

## ISU offers new software engineering program

The Board of Regents, State of Iowa has approved a new bachelor's of science degree in software engineering at Iowa State. The new degree program makes Iowa State one of nearly 50 colleges that offers a software engineering degree and is the result of eight years of hard work by **Suraj C. Kothari**, **Mani-maran Govindarasu**, and **Arun Somani** from the Department of Electrical and Computer Engineering, and Robyn Lutz, Samik Basu, and Carl Chang from the Department of Computer Science.

Preparation for the program first began in 1998. After working out arrangements between the two departments that will jointly administer the program—the Department of Electrical and Computer Engineering in the College of Engineering and the Department of Computer Science in the College of Liberal Arts and Sciences—the developers received approval from each department and its curriculum committees, the university curriculum committee, the University Senate, the university Office of the Provost and finally, the Board of Regents.

"Software engineering is expected to become the number one job available in engineering worldwide," says Arun Somani, chair of the ECpE department. "Because of that, it makes sense to have a formal program in this discipline."

learn engineering aspects—processes, techniques, and principles—for developing, analyzing, and evolving complex software.

The degree program, in part, responds to a call from two key professional organizations—the Institute of Electrical and Electronics Engineers, and the Association for Computing Machinery—for more software engineering programs nationally. A joint 2004 report

of the two groups included a model curriculum for software engineering.

Students can begin enrolling in the new degree program in the spring 2007 semester. The program will start with an initial batch of 48 students. Two faculty positions also will be added over the next two years to accommodate the program. "We expect the program to grow very fast," Somani says. ■



*ECpE students study in the Coover Hall computer lab.*

Students in the degree program will

# Letter from the Chair

Season's Greetings from the ECpE faculty and staff. We hope this issue of *ECpE Connections* finds you healthy, happy and enjoying this holiday season. In the ECpE department, it seems as if the holidays have been here all autumn long as we've had many new, exciting changes for our program and building, as well as honors for and newcomers to our faculty.

One of the most exciting events for our program this fall is that after nearly eight years of development, the Board of Regents, State of Iowa approved a software engineering major at Iowa State. Students can begin enrolling in this program in the spring 2007 semester. Read our cover story to learn more.

Phase 1 of the Coover Hall expansion project, which we told you about in our last newsletter, began on time this past spring. In the meantime, another exciting development occurred. A revised plan for Phase 2 was approved this fall by the university administration. (Read more about the building plans on page 9.) The new additions and renovations will cost \$22.3 million as opposed to the \$10 million for renovations only. Support from alumni and donors is essential for the success of this project and to continuing the department's stellar national reputation. If you'd like to donate to the building fund, contact the development office at (515) 294-4280. Also, several opportunities exist for alumni and donors to be naming donors for the building. Find out how you can get involved on page 9.

Additionally, I am very pleased to announce that two of our assistant professors, **Jiming Song** and **Aleksander Doganzdic**, have received prestigious career awards from the National Sci-

ence Foundation. Their work, along with the work of our other professors and researchers continue to make Iowa State's ECpE department one of the top electrical and computer engineering departments in the country. (See the next page for more on award recipients.)

Speaking of our faculty, the department welcomed four new faculty, **Jaeyoun Kim**, **Santosh Pandey**, **Joseph Zambreno**, and **Aditya Ramamoorthy**, and four new staff members, **Debbie Van De Velde**, **Steve Nystrom**, **Greg Smith**, and **Dana Schmidt**, this fall. Meet these newcomers on page 4.

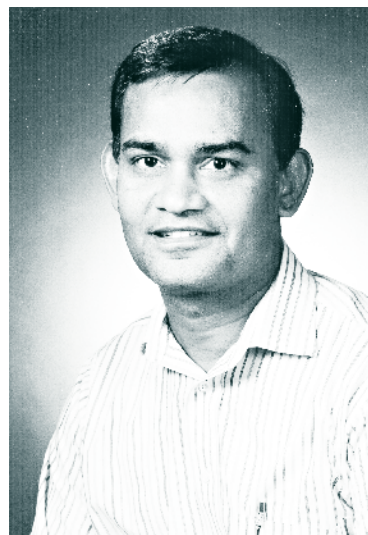
Our department also published our biennial research report in August 2006. You can view this at [www.ece.iastate.edu/research.html](http://www.ece.iastate.edu/research.html). The department is now organized around five major research focus areas: bioengineering, distributed sensing and decision making, cyber infrastructure, energy infrastructure, and small-scale technologies. This alignment meets national needs, as well as priorities of Iowa State and the College of Engineering. Each of these groups is active in developing collaborative research programs. If you have any comments or questions regarding these programs, please feel free to contact me or other faculty.

I continue to look forward to your suggestions. Best wishes for a happy holiday season! ■

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## Arun Somani

Jerry R. Junkins Chair Professor and  
Department Chair



*Arun Somani*

## ECpE Connections

Published by The Department of Electrical and Computer Engineering

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# Honors and awards

Several faculty and alumni recently have been recognized for their career achievements. The ECpE department congratulates the following individuals:

**Richard E. Horton**, professor emeritus, and his wife, Sandra, are the recipients of the ISU Alumni Association's 2006 National Service Award. Horton earned his bachelor's, master's and PhD in electrical engineering from Iowa State in 1962, 1963, and 1967, respectively. Sandra obtained her bachelor's of science degree in child development from Iowa State in 1967. Read more about the couple at [www.isualum.org/en/awards/honors\\_awards](http://www.isualum.org/en/awards/honors_awards).

