ECpE Connections

IOWA STATE UNIVERSITY

The ELECTRICAL and COMPUTER ENGINEERING Alumni Newsletter

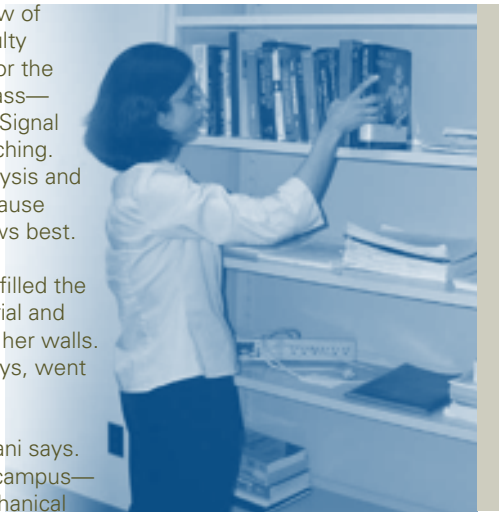
Vol. 22, No. 1 Fall 2005

ECpE welcomes two faculty

Vaswani getting comfortable in new role

Two weeks before the fall semester started, the walls in **Namrata Vaswani**'s office were still bare and her bookcase was empty. Decorating was going to have to wait, she decided, until more important tasks were accomplished.

Vaswani is one of two new faculty members in electrical and computer engineering this fall, and when she wasn't meeting new colleagues or working on proposals with a few of Iowa State's veteran ECpE faculty members, she was preparing for the graduate-level special topics class—Topics in Communications and Signal Processing—she would be teaching. The class, based on image analysis and computer vision, is perfect because those topics are what she knows best.



Once classes started, Vaswani filled the bookcase with reference material and strategically placed pictures on her walls. Her first couple classes, she says, went quite well.

"I'm enjoying teaching," Vaswani says. "I have students from all over campus—from computer science to mechanical engineering to electrical and computer engineering. It's an interesting mix of backgrounds."

Nine students are enrolled in this semester's class, and four more are auditing because it's in their research area.

Before arriving at Iowa State, the new assistant professor was at Georgia Tech, serving a postdoctoral fellowship in the School of Electrical and Computer Engineering there. Prior to that, she was

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Nguyen sees (cardinal and) gold at Iowa State

Also joining the electrical and computer engineering department is **Tien Nguyen**, who just finished work on his PhD in software engineering at the University of Wisconsin–Milwaukee. His specialty is helping developers improve the process of updating software systems. To do that, he says, developers need program analysis to help them understand more clearly the entire process of writing a program and managing the overwhelming amount of documentation that goes along with that job.

Nguyen already has become a member of Iowa State's software systems group, which he believes will help him expand his research. "Just look around," Nguyen says. "Everybody here is excellent at research, and I'm very happy and proud to be in this type of environment."

But, Nguyen adds, the research opportunities are only one reason he chose to accept a job offer from Iowa State. "I saw a lot of good things in the department that will provide me with the structure to be successful in my professional career," he explains.

Nguyen is impressed with many of the resources at his disposal, including Parks Library, where the nearly endless volumes of books and resources available fascinated him. He even found a few rare manuals he hadn't been able to find in other university collections.

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Note from the Chair

Not only is the fall spectacular with all its beauty, it's also one of the best times of year at a university. Everything is new again—new students, new faculty, new classes. And, as always, we as a department are excited about the upcoming year.

Enrollment, while down somewhat in ECpE this fall, is closer to what our department can comfortably support. We'd like to keep the student-to-faculty ratio at 20-to-1 or lower, and with 45 faculty members our target number is 900 students. We have 984 this fall, so we're still slightly above the desired number, but we're closer to our target.

The graduate program is healthy, with enrollment remaining virtually the same—nearly 250 this semester.

The department has hired four new faculty, two on campus for the fall semester and two more will begin in the spring. Tien Nguyen, who recently completed his PhD in software engineering at the University of Wisconsin–Milwaukee, fills a great demand in that area.

Namrata Vaswani is coming to us from the Georgia Institute of Technology, where she just finished a postdoctoral fellowship. Prior to that, she was at the University of Maryland in College Park working toward a PhD in image and video processing. Her work in image processing with biological applications is a great match for many of Iowa State's new initiatives, and we're happy to have her aboard.

Chen-Ching Liu will be the new Palmer chair for ECpE and will arrive on campus in time for the spring semester. His expertise is in power and alternate energy sources. Also this spring, Umesh Vaidya will begin his duties at Iowa State. He has a strong theoretical background in control with applications in nanotechnology and biological areas.

The department also plans to hire up to four more faculty in emerging areas of study in the near future.

And speaking of emerging areas, ECpE's work in sensors and with the iCube (Information Infrastructure Institute) initiative is going extremely well. The department secured three NSF grants in this area last year and has set up a new research laboratory to develop applications.

Finally, the new ECpE building is on schedule, and there's no reason to think that's going to change. Right now we're working on the building design and expect Phase 1 of construction to begin no later than May 1. Everyone in the department is eager to get the construction underway and looking forward to all of the improvements ahead.

