COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING

PENNSTATE

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ANNUAL WAYNICK LECTURE

The Communication and Space Science Laboratory is proud to announce that David R. Smith is the presenter for the 2010 Arthur H. Waynick Memorial Lecture series to be held on April 30 at 8 p.m. at the Cybertorium, 113 IST Building on the University Park campus. A reception will follow in the adjacent West Atrium. This event is free and open to the public.

Smith is the William Bevan Professor of Electrical and Computer Engineering at Duke University and serves as director for the Center for Metamaterial and Integrated Plasmonics.

Smith's research on electromagnetic media includes the study of surface plasmons at visible and near infrared wavelengths. His research group studies all aspects of plasmonic structures, including plasmon nanoparticles as a platform for biological and biomedical diagnostics, as well as integrated plasmonic components as chip-scale nanophotonic devices for information processing. Recent work has focused on the demonstration of a variety of optical components based on long-range plasmons, including couplers, bends, multimode couplers and interferometers.

David Smith

Smith was selected as a Thomson Reuters Citation Laureates for 2009. The citation laureates are recognized for their contribution to the advancement of science and typically rank among the top one-tenth of one percent of researchers in their fields.

Smith's research group is featured on "That's Impossible!" on The History Channel. The episode, "Invisibility Cloaks," airs throughout July.

This annual event which honors Arthur H. Waynick, who served as the department head for electrical engineering and founded Penn State's Ionosphere Research Laboratory, now known as the Communications and Space Sciences Laboratory.

Waynick received his bachelor's and master's degrees in physics from Wayne University in Detroit, MI, in 1935 and 1936, respectively. He then served as an instructor of physics in 1935–1937.

Waynick studied the ionosphere at the Cavendish Laboratory in Cambridge in 1937–1939. As a result of the start of World War II, he returned to Wayne University in 1939 as assistant professor of physics.

In 1940, Waynick joined the Harvard Underwater Sound Laboratory focused on underwater sound for submarine detection. While at Harvard, Waynick received his Sc.D. in communications engineering in 1943. At the Harvard Underwater Sound Lab, he developed a binaural listening system and a servomechanism in the development of an acoustic torpedo.

When the U.S. Navy established the Ordnance Research Lab, in 1945, at Penn State, Waynick was recruited to serve as the electronics section head. In 1948, Waynick became the first A. Robert Noll Professor of Electrical Engineering and the electrical engineering department head. As a result of his interest in atmospheric research, in 1949, Waynick established the Ionosphere Research Lab (IRL), later renamed the Communications and Space Sciences Laboratory. He served as director of the lab until his retirement in 1971 and maintained an active role until his death in 1982.

Waynick profoundly influenced the course of radio science and atmospheric research, both in the United States and abroad. As director of IRL, he maintained a policy of convening outstanding international scientists as resident consultants to the laboratory, a program that proved immensely productive in engaging both staff and students in cooperative research activities in important new fields of study.

In addition to his many national and international activities and awards, Waynick was a fellow of the IEEE, a fellow of the American Geophysical union and a member of the National Academy of Engineering. He was a Guggenheim Fellow at Cambridge University and was a fellow of the Institute of Electrical Engineers in England.

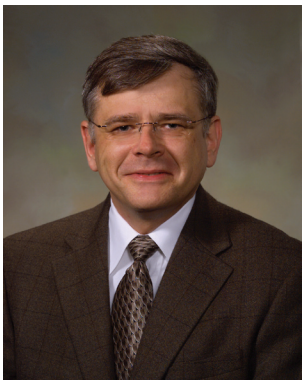
Since 1984, the Waynick Memorial Lecture Series has brought together scientific minds to continue the pioneering spirit of Arthur Waynick by providing a forum for the world's top scientists to discuss ionospheric research, electromagnetic, communications, and the space sciences. We are proud to continue his legacy and hope you can join us for the annual lecture series by welcoming David Smith on April 30.

To ensure this valuable series continues, please forward financial contributions to:

MaryAnn Henderson
Department of Electrical Engineering
The Pennsylvania State University
316 Electrical Engineering East
University Park, PA 16802

Faculty Spotlight

Victor Pasko, originally from Ukraine, obtained his bachelor's and master's degrees in theoretical physics from Kiev University in 1987 and 1990, respectively. In 1992, Pasko entered the Ph.D. program in electrical engineering at Stanford University. While at Stanford, Pasko became interested in atmospheric electrodynamics. Pasko comments, "My primary interest at that time was in the understanding of experimentally observed perturbations of very low frequency (VLF) waves propagating in the waveguide formed by the Earth's surface and the lower ionosphere. I was considering if lightning quasi-static fields could contribute to ionospheric perturbations and had started doing some quantitative simulations of these fields." During the summer of 1994, one of the most successful experimental campaigns on sprite discharges in the upper atmosphere was conducted and videotaped by Davis Sentman and his team from the University of Alaska. After viewing the video, Pasko and his group developed a quantitative mechanism on how these events were produced. The entire subject of his Ph.D. work at Stanford was changed as a result of these developments.



