COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING

PENNSTATE

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Welcome to a new academic year!

Every fall brings a group of new faces to campus and signals a new beginning. We are looking forward to a great year and hope that many of you can become involved in the department activities. See page 4 for details of the activities scheduled for homecoming weekend. Come and enjoy some networking and reuniting with classmates.

MENTORING PROGRAM BEGINS

The first year of the electrical engineering department mentoring program is beginning. We have 80 volunteers to be mentors to electrical engineering junior and senior students. The matching of the alumni-student pairs will take place in early September.

The mentoring program is an initiative of the Society of Penn State Electrical Engineers (SPSEE), the alumni group of the department. A number of dedicated volunteers have been collaborating and assembling information to create this experience for the students. Jerry Kolbe, electrical engineering alumnus and director of business development for Murata Electronics, stated, "We are excited that the planning has come to fruition and look forward to a great first year of the mentoring program."

We modeled our program after an established mentoring program in the Department of Mechanical and Nuclear Engineering. Jerry Robertson, mechanical and nuclear engineering alumnus, commented, "I am excited about the success of the MNE/PSMES Mentoring Program and the positive impact it will continue to have on the professional development of Penn State mechanical engineers. Because of this program, mechanical engineering students are receiving professional guidance from alumni and opportunities to establish a network that will provide both short- and long-term career benefits."

The mentors will provide guidance and counsel to the student. The students will gain a real-world perspective of their chosen career path. Having a mentor can solidify or even modify their idea of what they may want to pursue upon graduation. Establishing a relationship with an alumnus now can lead to life-long friendships and foster networking opportunities for years. "I hope that many of our undergraduate students will seize this opportunity to get a head-start on their professional careers," stated David Salvia, electrical engineering undergraduate program coordinator. "I wish that something like this existed when I graduated back in 1987."

We will be providing the mentors with action plan forms for communicating with the student. We would appreciate feedback from the mentors and the students. Since this is the first year of the program, we anticipate many suggestions. This feedback is very valuable and will allow us to fine-tune and improve the process.

More information about the mentoring program can be found on our website: http://www.ee.psu.edu/AlumniFriends/MentoringProgram.aspx or by contacting Cathy McClellan at cls118@psu.edu or 814 863-0253.

We invite all mentors and students to meet at the electrical engineering homecoming football tailgate on Oct. 9. Details of the tailgate can be found on page 4 of this newsletter.

Thank you to all of our volunteers! We are excited about this new initiative and look forward to a great year.

IONOSPHERIC MODIFICATION FACILITY IN PERU

Jim Breakall, professor of electrical engineering, and Julio Urbina, assistant professor of electrical engineering, recently made a trip to the Jicamarca Radio Observatory near Lima, Peru, to discuss the feasibility and design of a high power ionospheric modification facility funded by the National Science Foundation. Breakall is the main antenna designer of a similar facility that will be located at the Arecibo Observatory in Puerto Rico. He has been involved in that undertaking since the original facility was destroyed by Hurricane Georges in 1998. He was also instrumental in the design of a similar facility in Alaska, HAARP, with Tony Ferraro, distinguished professor emeritus, in the 1990s. When completed, the facility in Peru will be extremely important as it will be the only such place to carry out this research in the equatorial region.

Originally from Peru, Urbina worked as a radio frequency and digital engineer at the Jicamarca Observatory in his early career and hosted Breakall on the excursion.

Breakall comments, "This will be another very important research project for Penn State to have been fortunate enough to be involved in the designs of three of the premiere ionospheric facilities in the world."

From left, Professors Urbina and Breakall with Jicamarca chief engineer Otto Castillo with the huge Jicamarca 18,432 dipole antenna array in the background.

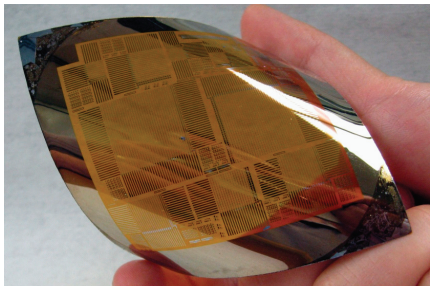
Faculty Spotlight

Thomas N. Jackson, Robert E. Kirby Chair Professor of Electrical Engineering, joined Penn State in 1992. Jackson can trace his interest in electrical engineering to elementary school. Born in Michigan, Jackson lived in several locations in Michgan, New York, and Pennsylvania, before returning to Michigan to attend the University of Michigan majoring in electrical engineering. He ended up staying at the University for his master's and doctoral degrees in electrical engineering.

