IOWA STATE UNIVERSITY

CONNECTIONS The Department of Electrical and Computer Engineering Newsletter for Alumni and Friends 1 Spring 2007

Major Companies Show Interest in Professor Kothari's Research

4 ECpE Professors Receive Patents

Alumnus Named CEO of Major Technology Company

Student News

- Undergraduate and Graduate Awards
- ECpE Student Profiles
- Organization Updates

departmentNews

Letter from the Chair

Dear alumni and friends,

ach semester at Iowa State brings innovation, success stories of alumni, and recognition for our talented students. This spring semester is no exception.

One of our main focuses for this semester has been recruiting top-notch new faculty to our department. We hope to fill four to five positions in the areas of

embedded systems, VLSI (both analog and digital), software engineering, power/ energy, distributed decisions, sensor/sensor networks, systems biology, and security. Already, we've brought 17 excellent candidates to campus. Our final hiring decisions will be made soon.

This spring also marks the beginning of the university-wide 150-year birthday celebration. The ISU Alumni Association will be kicking off the festivities at VEISHEA weekend April 20-22 and will continue from 2007-2008. The Department of Electrical and Computer Engineering (ECpE) also has a birthday coming up. We'll be celebrating our 100th birthday from 2008-2009. Look for more details about the celebration to come on our Web site at www.ece.iastate.edu and in future newsletters.

Speaking of our Web site, have you visited it lately? If not, be sure to check it out. We've recently added updates to the site, including an online form for you to send us updates on what's new with you. (Go to www.ece.iastate.edu, then click Alumni.)

To follow up on stories in our last newsletter, our departmental reorganization is proving to be productive. Our electrical engineering, computer engineering, software engineering and applications faculty are working together to spur innovation. Additionally, our software engineering program is recruiting its first students. They will begin enrolling in the program this fall.

I, on behalf of the ECpE department, would also like to extend congratulations to our alumni and faculty who have been making great achievements and experiencing success (see alumni news, page 12, and faculty awards, opposite page).

You'll also note that construction for our new west wing of Coover Hall is well underway (see page 5 for details). We expect the new wing to be available for use by the end of the calendar year, providing us with a significantly improved teaching and laboratory infrastructure.

As always, please feel free to send us your suggestions to improve our strong program. Best wishes for a wonderful spring and summer!

Arun Somani Jerry R. Junkins Chair Professor and Department Chair

Spring 2007 | Vol. 23 Issue 2

Department Chair: Arun Somani Newsletter Editor: Dana Schmidt (schmidtd@iastate.edu) Faculty Newsletter Coordinator: Murti Salapaka

Published twice a year by the Department of Electrical and Computer Engineering, 2215 Coover Hall, Iowa State University, Ames, IA 50011-2230; www.ece.iastate.edu; schmidtd@iastate.edu, (515) 294-2664. © 2007



IN 1119 1990E
<mark>departmentNews</mark> Myers Joins 25-Year Clubpage 4
Kumar Named IEEE Fellow page 4
Distinguished Lecture Series Wrap-Up page 5
Support the Coover Building Projectpage 5
Calendar of Events page 14
<mark>researchNews</mark> Guan Wins NSF CAREER Award page 6
Staying a Step Ahead of Hackers page 7
Kothari's Research Attracts Worldwide Attention page 8
ECpE Professors Receive Patents page 8
<mark>studentNews</mark> Student Organization Happeningspage 9
In Pursuit of a PhD page 10
Head of Her Class page 11
Student Awards page 11
<mark>alumniNews</mark> Doluca Named CEO of Tech Company page 12
Alumna Visits Campus page 13
From India to Washington State page 13
PPEA Honorees page 14
Alumni in the News page 15

Cover photo: Professor Suraj Kothari sits in his office. Photo by Dana Schmidt.

If you're planning a gift to the ECpE department, please visit www.foundation.iastate.edu/gift or contact Keith Fortmann, (515) 294-4280 or kfortman@iastate.edu.

Iowa State University does not discriminate on the basis of race, color, age, religion, national origin, sexual orientation, gender identity, sex, marital status, disability, or status as a U.S. veteran. Inquiries can be directed to the Director of Equal Opportunity and Diversity, 3680 Beardshear Hall, (515) 294-7612.

Departmental Honors and Awards

During the last semester several of our faculty and staff members were recognized for their career achievements. The ECpE department congratulates the following individuals:

Brett Bode, adjunct assistant professor of electrical and computer engineering and associate scientist at the U.S. Department of Energy's Ames Laboratory, received the 2006 IBM Faculty Award for his work on developing management systems for petascale computing. Petascale computing is the push toward developing a supercomputer that has more than a petaflop peak performance. As part of the award, Bode will be collaborating with IBM on a yearlong project to develop software for one of their high-end computing systems. The IBM Faculty Awards program is a competitive worldwide program with the goal of fostering collaborations between researchers at leading universities throughout the world and those in IBM research, development, and service organizations.

Yong Guan, assistant professor, received a prestigious National Science Foundation CAREER Award. The award is given to teachers and scholars who most effectively integrate research and education within in the context of their organization's mission. (See page 6 for more about Guan and his research.)



Iowa State University President Gregory Geoffroy (right) presents Anthony Moore (left) with a CYtation Award.

Doug Jacobson, associate professor, received the Technology Association of Iowa's Prometheus Award for Educator of the Year. (See page 7 for more details.)

David Jiles, collaborating professor, was named a Royal Society Research Fellow in the United Kingdom. He also received a Fellowship of the Japan Society for the Promotion of Science. As part of the fellowship, Jiles traveled for two weeks in Japan giving invited lectures.

Mani Mina, senior lecturer, was named the VEISHEA Faculty of the Year for the College of Engineering.

Anthony Moore, academic advisor, was selected to receive a CYtation Award. Iowa State University President Gregory Geoffroy presented the award to Moore in a January awards ceremony. The Professional and Scientific (P&S) Council gives CYtation Awards semi-annually to recognize P&S staff from throughout the university who have demonstrated a commitment to excellence. Moore was nominated by Vicky Thorland-Oster.