Fundraising for Phase 1 of the project was boosted by a gift from alumnus George L. Irvine, who graduated with a degree in engineering in 1930. The department received nearly $3.9 million as part of his charitable remainder trust fund. If you were planning to be a naming donor, that opportunity still exists!

We're also grateful to the countless others who have supported ECpE through the building fund and other activities. Your generosity has helped us maintain our standard of excellence.

Enrollment

	2005	2004
Computer Engineering Undergraduate	554	649
Electrical Engineering Undergraduate	430	508
Total Undergraduate	984	1157
ECpE Graduate	244	251

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Vaswani . . . continued from p. 1

working on her PhD in image and video processing at the University of Maryland in College Park.

Vaswani's research interests are in estimation and detection problems in statistical signal and image processing, and in computer vision. In particular, her current focus is on shape analysis, tracking, and change detection in state space models and on image classification.

Vaswani is interested in applying her knowledge in this area to biomedical image analysis. For example, she explains, she wants to segment different parts of a patient's brain through a three-dimensional MRI image. That will help doctors detect abnormalities that may potentially be a tumor. In current medical practice, much of this segmentation and detection is done manually. Another application, Vaswani adds, is detecting abnormal heartbeat patterns in patients.

That research interest will fit in well at Iowa State, says Associate Professor **Julie Dickerson**, who was part of the group that decided Vaswani was a good match for the university. "Her expertise in computer vision is an essential area that links with many of the university's initiatives," Dickerson notes. Those initiatives include human computer interaction, sensor networks, and iCube.

"She has the potential to play an important role in a lot of the places our department wants to go over the next several years," Dickerson adds about Vaswani. "And she's worked with some of the best people in the world. She stands out above many others in what she does."

Maybe the biggest change for Vaswani is moving to a small town. She has lived in metropolitan areas most of her life, growing up in Delhi, India, before moving to the Washington, D.C., metropolitan area and then Atlanta. But she's thoroughly enjoying the experience. "It's a very nice small town," Vaswani says about Ames. "It's a different experience, and I like it that people are friendly and you can actually walk to work if you want." ■

Nguyen . . . continued from p. 1

He says those resources will be an enormous benefit when it comes to teaching his class—Operating Systems, Principles, and Practice (CprE 308).

Since he already had college-level teaching experience, the transition to assistant professor wasn't difficult for Nguyen. In addition to his TA work at UW–Milwaukee, he was a lecturer at the Ho Chi Minh City University of Technology in Vietnam for two years before coming to the U.S.

While he wasn't too nervous on the first day of class at Iowa State, Nguyen admits he put some pressure on himself. "I wanted to make it perfect and get a good start," he says. "I think that will make it easier later."

Nguyen is making a concerted effort to ensure his lecture and lab tie in together. His strategy is to make the lecture as interactive as possible, and he challenges students to work together to solve problems during class. Nguyen presents a scenario, then gives students time to figure out possible solutions. He says it's not exactly a quiz, but similar. When time is up, students discuss and compare their answers and talk about how they reached their conclusions.

That approach has worked well so far and has given Nguyen the opportunity to adjust quite comfortably into his new position. And now that he's getting used to the rigors of teaching and conducting research at a Big 12 university, the next thing on Nguyen's to-do list is move his wife, Loan K. Pham, and three-year-old daughter, Khanh, to Ames.

Loan is also an engineer, working as a senior IT auditor in Milwaukee. She's hoping to find a position at Iowa State before the fall semester ends, and she's already looking forward to the move. But, who can blame her, Nguyen asks. "I love Ames. It's a great college town, yet it's very peaceful," he says. "It's a lot safer than Milwaukee, and I love walking around town in the evening. Everything is convenient and close to home." ■

ECpE welcomes Abbadi

Imad Abbadi was hired as ECpE's new systems support specialist in June. It was a homecoming for Abbadi, who earned a BS (2003) and MS (2005) in electrical engineering at Iowa State.

Since he already was familiar with how many things in the department ran, Abbadi was relatively comfortable on his first day in the office. "I knew the students, professors, and staff," Abbadi says, "so I didn't have any problems there."

Part of Abbadi's job is maintaining and updating the department's Cadence environment. Cadence is the software chosen as the electric design automation tool for VLSI design courses at Iowa State.

Abbadi says that while starting a new job is always challenging, this experience has been better than even he expected. "I'm getting help from people here who know a lot more about computers than I do," he reveals. "And working at Iowa State is giving me a chance to grow professionally. I want to learn as much as I can so I can help the department and university."

ECpE Professor **Randall Geiger**, who worked with Abbadi while he was in graduate school, says his former student is still getting his feet wet in his new position, but so far things are looking good. "We're fortunate that he'd been with the department and already had good rapport with the students," Geiger says.

Events drive Kumar

Ratnesh Kumar, recently promoted to full professor, is like many other educators at Iowa State—he spends countless hours in his research lab. Right now, he's working on five different projects, but it's his concentration in designing controllers for discrete-event systems that is getting the most attention from colleagues. His work, in essence, focuses on building logic into automated control systems found in manufacturing facilities, power plants, communications networks, and embedded systems.