Jackson joined the IBM T. J. Watson Research Center in 1980 as a research staff member. Jackson did research on III-V integrated circuits, superconductor-semiconductor devices, Ge MOSFETs, and active matrix display technology, and accumulated 28 issued U.S. patents (he has added another five since joining Penn State).

Jackson's switch to academia in 1992 was spurred by his interest in teaching and mentoring students and in exploring a range of research directions. Jackson's research group focuses on exploratory thin film electronic devices and microfabrication techniques. His current research interests include organic electronics, oxide semiconductors, biomolecular motors, and microelectromechanical systems. His general interest is in finding ways to put microelectronics in places and environments where it has not yet had impact, which could enable a wide range of next generation multi-purpose electronics such as displays, sensor arrays, and biomedical electronics among others.

Some of his thin film device research includes creating alternatives which are low cost, flexible, and have the potential for use in large area applications. Examples of this include displays and sensors which are flexible and/or transparent such as a display on the windshield of a car or stitched into military uniforms or hospital gowns. One of Jackson's research projects involves working with Penn State Milton S. Hershey Medical Center on the development of flexible electrodes to aid in an innovative way to control blood pressure. His funding for research comes from private industry, the Department of Defense, and the National Institutes of Health among others.



Flexible substrate with micro-bolometer arrays based on ZnO thin film transistors. Micro-bolometer arrays are the heart of infrared imagers used by soldiers and fire fighters. Flexible substrate micro-bolometer arrays may enable smaller, lower cost, higher performance imagers.

Jackson currently has ten graduate students involved in his research group. Each is involved in hands-on problem solving. Jackson's group is part of the Center for Thin Film Devices, which has a wide range of equipment for fabricating and testing thin film devices and systems. His group often customizes or builds their own equipment; consequently Jackson maintains a 5000 ft2 warehouse with systems and parts waiting to become the next new tool. Israel Ramirez, electrical engineering graduate student, explains, "As experimentalists we are constantly trying new approaches and methods, at Dr. Jackson's lab we have the opportunity to customize our tools to fit our current needs; I believe this is a great advantage in working with Dr. Jackson."

In addition to his research group, Jackson is teaching EE542 Semiconductor Devices this fall. He spends a great deal of time with his graduate students, in addition to teaching, as he coaches, trains, and challenges them to find original solutions as they take their problem solving skills into the lab. "Dr. Jackson's experience in the field of materials and devices is a constant source of knowledge for me and my colleagues," stated Ramirez.

When not immersed in the academic world, Jackson enjoys cooking, woodworking, being involved in his church and spending time with his family. Jackson, and his wife of 32 years, Susan, have two sons and live in State College.

Department Career Award to Mittan

The Penn State Department of Electrical Engineering and the Society of Penn State Electrical Engineers (SPSEE) awarded Paul Mittan the Early Career Recognition Alumni Award.

This award, in its first year, recognizes and honors outstanding Penn State electrical engineering alumni at the outset of their career who have demonstrated outstanding technical excellence resulting in significant career accomplishments and have shown great potential for continued success in their field.

After receiving his bachelor's degree in electrical engineering from Penn State in 2004, Mittan joined Lockheed Martin Corporation. In 2005, Mittan was accepted into the Lockheed Martin's Engineering Leadership Development Program and completed a master's degree in Systems Engineering from Cornell University in 2008. Mittan was then appointed as manager of engineering leadership development, where he was responsible for the technical development of entry-level engineers. In March 2010, he was appointed to his current role as manager, hardware design engineering. His responsibilities include supervising hardware development engineers and technicians.

Mittan serves on the Learning Factory Industrial Advisory Board at Penn State as well as being involved as the Lockheed Martin Philanthropy Liaison to Penn State. He also is active as a member of the Electrical and Computer Engineering Industry Advisory Board at Binghamton University.

Mittan is the lead coordinator for the Engineering Explorer Programs which is a project-based outreach program for middle school and high school students. Mittan has received a number of distinctions including the Award for Excellence in AMCM Aircrew Training, Lockheed Martin Diversity Award, and a Lockheed Martin Special Recognition Award. Mittan is a 4th degree black belt in Tae Kwon Do and an Eagle Scout.

Mittan and his wife Amanda (Health and Human Development '04), reside in Sayre, PA.

Mittan will officially receive the Early Career Recognition Alumni Award from Ken Jenkins, professor and head of electrical engineering department, on Oct. 8, 3 p.m. at the SPSEE meeting in the EE East Building on the University Park campus.

Department Updates

William Higgins, distinguished professor of electrical engineering presented three papers on his research group's work on image-guided interventions in the chest at the American Thoracic Society Annual Meeting in New Orleans, LA. Co-authors include collaborators at the Penn State Milton S. Hershey Medical Center: Drs. Rebecca Bascom, Rickhesvar Mahraj, Jen Toth, and Dave Campbell. Co-authors also include current Penn State students Duane Cornish and Rahul Khare, and past Penn State students Drs. Jason Gibbs, Mike Graham, and Kongkuo Lu.

