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INDUSTRY MENTORS HELP STUDENTS SUCCEED

Students from the Student Space Programs Laboratory (SSPL) in the Department of Electrical Engineering participated in a preliminary design review for its Orbital System for the Investigation of the Response of the Ionosphere to Stimulation and Space (OSIRIS) weather Lite 2 (OLite 2) high altitude balloon mission on NASA's High Altitude Student Platform (HASP) balloon opportunity.

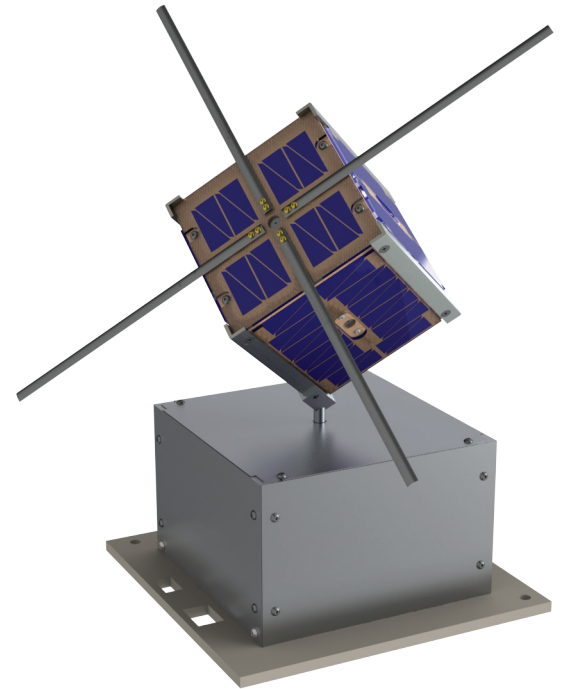
The OLite 2 payload is designed to test the basic systems for a CubeSat the students are designing and building. On the balloon, they will be testing their navigation algorithms, power generation and storage, thermal, communications, and flight computer. This mission is an extension of OLite 1, which has the same goals but in a much larger form factor. OLite 1 will fly this late spring or early summer.

OSIRIS studies the effect that the sun and ionospheric heaters, which are located at the Arecibo Observatory in Puerto Rico and the HAARP heater in Alaska, have on the ionosphere. These heaters pump hundreds of megawatts of power into the ionosphere to simulate “space weather” events.

Allen Kummer, graduate student in electrical engineering, is the OSIRIS Project Manager and a member of SSPL. Kummer stated that when the sun emits a coronal mass ejection (CME) in the direction of the Earth, the ionosphere absorbs the energy. “The increased plasma density weakens satellite communications and decreases GPS accuracy. Huge currents in the ionosphere couple with the power grid and the CMEs are health risks for NASA astronauts. During its six-month mission, the OSIRIS mission hopes to measure the plasma density at various spatial and temporal scales with three 10 x 10 x 10 cm CubeSats launched from the same rocket,” explained Kummer. Launch opportunities for OSIRIS are still being sought, but is targeted for 2013-14.

The OLite 2 student team met with their industry mentors from the Aerospace Corporation via live video conference for their preliminary design review to discuss their design ideas and receive feedback that will be valuable to a successful mission.

Twenty mentors from Aerospace Corporation participated in the video conference from El Segundo, CA; Chantilly, VA; Colorado Springs, CO; San Antonio, TX; and Silver Spring, MD.



OLite 2



SSPL members videoconferencing with their Aerospace mentors

FACULTY SPOTLIGHT



Jerzy Ruzyllo, Distinguished Professor of Electrical Engineering, joined the faculty in 1984. Originally from Poland, Ruzyllo earned his degrees from Warsaw University of Technology where he also served on the faculty. His M.S. and Ph.D. degrees are in solid state electronics and he earned a doctor of science (D.Sc.) degree in electron technology.

Following his Ph.D. and an earlier two-year graduate fellowship at the Tohoku University in Japan, Ruzyllo received an offer from Penn State to be a post-doctoral research associate. At that time, the United States was the only real power in the area of semiconductor science and engineering; and experience in the U.S. was essential in establishing an academic career in this domain. Before coming to Penn State, Ruzyllo knew that the University had a strong research base in his area of interest but did not know where exactly the campus was located. Ruzyllo stated, "There is no place called University Park on any map and initially I was not aware of the fact that I should be looking for a place called State College."