**Scott DeBoer**, who received his PhD in electrical engineering in 1995 and master's degree in physics in 1991, was recognized with the ISU Alumni Association's Outstanding Young Alumni Award. The award, which was established in 1968, is given to Iowa State alumni, age 40 and under, who have excelled in their profession and provided service to their community. DeBoer now resides in Boise, Idaho. Read more about him and his award at [www.las.iastate.edu/alumni/deboeraward.shtml](http://www.las.iastate.edu/alumni/deboeraward.shtml).

Two ECpE assistant professors, **Aleksandar Dogandzic** and **Jiming Song** have won the National Science Foundation's (NSF) most prestigious Early Career Award. The award is given in support of the early career-development activities of teachers and scholars who most effectively integrate research and education within the context of

their organization's mission.

Dogandzic's research focuses on novel solutions for prominent signal processing problems in sensor network design. In particular, he's developing methods for efficiently extracting information through distributed processing, conserving energy through node selection, and exploiting spatial correlations among sensor measurements.

The objective of Song's research is to explore and develop state-of-the-art, physics-based, accurate and efficient algorithms for electromagnetic modeling of nanoscale interconnects, embedded RF components, and high-speed circuits. Song says the new and accurate algorithms will lead to significant breakthroughs in the design of large-scale, complex 3-D high-speed circuits.

**Vikram Dalal**, professor and associate chair, was awarded a \$63,406 grant to work with Powerfilm, Inc. in Ames to develop high-performance solar cells using new technology. (See the complete article about Dalal on page 6.)

**Arun Somani** and **Govindarajan Krishnamurthi** received a patent, *Location Information Recovery and Management for Mobile Networks* (No. 7,111,795).

**Ratnesh Kumar**, professor, recently was named a Fellow of the Institute of Electrical and Electronics Engineers. Look for more on Kumar in the Spring 2006 *Connections*. ■

## ISU is second in nation to introduce engineering minor

Starting as early as the spring term of the 2006-2007 academic year, Iowa State will offer an engineering minor to students. The minor in engineering studies is being offered after a January 2006 survey of non-engineering undergraduates showed that 40 percent of students responding expressed interest in the minor, and 68 percent said they would take at least one of the new courses envisioned for the program.

The purpose of the program is to provide technological literacy to non-engineering students. Students in the program will acquire practical skills such as simple calculation and estimation using the engineering method and the performance of cost-benefit and risk-benefit analyses. In addition, they will develop a fundamental understanding of the engineering design process and the limitations of engineering systems, as well as the interdependence of the economic, environmental, and sociological aspects of technological change.

Students enrolled in the engineering minor will be required to take 21 credits (seven courses), 15 of these in engineering, including nine hours of required courses. The program's designers believe that the minor might add a semester to the typical student's academic program.

Developed under the supervision of College of Engineering Dean **Mark J. Kushner**, Iowa State's engineering minor will be only the second such program offered in the United States. Unlike Lehigh University's first-in-the-nation effort, however, enrollees in Iowa State's engineering minor won't be required to take upper-level math and physics courses as prerequisites.

"There's a national-level call to emphasize technological literacy for all people," says **Mani Mina**, an ECpE senior lecturer and director of the Engineering Studies minor program. The minor is an attempt to fulfill that call. It also helps fulfill the land-grant mission of the university to educate students not in technological fields about technology, Mina adds.

For more information on the program, visit [www.eng.iastate.edu/mes](http://www.eng.iastate.edu/mes). ■



NSF Early Career Award winners Jiming Song (left) and Aleksandar Dogandzic (right)

*Editor's Note: ISU News Services' Mike Krapfl contributed to this story.*

# New faces around campus

This fall the ECpE department welcomed four new faculty and four new staff members. They come from a variety of backgrounds and disciplines and the department is pleased to introduce them to you.

## Jaeyoun Kim



Joining Iowa State as an assistant professor, Kim most recently worked at the Berkeley Sensor and Actuator Center where he had served as a post doc researcher since

November 2003. He obtained his PhD at the University of Michigan at Ann Arbor in 1997 and his master's degree in electrical engineering from the University of Arizona at Tucson in 1994.

"I enjoy being at ISU," Kim says. "The culture and atmosphere are similar to that of Michigan, my academic hometown." Kim also adds, "I find that people are kinder and more helpful than any other place I've lived so far, both in the United States and Korea."

Kim plans to combine two of his research topics—nanophotonics and biophotonics—and explore new applications of them. Given the initiatives on bioscience researches and nanoscale physics, both at Iowa State and in the state of Iowa, Kim is positive he'll generate synergistic impacts.

## Santosh Pandey



"Teaching has been a fun experience thus far and I am experimenting with ways to make my class interesting," says Pandey, a new assistant professor. He currently teaches EE535:

Semiconductor Physics and next semester will teach EE530: Special Topics in Microelectronics and Photonics-

MEMS, Sensors and Microsystems.

Pandey received his PhD at Lehigh University in Pennsylvania and his bachelor's degree from the Indian Institute of Technology in Kharagpur, India. At Lehigh, Pandey demonstrated the feasibility of making a miniaturized silicon-based assay to detect the electrical excitability of ion-channels, which has burgeoned into a key research initiative for the bioengineering program. He has a keen interest in bioelectronics and biosensors, particularly at the cellular or subcellular levels. He also plans to further the applications of electronics for innovative understanding and discovery in life sciences. He has a courtesy appointment in the agricultural and biosystems engineering department.

"I am looking forward to building a research program that adds on the expertise we already have in ECpE with good students and a strong collaborative team," he says. "The ISU faculty all have been very forthcoming and helpful in this regard."

When Pandey's not working, he says he enjoys the varied places to brunch around Campustown.

