

COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING

PENN STATE



ELECTRONIC NEWSLETTER / SEPTEMBER 2009 / WWW.EE.PSU.EDU

Welcome to a new academic year!

The exterior of our buildings just received a face lift this summer with new paint. We look polished and are ready for our newest students. We are welcoming 59 new graduate students, from China, India, South Korea, Thailand, Turkey, and the United States. Together with our undergraduates, our student numbers are nearing 600.

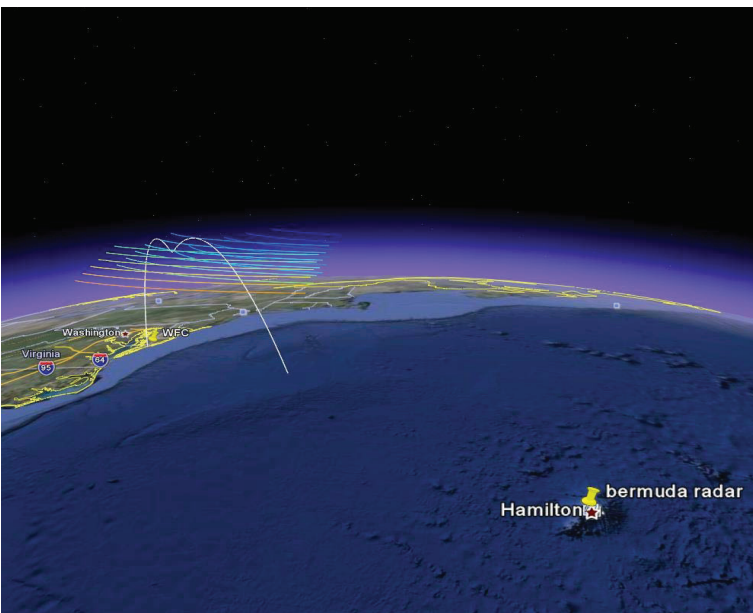
Look for our new Electrical Engineering Magazine which will be published this Fall. While we can't mail this to everyone, copies will be available in the department office or by e-mailing your address to cls118@psu.edu with attention: publications.



FACULTY AND STUDENTS PARTICIPATE IN MULTIDISCIPLINARY EXPERIMENT

Julio Urbina, assistant professor of electrical engineering, and three Electrical Engineering students, **Sandeep Kor**, **Ryan Seal**, and **Alexander Hackett** are traveling to Bermuda in September to participate in the Charged Aerosol Release Experiment (CARE). The experiment, funded by the Naval Research Laboratory, Department of Defense Space Test Program, National Science Foundation, and NASA will provide a greater understanding of the radar scattering properties of noctilucent clouds and help in our understanding of space weather and possible global warming changes.

Noctilucent clouds are formed in the mesosphere from water collecting on the surface of dust particles which are believed to come from micrometeors. The CARE project will produce an artificial noctilucent cloud by releasing aluminum oxide particles from a solid rocket motor equipped with a pin-wheel high speed dust dispenser. These particles will be released at approximately 280 km altitude over the Atlantic Ocean off the coast of Virginia. At 100 km altitude, the particles will slow down by colliding with the atmosphere to form the artificial noctilucent cloud. The NASA Aeronomy of Ice in the Mesosphere satellite will track the artificial cloud for weeks.



Magnetic aspect angle geometry of the radar interferometer system located in the Bermuda Islands. These are perpendicular to the Earth's magnetic field B contours at 250, 270, 290 km together with the CARE rocket trajectory. This common volume experiment is only possible if the radar is placed in Bermuda.

THE INTERNATIONAL CENTER FOR ACTUATORS AND TRANSDUCERS

The 56th ICAT/JTTAS Joint International Smart Actuator Symposium will be held on Oct. 6-7 at The Penn Stater Conference Center Hotel. The focus will be on compact and simple structured solid state actuators and integrated sensors.

You are invited to attend this symposium to share knowledge of current progress made in actuator/transducer materials, device designs and applications. If you are interested in presenting a poster at this symposium, please contact the symposium organizer as soon as possible. Company exhibitions & posters are also welcome.

Visit the conference Web site for registration and lodging information:
<http://www.mri.psu.edu/centers/icat/news.asp>

There are a number of experts involved in the CARE project including teams from Clemson University, the Air Force Research Laboratory, Stanford University, the University of Colorado, MIT/Haystack Observatory, and Penn State. Urbina and his team will be installing a VHF radar with 30kW peak power in Bermuda to provide ground based radar support for the rocket flight. The radar will be oriented at an elevation angle of about 11 degrees in the North-west direction and perpendicular to the Earth's magnetic field. The goal is to detect field aligned plasma irregularities that will develop in the ionosphere by injecting the artificial aerosol cloud. Providing hands-on experience for these students will bring value to their course work and research as they continue their education. For more information, contact Julio Urbina, jvu1@psu.edu.

