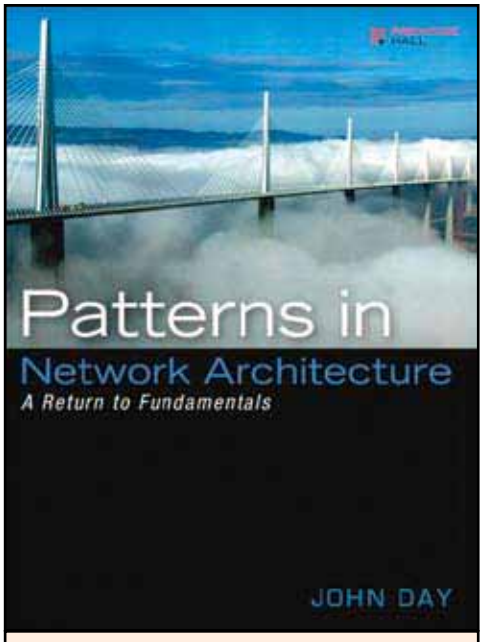
By Jamie Hutchinson

As ECE alumnus John Day (BSEE '70, MSEE '76) likes to tell it—always with a good laugh—his tiny hometown of Kinmundy, Illinois, got its name from a local handyman who, whenever he was asked to do a job, would reply, "Well, Ah cain't today, but Ah kinmundy."

Well, that's nothing: Day has been thinking hard about how to fix the Internet for three decades. He believes his new book, *Patterns in Network Architecture: A Return to Fundamentals* (Prentice-Hall, 2008), provides the answer. Part of the problem, he believes, is that few people realize the Internet is in trouble in the first place.

"The Internet is an unfinished demo," said Day. "The demo was held in 1972 and it's been living on Moore's law and Band-Aids for the last 30 years. It is more like DOS than Unix. The stagnation we see today began in the mid-70s."

Day had a role in the "demo" as a researcher with the U of I Center for Advanced Computation (CAC) through most of the 1970s. "We were the first people to *live* on the 'net," recalled Day. And for two of those years Day was one of the first telecommuters in the world, working for CAC while living in Houston. (He has a T-shirt that says "University of Illinois at Houston.") Day spent the 1980s managing the development of the Open Systems Interconnection (OSI) Reference Model, a network standards initiative that, according to Day, "self-destructed from its internal conflicts among competing interests." Day was also involved in several other standards projects.



> Alumnus John Day is the author of *Patterns in Network Architecture: A Return to Fundamentals,* a new book that offers suggestions for improving the Internet.

"We knew in 1975 that there were a number of things that had turned up in developing the ARPAnet, that were unsolved problems," said Day, whose book starts with these seven still-unanswered questions. "In addition, the war between connection and connectionless, and the beads-on-a-string versus the layered approach [to network architecture], had never been resolved. We never found a synthesis. If we were going to make progress, this had to be solved. It had wrecked too many attempts."

Writing from the vantage point of his deep involvement with these issues and as a historian, Day is able to explain not only the technical matters but also the political and economic forces behind the Internet. He feels the latter have played a greater role in the Internet's success than the technical accomplishments.

According to Day, the current problems of the Internet center on its inability to scale and its lack of half the necessary naming and addressing concepts. The early designers mistakenly assumed that more advanced mechanisms would be deployed before the Internet became widely available. As for names and addresses, Day is only half joking when he says, "they botched addressing because they were from Boston, where there is only one way to get anywhere, and not the Euclidean plains of the Midwest." Day shows how both problems can be accommodated in an elegant and simpler structure.

Day points out that academics and textbook authors have failed to teach the principles of networking and instead merely explain how existing networks function. "It's more like vocational education for artisans than university education for scientists." Day hopes his book—dedicated in part to the late ECE professor Heinz von Foerster, "who taught me how to think"—will help restore network theory as a field worthy of university study.

Day consults and teaches computer science in the Boston area.

ALUMNI CLASS NOTES

1950s

Howard Zinschlag (BSEE '59) has been awarded The Albert F. Sperry Founder Award for outstanding technical contributions and leadership in the silicon industry and for pioneering computer automation of silicon crystal growth.