Ruzyllo then returned to Poland and earned his D.Sc. degree. During that time, he received another offer from Penn State. Since then, Ruzyllo has been a faculty member in the Department of Electrical Engineering in the area of electronic materials and devices. His research activities are in the area of manufacturing methods and devices for semiconductor micro- and nanoelectronics and photonics as well as processing and characterization of electronic and photonic materials. A common thread in his research activities is the processing and characterization of semiconductor surfaces. Ruzyllo explains, "Under this umbrella, I was engaged in projects which scope was changing as the emerging needs and challenges in semiconductor device manufacturing were changing. For example, on one hand, I was involved in semiconductor surface research related to the development of advanced, nanometer scale, integrated circuits, and, on the other hand, on the surface processing issues in the development of nanocrystalline quantum dots deposition techniques for light-emitting diodes (LED) applications."

Besides his academic research and teaching, Ruzyllo participates in numerous national and international committees as well as advisory, editorial, and technical boards. He has particularly close ties to the Interuniversity Microelectronics Center in Belgium where he spent one of his sabbatical, as well as various French institutions involved in semiconductor R&D. He also collaborates very closely with Warsaw University of Technology in Poland. His professional services are closely tied to the Electrochemical Society where he has served in a range of key functions. Ruzyllo received the Penn State Engineering Alumni Society Outstanding Research Award and is an IEEE and Electrochemical Society Fellow. He earned the title of Distinguished Professor at Penn State in 2010 and was awarded the honorary title of professor by the president of the Republic of Poland in 2003.

In his spare time, Ruzyllo enjoys being involved in the popularization of semiconductor science and engineering through the internet where he created his own portal for just that purpose. He is also an avid downhill skier having started as a young boy and racing in his teen years. Ruzyllo's more recent skiing experiences range from weekend skiing at the local ski resort to helicopter skiing in Utah and all-mountain skiing in the French Alps.

Ruzyllo and his wife, Ewa, an architect, have two children, both Penn State graduates. Their son, Pawel, makes his home in Atlanta while daughter, Julia, is in New York City. Ruzyllo and his wife live in State College.

EE GRADUATE STUDENT PROJECT WINS PRIZE

A Penn State electrical engineering student project was recently selected a winner of British Airways' 2010 Face-of-Opportunity prize.

The project, WishVast: Building Trust and Social Capital Using Cell-phones, is a cell phone-based network that harnesses the pervasiveness of cell phones in Africa to build trust, optimize resource utilization and supply chains, connect people and expand their social networks, facilitate peer-to-peer trade and help people emerge from poverty. The British Airways prize includes travel anywhere in the world for a representative to conduct vital business meetings and admission to the airline's Face-of-Opportunity business conference in New York and London.

Thirty students across seven academic colleges at Penn State have worked on the WishVast team, which is part of the University's Humanitarian Engineering and Social Entrepreneurship (HESE) Program. The students field tested their technology in Kenya last summer by connecting employees looking for ad-hoc work with potential employers. A beta test of the system is planned for East Africa this summer

The WishVast team has also partnered with North Carolina State University's Department of Parks, Recreation and Tourism Management to adapt the system for connecting rural tourism groups with independent tourists in South Africa. Electrical engineering graduate student Chanakya Mehta, the group's technology lead, will travel to South Africa later this month with the North Carolina State team to conduct pilot testing of the system.

Mehta will attend the British Airways Face-of-Opportunity conference in New York on Feb. 2 and London on Feb. 3. The conference will allow Mehta the opportunity to receive



advice from top international business experts while networking with venture capitalists, renowned entrepreneurs, media members, and small business owners.

British Airways will fly Mehta to India later in February to meet with key partners, including the country's Self-Employed Women's Association and the National Innovation Foundation, to discuss possible adoption of the WishVast system. He will also discuss other HESE ventures and logistics for Penn State students who will be working on HESE ventures in India this spring and summer.

The WishVast team's previous awards include a \$1,000 Carter Academic Service Entrepreneur grant from the International Journal for Service Learning in Engineering and a \$4,000 award from the Clinton Global Initiative University Program.