Workers in an automobile manufacturing plant, for example, might build two products—a sedan and a minivan. If a marketing promotion increases the demand for minivans, employees may need to switch gears quickly to get the right product onto the assembly line. Kumar's research enables the company's automated control system to handle the quick changeover.

The challenge, Kumar says, is to present mathematically what a system can do, as well as what a system should do. When the math is done correctly, control logic is computed and implemented to restrict a system so it performs only the functions you want it to perform, which, in this case, is configuring the system to build only minivans.

Kumar co-authored the first-ever textbook on discrete-event systems. *Modeling and Control of Logic Discrete-Event Systems*, published in 1995, has been used at several universities. He has also written more than 120 articles on the subject, with nearly 50 of those printed in various refereed journals.

A related branch of Kumar's research enables system administrators to accurately predict when and where system failure is likely to occur. Any system, he says, will have one of its components fail at some point. "The question," he asks, "is how do you determine which component failed?"

The answer is found by monitoring the behavior of the network at multiple locations and then exchanging information about the health of the network to determine which components are experiencing problems.

Jim McCalley, another ECpE professor, works with Kumar on this research and says that even though using discrete-control capability is nothing new, Kumar's way of looking at the age-old problem is different. "Any power-plant generator has continuous-control capability to modulate response to power-system disturbances," McCalley explains, "but it's a new thing to say 'well, we can do this using discrete-control capability.'"

Kumar is also breaking new ground in the area of distributed diagnosis of event-driven systems. His research has attracted the attention of NASA and Argonne National Laboratory, where he has worked on the problem at its manufacturing facility and its Idaho Falls nuclear plant. He's also working with Penn State University's Applied Research Laboratory and the U.S. Navy on designing mission-control logic for underwater vehicles.

And if all of that weren't enough, Kumar is also collaborating with researchers in computer science on software verification. "Catching bugs in software early in the design phase results in huge savings in development cost, time, and labor," he says. Coincidentally, Kumar notes, the underlying mathematics for verification is the same as that for control or diagnosis.

In addition, Kumar is developing ideas with researchers from ECpE and ABE on designing an underground wireless sensor network for fertilization management in precision agriculture. This, he says, will minimize environmental impact, while at the same time maximize yield.

Since he teaches a full course load and is involved with several university committees, most of Kumar's research has to be completed at night. Fortunately, he says, the research is not experimental, so he can do much of it at home.

In the end, though, the long hours and hard work are worth it. "It's the quest for knowledge that is satisfying," Kumar says. "Identifying open problems in discrete-event systems and finding the answers are the ultimate reward."

ECpE buildings are truly moving forward

For the last year and a half, Associate Professor **Doug Jacobson**, chair of the ECpE Building Committee, has been working with architects and other committee members on the expansion of Coover Hall. Building plans drawn up during the recently completed schematic design phase show how the new space will be configured, as well as the size and scale of new rooms.

"It's very exciting," Jacobson says. "We're definitely moving forward on this important new building."

After receiving construction bids and then choosing a builder, Phase 1 of construction can begin. Jacobson says

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Ajjarapu works to prevent power blackouts

In August 2003, 50 million American and Canadian residents were plunged into darkness. A segment of the vast network of power plants and transmission lines that comprise the North American power system had failed. **Venkataramana Ajjarapu**, an ECpE associate professor, hopes he can help prevent similar blackouts from happening in the future. It's a complex task.

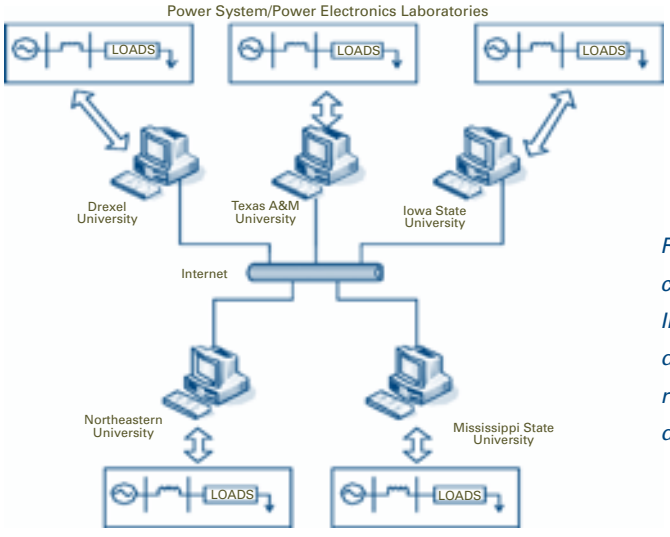
Since electric power can't be easily stored, it's important to monitor and balance supply and demand. Protection systems are designed to disconnect generators or transmission lines when they sense overloads. As the lines carry more power, they get hotter, causing them to stretch and sag between towers. If the lines touch trees, the system detects the sudden change in power flow from the short circuit and disconnects the line.

The outage of one line creates sudden increases in load to other lines. "This can be bad for the system," says Ajjarapu. Under normal operating conditions, the system adjusts; however, if it's already stressed, the reaction time is longer. As seen in 2003, a delay can quickly lead to cascading failures, and eventually the power grid will fail.