1960s

J.K. Aggarwal (MSEE '61, PhD '64) received the 2007 Okawa Prize, an annual award by the Okawa Foundation for Information and Telecommunication of Japan for outstanding international contributions to research, technological development, and business in the information and telecommunication fields.

Kenneth Batcher (MSEE '62, PhD '64) received the 2007 Seymour Cray Computer Science & Engineering Award from the IEEE Computer Society. The honor recognizes innovative contributions to high performance computing systems.

Sia Batman (BSEE '69) has been promoted to vice president of sales for Gigaram, a manufacturer of memory upgrade products.

Jack Saltich (BSEE '66, MSEE '67) has been elected to the board of directors of InPlay Technologies, a developer of human interface devices for electronic products.

1970s

Terry Dauenhauer (BSEE '76) was appointed by the Innovex, Inc., board of directors to become the president and chief executive officer. The company is a contract sales organization.

Frank Hurtte (BSCompE '77) has been named by *HVAC-R Distribution Magazine* as one of the two executive coaches in America who understand the heating, ventilation, air conditioning, and refrigeration market. Hurtte is a founding partner of the River Heights Consulting company.

Neal Keating (BSEE '78) became the president and chief operating officer of Kaman Corporation, a business dealing with aerospace and industrial distribution markets.

Marwan Simaan (PhD '72) has been named the Florida Chair and a Distinguished Professor of Electrical and Computer Engineering and Computer Science at the University of Central Florida. He will take over his new job duties this spring. He is also the recipient of the University of Illinois 2008 Award for Distinguished Service in Engineering.

Tim E. Taylor (BSEE '73) has been named the new president and chief executive officer of Xcel Energy's Public Service Company of Colorado. The Colorado operation is one of many initiatives specializing in energy products and services.

Scott Eugene Woodard (BSEE '73, MSEE '75, PhD '77) and Nancy Elizabeth Coho-Morrissey were married

ECE alumni fun at the Seattle Aquarium

ECE and other alumni from the College of Engineering mingled with each other and the fishes at the July Seattle area alumni event, which took place at the Seattle Aquarium. Pictures from all ECE alumni events are available on the ECE Web site at **www.ece.uiuc.edu/alumni**.

June 17, 2007, in Tulsa, Oklahoma, Scott is chief executive officer at Showingtime, Inc., in Chicago.

1980s

Ian Chen (BSEE '84, MSEE '86) has been named executive vice president of Sensor Platforms, Inc., a fabless semiconductor solutions provider.

Gregg Cook (BSEE '85) was named vice president of sales and marketing for ColdWatt, Inc., in October 2007. The company specializes in innovative power supply design.

Dean Paschen (BSEE '81, MSEE '82) is the recipient of an Award of Excellence presented by Ball Corporation, supplier of metal and plastic packaging products. He serves as a Ball Aerospace & Technologies senior advanced systems manager.

Lee Pucker (BSEE '85) has been given a two-year contract to provide chief executive officer services for a new consultancy position with the Software Defined Radio Forum, a nonprofit international industry association for reconfigurable wireless technology.

David Sigmond (BSEE '81) was promoted to senior U.S. patent attorney with Alban Tay Mahtani & de Silva (ATMD). The company is a full-service business law firm located in Singapore.

Sergio Verdu (MSEE '82, PhD '84) has been recognized with the IEEE Information Theory Society's most prestigious honor, the 2007 Claude E. Shannon Award. The award pays tribute to individuals for their profound contributions to the field of information theory.

1990s

Zhiyong Chen (BSEE '97) was appointed a nonexecutive director of Digital China Holdings Limited, an Internet technologies distribution and services company.

Ben Sander (BSEE '93, MSEE '95) has been named an Advanced Micro Devices (AMD) Fellow. AMD is a manufacturer of semiconductors based in California.

2000s

Eric Hewing (BSEE '98, MSEE '00) and Linda Gooch were married May 27, 2007, in Dallas, Texas. Eric is a solutions delivery manager with Texas Instruments.

Steve Lin (BSCompE '01) was recently appointed director of regulatory affairs and quality assurance at U-Systems, Inc., in San Jose, California. U-Systems is a leader in automated breast ultrasound.