Tien Nguyen, assistant professor, was awarded the Certificate for Outstanding Services for serving as a PhD Forum co-chair and a program committee member at last September's 30th IEEE International Computer Software and Application Conference in Chicago.

Arun Somani, Jerry Junkins chair professor and department chair,

was named a Distinguished Engineer by the Association for Computing Machinery (ACM). This award recognizes ACM members who have at least 15 years of professional experience, five years of continuous professional membership, and who have achieved significant accomplishments or have made a significant impact on the computing field.

New on the Bookshelf

Earlier this Spring, Professor Venkataramana Ajjarapu released his latest book. Computational Techniques for Voltage Stability Assessment and



Control (Springer, \$129) is targeted for researchers and industry professionals. The book covers numerical bifurcation techniques, continuation power flow, sensitivity analysis, voltage stability margin boundary tracing, and time domain simulation.

Throughout his career, Ajjarapu has contributed chapters to two other books: *Applied Mathematics for Restructured Electric Power Systems: Optimization, Control, and Computational Intelligence* (Springer, \$129), and *Voltage Stability Assessment: Concepts, Practices and Tools,* an Institute of Electrical and Electronics Engineers' Power Systems Stability Subcommittee special publication.

Ajjarapu's current book is available at www.springer.com.

Several other ECpE professors recently have written or contributed to many published books. Here's a sampling of their contributions:

Robert J. Weber's Introduction to Microwave Circuits, Radio Frequency and Design Applications (Publishing House of Electronics Industry, China) was translated into Chinese in 2006. To obtain a copy of the book, visit www. phei.com.cn/english/english.html.

Morris Chang contributed a chapter on computer architecture to *The Electrical Engineering Handbook* (Academic Press, \$99.95).

Degang Chen wrote a chapter called "Practical Test and BIST Solutions for High Performance Data Converters" in *Analog Circuit Design* (Springer, \$162).

Myers Joins the 25-Year Club

Cince 1981, Pam Myers, records Janalyst and graduate secretary, has contributed her talents to the Department of Electrical and Computer Engineering's Student Services group at Iowa State. Recently, she was honored for her service to the university and the department when she was inducted into the university's 25-Year Club at the group's 73rd annual meeting and banquet. Iowa State University President Gregory Geoffroy presented Myers with a certificate of membership and College of Engineering Dean Mark J. Kushner gave her an engraved business card holder and a note of congratulations. "It was a very memorable evening," Myers says.

Myers, a native of Boone, Iowa, started as a secretary for the Department of Electrical Engineering-the computer engineering part of the department's name was added later, she says. "My main duties were to work with the graduate program and help faculty make copies with the department's ditto machine."

Myers worked closely with the former department chair, Dr. J.O. Koplin, and watched graduate students such as James Davis and Doug **Jacobson** (who both are now professors at Iowa State) go through the program. "Getting to know the graduate students and watching them go on to successful careers has been very rewarding," she says.

In 1983, Myers was promoted to the next level of secretary and was elevated again in 2002 when she



Pam Myers

.

became a records analyst. Myers also was recognized in 2004 with the Mervin S. Coover Distinguished Service Award for outstanding service to graduate students, faculty, and the department.

Kumar Named IEEE Fellow

Professor **Ratnesh Kumar** recently was named a Fellow of the Institute of Electrical and Electronics Engineers (IEEE). This honor recognizes outstanding IEEE members for their

significant accomplishments in the advancement or application of engineering, science, or technology and for their contributions to the mission of IEEE.

"It's fulfilling to have accomplished this early in my career," says Kumar. "I'd like to acknowledge my family and parents, my thesis advisers, all my former and current students, all my past and present collaborators, and all the

colleagues who recommended my election to the Fellow grade." Kumar came to Iowa State in

2002 after spending nine years on the

University of Kentucky's faculty. Throughout his career, Kumar has won numerous awards, including the National Science Foundation Research Initiation Award, a Summer Fellowship from NASA and Idaho National Lab, and a

from Applied Research

at the University of Texas



Ratnesh Kumar

at Austin. Kumar is the coauthor of the book Modeling and Control of Logical Discrete Events Systems, and serves as the associate editor of the SIAM Journal on Control Optimization and Journal of

Discrete Event Dynamical Systems. He has had several other IEEE editorships and has served on program committees for the IEEE Control Systems Society and IEEE International Conference on Intelligent Control. He's also the co-chair for the 2008 International Workshop on Discrete Event Systems.

Kumar's research focuses on eventdriven and real-time systems. He also has worked in areas of sensor networks applied to precision agriculture, power system reconfiguration following a contingency, and optimizations applied to PCB assembly, coal-segregation, and load-demand management. The results of his research have been reported in nearly 200 articles.

Kumar joins the ranks of six other current ECpE professors from Iowa State—Randall Geiger, Mark J. Kushner, Chen-Ching Liu, James McCalley, Arun Somani, and Robert Weber—who have received this honor.

departmentNews

Distinguished Lecture Series Wrap-Up

This year, the ECpE department brought several leaders in electrical and computer engineering to campus for the 2006-2007 Information Infrastructure Institute (iCube) and F. Wendell Miller Distinguished Lecture Series. The following is an overview of the lecturers and their seminar topics:

• **Michael Pursley**, Holcombe professor, electrical and computer engineering, Clemson University; **Seminar Title**: "Protocols for Adaptive Modulation and Coding in Dynamic Spectrum Access Networks"

• **Richard Taylor**, professor of information and computer sciences, University of California, Irvine; **Seminar Title:** "Primacy of Place: The Reorientation of Software Engineering Demanded by Software Architecture" • **Tryphon Georgiou**, Vincentine Hermes-Luh chair in electrical engineering, University of Minnesota; **Seminar title:** "Means and Metrics: Towards a Quantitative Spectral Analysis"

• José Moura, professor of electrical and computer engineering, Carnegie-Mellon University; Seminar title: "Distributed Inference in Sensor Networks: Topology and Trade-offs"

• John Stankovic, BP America professor of computer science, University of Virginia; Seminar title: "Self-organizing Wireless Networks in Action"

• Shankar Subramaniam, professor of bioengineering, chemistry, and biochemistry, University of California, San Diego; Seminar title: "Is Systems Biology the Nexus for the Future of Computational Science?" • Fred Lee, Lewis A. Hester professor and a distinguished university professor of



John Stankovic

electrical and computer engineering, Virginia Tech; **Seminar title:** "An Integrated Approach Toward Power Electronics Systems Integration"

All of the seminars took place in Howe Hall's Alliant Energy-Lee Liu Auditorium. To view video of these lectures, you can visit www.ece.iastate.edu/news/ distinguished-lecture-series.html.