While the U.S. power system works amazingly well most of the time, the system is operating close to its limits and that makes it increasingly susceptible to outages. "We generate enough power," Ajjarapu explains, "but we're forcing the transmission lines to take on bigger loads. That leaves little time to make adjustments when a problem occurs."

Ajjarapu is developing bifurcation-based computational and analytical tools that apply specifically to the period when the system is approaching its limits. "We may know what will happen in one scenario, but our tool has to be able to address a wide range of contingencies because each problem impacts the system differently," he explains. "Our challenge is to model what will happen and also to make the tool work online. Operators must be able to quickly grasp how close they are to their maximum load so they can take appropriate action." He's writing a book about these tools that will be published next spring. Ajjarapu also developed a continuation power flow tool, which calculates maximum power transfer for various scenarios and conditions, that is already widely used in industry.

In his work as a researcher and teacher, Ajjarapu strives to give the industrial community, as well as students who are preparing for power systems careers, the tools they need to ensure voltage stability in the power system. Recently he contributed to an IEEE special publication that provides a wealth of information related to assessment, concepts, practices, and tools for voltage stability. This report received an outstanding technical report award. Ajjarapu also chairs an IEEE focus group on voltage stability to define the directions of voltage stability research.



Researchers, connected via Internet, are developing remote testing devices.

In October, Electrical Power and Energy Systems group and Iowa State will host the 37th North American Power Symposium. Ajjarapu is general chair and coordinator. Sponsored by IEEE, the symposium draws in faculty and students from many institutions to discuss power-engineering research and education.

An online resource developed by Ajjarapu, http://design-2.ee.iastate.edu/biblio/, provides easy access to information about current issues in managing voltage disturbances, maintaining voltage security, and minimizing system failures.

Ajjarapu has also established a second area of interest relating power electronics applications to power systems. Under an NSF Course, Curriculum, and Laboratory Improvement project, a state-of-the-art power electronics lab was established. Now this lab is part of the $3.7-million Multi-University (Drexel, Iowa State, Mississippi State, Northeastern, and Texas A&M) Research Initiative funded by the Office of Naval Research. Labs from the five institutions will be interconnected via the Internet. Ajjarapu is principal investigator for Iowa State in the project aimed at developing devices that will enable remote, nondestructive testing of power systems. This will allow researchers to test and measure processes that lead to system breakdowns, capturing the effects of communication delays on power system measurement and calculations. The remote testing capabilities will also allow Ajjarapu to demonstrate live laboratory experiments in the classroom, with video and audio feedback, to help prepare students for the lab. In addition, the project gives the researchers the ability to conduct the labs from another location in real time via the Internet.

Going beyond the boundaries

Four students from Iowa State's electrical and computer engineering department came up with an idea that they hope will eventually help the visually impaired "see" their surroundings. They took that idea and shaped it into a product they called RADVIS, an acronym for radio auxiliary detection for the visually impaired and sighted.

(left to right) Diane Rover—team mentor, Adam Mishler, Andrew Riha, Mike Schmitt, David Lawson

RADVIS is a device with an earpiece that announces the name of a person who gets within a specified distance—eventually, team members hope, up to eight feet—of a visually impaired individual. The device is being designed for use in the workplace and will operate especially well at locations where employees already carry radio frequency identification (RFID) tags (similar to an electronic key) to get into a building or locked office.

The decision to link the technology to RFID cards was based on the growing use of these tags."We didn't want to make a company buy new transponders for our system to work," says **Adam Mishler**, an ECpE senior and one of the four students working on the project. "We wanted it to fit in seamlessly with the rest of the employee population, and we wanted to base it on an up-and-coming infrastructure in security access and controls."

Mishler—along with **David Lawson**, **Andrew Riha**, and **Mike Schmitt**—worked on the project as part of Microsoft Corporation's Windows Embedded Student Challenge, in association with the Institute of Electrical and Electronics Engineers' (IEEE) Computer Society International Design Competition. Lawson and Riha, like Mishler, are seniors in ECpE, while Schmitt graduated last May and went to work for Rockwell Collins in Cedar Rapids but still helps the group with the RADVIS project.

The foursome earned an all-expense-paid trip to Redmond, Washington, in June, after being chosen as one of only 30 teams to advance to the final round. In all, more than 250 projects were submitted from universities worldwide.

The contest challenged undergraduates to devise a computer-based system that solved a real-world problem. Teams had to design, implement, and document a working prototype based on this year's theme, *Going Beyond the Boundaries*.

When he heard about the contest, Lawson's first thought was that it could be a nice tie-in with his senior design project, so he called Schmitt to see if he was interested in participating. After getting Mishler and Riha to join as well, the group asked College of Engineering Associate Dean **Diane Rover** to be the team mentor. It was a logical request—Rover was teaching the graduate-level embedded systems class that three of the students were taking. They talked with her about the project, explaining how they could incorporate the work for the contest into assignments for class.

The group made a solid argument, and Rover gave her blessing. "Since a design project is part of my class," she says, "it was an ideal situation."

After several brainstorming sessions, the group decided that RADVIS was the product that gave them the best chance of winning the competition. Riha says that the visually impaired face social and professional disadvantages in the workplace because they don't often know who is close. "This makes it difficult to engage in small talk and greetings with coworkers and friends," he explains. The group hopes RADVIS will eventually eliminate that problem.