## Joseph Zambreno



A recent graduate of Northwestern University in Evanston, Illinois, Zambreno received his PhD in electrical and computer engineering in 2006, his master's

degree in 2002 and bachelor's degree (summa cum laude) in 2001. Zambreno's research areas include computer architecture, compilers, and hardware/software co-design, with a focus on run-time reconfigurable architectures and compiler techniques for software protection. He has been the recipient of several honors and awards, including a Walter P. Murphy graduate research fellowship in 2001, a National Science Foundation graduate research fellowship in 2002, a Northwestern University graduate research fellowship in 2005,

and the Northwestern University electrical and computer science department best dissertation award in 2006.

"I have really enjoyed my interactions so far with the undergraduate and graduate students here at Iowa State," says Zambreno. "Their energy and enthusiasm is part of what makes it a pleasure to come to work every day. I am looking forward to starting and continuing collaborative relationships with members of the ECpE faculty as well as faculty across the university, enabling me to build a strong research program."

Zambreno is currently teaching CpRE 583: Reconfigurable Computing, a small graduate-level course in which students investigate both theoretical and hands-on aspects of reconfigurable and FPGA-based computing systems.

## Aditya Ramamoorthy



Coming to Iowa State most recently from Southern California, Ramamoorthy is an assistant professor and teaches EE224, an introductory class on signals and systems, along

with professor Nicola Elia.

"I like the college town atmosphere in Ames," he says. "It is a welcome change after having lived all my life in really big and crowded cities. I feel that it's an ideal place for teaching and researching."

Ramamoorthy received the BTech degree in electrical engineering from the Indian Institute of Technology, Delhi, in 1999. He served as a systems engineer at Biomorphic VLSI, Inc. in Thousand Oaks, California, until 2001. He received his master's and PhD in electrical engineering from the University of California, Los Angeles in 2002 and 2005 respectively. From 2005 to the present, Ramamoorthy has been a senior design engineer in the Data Storage Signal Processing group at Marvell Semiconductor, Inc. in Santa Clara, California.

His research interests are in the areas of network information theory, error control coding (for data storage and communication systems), and sensor networks. Ramamoorthy says he's looking forward to establishing a successful research program and developing new courses in the ECpE department at both the undergraduate and graduate levels.

"I find that there is a lot of discussion among faculty members from different backgrounds about research problems," he says. "The interdisciplinary nature of research at ISU is exciting."

#### Debbie Van De Velde



The ECpE staff welcomed Van De Velde as an Administrative Specialist in late August. Her duties include managing the office and assisting the department

chair with various assignments. Prior to assuming this position, she served as a fundraising consultant with Innova Ideas and Services in Ames. Her primary duties involved securing funding for nonprofit organizations.

Van De Velde's previous employment experiences involved serving as a fundraiser at the University of Oklahoma, Utah State University, and the University of Missouri. Debbie also has a background as an administrative assistant to the president of Kansas State University for 10 years. She has a bachelor's degree in business administration from Kansas State University and is married to Bruce Van De Velde. They have one daughter, Ashley.

#### Steve Nystrom



Originally from Sioux Center, Iowa, Nystrom has lived in Ames for the last six years. He graduated from Iowa State in 2005 with a degree

in computer engineering and then started working as a system administrator with Iowa State Facilities Planning and Management. This fall, Nystrom came to the ECpE department as a systems support specialist. He works with linux/unix administration in engineering, network security and hypercomputing, as well as with, CyBlue—an IBM BlueGene/L supercomputer—and other computing clusters.

Nystrom says he's looking forward to bringing Iowa State's engineering to the top of the industry; leading Iowa State into the next computer age with the use of supercomputing, grid networks, and BlueGene; and working with some of the greatest minds of Iowa State in cutting-edge research.

#### Dana Schmidt



An Iowa State alumna, Schmidt joins the ECpE department to take on the newly created communications specialist position. Schmidt's responsibilities include

coordinating the biannual alumni newsletter, writing news stories for the department's Web site, and proofreading faculty members' grant proposals. She splits her time with the ECpE and Civil, Construction, and Environmental Engineering departments.

Schmidt, who came on board in November, has a bachelor's degree in journalism and mass communications.

She most recently lived in Cincinnati, where she worked as an assistant editor at *Family Tree Magazine* and *The Artist's Magazine*. Her other previous experience includes stints at Meredith Corporation's Special Interest Publications—Creative Collection, *Family Circle* magazine and *The Iowan* magazine.

Schmidt says she's happy to be back in her native state and looks forward to the challenges this new position will bring.

#### Greg Smith



Smith joins the ECpE department as a program coordinator for the department's senior design program. He will be responsible for management, operation, support,

and coordination of senior design, a two-part, two-semester required course created to help students prepare for the workplace.

Smith has industrial experience in both electrical and software engineering, as a senior-level project engineer, project leader, and engineering manager. He also has academic research and teaching experience in electrical engineering and computer science as a research associate and assistant professor. He has worked for several international and startup companies. Smith received his bachelor's and master's degrees from Colorado State University, and his PhD from Iowa State. ■

## Accreditation in action

In October, officials from ABET, Inc., the U.S. accreditor of college and university programs in applied science, computing, engineering, and technology, paid a visit to each department within Iowa State's College of Engineering. During the visit, the evaluators did not cite any shortcomings with the electrical and computer engineering programs. "We are very pleased that we are running a quality program," says Arun Somani, chair of the ECpE department. ABET will formally notify the department of its accreditation status later this academic year.



# Developing more powerful solar cells

By Mike Krapfl, ISU News Service

Sure, Iowa has its share of rainy, snowy and cloudy days. But look out the window.

"We have a lot of sunlight," says Vikram Dalal as sunshine lights up a late-summer morning and the south-facing windows of his office at Iowa State University's Applied Sciences Complex.