Support the Coover Building Project

A s mentioned in the Fall 2006 *ECpE Connections*, the first phase of the Coover Hall Building Project is well underway. The building addition is currently being constructed (see below). Once it's completed, it will provide new space for classrooms, teaching labs, and research labs. The second phase of the project, consisting mainly of renovations



The building project is funded by private donors and state funds. The project will cost an estimated \$38.8 million. The ECpE department continues to seek donors interested in naming opportunities for classrooms, laboratories, and other areas. If you're interested in a naming opportunity or in simply donating to the ECpE Coover Hall Building Project, contact Keith Fortmann at the ISU Foundation (515-294-4280, kfortman@ iastate.edu).



Construction workers pour cement for the floors of the building.



The structure of the new building addition begins to take shape.

View an animation of the building's final design (pictured above) online at www.ece.iastate.edu.

Guan Wins NSF CAREER Award

For about 10 years, Assistant Professor Yong Guan has conducted research in computer security. His work is now paying off and honors are abounding. Guan recently received a prestigious National Science Foundation (NSF) CAREER Award. He also was invited to give a tutorial on digital forensics at a major security conference-the Association for Computing Machinery's Computer and Communication Security Conference—last October and to serve as the general chair of the nation's top conference in security-the Institute for Electrical and Electronics Engineers' (IEEE) 2008 Symposium on Security and Privacy in Oakland, California.

NSF research and award

Guan's NSF CAREER award provides \$400,000 over a five-year period to fund his current research in wireless security. His work could impact the security in the areas of healthcare, search and rescue operations, power grid operations, and battlefield surveillance. Guan says security and privacy are serious problems for those areas due to the design and tactics being used for those systems and applications. Currently, attackers can observe and eavesdrop on wireless devices (such as sensors and PDAs), causing the leakage of confidential information or false data reports, Guan says. The failure of these applications can compromise public safety, homeland security, personal privacy, the economy, and society at large. "We're developing methods to provide practical and resilient solutions to this problem," he adds.

As part of this research project, Guan is developing techniques to verify locations of mobile wireless devices and ensure the integrity of information provided by sensors and other devices. For example, firefighters use sensors to learn about the conditions inside burning buildings. The sensors record information about temperature, humidity, and the presence of explosive chemicals. That information is fed to the fire chief so he can decide whether or not to send in his firefighters. For the safety of the crew, the data from the sensor must be accurate.

Location verification has other important applications, too. For instance, individuals can access their computers remotely from nearly anywhere—from an airport, hotel room, home computer, or

Guan's Graduate Students

Several master's and PhD students are currently studying and researching under the direction of Assistant Professor Yong Guan. The students are working on projects ranging from intrusion detection for wireless networks to design and implementation of secure and robust VoIP caller ID services.



Back row: Zhen Yu (PhD), Bhuvaneswari Ramkumar (master's), and Su Chang (PhD). Front Row: Linfeng Zhang (PhD), Thieu Pham (master's), and Yawen Wei (PhD).



Yong Guan

work station. Today's technology verifies the identity of the person logging in, usually with just a password. But that's as far as the verification process goes.

Guan and his team of researchers are developing location-based access control so the system can verify not only who the person is, but also the location where he or she is logging in. This is especially important for employees who work with classified data.

Take the Los Alamos National Laboratory security breach that occurred last year, for example. According to reports by CBS News, classified documents, including sensitive weaponsdesign data, were found on USB thumbdrives during a drug raid at a Los Alamos, California, home in October 2006. The woman believed to have taken the information reportedly took the material home to work on and forgot about it.

With Guan's location-based access control, Guan says an employee dealing with sensitive materials could access classified documents only from a designated work computer at her office in the laboratory, thus preventing people from breaching classified information.

Research background and goals

When Guan began his research, he had one main goal: To develop practical solutions for detecting, tracing, and mitigating cyber-based attacks and criminals. With NSF support, Guan and his team have focused their research efforts on digital forensics. They are designing practical techniques for discovering, extracting, and analyzing digital evidence to accurately prosecute cyber criminals.

As a result of this research, Guan developed one of the first digital forensic courses in the United States. Now schools such as George Mason University, the University of Massachusetts, North Dakota State University, Dakota State University, and the City University of New York are seeking Guan's help in creating their own digital forensics classes. Guan, along with his colleagues Associate Professor Julie Dickerson and Assistant Professor Tom Daniels, also received a \$1.18 million grant from the Disruptive Technology Office (formerly known as Advanced Research and Development Activity) for researching innovative ways to find hidden criminal network attackers.

Other research Guan is conducting addresses secure network coding and cooperative relaying techniques. Guan, along with his colleagues, Professor **Ahmed Kamal** and Associate Professor **Sang Kim** are proposing technology to secure wireless networks. In September 2006, the team received a NSF grant worth \$350,000 for this research.

Yong Guan came to Iowa State University in 2002. He received his bachelor's and master's degrees in computer science from Peking University in China, and his PhD from Texas A&M University. Guan is affiliated with Iowa State University's Information Assurance Center and the Midwest Forensics Resource Center. He also is a member of IFIP's working group on digital forensics. IFIP is the leading multinational, apolitical organization in information and communications technologies and sciences.