Robert Richard Mills (BSCompE '03, MSEE '04) and **Katherine Edith Sutton** (BSEE '03) were married June 2, 2007, in Urbana. Robert and Katherine are both electrical engineers for Sandia National Laboratories.

Satish Rao (MSEE '03) and Kavitha Sekhar were married July 7, 2007, in Morristown, New Jersey. Satish is a postdoctoral researcher at the Institute of Photonic Sciences in Barcelona, Spain.

Cho receives National Medal of Technology

By Lauren Eichmann

ECE alumnus Alfred Cho (BSEE '60, MSEE '61, PhD '68) was awarded the National Medal of Technology by President Bush during a White House ceremony last July. He was recognized for his contributions to the invention of molecular beam epitaxy (MBE). MBE was invented in the late 1960s by Cho and J.R. Arthur at Bell Telephone Laboratories, and has been refined over the course of three decades. It is now a highly precise tool used for engineering semiconductor components of electronic and photonic devices used in CD players, cellular phones, microwave devices, and high-speed communications.

ECE alumnus Alfred Cho and President George Bush

The National Medal of Technology, which is administered by the Technology Administration of the U.S. Department of Commerce (DOC), is deemed the highest honor awarded by the president of the United States for technological innovation. According to the DOC Web site, the award recognizes "economic, environmental, and social well-being through the development and commercialization of technology products, processes and concepts; technological innovation; and development of the nation's technological manpower."

Cho is technically a 2005 recipient of the award. The announcement of the 2005 recipients was delayed because the process had been behind schedule.

Cho is the adjunct vice president of semiconductor research at Alcatel-Lucent's Bell Labs in Murray Hill, New Jersey. Among many awards and honors, he has also received the National Medal of Science, IEEE Medal of Honor, New Jersey Governor's Thomas Alva Edison Science Award, and Gaede-Langmuir Award of the American Vacuum Society.

ALUMNI CLASS NOTES

continued …

IN MEMORIAM

Charles Beerling (BSEE '62) died May 10, 2007. He was 67. Beerling was employed as a communications engineer with Celwave/R.F.S. Engineering.

Henry Bellagamba (BSEE '66) died November 5, 2007.

Ernest L. Berninger (BSEE '37) died November 12, 2007. He was 91.

Kenneth Carroll (BSEE '72, MSEE '75) died June 25, 2007. He was 56. Carroll was employed at Westinghouse and the Electric Corporation Defense and Electronics Center.

Howard Cary (BSEE '66) died August 1, 2007. He was 67. Cary retired as an electrical engineer from the Rockwell Corporation in Lisle, Illinois.

Bernard Geolat (BSEE '58) died July 18, 2007. He was 78. Geolat was a veteran of the U.S. Air Force and worked for McDonnell Douglas during the Mercury and Gemini space programs. He was a real estate developer after retiring from Scientific Atlanta.

James Harland (BSEE '49) died May 22, 2007. He was 82. Harland retired after more than 25 years with Cooper Industries, formerly McGraw Electric. He also served as a second lieutenant in the Army Air Forces during World War II.

Steve Janda (BSEE '96) died September 5, 2007. He was 39. He was employed at Hospira, a global specialty pharmaceutical and medication delivery company.

Daryl Kasper (BSEE '48) died December 27, 2007. He was 85. Kasper worked for Barber Coleman in Rockford, Illinois, until his retirement. He also served in the Army Corps of Engineers during World War II.

Wesley Knight (BSEE '53) died May 29, 2007. He was 75. Knight retired as a senior engineer in the electronics lab for General Electric after 37 years. He was also a U.S. Army veteran.

Walter Krueger (BSEE '49) died October 20, 2007. He was 88.

William Marston (BSEE '31) died January 6, 2008. He was 98. Marston worked with the Chicago Transit Authority and the Department of Traffic and Transportation before being appointed City of Chicago Traffic Engineer and the First Deputy Commissioner of the Department of Streets and Sanitation. He later retired as a consultant for the Illinois/Indiana Bi-State Commission.

Joseph Masi (MSEE '57) died May 19, 2007. He was 77. Before retiring from Stanford Research Institute, now SRI-International, Masi spent 23 years in the U.S. Air Force.