Dalal, the director of Iowa State's Microelectronics Research Center and the Thomas M. Whitney Professor in electrical and computer engineering, has spent more than three decades finding ways for that sunlight to generate more and more electricity. He thinks his latest project can boost the performance of an Iowa company's solar cells by 40 to 50 percent.

Dalal is working with PowerFilm Inc., an Ames company that manufactures thin, flexible solar panels, to improve the performance and stability of the company's solar cells. The project is partially supported by a \$63,406 grant from the Grow Iowa Values Fund, a state economic development program. Dalal

also has a three-year, \$220,000 grant from the National Science Foundation to support a separate but similar research project.

One of the challenges facing solar cell manufacturers is the fact that most cells are manufactured with crystalline silicon, the same material that's used to make computer semiconductors. Because computer parts have so much more value than solar cells, Dalal says there's a shortage of silicon for solar cells.

There is, however, a way to manufacture solar cells using a lot less silicon. Dalal says non-crystalline silicon wafers that are about 2 micrometers thick can replace crystalline wafers that are about 300 micrometers thick. The result is thin solar cells that can absorb lots of light and can be mounted on flexible plastic and other materials. It's the kind of solar cell technology produced by PowerFilm Inc. But the thin cells produce about half the electricity as crystalline silicon. And their performance drops by about another 15 to 20 percent over time.

"That's where we come in," Dalal says. Iowa State researchers have made discoveries in materials science and plasma chemistry that can improve hydrogen bonding to the silicon in the thin solar cells. And Dalal says that can improve the performance of the cells by about 35 percent and eliminate about 15 percent of the drop in performance.

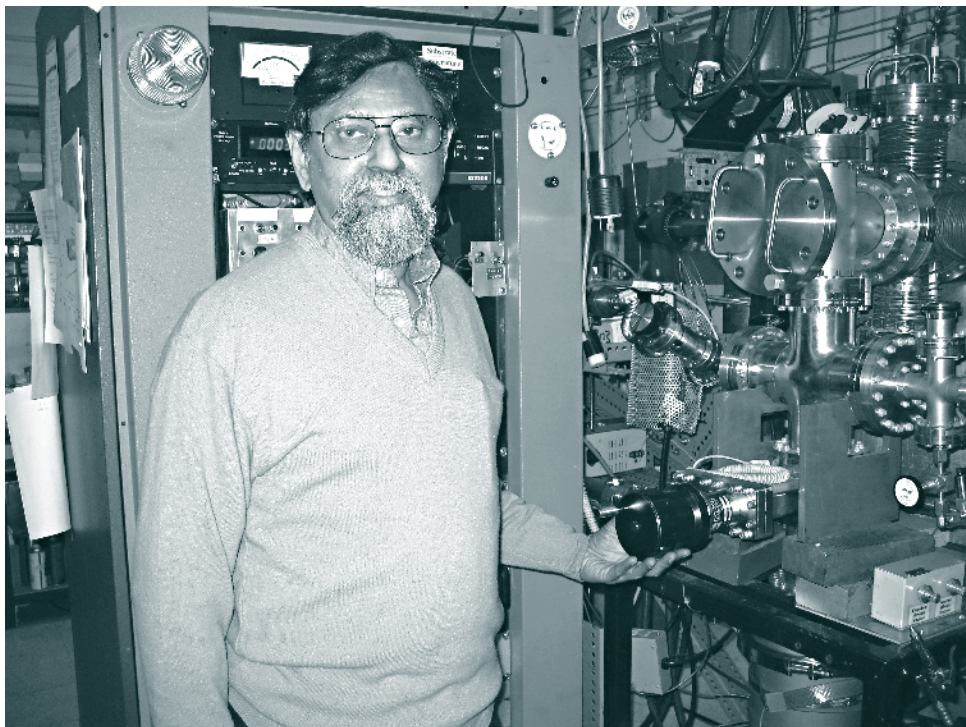
The discoveries are expected to result in several patents, Dalal says. They're also expected to be a potential boost to PowerFilm. Dalal says the new techniques should work with essentially the same manufacturing processes and equipment now used by PowerFilm.

Frank Jeffrey, the chief executive officer of PowerFilm, says he'd be happy to see the performance of his company's solar cells jump by even 20 percent. "It would put us in a much stronger competitive position. If we can increase performance and keep costs in line, that would give us a significant advantage over other people pursuing thin film solar technology right now."

But Jeffrey acknowledges Dalal's project won't be an easy one. "It's a significant challenge to get the advancement he'd like to make."

And Dalal is looking forward to facing those challenges in his laboratory. "This is both challenging and interesting work," says Dalal, who started studying solar technology in 1972 when he decided he didn't want to develop smart bomb technology for a defense contractor. "I find it's tremendously interesting, even after 34 years. And it helps humanity instead of killing it, which allows me to sleep at night." ■

*Professor and associate department chair Vikram Dalal poses with the solar reactor in his lab.*



## Professor wins two prestigious university awards

Srinivas Aluru is recognized throughout the university, nation and in many parts of the world for his research in high-performance computing. Because of his contributions to computational biology, and for his leading role in bringing the IBM Blue Gene/L supercomputer to Iowa State in January, it's not surprising Aluru has won two top university honors.

In August, Aluru began his three-year appointment as the Richard Stanley Chair in Interdisciplinary Engineering, an award usually given to one professor within the College of Engineering. A month later, he became the first-ever recipient of the Iowa State University Foundation's award for Mid-Career Achievement in Research. "I'm excited to receive this award," Aluru says.

Aluru's career began at Iowa State in the late 1980s when he came to the university from his native India after completing his bachelor's degree at India's premier technical school, the Indian Institute of Technology—equivalent to MIT in the United States. After applying to several schools and getting accepted by three, Aluru looked over the brochures Iowa State had sent him and decided to attend Iowa State—all without ever stepping foot on campus.