Staying a Step Ahead of Hackers

Associate Professor **Doug Jacobson** is setting out to build a new Internet, not to compete with the World Wide Web, but to make it safer.

Jacobson, director of the Iowa State's Information Assurance Center, is leading a new research project, the Internet-Scale Event and Attack Generation Environment, aimed at thwarting new generations of computer hackers, thieves, and sexual predators.

A virtual Internet will have branches throughout the university. Hackers will use the virtual Web to try to sabotage real computers and computer networks. Faculty and students will try to match wits with the hackers by creating firewalls and other computer and user protection technologies.

The success of computer and network security systems in recent years has forced hackers to change their strategy, Jacobson says. The research focuses on how to combat new schemes that are directed toward individuals rather than computer networks.

"The attackers are more and more going after the weak link, which is

people," Jacobson says. "As far as computer security technologies are concerned, an e-mail message that tells the user to go to a Web site and type in a Social Security number doesn't look much different from an e-mail that came from Grandma."

Jacobson was a recent target of a brazen attack. An e-mail message purportedly from Yale University claiming an article was about to be written about him was in fact a "Trojan horse"—a computer virus.

Creating technologies that can recognize risky e-mails and better track the source of predatory or virusladen e-mails and Web sites will be a focus of Internet-Scale Event and Attack Generation Environment studies, which are funded by the U.S. Department of Justice. The big challenge, says Jacobson, will be balancing security and privacy.

"Technologies that assist the user in security unfortunately run up against the privacy issue, so there's a real delicate balance that has to get played out between security and privacy," he says. —*Courtesy of Bill Brewer, ZLRIgnition*



Doug Jacobson

In March, the Technology Association of Iowa (TAI) named Doug Jacobson the Prometheus Awards' Educator of the Year. The Prometheus Awards recognize the outstanding contributions Iowa individuals and information technology companies have made to the industry, community, and state. Last year, Jacobson expanded a computer security competition to high school students, attracting students from 10 high schools. This year, he expects the number of participating high schools to grow to 30. This is the second consecutive year an Iowa State professor has won this award.

researchNews

Kothari's Research Attracts Worldwide Attention

The work of Professor Suraj Kothari **L** and his colleagues is capturing the attention of major corporations worldwide. The attention surrounds Knowledge-Centric Software (KCS) tools that Kothari and his colleagues

software, and analyze software used to control features in cars and airplanes. For instance, KCS tools can simulate runtime behavior in the software of an airplane's flight control system to check if conditions exist that would cause the control system

have developed. The tools allow experts to quickly and efficiently analyze and transform software, and can be applied in the automotive, avionic, and software industries.

"We've developed tools that perform complex analysis and Suraj Kothari transformation tasks



in seconds rather than hours," Kothari says. "These tools can eliminate human errors that often occur in tedious manual processing."

Kothari's new KCS tools help migrate software systems, detect errors in

to crash while the plane is inflight. The KCS tools detect errors faster and more thoroughly than methods currently used to check these systems.

In 2002, Kothari and his team commercialized their research and founded EnSoft, a

software engineering company located in the ISU Research Park in Ames, Iowa. The company has attracted some of Iowa State's top-notch engineering graduates.

Many major companies—including Toyota, DaimlerChyrsler, Ford, General

Motors, BMW, Volvo, Jaguar, Honeywell, Microsoft, Rockwell Collins, Motorola, General Electric, and Caterpillarhave shown an interest in the tools' applications.

Kothari says the automotive industry needs the tools because cars now are more complex than ever, especially due to the software used in key features such as anti-lock brake systems and the complex control systems for hybrid vehicles. He says so much software is used in cars and avionics now, it's becoming critical to examine software for its reliability.

Meanwhile, software companies could use the KCS tools to analyze system-level software. The tools can evaluate a system's design and security, as well as compare it to other similar systems.

"The whole idea behind the tools is to improve the productivity and reliability of software," Kothari says.

Kothari's research has been funded by various federal agencies, including a \$96,000 grant from the Grow Iowa Values Fund.

.

New Patents Awarded to ECpE Researchers

The ECpE department congratulates L the following individuals for being awarded patents:

Professor Suraj Kothari, along with former graduate student Yunbo Deng (PhDCpE '03) and former undergraduate research assistant Yogy Namara (BS Comp Sci '00), received a patent titled Integrated Interactive Software Visualization Environment (patent no. 7,174,536). This new tool analyzes the structure and behavior of software and then displays the results graphically, in an interactive manner. It has applications such as analyzing defects and predicting the impact of modifications to software.

Professor Randall L. Geiger, Associate Professor **Degang Chen**, and former graduate students Le Jin (PhDEE '06) and Kumar Parthasarathy (MSCpE '02) received a patent-Method for Testing Analog and Mixed-Signal Circuits Using Functionally Related Excitations and Functionally Related Measurements (patent no. 7,129,734). This method for testing a circuit is implemented either as a part of a builtin self test circuit of an integrated circuit or for production testing. The method includes determining at least one performance characteristic of the circuit based on a functional

relationship between excitation signals or on a functional relationship between measurement devices.

Associate Professor Murti Salapaka and former ECpE graduate students Abu Sebastian (MSECpE '99; PhDEE '04) and Deepak Sahoo (PhDEE '06) received a patent titled Method to Transiently Detect Samples in Atomic Force Microscopes (patent no. 7,066,014). In this method, he use of the transient data results in sample detection is at least 10 times faster than using the current steady state characteristics.

For more information on these patents, visit patft.uspto.gov/netahtml/ PTO/srchnum.htm.

Student Organization Happenings

By Kelsey Meyer

Team PrISUm: ISU Solar Car Team

Team PrISUm is a multidisciplinary student organization that designs, builds, and races solar vehicles. Most recently, Team PrISUm has been focusing on activities to give back to the community through outreach programs that teach about alternative energy. The team displayed one of their vehicles, Spectrum, at the Science Center of Iowa in Des Moines last winter as part of the center's interactive display on the benefits of solar energy.