After receiving his Ph.D. in 1996, Pasko stayed at the STAR Laboratory at Stanford University, as a postdoctoral research affiliate and later as an engineering research associate. His projects involved chemistry of the lower ionosphere, long range VLF propagation, transient luminous events, and plasma display panels. "The most valuable experience for me was work on several large multi-institution projects. These involved, in particular, several satellite proposals we submitted to NASA," stated Pasko.

Pasko joined Penn State in 2000 and is a member of the Communications and Space Sciences Laboratory. Pasko has expanded his research in atmospheric electrodynamics. His recent work, funded by the National Science Foundation (NSF), includes studies of lightning electromagnetic emissions and their ionospheric effects, infrasonic radiation from thunderstorms and aurora, studies of origins of energetic (10s of MeVs) electrons in the Earth's atmosphere responsible for terrestrial gamma ray flashes, similarity properties of streamer discharges in transient luminous events, and development of models of lightning leaders and their propagation characteristics. Pasko teaches classes in the areas of engineering electromagnetic, plasmas, and plasma assisted materials processing. He enjoys helping students in their classes and research projects, and is pleased to see them publish papers and present their work at conferences.

In 2002, Pasko received the NSF Faculty Early Career Development (CAREER) Award. In 2007 Dr. Pasko received the Editors Citation for Excellence in Refereeing for Geophysical Research Letters. Pasko serves as an associate editor of Radio Science and Journal of Geophysical Research. He organized and edited a special 2007 Radio Science section on Recent Advances in Studies of Schumann Resonances on Earth and Other Planets of the Solar System.

From 2005 to 2008, Pasko served as chair of Atmospheric and Space Electricity Focus Group of American Geophysical Union (AGU). He presently serves as vice-chair of U.S. Commission H of International Union of Radio Science and has served as organizer for a number of special sessions on the ionospheric effects of lightning . In addition, he served as a convener of AGU Chapman Conference on Effects of Thunderstorms and Lightning in the Upper Atmosphere at Penn State in 2009 attended by 110 professionals from 16 countries.

In his spare time, Pasko enjoys yoga and racquetball. He and his wife, Tanya, have two daughters and reside in Port Matilda.

Student Spotlight

Amanda Mills, electrical engineering undergraduate, is a motivated student. Originally from the small town of New Freedom, PA, Mills came to Penn State to broaden her horizons and explore new opportunities. She became interested in electrical engineering at an early age. Mills explains, "My grandfather was a radio operator during World War II. After the war, he often built his own radios for fun in the makeshift lab in his basement. Though my grandfather died before I was born, I loved hearing stories about him and enjoyed playing with his old lab equipment, radios, and antennas when I was younger. I suppose it was this influence, from someone I have never met, that gave me the inspiration to pursue a career in electrical engineering."

Mills, a Schreyer Honors College scholar, has maintained excellent grades and has been a recurring name on the Dean's List as well as receiving the Penn State President's Freshman Award and the Schreyer Honors College Academic Excellence Award each year since 2007. When asked what motivates her, Mills noted that electrical engineering is very interesting which makes studying much easier. She also enjoys being a part of the engineering community, which is so eager to pass on knowledge and explore new technological ideas.

Currently, Mills is completing a co-op at the Goddard Space Flight Center, specifically working in the RF Development Laboratory in the Microwave and Communication Systems branch. Mills comments, "We are performing research and development for communication networks, such as the Space Network, the Deep Space Network, and the Tracking and Data Relay Satellite System. So far, I have worked with the RF Development Lab on extending the Space Network's capabilities in the Ka Band. Furthermore, my team and I are developing high-speed test equipment for Tracking and Data Relay Satellite System ground stations."

Mills has embraced the extracurricular activities offered by Penn State. She has been heavily involved in the Student Space Programs Laboratory, participating in the NittanySat Satellite Project, OSIRIS Cube Satellite Project, and most recently the OSIRIS Lite Project onboard High Altitude Student Payload. She is also an IEEE student chapter officer and a part of the undergraduate student council.