Even though the Iowa State team didn't win any of the top prizes, the trip to Redmond was still an eye-opening experience for everyone involved.

"I was pretty happy with how things went," Lawson says. "I think we made a good presentation to the judges and they seemed to like it, but they pointed out we were kind of lacking in terms of describing how we planned to market the product and its commercial feasibility. Overall, though, it was a great experience."

Team Sam from Australia won the $8,000 top prize for their device that irrigates crops based on the weather forecast. If the weatherman calls for rain, no irrigation, but if it's supposed to be dry, the spouts will open.

A team from India placed second, Romania was third, Brazil took fourth, and a team from China finished fifth.

The judges, Riha notes, focused a great deal on marketability, and some teams went all-out down that path. "They really sold their product to the Microsoft judges," Riha says about the team that won first place. "They had a 50-page business plan, and that's what Microsoft was looking for."

The work won't stop for the group even though the contest is complete.

Students get a helping hand

Lawson, Mishler, Riha, and Schmitt say if it wasn't for the help of several people at the university and assistance from independent companies, the RADVIS project would never have gotten off the ground. Texas Instruments, for one, provided the RFID readers free of charge, while SVOX Ltd.—an international company with offices in Austria, Germany, Switzerland, and the U.S.—donated the text-to-speech engine.

Team mentor Diane Rover adds that the team's achievement went beyond the four members. Faculty and staff in the Department of Electrical and Computer Engineering, as well as Iowa State alumni, were all part of the success.

During the summer, Iowa State's Small Business Development Center contacted the four students about getting a patent for RADVIS, so now they're preparing for a business planning competition and studying the commercial feasibility of the product.

"We thought it might be good to give this a shot," Lawson says.

"It's difficult to say right now where this product will go in the future," Mishler adds. "We need to work with the Small Business Development Center and hash out the details with them." ■

Irvine trust aids ECpE department

A $3.9-million gift from engineering alumnus **George L. Irvine**, formerly of Naples, Florida, will be used to greatly enhance ECpE's research and teaching infrastructure. A portion of the gift also will be used to help pay for the first phase of construction on the new ECpE Building II.

Irvine, a 1930 electrical engineering graduate, spent his entire engineering career at General Electric, where he was a vice president when he retired. When he died in July 2002, Irvine used a charitable remainder trust (CRT) to leave a large portion of his estate to the university. Irvine's CRTs generated income for his beneficiaries during their lifetimes, but upon their passing, the remainder of the trust came to the electrical and computer engineering department.

According to **Keith Fortmann**, executive director of development for the College of Engineering, Irvine wasn't a man who craved recognition. "He wanted to help his family first, then he wanted the money to come here and be used for things we need in electrical and computer engineering," Fortmann says. "He felt like Iowa State made a big difference in what he achieved in his life."

While at Iowa State, Irvine served as vice president of the student body and president of the InterFraternity Council. He also was a member of Eta Kappa Nu and Tau Beta Pi.

Irvine was inducted into Iowa State's Knoll Patrons Society, the highest level of the University Order of the Knoll donor program, in 2000. ■

PPEA Awards

Three electrical engineering graduates received Professional Progress in Engineering Awards (PPEA) in 2005.

Established in 1989, the PPEA recognizes outstanding professional progress and personal development in a field of engineering specialization and distinguished community service by alums under the age of 46. It is the college's highest honor for young alumni.

Scott deBoer, MSPhys'91/PhDEE'95, engineering manager of R&D at Micron Technology Inc., Boise, Idaho. Led the company's development of both current-generation and next-generation memory technology and has received more than 100 patents.

Agustin Irizarry-Rivera, PhDEE'96, associate professor, electrical engineering, University of Puerto Rico, Mayaguez Campus. PI or co-PI on more than $1.1 million in grants, including a highly visible and innovative project that is part of an NSF initiative on electric power network efficiency and security.

Shelli Kay Starrett, PhDEE'94, associate professor, electrical and computer engineering, Kansas State University. Helped launch a highly successful nationwide MS degree program with focus on power engineering and a recipient of an NSF CAREER award.

Promotion and tenure

Five ECpE faculty members were recently awarded with promotion and/or promotion with tenure.

Former Assistant Professors **Chris Chong-Nuen Chu**, **Nicola Elia**, and **Manimaran Govindarasu** have all been promoted to associate professors with tenure.

Srinivas Aluru and **Ratnesh Kumar**, who were associate professors, were both promoted to professor status.

Congratulations to all candidates.

NSF grant puts genomics research on fast track

When ECpE Professor **Srinivas Aluru** put together a team last year, it wasn't for sport, although he was entering a championship competition of sorts. The prize—a Major Research Instrumentation grant from the National Science Foundation (NSF).

Aluru and his Iowa State team—**Patrick Schnable**, director of the Center for Plant Genomics; **Robert Jernigan**, director of the Laurence H. Baker Center for Bioinformatics and Biological Statistics; and **Arun Somani**, Jerry R. Junkins Professor and ECpE chair—knew competition would be tough. Researchers from all of the science and engineering disciplines nationwide compete for the prestigious grants.