Cyrus John Robert McLean (BSEE '49) died April 23, 2007. He was 79. McClean had a career in telecommunications as vice president of B.C. Telephone and later as director of government and space communications with the GTE Corporation in New York. He also served with the U.S. Navy during World War II.

Dewey Morse (MSEE '82) died September 15, 2007. He was 61. Dewey was employed by the U.S. Department of Defense and was a three-time award winner of the Commander's Civilian Achievement Award for Civil Service.

Charles Myer (MSEE '51) died April 30, 2007. He was 83. Myer served various roles in the U.S. Army, specializing in military electronic communication. After retiring from the Army, he was a senior consultant with Unisys Corporation for 15 years.

Joseph Podolsky (BSEE '60) died July 7, 2007. He was 68. Podolsky was president of a small company that sold software and IT services to the insurance industry. For the past 30 years, he worked at Hewlett-Packard, holding management positions in information technology and the communications department.

John Rannells (BSEE '58) died August 31, 2007. He was 72.

Sergio Servetto (MSEE '99) died July 24, 2007. He was 39. Servetto was an assistant professor of electrical and computer engineering at Cornell University.

Harwell Fitzhugh Smith, Jr., (MSEE '54) died June 17, 2007. A graduate of West Point, he was a former U.S. Army officer who went on to work for Union Carbide as division director of product engineering and scheduling. He later retired as director and manager of communications for Lockheed Martin Nuclear Division.

James Sparks Thale, Sr., (BSEE '42) died October 31, 2007. He was 87. Thale served as a captain in the Army Signal Corps during World War II. During his career, he served as chair of the Mathematics Department at Loyola University and as a scientist for Borg Warner.

Elmer Tietz (BSEE '52) died August 1, 2007. He was 78. Tietz was employed at Commonwealth Edison for 40 years.

George Troxell (MSEE '50) died June 18, 2007. He was 85. Troxell worked for Odeco after serving in the army. He was also a graduate of the U.S. Military Academy at West Point.

George P. Williams (BSEE '58) died July 24, 2007. He was 78. Williams wrote technical manuals for government contracts and later retired from Vitro, Inc., a leading glass producer.

HAVE NEWS TO SHARE?

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Remembering Bardeen and superconductivity theory

By Jamie Hutchinson

The 2007–2008 academic year marks an important centennial and a semicentennial for ECE and the University of Illinois. The late ECE professor and transistor inventor John Bardeen was born in 1908, and what Bardeen considered to be his greatest brainchild—the theory of superconductivity—was published in 1957.

Last fall, the University of Illinois honored both the man and his work with a sold-out conference at the Beckman Institute for Advanced Science and Technology. Among the many Nobel laureates in attendance were Leon Cooper and J. Robert Schrieffer, who shared with Bardeen the 1972 Nobel Prize in Physics for their theory of superconductivity, which has come to be called simply "BCS" (for Bardeen, Cooper, and Schrieffer). Bardeen had won his first physics Nobel in 1956, along with Bell Labs colleagues Walter Brattain and William Shockley, for inventing the transistor. No one else has won two such prizes.

BCS explains the mysterious loss of electrical resistance in certain metals at extremely low temperatures—a puzzle that for decades stumped such physics luminaries as Einstein, Bohr, and Feynman. After it was published in 1957, the theory quickly won acceptance among specialists and still stands today as a pillar of the field of condensed matter physics.

Bardeen joined the Illinois faculty in 1951 in order to focus on superconductivity. Schrieffer enrolled as a graduate student under Bardeen in 1953, and Cooper came on board as a postdoc in 1955, completing the team that would crack one of physics' toughest riddles.

Bardeen set the direction for the group by framing the problem around the existence of an energy gap between the normal and the superconducting states of the metal. The gap seemed to arise from the interaction of electrons and phonons, the quantized acoustic vibrations of the crystal lattice, but no one could identify the precise mechanism. It was Cooper in early 1956 who accounted for the energy gap with his notion of "Cooper pairs," electron pairs created when the attractive force caused by the electron-phonon interaction dominated the normal repelling force, or Coulomb force. Nearly a year later, Schrieffer convinced Cooper's skeptics (including Bardeen) by calculating a wave function for the Cooper pairs that satisfied the requirements of quantum theory. The team spent the next several months deeply immersed in checking, fleshing out, and refining the BCS theory, before submitting their paper to *Physical Review* for publication in December 1957.