Students are invited to join the WishVast team through the EDSGN 497C Design for Developing Communities and EDSGN 452 Projects in Community Service Engineering courses.

DEPARTMENT UPDATES

Mohsen Kavehrad, W. L. Weiss Chair Professor of Electrical Engineering, organized and chaired the 2010 IEEE Workshop on Optical Wireless Communications held in conjunction with IEEE GLOBECOM 2010 held in Miami, FL, in December 2010.

Mohsen Kavehrad, W. L. Weiss Chair Professor of Electrical Engineering, was quoted in the Dec. 27, 2010, edition of The New York Times. The article, by the Associated Press, is titled "Ceiling Lights in Minn. Send Coded Internet Data" and details efforts of LVX System to install LED lights which send coded messages to modems attached to computers. The full article can be viewed [here](#).

I. C. Khoo, W. E. Leonhard Professor of Electrical Engineering, presented two invited papers: "Broadband Nonlinear Electro-optical Responses of Nematic Liquid Crystals for Ultrafast Optical Switching and Image Processing Applications" at the Material Research Society Meeting, Symposium on Liquid-Crystal Materials--Beyond Displays, in Boston, Nov. 28, 2010; "Ultrafast all-optical switching with transparent and absorptive nematic liquid crystals - implications in tunable metamaterials and nanostructures," at the International Workshops on Liquid Crystals for Photonics 2010, Hong Kong, Dec. 5, 2010. The talks described work done in collaboration with his graduate students **S. Zhao**, **K. L. Hong**, **Junbin Huang**, **Yi Ma** and faculty associates **Tom Mal-louk** in the Department of Chemistry and **Tony Huang** in the Department of Engineering Science and Mechanics. The research is supported by the National Science Foundation - MRSEC, the Air Force Office of Scientific Research, and the Army Research Office.

Mohsen Kavehrad, W. L. Weiss Chair Professor of Electrical Engineering, was invited to attend the 2011 National Science Foundation Industry / University Cooperative Research Centers annual meeting in Arlington, VA, Jan. 12 - 14, 2011.

Mohsen Kavehrad, W. L. Weiss Chair Professor of Electrical Engineering, and **Jarir Fadlullah** ('10 EE PhD), presented an invited paper titled "Optical Wireless Networked Systems: Applications to Aircrafts," at the SPIE Photonics West, in San Francisco, in January 2011.

Bilén Named Head of SEDTAPP

Sven Bilén, associate professor of engineering design, electrical engineering and aerospace engineering, has been appointed head of the School of Engineering Design, Technology and Professional Programs.



Bilén joined Penn State in 2000. The author of numerous journal papers and conference publications, Bilén is the recipient of the 2008 Lawrence J. Perez Memorial Student Advocate Award, the 2003 Penn State Engineering Alumni Society Outstanding Advising Award and the electrical engineering department's 2002 Ruth and Joel Spira Award for Excellence in Teaching.

Bilén received his bachelor of science degree in electrical engineering from Penn State in 1991, and his master of science and doctoral degrees in electrical engineering from the University of Michigan in 1993 and 1998.

Ken Jenkins, professor and head of electrical engineering, has been elected to serve on the IEEE-Eta Kappa Nu board of governors as the governor - east region representative.

Tim Wheeler, research assistant in the electrical engineering department, recently received his master's of science degree in the College of Education, Department of Curriculum and Instruction with a science education emphasis.

Tim Gilmour, doctoral student in electrical engineering, recently had a paper accepted for publication by Experimental Neurology. The paper is co-authored with Christopher Lieu, Mark Nolt, Brigitte Piallat, Milind Deogaonkar, and Thyagarajan Subramanian. The paper is titled "The effects of chronic levodopa treatments on the neuronal firing properties of the subthalamic nucleus and substantia nigra reticulata in hemiparkinsonian rhesus monkeys." The paper is available online ([link here](#)).

John Mathews, professor of electrical engineering, was recently elected a Fellow of the Royal Astronomical Society of Great Britain. The Royal Astronomical Society is a prestigious organization that was founded in 1820 and is currently headquartered in the Burlington House in London.

Qiming Zhang, Distinguished Professor of Electrical Engineering, presented an invited talk at the Materials Research Society fall meeting titled "Multifunctional Electroactive Materials and Devices" in Boston, MA, in December.