Upon graduation in 2011, Mills plans to pursue a graduate degree specializing in RF and microwave engineering. She hopes to continue her involvement with satellite communications in her career. In her limited spare time, Mills enjoys running and playing tennis. In addition, she has recently learned to cook. Although she has thoroughly enjoyed her co-op experience, Mills is looking forward to returning to University Park to continue her course work. No doubt, this motivated young woman will hit the ground running.

Mark Your Calendar:

April 24	Blue/White Football game
April 30	Waynick Lecture
May 8	College of Engineering sponsored "City LIghts" In WDC
May 14-16	Spring graduation at University Park
May 21	SPSEE Spring Meeting
June 4-6	Penn State Alumni Association Traditional Reunion Weekend

Department Updates

IBM Felllowship Award

Ashkar Ali, Ph.D. candidate in electrical engineering, was recently awarded an IBM Ph.D. fellowship for the 2010-2011 academic year.

The IBM Ph.D. Fellowship Award is a worldwide highly competitive program, which honors exceptional Ph.D. students in the areas of computer science and engineering, electrical and mechanical engineering, physical sciences, mathematical sciences, business sciences, and service science, management, and engineering. Award recipients are selected based on their overall potential for research excellence, the degree to which their technical interests align with those of IBM, and their academic progress to date.

Ali is a member of the Nanodevices and Circuits Lab; and his adviser is Suman Datta, the Monkowski Associate Professor of Electrical Engineering. Ali's research involves High-k Dielectric Gated Quantum Well Transistors. This research entails investigation of an optimal scalable architecture for compound semiconductor based quantum-well transistors in the narrow gap CS materials space.

Ali will receive a stipend along with an educational allowance. In addition, he will be matched with a mentor from IBM and strongly encouraged to participate in an IBM internship, while completing his studies to strengthen and broaden his technical experience and network.

IPAC Meeting

Front row: Scott Thompson, Forrest Hunsberger, Tom Roell, and Leslie Melaragno. Second row: Ken Jenkins, Ed Singel, Joe Trench, Dale Hoffman, Richard Pieper, and John Golombeck (Not pictured: John Croteau, David Newman, and Doug Schultz)

The Department of Electrical Engineering Industrial and Professional Advisory Council (IPAC) met in March.

IPAC is a select group of representatives from industry, government agencies, and academia who advise the department on academic issues and on current trends and future directions in engineering.

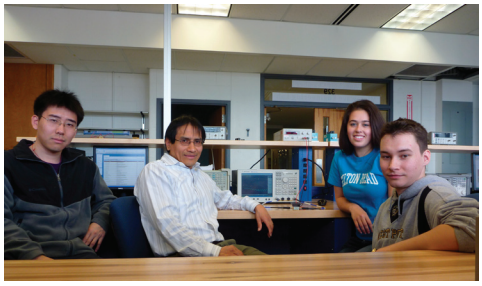
The group meets annually to receive an update on the department; undergraduate and graduate programs; and research activities. Joe Trench and Ed Singel were elected co-chairs for the year.

We thank David Newman for this dedicated service to IPAC as his term comes to an end.

A report was compiled with recommendations and suggestions and submitted to the dean's office. We look forward to continued successful collaboration with our IPAC members.

Antenna Anechoic Chamber and Microwave Lab Report

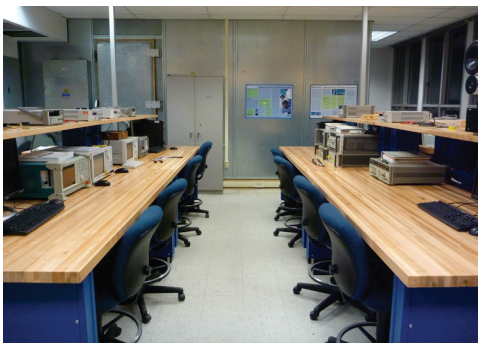
The new Microwave Lab Committee (MLC), created in spring 2009, met to plan and discuss the future of the old Microwave Lab located in 218 EE East. The committee concluded that combining the Antenna Anechoic Chamber and the Microwave Lab would be ideal to support several EE undergraduate courses such as Engineering Electromagnetics (EE 330), UHF and Microwave Engineering (EE 432), Antenna Engineering (EE 438), Satellite Communication (EE 474), Software Defined Radio (EE 497B), and future RF Design courses. During July 2009, the committee inventoried and sorted out (with help of several students and EE staff) all the equipment and materials in 218 EE East and moved all of it to 329 EE East, next to the Antenna Anechoic Chamber. With internal funds, twelve new chairs and six modern workbenches were purchased for the lab. The lab is equipped to support two complete lab stations, one for each group of two to three students.