Fifty years later, BCS is the model for the patient, collaborative, and experimentally based way of doing physics that has come to be called the "Urbana style." Aspects of the theory have been adopted to solve fundamental problems of particle physicists. The technological impact of the theory has been felt in fields ranging from medicine to astronomy to transportation.

"That may be one of the reasons that he was so successful—because he stayed with something so long," said Bardeen's biographer, U of I historian Lillian Hoddeson. "This is something that his mother once mentioned in a letter, too … that he just hangs on—he doesn't let go until he has really pursued the question."

ECE Professor John Bardeen

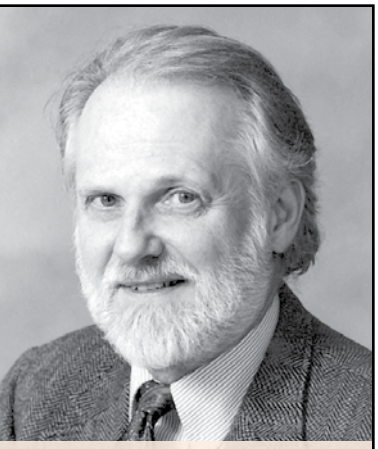
That bulldog quality changed the worlds of theoretical physics and technology. "Bardeen ushered in a revolution," said ECE Professor Nick Holonyak, Jr., who was Bardeen's first graduate student at Illinois. "If you turn off all the transistors in the world for one second, it would be a cataclysm."

Bardeen died in 1991 after four decades on the ECE and Physics faculties. The quadrangle between Engineering Hall and Grainger Library was dedicated as the Bardeen Quad in 2004.

The sound of music: Beauchamp slices, dices, **puts it together again**

By Jamie Hutchinson

If you learned that an ECE professor retired to devote more time to music, you might think he'd had it with engineering. Not so, at least in the case of ECE Professor Emeritus James Beauchamp (PhD '65). The musical acoustics expert simply decided in 1997, after more than 30 years on the faculty, to focus more on research. And he's been doing just that.



James Beauchamp, alumnus and ECE professor emeritus

Beauchamp's current projects cover a range of approaches to analyzing and synthesizing musical sound. He's also developing software for digital analysis/synthesis of music, advising graduate students, and chairing the technical committee on musical acoustics of the Acoustical Society of America. He recently edited—and contributed a chapter to—the anthology *Analysis, Synthesis, and Perception of Musical Sounds: The Sound of Music,* published in 2007 by Springer. And he hasn't altogether given up classroom teaching: last spring he taught ECE 403: Audio Engineering.

Growing up in Detroit, Beauchamp trumpeted in the school band and orchestra while excelling at math and science. Studying for his bachelor's and master's in electrical engineering at the University of Michigan, he continued to play both casually and with university ensembles.

For his final project in a college acoustics class, Beauchamp played a trumpet tone into an oscilloscope, photographed the readout, "cranked out the harmonics by hand" with Fourier analysis, then tuned six sine wave generators to those harmonics and fed it all back into the oscilloscope. Eventually the synthesized waveform matched the original. As a grand finale, the young musician/engineer generated from the new waveform a sound that was indeed somewhat trumpetlike, at least briefly.

"The important thing was, I discovered for myself that you can add up harmonics to synthesize a musical sound," Beauchamp reflected.

He came to Illinois for PhD study in electrical engineering under Lejaren Hiller, the chemistry-turned-music professor who founded the University's esteemed Experimental Music Studios (EMS). A grant from Magnavox (which at the time manufactured organs in Urbana) supported Beauchamp's dissertation project based on the "Harmonic Tone Generator" (HTG), an analog electronic instrument that performed time-varying additive synthesis of harmonic musical tones. Illinois composers Herbert Brün, Salvatore Martirano, and Kenneth Gaburo—today regarded along with Hiller as pioneers of electronic music—composed and experimented with the HTG.