Ji-Woong Lee, assistant professor of electrical engineering, and his student co-authors Sanam Mirzazad-Barijough, Supratim Ghosh, and Tingting Lu presented three papers at the 2010 American Control Conference held in Baltimore, MD. Two of the papers received the Best Presentation in Session Award.

Electrical engineering graduate student Yangsoo Kwon, supervised by Ram Narayanan, professor of electrical engineering, won the second prize in the student paper contest at the 5th IEEE Waveform Diversity and Design Conference held in Niagara Falls, NY.

Victor Pasko, professor of electrical engineering, presented an invited lecture on atmospheric electricity and electric coupling between the lower and upper atmosphere at the Workshop on Global Change and the Solar-Terrestrial Environment which was held in June at Aspen Global Change Institute in Aspen, CO.

The research work presented by electrical engineering graduate student Jianqi Qin at the 2010 Coupling Energetics and Dynamics of Atmospheric Regions Conference held in June in Boulder, CO, was selected for an honorable mention. Qin's work is devoted to numerical modeling of lightning induced transient luminous events and their effects in the middle atmosphere. Qin is working on his Ph.D. degree in Professor Victor Pasko's research group.

Students from the International Center of Actuators and Transducers, led by Kenji Uchino, professor of electrical engineering, received first place in the student poster competition at the 2010 U.S. Navy Workshop on Acoustic Transduction Materials and Devices. Seyit O. Ural, a materials science and engineering graduate student produced the poster titled "High Power Characterization of Piezoelectric Materials" which introduced new innovative techniques to perform near-"in service" characterization of piezoelectric materials/devices. Ural shares this honor with Yuan Zhuang, electrical engineering graduate student, Menglun Tao from Wuhan University of Technology, and Safakcan Tuncdemir, electrical engineering graduate student.

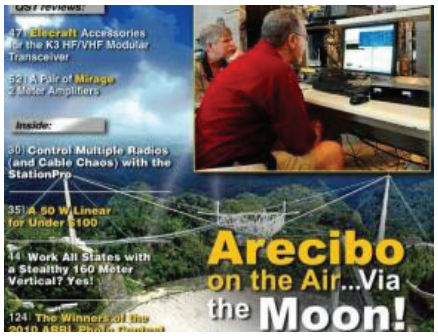
Doctoral student Xiang He and Aylin Yener, professor of electrical engineering, received the Best Paper Award at the 2010 IEEE International Conference on Communications (ICC) in CapeTown, South Africa. The paper, presented in the Communication Theory Symposium of ICC, is in the area of Information Theoretic Security and is titled "A New Outer Bound for the Secrecy Capacity Region of the Gaussian Two-Way Wiretap Channel."

Srinivas Tadigadapa, professor of electrical engineering, has been elected to serve as electrical engineering's representative to the College of Engineering Faculty Council.

Mohsen Kavehrad, W.L. Weiss Professor of Electrical Engineering, was an invited speaker for the IEEE Nanotechnology Council meeting held at Boeing in Seattle, WA, in August. His talk was titled "Optical Wireless Networked-Systems: Applications to Aircrafts."

Ken Jenkins, professor and head of electrical engineering, presented a paper co-authored by Chandra Radhakrishnan, electrical engineering graduate student, at the 53rd Midwest Symposium on Circuits and Systems (MWSCAS) in Seattle, WA, in August. Jenkins recently became the treasurer of the steering committee that oversees the MWSCAS conferences.

Jim Breakall, professor of electrical engineering, was featured in an article and on the cover of the August edition of QST Magazine, the official journal of the American Radio Relay League. The article includes Breakall's work at Arecibo and highlights an event in April in which amateur radio operators were able to use the Aricebo radio antenna in a *moonbounce*.



The Materials Research Society's Von Hippel Award to L. Eric Cross

L. Eric Cross, Evan Pugh Professor Emeritus of Electrical Engineering, is the recipient of the 2010 Von Hippel Award from the Materials Research Society (MRS). The Von Hippel Award is the society's highest honor and is "conferred annually to an individual in recognition of the recipient's outstanding contribution to interdisciplinary research on materials."

A founding member of the Penn State Materials Research Laboratory, Cross continues to make important contributions to the field of ferroelectric materials. He is recognized "for his imposing leadership in the science and applications of ferroelectric materials." His current work on flexoelectric composites could make possible a new generation of lead-free transducers for use in multiple industries worldwide.