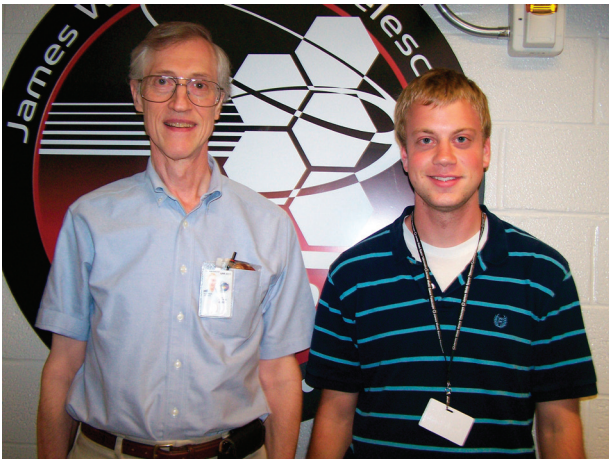
STUDENTS GAIN EXPERIENCE OVER THE SUMMER WITH COLLEGE OF ENGINEERING PROGRAM

The College of Engineering offers a valuable program matching students with employers through the Engineering Career Resources and Employer Relations office (formerly the Engineering Cooperative Education and Professional Internship Program). Through the programs offered, students can obtain career-related work experience prior to graduation. The program is free to all students in the College of Engineering, and students can choose to earn academic credit for their work experiences.

One of the students who benefited from the internship program this summer is **Keegan McCoy**, undergraduate student in Electrical Engineering. McCoy spent ten weeks this summer at NASA's Goddard Space Flight Center in Greenbelt, MD, where he developed an optical test plan at the Integrated Science Instrument Module level for the James Webb Space Telescope's Fine Guidance Sensor and Tunable Filter Imager using internal calibration lamps and the optical telescope element SIMulator. McCoy was named a John Mather Nobel Scholar this summer, an annual award that recognizes the highest achieving internship students at Goddard. McCoy commented on his experience, "With my goal of working for NASA and becoming an astronaut, Penn State's Engineering Career Resources and Employer Relations office and the NASA Academy internship program provided me with the unique opportunity to not only work on a major NASA space telescope, but also to travel to other NASA centers and commercial space companies, to develop leadership skills, and to listen to speakers from throughout the space industry, so that I can become one of NASA's leaders of tomorrow."

In addition to the Co-op and Internship Program, the Engineering Career Resources office has a number of services for students and corporate partners. The Professional Development Program is a series in which they invite industry representatives and faculty members to give presentations on career topics such as résumé and cover letter writing, technical writing, developing leadership skills, and making the transition from school to work. The office arranges and participates in recruiting events, including Fall Career Days and Spring Engineering Career Week. Approximately 1,000 different employers recruit Penn State engineering students during any given academic year.

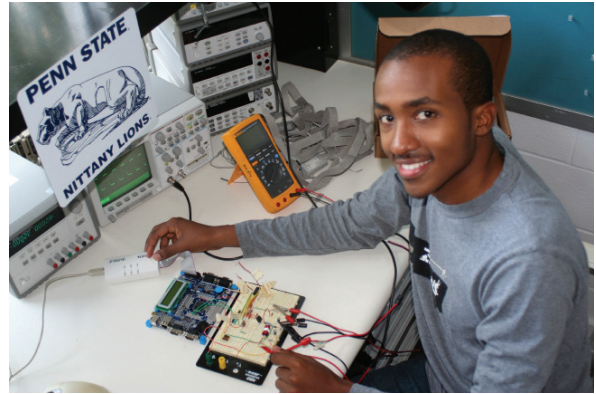
For more information, please visit www.engr.psu.edu/career



Keegan McCoy with Dr. John Mather, the project scientist for the James Webb Space Telescope and recipient of the 2006 Nobel Prize in Physics for his work on the cosmic microwave background.

STUDENT SPOTLIGHT

Matthew Anderson remembers taking apart his race car when he was boy to see how it worked and if he could put it back together. Anderson, a senior in electrical engineering, started his interest in engineering at an early age. Growing up in Jamaica, he dreamed of becoming an innovator and inventor of devices to make life easier and better. No doubt this driven young man will realize his goals.



Anderson started his collegiate education at Lawrence University in Appleton, WI. While there, he enrolled in the "3-2 Program" which allowed Anderson to complete three years at Lawrence and then two years at Penn State studying engineering. In Spring 2010, Anderson will have a bachelor of arts in Applied Physics from Lawrence and a bachelor of science in Electrical Engineering from Penn State.

