

SPARKS

Department of Electrical Engineering, University of Arkansas

Fall 2009

Volume 2, Issue 2

Upcoming Events

- November 25-27—Fall Break
- October 12—Seminar,
Brian Blow, Medtronics
- December 9-16—Final Exams
- Dec 17-Jan 8—Winter Break
- January 11—Spring Classes begin

If you would like to receive this newsletter electronically, please send your email address to cjhowar@uark.edu.

Greetings from the Department Head



Dear Alumni, Friends and ELEG members,

This fall 2009 marks the 112th year that the department has been teaching future engineers in the state of Arkansas. The department is offering 23 courses and 6 laboratory courses with 16 tenure and tenure-track faculty members and 8 graduate teaching students supported by a staff of 5 full-time employees and several work-study students.

On the personnel side, Daniel Klein has joined the department as a Scientific



Research Technician. Daniel has a bachelor degree in Computer Engineering from the University of Arkansas and is very excited about contributing to the department. Our department head, Dr. Samir El-Ghazaly, will be spending one year at the National Science Foundation as the Program Director of Electronics, Photonics and Device Technologies. This is a great opportunity for Dr. El-Ghazaly as he will have the opportunity to develop new funding programs in order to help the nation maintain its research advantage. The University of Arkansas will also benefit from the high visibility of this position. We wish him well and looking forward to having him back in Arkansas next year.

This Fall 2009 issue of Sparks provides a summary of some of the activities that

have taken place around the department. We have a wonderful group of faculty members, staff and students to continue moving this department forward.

We always welcome hearing about the accomplishments of our alumni since they make us feel proud and provide us with the necessary boost to continue our teaching, research and service activities. Please, let us know of your contributions by sending them to Connie J. Howard at cjhowar@uark.edu.

Regards,

Juan Carlos Balda, Professor
Acting Department Head

Stimulus Funds Will Help Researchers Modernize National Power

Electrical engineering researchers at the University of Arkansas and the University of South Carolina were informed that they will receive an award from the National Science Foundation (NSF) to continue and strengthen their efforts to modernize the national power grid. The award will establish an NSF center of excellence, known as an Industry/University Cooperative Research Center.

"These funds will help us develop the knowledge, tools, hardware, software and personnel to flood the 21st century power grid with power electronics," said Alan Mantooh, professor of electrical engineering and executive director of both the new center and the existing National Center for Reliable Electric Power Transmission (NCREPT). "The nature of this grant will enable us to expand NCREPT's work with utility companies, defense contractors, equipment manufacturers, component suppliers and others to bring to market the technologies that will be needed to realize a robust and more reliable power grid." Other University of Arkansas researchers involved in the project include Simon Ang, Juan Balda and Roy McCann, professors of electrical engineering; T. A. Walton, managing director of NCREPT; Yongfeng Feng

and Brian Rowden, research assistant professors; and approximately 40 graduate and undergraduate electrical engineering students.

Mantooh said that the combination of academic research and industry insight, made possible by the grant, will accelerate commercialization of solid-state systems. Researchers will focus on design, development, evaluation, control and standardization of grid-connected power-electronic equipment. Attention will also be given to intelligent coordination of the emerging, digitally controlled electric power grid.

The award, funded under the American Recovery and Reinvestment Act of 2009, becomes effective September 1 and will last for 5 years. It is renewable for up to another 5 years. Each year of the grant period, NSF will provide \$113,000 for administrative costs to the University of Arkansas as lead institution and \$63,000 to the University of South Carolina. So far the center has recruited 12 private companies as members of the Center and is seeking more, Mantooh said.

The overall goal of the center is to pursue projects that enhance grid reliability. The center will train students and practicing engineers to develop and manage

the next generation of power systems. Producing more students in the field is important to Arkansas and the nation, Mantooh said. The energy and power industry estimates that over 50 percent of the engineers will retire in the next 5 to 10 years. Young people are being encouraged to strongly consider a career in electrical engineering to meet the demand.

"To put this in perspective, if all the country's electrical engineering programs put all of their students into this field, it wouldn't be enough," Mantooh said. "So our graduates are seeing wonderful employment opportunities at the bachelor's, master's and Ph.D. levels."