World War II interrupted Cross's undergraduate education at Leeds University in the United Kingdom. During the war, he worked for the British Admiralty on a program using high frequency direction finding to track German U-boats, which ultimately allowed convoys to cross the Atlantic unharmed. The U.S. Navy supported much of his later work in the field of sonar undersea transducers.

Cross is a fellow of the Materials Research Society, the American Physical Society, the Optical Society, the Ceramics Society and the Institute of Electrical and Electronics Engineers. In 1983, he was elected to the National Academy of Engineering. Cross joined Penn State as a senior research associate in 1961. He became an associate professor in 1964 and was named professor in 1966. In 1985, he was named Evan Pugh Professor of Electrical Engineering, an Evan Pugh Professorship is the highest distinction that the University can bestow on a faculty member. He is the author or coauthor of more than 850 refereed papers and he holds12 patents. Along with his late colleague Robert E. Newnham, Cross developed the piezoelectric transducer designs used in almost all modern medical ultrasound machines.

Cross will receive the Von Hippel Award at the MRS fall meeting on Dec. 1, in Boston, where he will deliver the award lecture based on his research, "Flexoelectric Composites — The Cutting Edge for New Lead-Free Piezoceramics."

Football Homecoming Weekend Oct. 8-10
Join us for these events during Homecoming weekend

Society of Penn State Electrical Engineers Meeting

Society of Penn State Electrical Engineers is holding their fall meeting on Friday, 3:00 – 4:30 p.m. in 101 EE East. Items on the agenda include department update, SPSEE activities, and the mentoring program. We will also be awarding the first Early Career Recognition Alumni Award to Paul Mittan. Light refreshments will be provided. You can sign up on the department website:

http://www.ee.psu.edu/AlumniFriends/FallMeeting2010.aspx or by calling Cathy at 814-863-0253.

Homecoming Parade

The homecoming parade begins on Friday at 6:00 p.m. and is routed through campus and downtown. The College's alumni association is marching in the parade this year. They will be carrying the Penn State Engineering Alumni Society banner and will be joined by the EcoCAR. There are limited spaces available for those interested in joining the college in the parade. If interested, please email jtheiss@engr.psu.edu.

Football Tailgate

Yes, we're trying it again.

A homecoming football tailgate for electrical engineering alumni and the department will be held on Oct. 9 prior to the game with Illinois beginning at 9 a.m. Kick-off is noon. We will be located at RV parking space number 1113 which is the first row of RV's west of the stadium on the paved lot near Gate B.

Special thanks to John Wenaas (B.S., finance '69) and Wayne Breisch (B.S., electrical engineering '59) for assistance in donating this space!

Please plan to stop by. You don't have to register but it will give us an idea of how many people to expect. You can sign up on our website: http://www.ee.psu.edu/AlumniFriends/default.aspx or by calling Cathy at 814-863-0253.

Join us for an exciting homecoming weekend!

Mark Your Calendar:

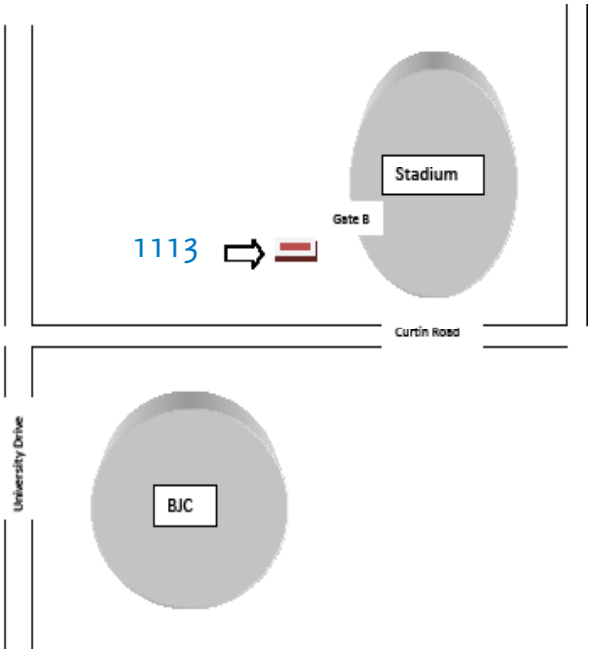
Sept. 13	Career Week Begins
Oct. 8	SPSEE meeting
Oct. 8	Homecoming Parade
Oct. 9	Tailgate

Ropchock Retires

Bernard (Bernie) Ropchock, the Department of Electrical Engineering's stockroom equipment technician, retired in July after 49 years of service at Penn State. Good luck to Bernie as he enjoys his retirement.

Pictured from left: Bernie Ropchock and Ken Jenkins, professor and head of electrical engineering department.

Map to the homecoming tailgate:



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Please submit news items to: Cathy McClellan at **cls118@psu.edu**