Penn State was a natural choice for Anderson seeing as his interests are in power electronics and embedded systems. Even though Penn State is a large university, Anderson is impressed with the approachability and availability of the faculty. He enjoys being able to apply what he has learned in class through hands-on activities and team projects, thereby making the subject matter more meaningful. His favorite class, thus far, has been EE350, Continuous-Time Linear Systems with Associate Professor Heath Hofmann. This class challenged him in new ways and rewarded him with the confidence to tackle any opportunity.

His current 3.95 GPA, in combination with his leadership roles in a number of student activities, has rewarded Anderson with the Hai-Sup Lee Scholarship for his final year at Penn State. This scholarship was essential for Anderson to be able to continue his studies here. The economic downturn has hit impoverish Jamaica especially hard and his family was not immune. Witnessing the poverty and hardships of Jamaica has allowed Anderson to view his education in a different light. "I don't take the opportunities here in the United States for granted. I will continue to work hard and am determined to succeed," stated Anderson. His plans upon graduation haven't been determined yet. Graduate school is on the forefront of his plans but he isn't ruling out entering the workforce directly as well. Anderson commented that his goal is to find a career path that will challenge his creativity and expertise while providing the opportunity to learn skills outside of his field.

To reach Matthew Anderson: mga5036@psu.edu

FACULTY NEWS

Sven Bilén, associate professor of electrical engineering, was recently named interim head of the School of Engineering Design, Technology, and Professional Programs.

Craig Grimes, professor of electrical engineering, was invited to present a talk titled, "Synthesis of Vertically Oriented TiO₂ Nanotube/wire Arrays on FTO Coated Glass Substrates: Application to Hybrid, Organic and FRET Photovoltaics" at the Conference on Hybrid and Organic Photovoltaics on May 22, in Benidorm, Spain.

Grimes was interviewed and quoted in the July edition Popular Mechanics Magazine for an article titled "6 Bright Ideas for the Future of Energy" www.popularmechanics.com/science/earth/4322757.html

W. Kenneth Jenkins presented a paper titled "Hybrid WHT-RNS Architectures for Fault Tolerant Adaptive Filtering" at the 52nd Midwest Symposium on Circuits and

Systems in Cancun, Mexico, on Aug. 3-7.

Mohsen Kavehrad, W.L. Weiss Professor of Electrical Engineering, convened a workshop titled "Greater Than 10Gbps Copper Ethernet," an outreach activity of the Center for Information and Communication Technology Research (CICTR) on Aug. 10-12 on the Penn State campus. CICTR is a research center within the Department of Electrical Engineering focused on areas of technologies, systems, and network architectures that enable the vision of the information age.

Raj Mittra, professor of electrical engineering, was an invited speaker and co-sponsor in a workshop titled "Adelphi Antenna Workshop on Metamaterials" convened by several agencies of the Department of Defense. The workshop was held on May 27 and 28 in Columbia, MD.

In addition, **Mittra** authored and co-authored 24 papers, several of which were invited, at the

International Symposium on Antennas and Propagation, held in Charleston, SC, on June 1-5. The papers covered various topics, including small antennas, metamaterials, RFID tag designs and computational EM. **Mittra** also chaired three sessions and presented a short course on RFID Systems.

Mittra co-authored a book with Yang Hao titled FDTD Modeling of Metamaterials: Theory and Applications

Mittra presented two talks "Benchmark Studies of Four Computational Electromagnetics Codes: CST, HFSS, FEKO & GEMS" and "Future Directions in Computational EM" at the Institute of High Performance Computing in Singapore while collaborating on research into computational EM and plasmonics from July 5-18.

Mittra presented a talk titled "Modeling of Large-Scale Electromagnetic Systems on Parallel Platforms" while visiting Oak Ridge National Lab July 22-23.

Victor Pasko, professor of electrical engineering, convened the Chapman Conference on the Effects of Thunderstorms and Lightning in the Upper Atmosphere on May 10-14 in State College, PA, with a total of 110 participants from 16 countries.

ALUMNI NEWS

Do you have any news to share? . . . been promoted? . . . changed companies? . . . started your own business? . . . invented the next and newest widget? . . . received an award? We'd love to hear from you.

Do you have a great Penn State story? . . . run into another engineering grad from Penn State in an unusual place? . . . reunited with a class mate? . . . married to an Ohio State fan? I'd love to hear your stories.