The grant will also help researchers make full use of NCREPT's unique test facility, a 7,000-square-foot building at the Arkansas Research and Technology Park in south Fayetteville. The facility, capable of testing power systems up to 6 megawatts, consists of several transformers, many circuit breakers and regeneration drives that are connected in a highly reconfigurable and programmable manner to enable many types of application scenarios, including distributed generation and protection devices.

New Personnel



Daniel M. Klein joined the Department as a Scientific Research Technician, starting the first day of the fall semester, August 24. Daniel was born in Anaheim, California, but has lived in Arkansas for the past 15 years. He received his BS in Computer Engineering from the University of Arkansas in 2006. He last worked at Superior Industries in Fayetteville, where he was the Engineering MIS Manager.

Daniel will be working with George Tatge, and will be responsible for maintaining all computers, labs and servers in the Electrical Engineering Department. When he gets a chance, he enjoys computer games, hiking, and floating.

WiNS Center Nanotechnology and Healthcare Education Training Workshop

The NSF EPSCoR WiNS Center (Director: Dr. Vijay K. Varadan) hosted a training workshop July 29–31, at the University of Arkansas' Research and Technology Park, providing an opportunity to expose researchers to interdisciplinary research projects in nanotechnology and healthcare related areas, to enhance collaboration between center members, and to better prepare students and researchers for the application of nanotechnology, information technology, and biotechnology in their healthcare-related careers. Among the 65 participants that attended the workshop were researchers from six universities, three institutions, and three companies from Arkansas and neighboring states. Included in the group were researchers from the core state universities that constitute the Center, including participants from Arkansas State University, University of Arkansas at Fayetteville, and University of Arkansas at Little Rock.

After a welcome by Dr. Ashok Saxena, Engineering Dean, invited speakers from the National Science Foundation, University of Nebraska Medical Center, St. Jude Children's Research Hospital, University of Oklahoma Health Sciences Center, and University of Arkansas for Medical Sciences introduced recent trends and innovations in nanotechnology related to healthcare. Training sessions during the workshop

Faculty Focus

Alan Mantooth, professor of electrical engineering and executive director of the National Center for Reliable Electric Power Transmission, received the William D. and Margaret A. Brown Faculty and Staff Excellence Award—Faculty Division at the AAEE Banquet in April.

2008-2009 College of Engineering Faculty Awards for the Electrical Engineering Department were: Outstanding Teacher: **Magda El-Shenawee**; Outstanding Researcher: **Vijay Varadan**; Outstanding Service to Students: **Roy McCann**

provided hands-on training with modern nanobiotechnology techniques and equipment. Research presentations and posters were also presented by students and researchers. A special lecture was also presented by Dr. Shannon Davis, Assistant Dean of Engineering, for researchers entering academic positions.



Scott C. Smith, H. Alan Mantooth, Jia Di (CSCE), and Jingxian Wu received a Department of Education Graduate Assistance in Areas of National Need (GAANN) grant to fund 4 Ph.D. students for three years in the area of Asynchronous and Mixed-Signal IC Design and CAD for Next Generation Ultra-Low Power Computing and Communication Systems for Medical, Mobile, and Sensor Network Applications.

Omar Manasreh provides this news from his Optoelectronic Research Lab: New personnel include Dr. Shilin Li who was hired as post-doctoral fellow through the Institute of Nanoscale materials Science and Engineering; Dr. Eric DeCuir, Jr., graduated with his Ph.D. and currently he is working with the group as a research associate; a new Ph.D. student, Nazarly Andrushchak, from Ukraine joined the group with a full Fulbright Scholarship. Also, two

papers were accepted for publication in Applied Physics Letters, and a third paper which resulted from collaborative efforts between our group and researchers from the Physics Department, was published in the journal of Nanotechnology. Recent growth of ZnO nanorods by both graduate and undergraduate students indicates that we have a better control on the size and shape of these nanostructures. These nanorods may have application in high efficiencies solar cells.

The **Solar Splash** team was one of the winners of the John A. White Award for Faculty-Student Collaboration and was showcased at the Academic Convocation held on August 23. Solar Splash is a joint effort between the **Electrical Engineering Department** and the Mechanical Engineering Department.