Earlier this year, the team received the new regulations for the 2009 solar car competition. The electrical and mechanical teams are currently in the process of designing the group's next car. In 2005, the team raced its car, PrISUm Fusion, in the North American Solar Car Challenge, competing with teams from the United States and Canada. Out of the 28 teams that attended the qualifiers, only 21 qualified for the race. Team PrISUm placed first in the stock class, second in the overall in the qualifier, and 11th overall.

Fusion was designed entirely by students, as are all of the cars Team PrISUm races. The car has a maximum speed of 76 mph and weighs 609 pounds. It has one 15 (peak) horsepower New Generation Motor (NGM) threephase brushless DC electric motor, 532

rusion

LG Chem lithium-ion battery cells with ~4.5 kWh capacity, and 596 silicon solar cells at about 20 percent efficiency. Fusion uses an LCD camera as a rearview mirror, a student-designed battery protection system, and a CAN network and wireless telemetry system to remotely monitor the car's systems. Fusion is street legal and classified as an experimental vehicle with the Iowa Department of Transportation.

Electrical and computer engineering undergraduate students on Team PrISUm include **Scott Elliot**, **Jared Leonard**, **Ed Cramer, Kyle Miller**, **Ashley Polkinghorn**, and **Tim Prince**.

For individuals or companies interested in sponsorship or requesting a demonstration from Team PrISUm, visit www.prisum.iastate.edu or e-mail solarcar@prisum.org.

Institute of Electrical and Electronics Engineers

The Institute of Electrical and Electronics Engineers (IEEE) provides opportunities for students to gain valuable industry, academic, and community experiences. During the fall semester, IEEE hosted several company information sessions for students to learn about opportunities at businesses such as Micron



Students work on PrISUm Fusion.

Technology and National Instruments. Students also attended IEEE's forums on the electrical and computer engineering curriculum, engineering ethics, and engineering sustainability.

Additionally, IEEE is involved in community outreach activities, such as doing presentations for high school

Continued on page 10

Freshman Leaders in Engineering

Freshman Leaders in Engineering (FLiE) is a student group for selected freshman engineering students from all different majors. This year five electrical and computer engineering students are involved with the group. The purpose of the group is to develop the members' leadership and organizational skills for their future careers.

Throughout the year, FLiE hosts leadership workshops, among other activities. This semester, the team hosted a Caterpillar Leadership Workshop. During the fall semester, the group began planning and constructing the College of Engineering's VEISHEA float. Construction on the float will continue until VEISHEA week, April 16-22.

Continued from page 9



An IEEE student helps youngsters at the Society of Women in Engineering's Halloween Village.



Photos courtesy of Team PrISUm and IEEE student chapter (pages 9 and 10)

Team PrISUm shows off their solar car to a group of kids at the Science Center of Iowa in Des Moines, Iowa.

students and participating in the Society of Women in Engineering (SWE) Halloween Village. During SWE's Halloween Village, IEEE provided activities for children, including creating paper bats and ghosts with LED eyes. The group also brought electronic toy kits for the kids to play with. To raise funds for these events and others, IEEE sold IEEE T-shirts and held weekly pizza sales. IEEE also produces a monthly publication titled *The Relay*.

For more information about the Iowa State IEEE student chapter, visit *www.stuorg.iastate.edu/ieee.*

In Pursuit of a PhD

For a guy who's been exploring computers and programs since he first got his hands on MUD (a multiplayer computer game combining role-playing games, hack and slash-style computer games, and social chat rooms) and Internet Relay Chat at age 11, it's no surprise **Ramon Mercado** is now passionate about earning his doctorate in computer engineering.

Mercado came to Iowa State from his home in Bayamón, Puerto Rico, in 2005 to pursue a PhD in system design.

"Ever since I can remember, I've been attracted to computers," says Mercado. "My parents worked at a university and this gave me a unique opportunity to explore some 'computer systems.""

At Iowa State, Mercado works in the embedded systems research area. "I try to get ahead of the curve and develop new methods and tools that'll speed the design of embedded systems," Mercado says.

During an undergraduate coop experience at Texas Instruments, Mercado found the research area he wanted to pursue. It was there he started working with field programmable arrays (FPGAs). "My project was to design a new expansion card for a test setup," he says. "This new card was designed to source and capture audio signals to a chip for a cell phone. The entire process of



Ramon Mercado

designing the PCB board, doing the VHDL for the onboard FPGA, and finally the low-level programming to interface with the test setup thrilled me."

Mercado says one of his most rewarding experiences at Iowa State is being involved in developing a computer engineering course, *CprE* 488: *Embedded System Design*, and then getting to help students as the lab's teaching assistant. "To become a university professor is one of my greatest motivations for doing graduate studies," he says. "Having the chance to participate in this process was a great experience and having the students react with much enthusiasm was very rewarding."

Mercado's enthusiasm for teaching was recently recognized in 2006 when he won the university Teaching Excellence Award for graduate students. He's also received several other honors, including a Graduate Assistance in Areas of National Need (GAANN) Fellowship in 2006 (available via the Information Infrastructure Institute), a Lockheed Martin Fellowship in 2005, and the Outstanding Intern award at Texas Instruments in 2001. Additionally, he's a student member of the Institute of Electrical and Electronics Engineers.

The enthusiasm Mercado shows for computer engineering is perhaps equaled only by his passion for the ancient Chinese board game Go—a game of strategy played on a ruled wooden board with stone markers. "It's a very challenging game," says Mercado, who's the president of the Cyclone Go Club. "I became even more interested in it when I learned that, unlike chess, computer versions have never defeated any professional player."

When Mercado completes his PhD in 2009, he plans to return to Puerto Rico to teach and research. "I wish to give back what was given to me—all the opportunities and the great education I received," he says. "I wish to help the next generation of students have the same experiences I've had."

studentNews

Head of Her Class

Like many students who choose to attend to Iowa State, **Sasha Kemmet** decided to come to Iowa State because of the university's reputable, topranked engineering program. After she got here, the now senior in electrical and computer engineering, discovered many other reasons to stick around.