Send to: **Cathy McClellan**, cls118@psu.edu

SOCIETY OF PENN STATE ELECTRICAL ENGINEERS

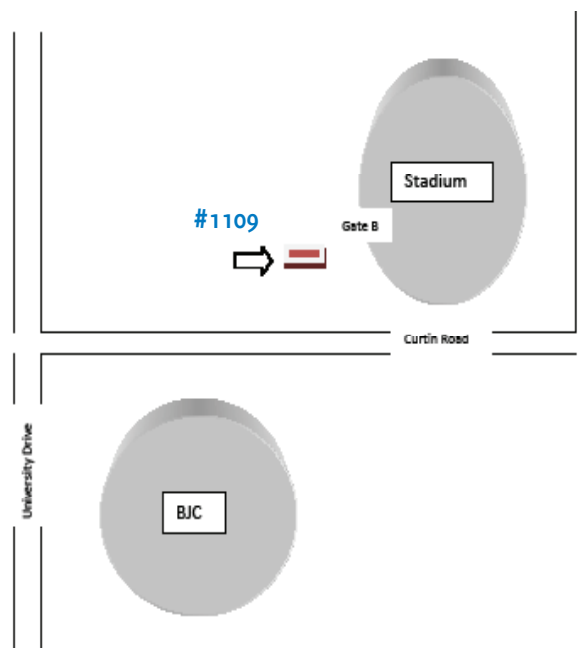
Meeting and Reception

Society of Penn State Electrical Engineers (SPSEE) kicks off the 2009-2010 academic year with a meeting and reception on **Oct. 2** at the Nittany Lion Inn. The meeting will be held in the The Penn State Room from **3-5 pm**. Items on the agenda will include the activities of the three committees, news on the state of the department, and a presentation by Professor **Thomas Jackson**. A reception will follow from **5-7 pm**. Please RSVP to Cathy McClellan cls118@psu.edu or call 814-863-0253.

Homecoming Tailgate

A homecoming football tailgate for alumni, faculty, and staff will be held on **Oct. 17** prior to the game beginning at **10:30 am**. Kick-off is 3:30 pm. We will be located at RV parking space **1109** which is the first row of RV's west of the stadium on the paved lot near Gate B. The parking space for our tailgate has been generously donated by Electrical Engineering alum, **Joe Sullivan**. Please see the map for location. While an RSVP is not needed, it would help with the planning: Cathy McClellan cls118@psu.edu or call 814 863-0253. Please stop by!

Map to tailgate site on Oct. 17



SUCCESSFUL CONFERENCES AT PENN STATE

The Chapman Conference on the Effects of Thunderstorms and Lightning in the Upper Atmosphere was held on the Penn State campus on May 10-14. The conference, convened by **Davis Sentman**, professor of physics, University of Alaska, Fairbanks; **Victor Pasko**, professor of electrical engineering, Penn State; and **Jeff Morrill**, research physicist, Naval Research Laboratory, coincides with the 20th anniversary of the first recorded image of a transient luminous event in the upper atmosphere by John R. Winckler of the University of Minnesota.

The conference was a culmination of the dynamic growth of research on transient luminous events and terrestrial gamma ray flashes during last two decades. The focus included observations of transient luminous events, theory of transient luminous events, ELF/VLF effects of lightning and transient luminous events, and energetic radiation from lightning and terrestrial gamma ray flashes.

There were 110 participants representing Brazil, Canada, Denmark, France, Fiji, Greece, Israel, Italy, Japan, the Netherlands, Norway, Russia, Spain, Taiwan, United Kingdom, and United States.

The Greater than 10Gbps Copper Ethernet workshop was co-sponsored by the Nexans Data Communications Competence Center and the Penn State Center for Information and Communication Technology Research (CICTR) and chaired by **Mohsen Kavehrad**, professor of electrical engineering at Penn State. Held from Aug. 10-12, in State College, value of twisted-pair cable solutions in the data center and enterprise networks. There were convincing arguments from the participants to have an Ethernet Committee Call-For-Interest for a 40GBASE-T solution in 2010.

The participants included representatives from many industry-leading companies from North America, Europe, and Asia, including:

- Cable manufacturers: Leoni, LS Cable, Nexans
- Chip manufacturers: Broadcom, Solarflare
- Connector manufacturers: Bel Stewart, Meritek, Siemon, Tyco
- System providers: Cisco, Force10 Networks



See if you can identify these Department of Electrical Engineering icons.



25 years later—1977-2002



UPCOMING EVENTS:

Oct. 2: SPSEE Meeting, Nittany Lion Inn, 3 p.m.

Oct. 6-7: Smart Actuator Symposium

Oct. 17: Homecoming Tailgate, Space 1109, 10:30 a.m.

Contact Information:

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

This publication is available in alternative media on request.

Penn State is committed to the affirmative action, equal opportunity,
and the diversity of its workforce.

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