Summer Camps

The Electrical Engineering Department participated in two camps this summer. The first was an EE Camp held June 15-19. There were 24 rising junior and senior students from all over the country, all interested in electrical engineering. The students stayed on campus in a dorm during this week to give them the UA experience. The students went to Beaver Dam and had a great tour — one of the few being given since September 11, 2001. Other tours included the SWEPCO power station in Gentry, the wind turbines that can be seen just off I-540 in Springdale, the NCREPT facilities, APEI, and outstanding tours of the labs of Dr. Juan Balda, Dr. Scott Smith, and Dr. Omar Manasreh. During the day, the students designed and constructed solar cars, wind turbines, and solar water heaters, as well as constructing simple circuits and electromagnets. The second camp was a GT Scholars Explorations iCAMP segment for Electrical Engineering. This was held the week of June 22. The

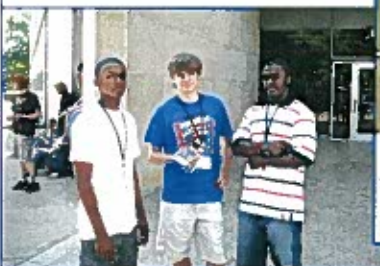
students were rising 6th and 7th graders. The students designed and built a wind turbine which generated electricity. The camps were organized by Bryan Hill and his excellent staff in the Engineering Recruitment Office. The students seemed to have a good time and Dr. Randle Overbey, Facilitator of the camps for the EE Department, says that he, personally, had a great time, and he believes we succeeded in encouraging the students to pursue careers in science and engineering (particularly, electrical engineering).



EE Camp



iCamp



Student Spotlight



John Damron, Lauren Megee, Tristan Evans, Brady Delperdang, Jordan Greenlee

Students from the Electrical Engineering department at the University of Arkansas participated in the annual Texas Instruments Analog University Design Contest winning third place in the prestigious Engibous Prize competition. This is the second consecutive year a team from the University of Arkansas has placed in the top three (first place last year).

The contest is aimed at Junior and Senior level undergraduate students and emphasizes innovation in the use of analog integrated circuits to realize a project. The winner advances to the Engibous Summit in Dallas. This year, a total of 25 teams from North American universities competed and, of those, nine remaining teams were invited to attend the summit.

Representing the University of Arkansas were **Brady Delperdang, John Damron, Tristan Evans, Jordan Greenlee and Lauren Megee**, with their project, "Photovoltaic Array with Maximum

Power Point Tracking." The report submitted for the contest was part of their Senior Design classes and was sponsored by American Electric Power. The project utilized a TI DSP as well as other analog components to take accurate readings of a PV array's present voltage and current output and used a boost converter to ensure the array was at its most efficient operating point. Grid connectivity was also explored and implemented with an H-bridge and phase lock loop.

First and second place went to Virginia Tech and the University of Arizona, respectively.



Stephen Crain, Senior undergrad student has been involved in **Dr. Magda El-Shenawee's** research group since 2008. Stephen was selected by Dr. El-Shenawee to spend three summer months in France funded by her NSF grant to work with her collaborators at the University of Technology of Troyes. Stephen has been involved in Dr. El-Shenawee's collaborative research project with the French researchers on fabricating nano-antennas and

measuring the near field enhancement. Stephen has shown great progress on his research and had fun travelling around Europe during the summer.

The National Center for Reliable Power Transmission sponsored **Andre' Cook**, a mechanical engineering freshman, as part of the Carver REU Program this summer. Andre's work focused on strengthening the new center's Personnel Safety Program. Andre's home is San Antonio, Texas, where he graduated in the top 10% of his class. He is an INROADS Scholar and a Silas Hunt Scholar. In addition, Andre' has worked as a community volunteer in a San Antonio hospital and with Habitat for Humanity. Andre's primary coach was **T.A. Walton**, NCREPT Managing Director.