"I like that there are so many opportunities to get involved—be it with academic, social, or political activities," she says. "I love that I'm surrounded by people with such diverse backgrounds and ways of thinking that it continually challenges me to think differently, more deeply, and more creatively."

Kemmet is highly involved in many student organizations on campus. She is the president of the Iowa State Institute of Electrical and Electronics Engineers' student chapter, an ECpE department representative for the Dean's Student Advisory Council, an Electrical Engineering Learning Community mentor, and a member of the *Des Moines Register*'s Young Adult Contributors Board. She also co-founded Cy Speaks-ISU Toastmaster a student group for public speaking.

In fact, Kemmet says her most rewarding academic experience occurred because of her involvement as a teacher's assistant for a lab and course mentor. "The experience of helping other people understand an idea or concept is dually rewarding in that you realize you are becoming fluent enough in the subject area to explain it and you get to see the knowledge passed on to another person."

That desire to teach and eagerness to learn is part of why Kemmet plans to get her master's degree and PhD and then become a professor and researcher. She plans to study electromagnetism in graduate school. "I decided to pursue my master's because of the great mentorship from Dr. **Mani Mina**, who will be my major professor, and the passion for the subject that he introduced to me."



Sasha Kemmet

Kemmet, who's originally from Waukee, Iowa, worked on a GPS system for John Deere in the summer 2005. In 2006, she spent the summer in Washington, D.C., writing a policy paper on wind energy. "I learned the importance of seeing the multidimensional aspects of the subject," she says. "I also felt like I was able to use the knowledge and background I had gained here at Iowa State to make positive contributions to addressing the energy issues this country faces."

Recently, she was recognized for her involvement on campus when she won the 2006 Deans' Student Leadership Award and the Everitt Award. The Deans' Leadership Award is presented to three engineering junior or senior students who demonstrate outstanding leadership in major college-wide, university, community, or professional organizations. The Everitt Award honors outstanding seniors in electrical and computer engineering with an interest in communications and computers.

Kemmet also recently received a prestigious National Science Foundation Graduate Research Fellowship.

She says she looks forward to helping people in her community, country, and the world bring about positive changes in society.

Undergraduate and Graduate Student Awards

Each semester graduate and undergraduate students are recognized for their contributions to the university and for their excellence in and out of the classroom. The ECpE department extends our congratulations to the following students:

Scott Penick, junior in electrical and computer engineering, was awarded the Live-In Mentor Award. This award recognizes the work of peer mentors working with students in learning communities on campus. It honors peer mentors who demonstrate excellence in team building, programming, interpersonal interaction, leadership, academic assistance, classroom presentations, and/or tutoring. Penick is a peer mentor for the Computer Engineering Learning Community. He works with freshmen computer engineering students who live in Friley Hall's Lincoln House.

Sasha Kemmet, senior in electrical engineering, won a prestigious National Science Foundation (NSF) Graduate Research Fellowship. (Read more about Kemmet at left.)

Adrienne Huffman, an ECpE master's degree student, won an honorable mention for a NSF Graduate Research Fellowship.

Lewis Hill II (BSCpE '98, MSECpE '00), PhD student in human computer interaction; Min Pan, PhD student in computer engineering; and Dan Yang, PhD student in electrical engineering, each received a university Research Excellence Award in the fall 2006 semester. The awards are given each semester by Iowa State University to honor a select group of graduate students for outstanding teaching and research. All three PhD candidates graduated in the fall of 2006.

Alumnus Named CEO of Major Technology Company

In January, Maxim Integrated Products, a Sunnyvale, California-based technology company, named **Tunc Doluca** (BSEE '79) its president and CEO. Doluca has been with the company for 23 years, during which he's served in a variety of roles—from a member of the integrated circuit design development staff to group president for the Portable, Computing, and Instrumentation Electronics group.

Doluca's lived in Silicon Valley since he graduated from college. He holds 11 mixed-signal design patents as well as a master's degree. Doluca's also been married for 25 years and has two daughters ages 23 and 17. When he's not at work, he says he enjoys playing tennis, traveling, and visiting friends, family, and places in his native country, Turkey. Doluca graciously answered our questions about his career achievements and Iowa State experience.

ECpE: What was your reaction when you learned you were to be named the new president and CEO of Maxim? **Doluca:** My first reaction was one of sadness because our founder, company leader, and my mentor for 20-plus years communicated his health issues and his need to slow down. Once I got over the surprise, I was excited by the idea of leading our company.



Tunc Doluca

ECpE: How did you go from being an electrical engineer to a CEO? **Doluca:**

From the start, I wanted to design circuits and first to market—to design products that were feature rich, yet had the right balance between innovation and achieving time-to-market goals. Once I began to manage business units in our company, I realized I eventually wanted to run a company. I started out as a design engineer, advanced to manage a small group of design engineers, and then to vice president of research and development. Later, I became responsible for a business unit and learned about marketing, merchandising, manufacturing, and applications and test development engineering. Last year, I added our worldwide sales and marketing responsibility and eventually became CEO.

that were better than our competitors'

ECpE: What do you enjoy most about your work?

Doluca: I enjoy product planning, technology and product development, and organizing teams together to tackle tough product performance challenges our customers present to us. I also enjoy being around a lot of great employees, mostly engineers by training.

ECpE: What are your plans for Maxim now that you're the president and CEO? **Doluca:** We want to make it a great company—one that continues the legacy of innovation and develops value-added products for our customers. The inevitable result will be revenue and profit growth benefiting our shareholders and employees.