"The primary criterion is to show that compelling research drives the need for the equipment," says Aluru. Three interdisciplinary high-profile projects helped win the grant for Aluru's team. The projects focus on sequencing the maize genome, clustering expressed sequence tags, and studying protein interactions.

With the NSF grant of $600,000 plus $300,000 from Iowa State, which includes half from the Office of the Vice Provost for Research and half from the Plant Sciences Institute, the team plans to purchase a 512-node computer system with scalable interconnect so multiple processors can communicate with each other simultaneously. The equipment will enable the researchers to solve large-scale computational problems that otherwise would take years to complete.

The maize or corn genome, for example, is 2.5 billion nucleotides long. After sequencing short pieces that at most are a thousand nucleotides in length, the pieces are assembled to create the genetic blueprint. With the maize genome sequencing expected to generate some 30 to 60 million sequences, the problem could well have become a computational marathon.

Working with plant geneticist Schnable, Aluru developed specialized algorithms and figured out a way to use parallel computing to assemble the sequences quickly. With the new equipment, he estimates his lab will be able to assemble 30 million sequences in a day. The abilities to try different methods and use different parameters are the key benefits of being able to assemble the sequences so quickly.

Last February, NSF and the U.S. Departments of Agriculture and Energy initiated a $30-million project to sequence and assemble the entire genome. Schnable and Aluru are part of a multi-institutional consortium that made a proposal for the project. The acquisition of the equipment makes them a top choice for assembling the sequences.

The second project is to cluster expressed sequence tags (ESTs) or, as Aluru describes it, go gene hunting. Genes express themselves as they convert into proteins. Biologists can capture the sequences or ESTs that result from the conversion process. Organisms express lots of genes at once, which are unique to all of the different tissues in the body. At present, more than 6 million human ESTs and more than 4 million mouse ESTs are known. The computational challenge is to cluster the ESTs into groups so the sequences that come from the same gene fall into one group. Once that's done, researchers can figure out where the clusters come from on the genome and be able to identify the genes.

With the new equipment, Aluru's research group will use software they developed to cluster a million ESTs in one run. "That's significantly more than any other program can do," Aluru says. "We'll use it to develop a catalogue of all the human genes and all of the mouse genes."

Jernigan will lead the third project focusing on protein systems biology. Proteins typically interact with other proteins to carry on bodily functions. While many researchers are doing localized studies to understand the role of proteins in a particular activity, Jernigan plans to scale it up and look at the interactions at the whole organism level.

As expertise and awareness about the supercomputer grows, Aluru expects many other projects with the life sciences to be generated.

Harpoles win Campanile Award

Murray and **Ruth Harpole** of St. Paul, Minnesota, received the 2005 Order of the Knoll Campanile Award for service and generosity that advanced the excellence of Iowa State.

Murray graduated in 1943 with a degree in electrical engineering and went on to found Pentaire Inc., a global leader in water-handling equipment and enclosures for electrical equipment.

The Harpoles have been active at Iowa State both by serving on various boards and through gifts that supported the Engineering Teaching and Research Complex and the renovation of Coover Hall, in addition to creating a professorship in electrical and computer engineering.

Buildings . . . continued from p. 4

the first phase is scheduled to start in the spring of 2006 and take about 18 months to complete. It will begin with the demolition of the "Cyclone" addition to Coover Hall that was built in the 1950s on the east side of the original building. The demolition, Jacobson adds, will have minimal impact on faculty, staff, and students. After that, a three-story building will be constructed adjacent to Coover.

The first floor of the new building will house an interactive classroom. There will also be new research labs on the first and third floors, along with additional teaching lab space on the second floor.

The new setup, Jacobson says, will be ideal for both research and teaching. "The space will be perfect for student-faculty interaction," Jacobson adds.

Phase 2, which will take about two years to complete, will consist of renovating the original Coover building. This part of the construction process will have a much bigger impact because work will have to be completed floor by floor and will cover a much larger area than Phase 1.

Jacobson says the improvements to Coover Hall and construction of the new ECpE Building II will mean an increase in lab, office, and classroom space. Right now, Coover has about 45,000 square feet of space, but when finished the two buildings will mean nearly 65,000 square feet for the department.

It's also going to encourage more teamwork and be the home of modern, flexible learning environments that can be adapted to meet the changing needs of the department, says **Keith Fortmann**, the College of Engineering's executive director of development, who is another key player in this project. The biggest difference faculty and students will see in the new ECpE building, he adds, will be the clustering of labs, which is going to create a greatly enhanced environment for research that brings the department's faculty together under one roof.

Fortmann notes that constructing a small, new building, in addition to remodeling Coover, will prove far more cost-effective than building an entirely new facility. His office has raised most of the $8.25 million in private funding needed to finish the first phase. Fortmann says the economy has rebounded from the 2001 downturn, and fundraising for the project has picked up momentum. His group is, however, going through a final push to complete their fundraising goal for Phase 1 before they break ground in the spring.

The development office needs to raise an additional $5 million in private funding for Phase 2 of the project, Fortmann says. "The support of alumni and donors continues to be critical to the continued success and national reputation of the ECpE program," Fortmann adds. "And the college is seeking everyone's support for the project."