Matt Bell, Jordan Greenlee, Alan Mantooth, Osama Saadeh, Chris Lee, Brian Sepko, William Holden, Stephen Short

HKN-IEEE BANQUET

The 31st Annual HKN-IEEE Banquet was held April 22, 2009. The guest speaker was Dr. James C. Rautio, of Sonnet Software. Awards were given to Outstanding Seniors: Caleb Sieck, Scott Geurin, and Beau Jackson; Outstanding Junior was Brady Hurlburt, and Outstanding Sophomore was David Hendren. Chris Hoyt and Caleb Sieck were also presented with the plaque won by them at the IEEE Contest sponsored by CCET.



Caleb Sieck, Christopher Hoyt, Dr. Terry Martin



Dr. James Rautio

Congratulations, Graduates!

On May 9, the Department of Electrical Engineering served a luncheon for their graduates and families, just prior to the College of Engineering Commencement Ceremony. This gave the families an opportunity to meet the faculty and staff of the Department and see where their loved ones had spent the better portion of their college careers. It was an enjoyable day for all concerned. We wish our graduates and their families all the best.



Staff Notes



George J. Tatge, Master Scientific Research Technologist for Electrical Engineering, was awarded the William D. and Margaret A. Brown Faculty and Staff Excellence Award—Staff Division at the AAEE Banquet in April.

Connie Howard, Administrative Specialist II, received the Employee of the Year award for the College of Engineering, and was one of 40 nominees for Outstanding State Employee at the Arkansas State Employee Association Banquet on August 7.





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Alumni Updates



Bill McVey, 1971 Electrical Engineering graduate, recently provided the Department with an update on his career since graduation. In 2002, he became the second graduate engineer from Arkansas to be selected to serve on the Oklahoma

Engineering/Land Surveyor Board and the first Electrical Engineer from Arkansas to serve. He was recently appointed to his second six year term on the Board.

In regard to his appointments to the Board, Bill had the following comments: "It has been a very interesting and busy six years. As I was thinking back over the last six years since becoming a member of the board, I could not help but think about all the fine young men and women who have become licensed as Engineering or Land Surveyor Interns and/or Professional Engineers or Land Surveyors. They number in the hundreds. Presenting the new licensees their certificates at the Certificate Presentation Ceremonies was a true pleasure. A very special moment was when I presented the PE Certificate to the son of a fellow engineer who has been one of my peers for the last 35 years. Since becoming a Grandpa, I have become more and more aware of the 'cycle of life' and this was a special moment.

"Helping to develop exam questions for the October 2004, Electrical & Computer Engineering PE Exam with NCEES in Clemson, South Carolina was also a special experience.

". . .The work at this board is addictive but it is a wonderful addiction to be able to help elevate our professions and help other board members and our outstanding board staff to protect the health, safety, and welfare of the public. "

He holds a P.E. license in 15 states and is very active in many professional engineering societies and other professional activities, such as the American Council of Engineering Companies, Consulting Engineers Council of Oklahoma, American Society of Hospital Engineers, National Association of Corrosion Engineers, and the Oklahoma City Electrical Appeals and Code Commission Review Board, 1992-1994.

Bill gives credit for any success he has ever enjoyed to a wonderful lady named Ann Morton, who came into his life after the first two years of college. He actually met Ann just before being asked by the U of A to, as he puts it, "take a year off and grow up, essentially." He says their story is really a love story and that when he returned, she worked full time and he worked part time to put him through college. The McVey's have two wonderful adult kids and six wonderful grandkids, ranging in age

from 10 months to 14 years. Bill and Ann moved to Oklahoma City right out of college in January 1971, and have been there ever since. He first worked with the local electric company, and later FSB Architects/Engineers, before coming to PSA Consulting Engineers in 1984. He is currently President of PSA. PSA Consulting Engineers, Inc., has provided mechanical and electrical engineering primarily for construction projects since 1971. Among PSA's more noteworthy projects, Bill lists the Bricktown Ballpark (\$31M), OSU Gallagher-Iba Arena Renovation (\$54M), OKC Civic Center Renovation (\$54M), Hilton Skirvin Hotel Renovation (\$43M), OKC Art Museum (\$23M) and many, many others over the last 38 years.

Naturally, Bill and his family are huge Hog fans. They have had season tickets to all the Fayetteville and Little Rock games since the late 60s and rarely miss any of the home games. **Go Hogs!!!!!!!!!!!!!!**