ECpE: What do you consider your most important career achievements? **Doluca:** When Maxim was a small company, I was asked to be the general manager of our first vertical business unit, which started out with less than 25 employees. Many years of teamwork grew

About Maxim Integrated Products

The mission of Maxim Integrated Products is "to provide engineering solutions that add value to our customer's electronic equipment." The company specializes in developing analog and mixed-signal integrated circuits, and is run by engineers, says Tunc Doluca, president and CEO. Maxim has 71 product lines and introduces about 500 new products each year. It designs products for power management, data conversion, interface, sensors, RF transceivers, embedded microcontrollers with analog front-ends, and more.

our sales from a modest \$25 million to more than \$600 million. I'm proud of what we accomplished as a team. We grew a business and provided jobs and income for nearly 1,000 employees and their families.

ECpE: What advice do you have for other engineers seeking to advance in their careers? **Doluca:** Always seek companies that value engineering the most in their organizations. Never forget that your objective is to build a product that reaches market in a timely manner. Balance the instinct [as an engineer] to innovate with being pragmatic. A perfect product that never reaches customers cannot be successful. Also, make sure you're surrounded with a team of energized, competitive co-workers. Remember, you can never be successful working alone-you need support from marketing, manufacturing, test development, and many other functions. Choose your company wisely.

ECpE: What did you enjoy most about Iowa State when you were a student? **Doluca:** The engineering education at Iowa State was great. I got an excellent electrical engineering foundation that provided me with the right tools to continue on to graduate school and beyond.

alumniNews

From India to Washington State

For Ananth Kalyanaraman, a recent Iowa State PhD recipient, his professional life couldn't be any better. After working alongside Professor **Srinivas Aluru**, an award-wining researcher and Stanley Professor at Iowa State, Kalyanaraman moved to Pullman, Washington, last August to start a new position as an assistant professor of electrical engineering and computer science at Washington State University.

Kalyanaraman began his collegiate career at Visvesvaraya National Institute of Technology in Nagpur, India. After receiving his bachelor's degree, he came to Iowa State to pursue his master's degree and doctorate. While at Iowa State, he developed an interest in computational biology and bioinformatics, parallel algorithms and applications, and string algorithms. He also won the Iowa State University Research Excellence Award, Pioneer Hi-Bred Graduate Research Fellowship, and IBM PhD Fellowship, as well as awards for Best Paper at the 2006 IEEE International Parallel and Distributed Processing Symposium and the 2005 IEEE Computational Systems Bioinformatics Conference.

As a student, Kalyanaraman says he enjoyed Iowa State's high-quality graduate program. "Ames was a home far away from home for both my wife and me," he says. "We thoroughly enjoyed, and miss, both Ames and Iowa State. My wife and I have several friends at Iowa State and hope to

Alumna Visits Campus

Computer engineering alumna **Christy Coleman** (BSCpE '95; MS '97) visited campus recently to participate in a panel titled "Women's Perspectives on the Engineering Classroom." Coleman, a technical project manager for business and regional aftermarket programs at Rockwell Collins in Cedar Rapids, Iowa, says the most important advice for women engineers is to have confidence and believe in themselves. "Regardless of what life may throw your way, if you have confidence you will be able to adapt and be successful."

Coleman returns to campus several times each year as a representative for Rockwell Collins. She talks to classes about career opportunities at the company and to recruit students at the Engineering Career Fair. She also has helped with the industrial review panel for ECpE senior design projects. "I like coming back because I always feel invigorated by the energy on campus," she says. "I had such a great experience at ISU that it's hard not to miss all the fun and especially the learning."

At Rockwell Collins, Coleman currently works with an engineering team to develop solutions that meet the needs of their aftermarket customers. She says one of her greatest career achievements occurred in her previous position as an engineering



Christy Coleman

group manager for about 15 software engineers at Rockwell Collins. "I really enjoyed getting to know each of my group members and helping them grow and be successful in their projects."

Coleman also has taught an introductory circuit analysis class at Kirkwood Community College in Cedar Rapids. "It was a great experience to develop lecture material and to structure homework and tests," she says. "It also gave me the opportunity to realize I enjoy teaching and may want to pursue other teaching opportunities in the future."



Ananth Kalyanaraman

keep those connections alive for a long time to come."

He says his research now is in the area of bioinformatics and computational biology. "I focus on developing efficient high performance computing methods and software for complex problems in molecular biology and genetics," he says. "My long-term goal is not just to enable but also to accelerate the tasks of discovering and understanding the fundamental processes that control the biology within and around us."

His current projects are in the subfield of computational genomics. In fact for one project, he's continuing to work with Iowa State scientists on sequencing the maize genome. In another project, he's working with wheat geneticists at Washington State to develop methods to advance the state of computing for studies related to wheat genomics.

In November, Kalyanaraman, along with Aluru and Georgia Tech's David Bader, presented a tutorial on highperformance computing methods for computational genomics at the IEEE/ ACM Supercomputing Conference in Tampa, Florida. And since 2002, Kalyanaraman has published four refereed journal articles and five refereed articles for conference publications, as well as contributed to three books related to his research.

As for his personal life, Kalyanaraman is married to a fellow Iowa State alum. In his spare time, he also enjoys Calvin and Hobbes comics, music, and nature documentaries.

alumniNews

Alumni Receive College Awards

wo ECpE alumni—Charles **L** Campbell and Vamsi

Chadalavada—have been chosen to receive Iowa State University's College of Engineering Professional Progress in Engineering Awards (PPEA). The PPEA awards are given each year to as many as four individuals in recognition of outstanding professional progress and personal development in engineering.

Campbell, who received his bachelor's, master's, and PhD degrees in electrical engineering at Iowa State (BS '88', MS '91, PhD '93), currently works as a design engineering director for TriQuint Semiconductor in Richardson, Texas. One of his most noted contributions to the field has been in developing new small signal model extraction techniques, creating methods that are now standards at his current company. He also has served on several professional committees, including the Compound Semiconductor

Integrated Circuit Symposium Technical Committee, the Institute of Electrical and Electronics Engineers' (IEEE) Microwave Prize Selection Committee, and the IEEE Editorial Review Board. Campbell is a senior member of IEEE and a member of Tau Beta Pi.