David Jiles to give Royal Society Ewing Lecture

Professor **David Jiles**, who taught at Iowa State from 1984 until July 2005, has been selected to give this year's Ewing Lecture at the United Kingdom's Royal Society. The lecture, on nonlinear behavior in magnetic materials, will be presented on December 7 in London.

The Ewing Lecture honors Sir James A. Ewing (1855–1935), generally acknowledged as the scientist who, in the early years of the 20th century, helped to make Japan a worldwide leader in magnetism. The UK Magnetics Society recommends candidates for the Ewing Lecture to the Royal Society; the lecture is sponsored by both societies.

Before accepting a position at Cardiff University in Wales last July, Jiles was Anson Marston Distinguished Professor in ECpE and MSE at Iowa State. He also served as senior physicist with Iowa State's Institute for Physical Research and Technology, holding appointments with both the Ames Laboratory and the Center for Nondestructive Evaluation. And he was named editor-in-chief of *IEEE Transactions on Magnetics*, the leading academic journal devoted to the basic physics of magnetism, magnetic materials, applied magnetics, and magnetic devices.

Now a collaborating Anson Marston Distinguished Professor, Jiles continues his affiliation with Iowa State by supervising a research group that is investigating magnetism and magnetic materials, condensed matter and materials physics, the electronic properties of materials, the mechanical properties of solids, and the nondestructive evaluation of materials.

During his tenure at Iowa State, Jiles was instrumental in coordinating several national and international research programs on the effects of structure on the magnetic properties of materials. He published more than 400 research papers and two books: *Introduction to Magnetism and Magnetic Materials* (first edition 1990, second edition 1998) and *Introduction to the Electronic Properties of Materials* (first edition 1994, second edition 2001). His third book, *Introduction to the Principles of Materials Evaluation*, will be published by Taylor and Francis in 2006.

Serving up help at a moment's notice

Left to right: Pam Myers, Vicky Thorland-Oster, Ginny Anderson (secretary), Roger Bentley, Sadie Kohlhaas, Tony Moore

Whether you're a freshman on campus for the first time, a graduate student who's been here for six years, a new faculty member, or a professor with 25 years' tenure, ECpE's student services group offers a variety of services to make academic life easier.

Located in 1401 Coover, the staff includes **Roger Bentley**, **Tony Moore**, **Pam Myers**, **Vicky Thorland-Oster**, and graduate assistant **Sadie Kohlhaas**.

Academic advising and curriculum planning take up much of Bentley's time, but, like others in the group, he also teaches a non-engineering college introductory class that helps incoming freshmen understand the academic expectations for electrical and computer engineering majors. The students also learn important college success skills, good study habits, dealing with change, and many other topics aimed at helping new students transition into the college life. Those who want to find out more about tutoring, the peer-mentoring program, and the learning communities can also go to the student services group for information about those programs.

For new faculty members like **Namrata Vaswani**, the group provides many services, one of which was helping Vaswani find a graduate assistant this fall. "I pointed her in the direction of a student who met her qualifications," Myers says about her role in the search. "She's working with the student on a trial basis right now, and I think she's very excited about that."

Myers also helped Vaswani drum up interest for her graduate-level special projects course. Vaswani was expecting five or six students on the first day, but after Myers sent announcements to all graduate students describing the course, nine ended up enrolling and four are auditing the class.

International students use the services this team offers to ease what is often a difficult transition. "There's a lot of red tape," Thorland-Oster explains. "It's a big transition, and communicating with them can be difficult. There are so many things international students have to learn, and they have a lot of pressure placed on their shoulders."

While graduate assistant Sadie Kohlhaas is admittedly just learning the ropes, she's impressed by what she's seen in the office so far. "Everyone here works well together," she describes. "There hasn't been a time when a student went away mad because someone wouldn't talk to them or someone was rude. A student might not be happy with an answer they get, but at least when they leave they understand why they got that answer."

Moore says that since students turn to him for advice, one of the most important roles he plays is that of advocate. To perform in that role effectively, he has to build solid relationships with hundreds of advisees. The students have to trust him, Moore says, because many times someone will show up at his office to ask for advice that may not be rooted in academics.

That, Moore says, isn't always easy. "We have to walk a fine line between being advocates for the students and helping them be successful, but we also have to work within the rules and procedures of Iowa State," he explains.

Adds Bentley, "We train students to be self-advocates who ultimately take responsibility for their academic and personal development. It's part of our job to act in a consultant/advocate role between the university and the student."

Another service this group provides is helping seniors make sure they have everything in order for graduation by going over their final degree audits. "We go over their graduation checklist to make sure they know what's coming down the road, and we make sure everything is taken care of," Thorland-Oster explains. "We don't want any nasty surprises."

So, whether it's a senior who wants help improving his portfolio, or an international student making her way through the difficult process of familiarizing herself with university policies and rules, students in ECpE can count on the student services group. Roger, Tony, Pam, Vicky, or Sadie are glad to answer those difficult questions and provide valuable advice.