After receiving his master's degree in computer science, he continued on to his PhD at Iowa State. Later, he accepted a faculty position at Syracuse University and then New Mexico State University before returning to Iowa State in 1999.

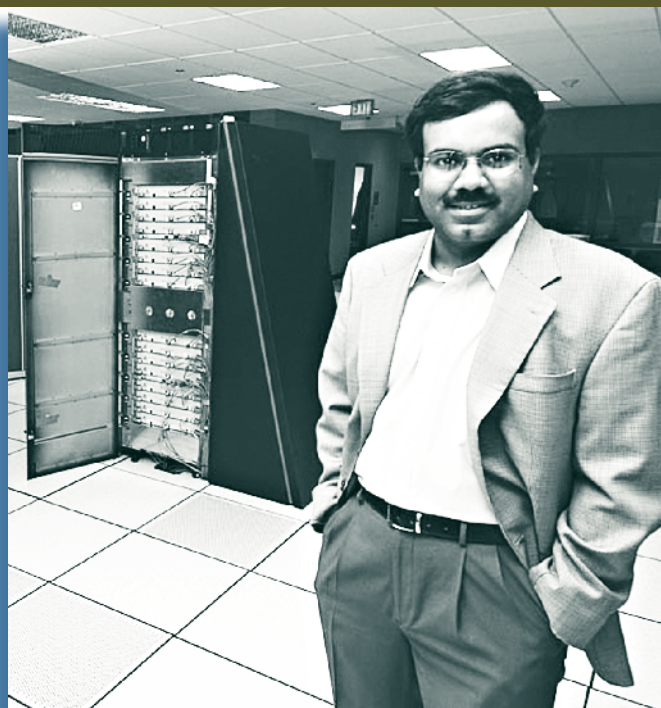
Aluru's recent work in high-performance parallel computing, including genome

sequencing, has garnered him attention. (For more on this, see the biennial *Research Highlights* magazine available by contacting the ECpE department or online at [www.ece.iastate.edu/research.html](http://www.ece.iastate.edu/research.html).)

As the part of the Stanley Chair, Aluru will be an advocate for interdisciplinary activities and research, and raise the profile for such activities. Funding provided through the professorship will enable Aluru to enhance his research efforts and give visibility to the interdisciplinary work already underway in addition to bringing in high-profile speakers in interdisciplinary research.

One of Aluru's next research projects involves simultaneously analyzing gene expression data collected from thousands of individual laboratory experiments. For example, researchers do experiments to understand the characteristic differences of a specific biological condition, such as the presence of a disease or the effect of saltwater stress on a plant. For each organism, millions of research dollars are cumulatively spent, but there's no collective way to analyze the data. And that's where Aluru comes in. He wants to develop parallel methods for the collective analysis of data. "Because of the enormity of data, we need a large-scale parallel computer such as the IBM Blue Gene."

Additionally, Aluru is working with



*Srinivas Aluru stands next to the IBM BlueGene/L supercomputer located in Durham Hall.*

Krishna Rajan in the materials engineering department on a project involving a new field, materials informatics. Using an atom probe microscope (which Aluru says will be arriving at Iowa State any day now) he and other researchers will be able to see how atoms are arranged and identify the properties of the materials.

The ISU Foundation's award for Mid-Career Achievement in Research is chosen from a pool of nominations submitted by each department. The Stanley Chair is awarded by the College of Engineering to professors demonstrating excellence in interdisciplinary research and training. ■

## More research news

Learn all about the ECpE department's research efforts in the biennial *Research Highlights* magazine. For a PDF copy, visit [www.ece.iastate.edu/research.html](http://www.ece.iastate.edu/research.html). Or if you'd prefer a printed copy, contact the ECpE main office by telephone at (515) 294-2664 or by mail at 2215 Coover Hall, Iowa State University, Ames, IA 50011-3060.





# A whole new world

ECpE senior Mark Tekippe, a Story City native who comes from a family of Iowa State graduates, never could have imagined where his college journey would take him when he started four and a half years ago. And he never could have imagined it would lead to him winning the 2006 Deans' Student Leadership Award. "Over my first year and a half, I really began to feel a connection to Iowa State and to my major," says Tekippe. "In a way, I feel like I fell into my major and I am extremely fortunate to have ended up studying electrical engineering."

Early on in Tekippe's Iowa State career, he became involved with a student group called Engineers for a Sustainable World (ESW). "ESW allowed me to consider ways that I could apply my engineering skills to problems faced by developing countries," Tekippe says. Support from the ECpE department enabled Tekippe to attend a national conference on sustainable engineering, and later Tekippe took a course in sustainable, international development at Iowa State. As part of the course and his ESW involvement, Tekippe worked with other engineering students to research sustainable water disinfection in the Kamuli District of Uganda, a project which received an Environmental Protection Agency P3 Award to fund initial research.

This past spring, Tekippe was one of six students selected by the College of Agriculture to pilot a service learning/sustainable agriculture project in Uganda. Their goal was to increase food security and agricultural skills, and to ultimately improve the livelihoods of residents in rural Uganda. The project was a joint effort among Iowa State University, Makerere University in Kampala, Uganda, and Volunteer Efforts for Development Concerns (VEDCO), a Ugandan non-governmental organization. "Our team spent a little over four weeks in Uganda and we worked with three students from Makerere University," says Tekippe. "We worked in the rural village of Namasagali, along the banks of the Nile River. We spent most of our time at Namasagali Primary School teaching lessons in agriculture, expanding the school garden, and visiting farmers and members of the community."