Qiming Zhang, Distinguished Professor of Electrical Engineering, was the keynote speaker at the International Conference on Molecular Materials in Singapore in January. His speech was titled "Electroactive Polymer Devices."

Kenneth Jenkins, professor and head of electrical engineering, will be attending "Reforming Electrical Energy Systems Curriculum Workshop," sponsored by the Office of Naval Research. Jenkins will be serving as chairman of the academic administrators group at the workshop which is being held in February in Napa, CA.

Mitra Honored with IEEE Medal

Raj Mitra, professor of electrical engineering, was recently awarded the 2011 IEEE James H. Mulligan, Jr. Education Medal for contributions to graduate education, engineering research, and research training in electromagnetic communication.



Mitra joined Penn State in 1996. He is the director of the Electromagnetic Communication Laboratory. He is a life fellow of the IEEE, a past-president of AP-S, and served as the editor of the Transactions of the Antennas and Propagation Society. He has been a visiting professor at Oxford University and the Technical University of Denmark. He has published over 700 journal papers and more than 35 books or book chapters. Mitra has three patents in communication antennas.

IEEE is the world's largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity.

Department REU Program Funded

The National Science Foundation recently announced that it will fund the Department of Electrical Engineering's Research for Undergraduate Students (REU) program for an additional three years. The goal of the REU program is to provide interested undergraduate students, selected from across the nation, the opportunity to be involved in cutting-edge research and thus develop students' interests in graduate studies and in future research in electrical engineering areas.

Congratulations to our Fall 2010 Graduates

MS

Ravikant Gupta
Aditya Hariharan
Aditya Jain
Wai Kei Ri Kot
Saurabh U Pawar
Urmila P Pujare
Erik D Weir
Jing Zhou

PhD

Meng-Ku Chen
Pin-Heng Chen
Jarir M Fadlullah
Wenchong Hu
Prasoon Joshi
Ping Kao
Hyun Soo Kim
Saurabh A Mookerjee
Shabnam Sodagari
Chia-En Yang
Kyungho Yoo
Dalong Zhao

SPSEE Spring Meeting

April 6

5:00 p.m. Meeting and election of officers

6:30 p.m. Light buffet/reception

129A Hetzel Union Building

Mentors and mentees are encouraged to attend.

Following the reception, participants are encouraged to walk to Eisenhower for the Waynick Lecture, featuring Neil DeGrasse Tyson, which begins at 8:00 p.m.

Sign up to attend on our website here.

Welcome Shannon

We welcome our newest staff member, **Shannon Ranio**, proposal and award generalist, who joined us Jan. 3. Ranio has been employed at Penn State since 2001. Most recently she was the administrative support coordinator for the Center for Neural Engineering in the Department of Engineering Science and Mechanics. Prior to that, Ranio was the assistant coordinator for research funds for the Institute for Manufacturing and Sustainability Technologies at ARL. Ranio grew up in Germany and now lives in Bellefonte with her husband and five-year-old daughter.

Waynick Lecture 2011

The annual Arthur H. Waynick Memorial Lecture will be held on April 6 at 8:00 p.m. in Eisenhower Auditorium on the University Park campus.



The speaker is **Neil deGrasse Tyson**, director of the Hayden Planetarium.

The event is free and open to the public. More details and information will be posted on the department website.

Early Career Recognition Alumni Award

The Society of Penn State Electrical Engineers and the Department of Electrical Engineering is looking for nominations for the Early Career Recognition Alumni Award. This award honors outstanding Penn State electrical engineering alumni at the outset of their career. Nominations are due by May 15 and can be made by anyone with knowledge of the career progression and accomplishments of the nominee.

The nomination form as well as award criteria will be sent as an attachment to this e-newsletter. In addition, forms are available on our website here and in the electrical engineering office. The information can be mailed or faxed upon request.

Please contact Cathy McClellan, cls118@psu.edu or 814-863-0253 with any questions. We look forward to hearing all the wonderful things that our alumni have accomplished.

Contact Information:

Department of Electrical Engineering, 121 Electrical Engineering East, University Park, PA 16802, Phone: 814-865-7667, FAX: 814-865-7065

Web: www.ee.psu.edu

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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