Honors & Awards

Steve Russell	Patent: "Spread Spectrum Digital Data Communication Overlay System and Method"
Mani Mina	LINC Faculty Member of the Year
Aleksandar Dogandzic	2004 International Electrical and Electronics Engineers (IEEE) *Signal Processing Magazine* Award
Wilma Bucklin	Mervin S. Coover Distinguished Service Award
Steven Kovarik Joseph Mesterhazy Mark Shamblin	COMPUTER SERVICES GROUP
Gary Bridges Jason Boyd Edwin Jones	TECHNICAL SERVICES GROUP
David Jiles	United Kingdom's Royal Society Ewing Lecturer
Srinivas Aluru	Best Paper Award—IEEE Computational Systems Bioinformatics Conference
Vikram Dalal	David R. Boylan Eminent Faculty Award for Research
Puneet Sharma	The Thomas M. Whitney Fellowship
Natarajan Viswanathan	Harpole-Pentair Development Faculty Award
Basheer Al-Duwairi	Research Excellence Award
Qiming Chen Jing Fang Mikel Bezdek Joshua Olson Joseph Schneider Ganesh Subramanian Lu Zhang	
Anthony Persaud Miguel Contreras	GEM Fellowship
Benjamin Anderson	Cisco Fellowship
Mahadevan Gomathisankaran	IBM PhD Fellowship
Anantharaman Kalyanaraman	
Ramon Mercado	Lockheed Martin Fellowship
Benjamin Jackson	USA MGET Fellowship

Faculty making marks in business, academics

While ECpE alumni are finding success in the world of academics, ECpE faculty members are making their mark in business.

Take, for example, Professor **Suraj Kothari** who, in 2002, founded Ensoft, a company that makes tools for developing and maintaining large software systems. By automating tedious software engineering practices, Ensoft's products improve productivity and software quality.

The company, with headquarters at the ISU Research Park, has seven employees.

Associate Professor **Doug Jacobson** also runs a company at the Research Park. Palisade Systems, founded in 1996, develops and sells computer network security systems, targeting businesses that need to protect confidential information.

Palisade's products are mainly used in legal, health care, and financial services settings. The company has 23 employees.

At least one ECpE faculty member is making strides in academics too. Assistant Professor **Zhao Zhang** recently co-authored a paper that was published in the *33rd Annual IEEE/ACM International Symposium on Microarchitecture* held in Monterrey, California, last December. His presentation centered on the reduction of memory bank conflicts in high-performance workstations and servers.

The solution, called XOR interleaving or permutation interleaving, has now been adopted in Sun MicroSystems' UltraSPARC IIIi processor, which is used in Sun's entry-level servers and high-performance workstations.

Zhang worked with **Xiaodong Zhang**, a professor at The College of William and Mary, and **Zhichun Zhu**, assistant professor at the University of Illinois at Chicago.

ECpE would like to hear from you!

Write to us at 2215 Coover Hall, ISU, Ames, IA 50011-3060; call us at 515 294-2664; e-mail to ece@ee.iastate.edu; or fax to 515 294-3637.

We want to hear 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, student groups, and other department 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.

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Alumni making a mark in academia

Two ECpE alumni—**Mark Law** and **David Lilja**, who both graduated in 1981—are making their mark in the world of academia. Both are leading electrical and computer engineering departments at major universities, Law at the University of Florida and Lilja at the University of Minnesota.

Law is beginning his third year as chair of the department in Gainesville. After earning his BS in computer engineering from Iowa State in 1981, Law went on to Stanford, where he completed his MS and PhD. He started working at Florida in 1988.

Mark Law

Law says his years at Iowa State prepared him well for his career. "Iowa State gave me a great experience," Law says.

Law was an honors student at Iowa State, which gave him the opportunity to somewhat tailor his program. He took advantage of that opportunity, using the experience to further his public speaking skills with presentations in philosophy and history classes. "I might not have had that opportunity somewhere else," Law notes.

At Stanford, Law studied semiconductor device theory, which is still his research area today. He's trying to improve the performance of transistors. He works with companies like IBM, Intel, and Texas Instruments, helping them understand how to optimize their transistors.

Lilja, meanwhile, has been teaching at the University of Minnesota since 1991 and was appointed to the electrical and computer engineering chair there earlier this year.

After graduating with a BS in computer engineering from Iowa State in 1981, Lilja earned an MS from the University of Illinois in 1982. He then spent several years in Silicon Valley working as a computer designer at Tandem Computers, Inc., before returning to Illinois to complete his PhD in 1991.

Lilja also believes his years at Iowa State were important in developing the skills he uses today.

"Iowa State gave me a great foundation in engineering that has served me well throughout my career," he says. "The education I received prepared me both for working in industry and as the basis for my graduate studies. I also had a wonderful advisor, **Dr. E. C. Jones**, who helped me see that my options were wide open."

David Lilja

Lilja's research focuses primarily on high-performance computer architecture, parallel processing, nanocomputing, and computer systems performance analysis.

Law and Lilja were friends while at Iowa State, and both served as officers in Eta Kappa Nu.

"It strikes me as somewhat unusual that two alums from the same class are now serving as department chairs," Law says. "I know I'm proud of my undergraduate training, and I'm sure Dave is as well."

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