But Tekippe's trip to Uganda wasn't his first trip overseas. Tekippe previously had spent two months studying at Brunel University in England, and then a semester at the National University of Singapore (NUS)—rated one of the top 10 engineering programs in the world by the *London Times*. "I planned a three week trip in Thailand to become certified in scuba diving before my studies started in Singapore," says Tekippe.

"I flew into Bangkok on December 21, 2004—only five days before the tsunami." Luckily, a last minute change of plans took Tekippe to an island off the east coast of Thailand, and out of harms way, when the tsunami struck.

During his time at NUS, Tekippe also traveled to nearby countries such as Laos, Thailand, Vietnam, Cambodia, Malaysia, and Indonesia. "I felt this experience really opened my eyes and gave me a much better understanding of the world and people around me," he says.

Tekippe says he's in awe of the abundance of opportunities he was able to take advantage of at Iowa State. "I have received an incredible engineering education, had the opportunity to work for a year in industry through internship and co-op programs, and been able to travel to nearly 30 countries—all in only four and a half years while pursuing my undergraduate degree."

Tekippe, who will graduate this December, recently accepted a full-time hardware engineering position with Digi International in Minnetonka, Minnesota, an industry leader in device networking for business solutions.

In April 2006, Tekippe was presented with the College of Engineering Deans' Leadership Award at the annual Marston Club Dinner. Tekippe says he was surprised to learn he won the award. "As a student, it's easy to forget that the faculty and administration are not only teaching and guiding their students, but that they are also paying close attention to their students' accomplishments and interests," he says. The annual award goes to three engineering juniors or seniors who demonstrate outstanding leadership in major college-wide, university, community, or professional organizations. In addition to Tekippe, Sasha Kemmet, also a senior in ECpE, was one of the three Deans' Leadership Award recipients. ■

*ECpE senior Mark Tekippe stands with his host family in Uganda.*





# Building blocks

This fall the department broke ground on Phase 1 of the Coover Hall Building Project. Phase 1 is dedicated to creating 23,000 square feet of new space for students. The space will include classrooms, teaching labs, and research labs. "The construction is on schedule," says Doug Jacobson, professor of ECpE and chair of the ECpE Building Committee. "We've had good weather this fall, so we've been fortunate."

Completion of the first phase is expected in the spring of 2008. Phase 2 could begin as early as 2008.

Phase 2 of the building project was altered recently and now includes quite a bit of new construction instead of renovations only (see diagram below).

The plan for Phase 2 will add 33,000 square feet of new space and will provide a home for advising and senior design, as well as administrative office space and offices for faculty and graduate students. Also, an atrium will be created by enclosing the courtyard with

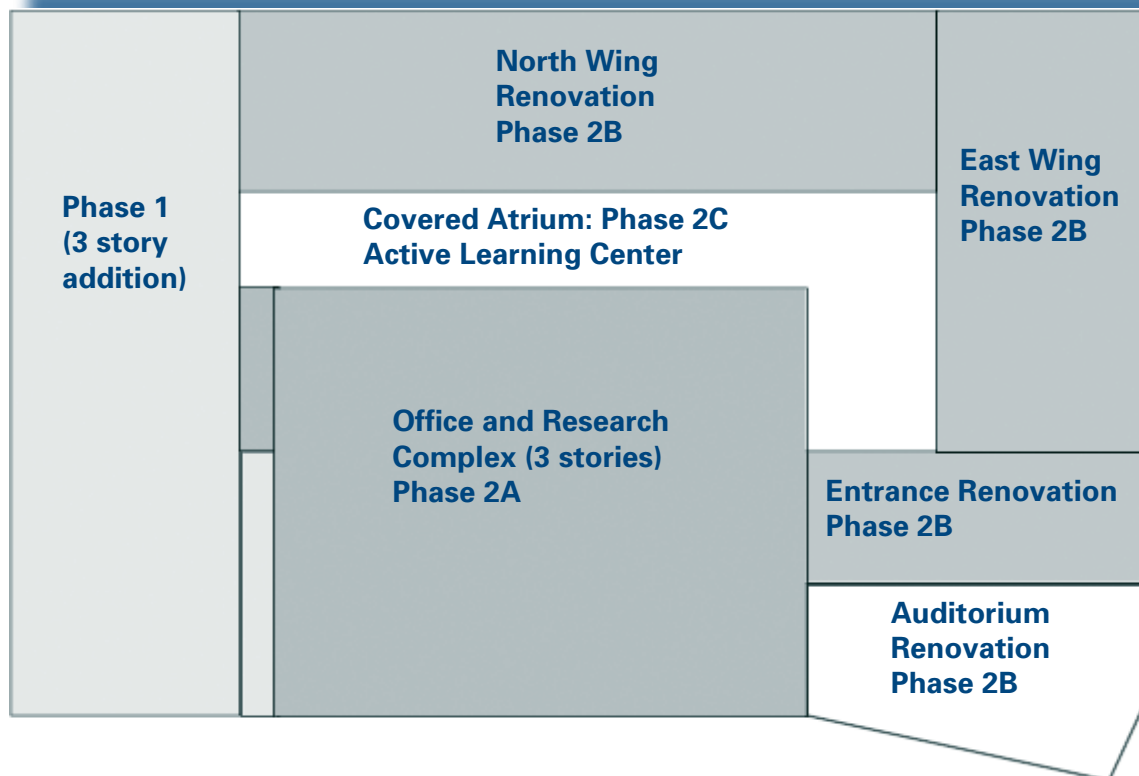
a glass roof. Jacobson says the atrium will provide a place for students and faculty to gather. The new construction for Phase 2 is anticipated to take two years, and renovations such as updating the windows, air conditioning system, and more will take another two years.

The building project is funded in part by private donors and state funds. Together, the project will cost an estimated \$38.8 million.