In letters supporting Campbell's PPEA award nomination, one of Campbell's colleagues wrote, "Before he became design director, Dr. Campbell built up a team from scratch focusing on designs for the optical market. After learning about the market and design requirements, he and his team designed many parts that are still, five years later, state of the art."

Vamsi Chadalavada, who received his master's and PhD in electrical engineering at Iowa State (MS '91, PhD '94), is the senior vice president of market and system solutions for ISO New England, the Holyoke, Massachusetts-based regional transmission organization responsible for the reliable real-time dispatch of the six-state New England power systems

During his time at ISO

attract new capacity and ensure

reliability in the New England

forward capacity market and

achievements in just 13 years

have significantly influenced not

only his chosen field of power

engineering, but also national

policy with respect to design

of electricity markets," says

ancillary services market.

"Dr. Chadalavada's



Charles Campbell



Vamsi Chadalavada

Arun Somani, Jerry Junkins chair professor and ECpE department chair.

Prior to joining ISO New England, Chadalavada served as vice president and general manager of Siemens Energy Management and Information Systems, a division of Siemens Power Transmission and Distribution. In this role, he led a remarkable turnaround and positioned the division as a leader in the delivery of standardized solutions in the areas of information systems, energy management systems, and wholesale electricity market systems.

Chadalavada also has served as a reviewer for IEEE power engineering journals and as a member of the IEEE Transmission Security Subcommittee.



Upcoming events sponsored by the ECpE department and the university.

Mav 4

Graduate Commencement

C.Y. Stephen's Auditorium, 8 p.m.

May 5 **Undergraduate Commencement** Hilton Coliseum, 1:30 p.m.

May 17-19

Alumni Days: Class of 1957

ISU Campus; see www.isualum.org/en/ events/alumni_days for details.

August 8-19 **ISU Sesquicentennial exhibit** at the lowa State Fair

Des Moines, Iowa

August 20 Fall 2007 Semester Begins

September 18 **Fall Engineering Career Fair**

Hilton Coliseum, 1 to 6 p.m.

October 12-14 **Cyclone Family Weekend** Find information at www.familyweekend.

iastate.edu.

October 20 **Homecoming Football Game** vs. Oklahoma

Jack Trice Stadium, Time TBA

December 2007 **College of Engineering Alumni Holiday Parties**

Location, date, and time TBA; visit www. engineering.iastate.edu for details as they become available.

Check our Web site at www.ece.iastate. edu for additional details and up-to-theminute information on departmental events and seminars.

Alumni in the News

Our alumni have been making news around the country. Here's a sampling of these Iowa State newsmakers and their latest career moves:

• **Kamal Ahmed** (BSCpE '87; MBA '89) has been named country manager to oversee Microsoft Pakistan. *Source: Balochistan Times*

• **Scott Anderson** (BSCpE '83) recently joined Rush Tracking Systems in Lenexa, Kansas, as the Director of Professional Services. *Source: PR Web* • **Yuhang Ho** (BSEE '94) from Malaysia received the best directing award for his feature film, *Rain Dogs* at The Festival of 3 Continents, in Nantes, France. The movie is about a young man who arrives in the city in search of his brother, but falls into a world of violence. He seeks refuge in a fishing village where he finds love, loss, and redemption. *Source: www.3continents.com*

in Lenexa, Kansas, as the Director of • **Glenn Stark** (BSCpE '78) has been Professional Services. *Source: PR Web* named director of systems engineering at



IDE Incorporated of Scotts Valley, California. *Source: Santa Cruz Sentinel*

• Luke Wenz (BSCpE '06) joined CISCO, Inc. as an application developer in Des Moines, Iowa. *Source: Des Moines Register*



Please place stamp here.

IOWA STATE UNIVERSITY

Dept. of Electrical and Computer Engineering Attn: Communications Specialist 2215 Coover Hall Ames, IA 50011-3060

hhhlunlundhullullullullullundhlundh



Mailing Instructions: Fill out reserve side of this form with updated information, and then detach the form along perforated edge. Fold the form along the dotted lines so that the ECpE address shows on the outside of the form. Tape the form closed and place your stamp in the labeled box. If you're mailing a check, remember to completely seal the edges of the form or send the form along with the check using a standard envelope.



We want to hear about your career moves and personal news for future issues of *ECpE Connections*. You're welcome to enclose photos; however, we can't return them. We need your help, too, with gifts to the department's scholarship funds, lab facilities, building improvements, student organizations, and other departmental activities. If you're making a contribution to lowa State, please consider designating it for the Department of Electrical and Computer Engineering using the form below. Please enclose it with your news, pledge, or gift and mail it to: lowa State University, Department of Electrical and Computer Engineering, Attn: Communications Specialist, 2215 Coover Hall, Ames, IA 50011-3060. Also, feel free to give us a call at (515) 294-2664 or e-mail us at *schmidtd@iastate.edu*.

Name:	Graduation Year:					
Address:						
City:	State:	Zip:	Country:			
Home Phone:	Business Phone:					
E-mail Address:						
News I'd Like to Share:						

I want to help the ECpE department become the best!

Please contact me about supporting:	I'd like to supp	port the:			
endowed chairs and professorships	ECpE Excellence Fund			Other Fund	
scholarships and fellowships	\$ 1,000		\] \$1,000		
Iaboratories and classroom space	\$ 500		□ \$500		
Coover Building Project Fund	\$ 250		\$ 250		
	Other	\$		Other \$	
Payment Type:					
Check enclosed (payable to ISU Foundation)	🖵 Credit Card	Select Type:	🖵 Visa	Mastercard Discover	
Credit Card Number:		Name as shown on the credit card:			
Expiration Date: Cardhold	ler Signature:				

Thank You!

07 EC7:03

IOWA STATE UNIVERSITY

Dept. of Electrical and Computer Engineering 2215 Coover Hall Ames, IA 50011-3060 NONPROFIT ORG. U.S. POSTAGE PAID AMES, IA PERMIT NO. 200