Beauchamp joined the ECE faculty full-time in 1965, and from 1969 until his retirement he held a joint appointment in ECE and music. In 1968, Beauchamp and ECE colleague Heinz von Foerster co-edited the volume *Music by Computers* (John Wiley), reflecting Beauchamp's embrace of the digital domain. When Hiller left Illinois in 1969, Beauchamp took charge of the EMS until 1972. He founded the Computer Music Project (CMP) in the EMS in 1984 and directed it until 1993. Both the EMS and the CMP still thrive today.

A current project with Beauchamp's advisee, ECE PhD student Mert Bay, began modestly enough with tandem recordings of a woodwind quintet—one recording with the group together in a room, the other with each instrument recorded in isolation on a dedicated channel. The basic idea has been to demix the individual instruments out of the first recording and compare each with the "ground truth" of the second. "But I've decided to explore it more," said Beauchamp, who looked forward to listening to the music with each instrument on a separate speaker. "You could listen this way in surround sound on a home theater. You could do music-minus-one by knocking out one part and playing it yourself along with the recording." He also mentioned the potential for automatic music transcription using the process.

With ambitions like that, it's no wonder retirement hasn't meant slowing down. And we haven't even mentioned Beauchamp's volunteer work with the local Sierra Club, or his 11-year-old son Nathan, who enjoys music, athletics, and chess with his dad.

CAMPUS ROUNDUP



Photos courtesy of Kalev Leetaru

QUAD CAM HITS THE ROOF Been a while since you were on campus? Now you can see the main quad whenever you like! Mounted high above Foellinger Auditorium, the University's new Quad Cam gives you control of the view from your computer. Visit **www.uiuc.edu/resources/quadCam.html** to see the quad any time you like!

CAMPUS BUILDUP The construction business is booming on campus with projects underway at every turn. The Univerisity of Illinois Board of Trustees recently approved a $15 million construction project for Huff Hall that will add a 36,000 square-foot north wing for the College of Applied Health Sciences.

Other projects include a new townhouse complex and a 24-story apartment building, both on Green Street. Another high-rise apartment building complete with a first-floor grocery store is rising from its location on Springfield Avenue in the footprint of the old Burnham City Hospital.

At Fourth and Daniel, a new dormitory, Presby Hall, owned by the McKinley Presbyterian Church and Foundation, will be the first eco-friendly residence hall on campus.

Remodeling of Memorial Stadium is ongoing, and IMPE is scheduled for completion this summer. The new Illinois Conference Center near the Research Park will include a five-story hotel, full-service restaurant, conference center, and ballroom.

ILLINOIS BY THE BAY The University of Illinois opened a new development office in the San Francisco Bay Area last fall. The new office staff will be responsible for "representing the three Illinois campuses in all disciplines, with an emphasis on the Urbana campus," said Tammy Nicastro, Illinois director of development and alumni relations.

The main goal of the new office is to respond to the needs and interests of the alumni and corporations in and around the Silicon Valley area.

SIX PACK REDEVELOPMENT UNDERWAY Work began in December on a $75 million project that will replace the Peabody and Gregory Drive dining halls. The project also includes a future residence hall complex which will house 150 residents, including students with physical disabilities, and is scheduled to open in fall 2010. Both the dining and residence halls are part of a long-range plan to replace the existing residence halls commonly referred to as the Six Pack.

The new facilities will be named in honor of Stanley O. Ikenberry, the University's fourteenth president. Ikenberry served from 1979 to 1995 and is currently U of I Regent Professor and President Emeritus.

BUSINESS AND INDUSTRY SERVICES AVAILABLE AT NAPERVILLE SATELLITE For-credit graduate programs in engineering and computer science are now available from the University's Business and Industry Services (BIS) in Naperville, Illinois. Offerings include a certificate in business management for engineers and a master's degree, certificate, or individual classes in computer science. Some of the courses will be live—with a teacher in the classroom—while others will be "mixed delivery," involving an online video of a professor's lecture from the Urbana-Champaign campus. After viewing the lecture, students will be able to meet with a teaching assistant or have a video conference to further discuss the topics.