Currently, the department is seeking donors interested in naming opportunities for the projects in the two newly constructed buildings and the atrium, as well as for classrooms and labs. Jacobson says they hope former students will want to pool their resources together to name rooms and labs after former faculty members. If you're interested in donating to the ECpE Coover Building Project or a naming opportunity, contact Keith Formann at the ISU Foundation (515-294-4280, [kforman@iastate.edu](mailto:kforman@iastate.edu)). ■



*Above right: The photos show construction efforts for Phase 1. You can track the building's progress with the Coover Remodeling and Addition Webcam at [www.fpm.iastate.edu/webcam/coover](http://www.fpm.iastate.edu/webcam/coover). Below: The diagram depicts the final floor plan for Coover Hall after it is renovated.*



# Living out the dream

For Frederick "Fritz" Raab, a nearly Iowa native, Iowa State University felt like the natural place to go when he started college in 1964. After all, his family members were natives of Waterloo, Iowa, even though Raab was born in Fort Crook, Nebraska.

When Raab came to Iowa State, he eagerly joined the Sigma Nu fraternity and became involved with the student chapter of the Institute of Electrical and Electronics Engineers (IEEE). "I enjoyed working with the student IEEE branch. We brought in speakers from different companies to try and educate students on what the world of work was like," he says. "We even did a skit at a banquet once where we poked fun at a lot of the professors, and that was a lot of fun."

Raab also enjoyed being involved in his fraternity. In fact, a lot of Raab's social activities in college revolved around his fraternity. That is how he met his wife, Becky. Well, sort of.

Raab recalls a weekend in the 1967 when his fraternity was putting on a traditional tea to welcome the new housemother. Since Raab had been to many similar teas before, he and his buddy decided to skip town for this one. Their road trip to Waterloo led them to a double blind date. Who would go with whom? Raab says the guys flipped a coin to decide. Becky is fond of saying she won Raab in a coin toss.

Now several years after that coin toss, Raab lives in Vermont with Becky, and owns his own company—Green Mountain Radio Research. "Most of my work is related to high-efficiency power amplifiers—the part of a radio transmitter that makes the signal that's sent out by cell phones, wireless modems, broadcast transmitters, satellites, police radios, and other applications such as magnetic-resonance imaging (MRI)," says Raab. "My designs increase efficiency—the amount of radio signal produced for a given amount of electrical power. This is somewhat like increasing the miles per gallon of an automobile. It also makes the amplifiers smaller and lighter, and in the case of a cell phone, lets you talk longer before having to recharge the battery."

Raab's clients have included the U.S. Department of Defense, the National Science Foundation, and several private companies such as Motorola. Raab founded the company in 1980 after spending four years working on radio transmitters and navigation at Cincinnati Electronics in Ohio, and then five years doing radio navigation work and working on a position finding system (which became used as a sensor for virtual reality displays) at Polhemus Navigation Sciences near Burlington, Vermont.

"I had always wanted to have my own company and to have more direct contact with clients," says Raab.

Twenty-six years later, Raab's company continues to be a success, and is one of Raab's proudest accomplishments. Raab's other achievements include receiving an Iowa State Engineering PACE award in 1995 and becoming an IEEE Fellow in 2006. In addition, he's published nearly 100 technical papers and co-

authored the classic textbook, *Solid State Radio Engineering*. He's currently working on projects such as high-efficiency power amplifiers for military jammers, space-based radar, and MRI.

Raab remembers many practically-oriented electrical engineering classes—communications, control, information theory, random process, antennas, and radio astronomy—that were interesting and provided information he later used in his work. He also recalls being both challenged and supported during his graduate studies by his professors, particularly Paul Bond, Tom Scott, and Grover Brown. He adds that his work on high-efficiency power amplifiers began with the research he did for his PhD dissertation.

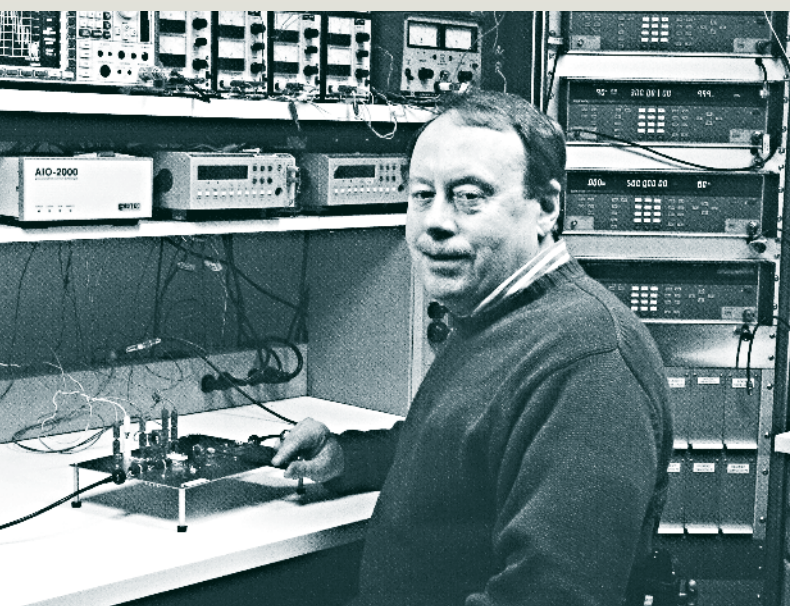
In Raab's various business dealings and at engineering conferences he attends, Raab says he's always impressed at the number of Iowa State alumni he meets. "It's funny because out in the East, people don't know Iowa from Ohio or Idaho, but when you go to an engineering conference it's surprising how many ISU grads there are," he says. "The achievements of ISU alums are the best testament to the quality of education ISU provides."

When he isn't working, Raab says he spends his free time on two hobbies he's had since childhood—amateur radio and railroads, both real and model. "I'm quite sure that wiring up my electric trains when I was 6 and 7 had something to do with becoming an electrical engineer," he says.

Raab also enjoys taking photographs and traveling with his wife Becky. Their son, Hans, recently graduated from Arizona State University. ■



*Raab and his wife Becky enjoy his Sigma Nu reunion in 2005.*



*Frederick "Fritz" Raab works in his lab.*



# Calendar of events

Upcoming 2007 lectures and presentations sponsored by ECpE and the university.

## ECpE Distinguished Lecture Series

January 22

Alliant Energy-Lee Liu Auditorium, Howe Hall, 1:10 to 2:30 p.m.

### **Distributed Inference in Sensor Networks: Topology and Trade-offs**

Jose Moura, professor, Carnegie-Mellon University

February 8

Alliant Energy-Lee Liu Auditorium, Howe Hall, 3:30 to 5 p.m.

### **Self-organizing Wireless Sensor Networks in Action**

John Stankovic, BP America professor, University of Virginia

March 29

Alliant Energy-Lee Liu Auditorium, Howe Hall, 3:30 to 5 p.m.

### **An Integrated Approach Toward Power Electronics System**

Fred Lee, Lewis A. Hester Professor of ECpE and Distinguished University Professor, Virginia Institute of Technology and State University

April 23

Alliant Energy-Lee Liu Auditorium, Howe Hall, 1:10-2:30 p.m.

### **Is Systems Biology the Nexus for Future Computational Science?**

Shankar Subramaniam, professor, University of California at San Diego

## Department and University Events

April 12

Location to be determined, 12:00 to 5:00 p.m.

### **External Advisory Board Meeting**

April 12

Scheman Building, 5:30 to 9 p.m.

### **Scholarship Awards Reception and Dinner**

April 13

2222 Coover Hall, 7:30 a.m. to 1 p.m.

### **External Advisory Board Meeting**

April 16-22

Various locations on campus

### **VEISHEA 2007**

May 4

Hilton Coliseum, Time to be announced

### **Undergraduate Commencement**

May 5

C.Y. Stephens Auditorium, Time to be announced

### **Graduate Commencement**

Check our Web site at [www.ece.iastate.edu](http://www.ece.iastate.edu) for additional details and up-to-the minute information on departmental events.

## In memoriam

The ECpE department recognizes our alumni who passed away this past year. This list includes alumni who died since October 1, 2005. It is arranged in ascending order of graduation year.

**Arloe Paul**, BS 1933, December 14, 2005

**Allen Campbell**, BS 1936, June 10, 2006

**Bruce Montgomery**, BS 1936 and PhD 1943, May 21, 2006

**Maurice London**, BS 1937, March 25, 2006

**Robert Hartsook**, BS 1938, October 31, 2005

**Richard Potter**, BS 1938, April 24, 2006

**William O'Halloran**, BS 1939, March 18, 2006

**Jack Temin**, BS 1939, January 7, 2006

**Robert Klar**, BS 1940, July 7, 2006

**Walter Bachman**, BS 1941, August 30, 2006

**Richard Rollman**, BS 1941 and MS 1942, February 4, 2006

**Orlo Best**, EX 1942, July 21, 2006

**Stanley Starr**, BS 1942, May 17, 2006

**Henry Hanson**, BS 1943, March 14, 2006

**Charles Pfund**, BS 1943, January 9, 2006

**Louis Plotkin**, BS 1943, March 14, 2006

**Arthur Runft**, BS 1943, October 18, 2005

**Dwight Long**, BS 1945, March 30, 2006

**Eugene Harrison**, BS 1946, June 14, 2006

**Donald Waidelich**, PhD 1946, July 22, 2006

**Richard Mannheimer**, BS 1948, February 6, 2006

**John Sweeney**, BS 1950 and MS 1951, December 8, 2005

**Dale Baker**, MS 1951, January 10, 2006

**Duane Hildebrand**, BS 1954, July 22, 2006

**Charles Cartmill**, BS 1955, January 18, 2006

**John Noecker**, BS 1957, October 30, 2006

**Robert Samuels**, BS 1959 and MS 1960, April 4, 2006

**Les Johnson**, BS 1961, September 4, 2006

**Wendell Ebling**, BS 1965, September 22, 2006

**Richard Hoft**, BS 1948 and MS 1965, January 1, 2006

**Stephen Smith**, BS 1965, November 2, 2005

**Wayne Jones**, BS 1970, MS 1972 and PhD 1975, June 8, 2006

**Michael Shannon**, BS 1971, June 17, 2006

**Robert Walstrom**, MS 1971 and PhD 1979, August 31, 2006

**Richard Robinson**, BS 1982, August 2, 2006

**Wei Yau**, BS 2005, January 16, 2006

# **ECpE** would like to hear from you!

Write to us at Communications Specialist, 2215 Coover Hall, ISU, Ames, IA 50011-3060; call us at 515 294-2664; or e-mail to [schmidtd@iastate.edu](mailto:schmidtd@iastate.edu).

Tell us about your personal news and career moves for alumni notes in future newsletters. You're welcome to enclose photos; however, we can't return them. We need your help, too, with donations to scholarship funds, lab facilities, building improvements, student groups, and other departmental activities. If you're making a contribution to Iowa State, please consider designating it for the Department of Electrical and Computer Engineering. This form will make it easy to send us news (feel free to add a page to this form), a pledge, or a gift.

Name \_\_\_\_\_ Grad. year, degree, student name if different \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

E-mail address \_\_\_\_\_

Notes \_\_\_\_\_

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