The BIS staff also provides expertise in strategic global leadership, innovation strategy, Six Sigma, lean operations, quality system implementation, customer and employee surveys, IT certification, software training, basic and technical skills, continuous process improvement, HR consulting, executive leadership, and culture change.

For more formation, visit **www.bis.uiuc.edu** or call (630) 505-0500.

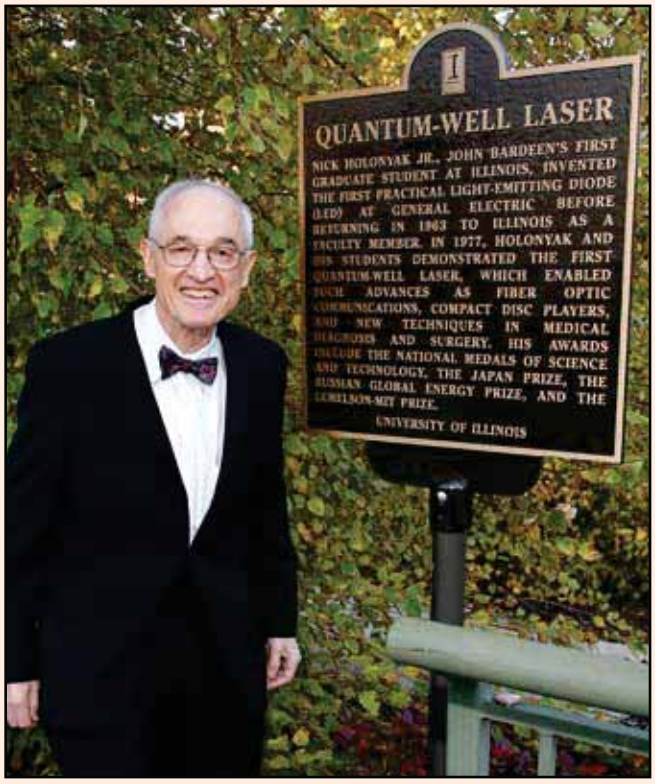
A NEW WINDOW TO THE CAMPUS A much anticipated facelift for the University's Web page is in the works. Driven by Chancellor Richard Herman and Provost Linda Katehi, the new Web site is intended to trumpet Illinois' excellence using modern elements. The new home page will feature a mix of technology and art with new media interactivity and a much simpler interface than the current, overflowing home page.

Get a sneak peek of the new site at **www.uiuc.edu/webteam/design.html**.

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

Holonyak honored with campus marker

ECE Professor Nick Holonyak, Jr., was recognized last fall with a University historical marker honoring him and his development of the quantum-well laser. The plaque is one of only about 40 installed across the Illinois campus to serve as a tribute to noteworthy individuals and their achievements. The Holonyak marker is located just north of Everitt Lab at the site of the old Electrical Engineering Research Laboratory (EERL) on the Bardeen Quadrangle.



Colleagues, friends, and students gathered at a reception on November 9 to celebrate Holonyak and the historical marker. Among the attendees was University of Illinois President B. Joseph White. Speaking to the gathering, he related the story of his first encounter with Holonyak after being appointed president three years ago. He said he did not know of Holonyak when they met during a chance encounter. White said, "Tell me a bit about yourself." In explanation, Holonyak simply replied, "Well, I'm pretty famous around here."

"I immediately went to my office, I did my homework, and only then did I realize that perhaps only Nick could say that and have it be a modest statement," said White. "And it actually was. That was my occasion to learn about a man who is a great inventor, whose life story is absolutely astounding… a man who has changed, and is changing, the world. A man who has educated so many people coming behind him."

At age 79, Holonyak has accomplished much in his lifetime. The first graduate student of the late John Bardeen, Holonyak invented the practical light-emitting diode (LED) while at General Electric. He returned to Illinois as a faculty member in 1963, and in 1977 produced the first quantum-well laser with his students. The invention allowed for fiber optic communications, CD players, and advances in the field of medicine. Holonyak has received numerous accolades for his work, which is ongoing, including the National Medals of Science and Technology, Japan Prize, Russian Global Energy Prize, and Lemelson-MIT Prize.

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