From left to right, Zhihao Jiang, Dr. Julio Urbina, Amanda Mills, and Shane Kelly in the new Microwave Lab

The lab opened its doors officially this semester with the instruction of the course Ultra High Frequency (UHF) and Microwave Engineering (EE 432) that is being taught by Julio Urbina, assistant professor of electrical engineering. There are currently 33 students enrolled in this course. The curriculum emphasizes the design and analysis of UHF-microwave systems such as microstrip transmission lines, waveguides, couplers, amplifiers, oscillators, and filters. The course concludes with a final project where students devote several weeks to the design, fabrication, and testing of a 2.4 GHz balanced amplifier, a course project that is very lab-intensive. The course makes extensive use of Advanced Design Systems (ADS) 2009 of Agilent.

The Undergraduate Labs Committee has agreed to use their available funds from 2010-2011 fiscal year to upgrade the Microwave Lab. As a first step, the MLC has recommended the acquisition of a new antenna measurement system for the Antenna Anechoic Chamber. This new antenna system will bring a hands-on component to EE 330 and other related courses by providing demo/labs of key electromagnetic concepts and also support recruiting activities for the department. Since state-of-the-art microwave test equipment is expensive, the MLC is seeking generous donations from our strategic vendors and is also looking for sources of external funding. Decisions on what to upgrade is currently under review.



The new Microwave Lab

The members of the MLC would like to extend their sincere gratitude to Penn State EE alumnus Russ Kramer from Agilent, for helping with the instruction of ADS 2009 and for generating ADS licenses.

Committee members: James Breakall, Ram Narayanan, Mark Wharton, Sven Bilén, Doug Werner, Kultegin Aydin, and Julio Urbina, chair.

Ametek Outstanding Student Leader

Christopher Shotter, electrical engineering undergraduate student, was awarded the Ametek Outstanding Student Leader Award from the College of Engineering for the 2009-10 academic year. This scholarship recognizes an academically talented student who exemplifies leadership, team work, and global citizenship.

Shotter, from Monaca, PA, is active in a number of campus activities including, OhanaTHON, Dance Marathon, and Pride of the Lions pep band. He is also an undergraduate teaching assistant. In addition to his campus activities, Shotter is a member of the Station 57 Volunteer Fire Department and captain of thej unior fire department. He is the facilitator and North Western Regional Director of Hugh O'Bryan Youth Leadership program.

Shotter has been the recipient of a number of awards and scholarships including: Coca-Cola National Scholarship, Toyota National Scholarship, Western Pennsylvania Outstanding Youth In Philanthropy, and President's Gold Service Award.

Society of Penn State Electrical Engineers
SPSEE Spring Meeting

Friday, May 21

11:30-1:30 (light lunch will be provided)

101 Electrical Engineering East

Items on the agenda include:

Mentoring program

Early Career Recognition Alumni Award

Alumni Volunteer Opportunities

Committee Reports

Please R.S.V.P. with Cathy: 814-863-0253 OR cls118@psu.edu

Early Career Recognition Alumni Award

An Early Career Recognition Alumni Award has been created to honor outstanding Penn State electrical engineering alumni at the outset of their career. This is an exciting new way to recognize our alumni. 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 the e-newsletter. In addition, forms are available in the electrical engineering office and can be mailed or faxed upon request.

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

6th Annual City Lights series

The Penn State Alumni Association and the College of Engineering Alumni Society are sponsoring the event, "Space Flight: Still the New Frontier?" at the Smithsonian Air and Space Museum's Udvar-Hazy Center, in Washington, D.C., on Saturday, May 8, at 10:00 a.m.

Opened in 2003, the Smithsonian Air and Space Museum's hangar-sized Udvar-Hazy Center offers visitors a closer look at everything from the prototype for the first commercial jet, the Boeing 707, to the Space Shuttle Enterprise. Penn State professor and space shuttle astronaut Jim Pawelczyk '85g, veteran of a 16-day shuttle mission, will be on hand to talk about the future in space travel. The day includes lunch, Pawelczyk's presentation, and plenty of time to tour this incomparable museum.

Cost: $25 for Alumni Association members, $40 for non-members, $10 for children ages 12-18 (under 12 free). Cost includes lunch and program. For more information or to register, go to www.alumni.psu.edu/events or call 800-548-LION (5466).

Faculty News in Brief

Although far from a complete list, the following represents the types of activites of the electical engineering faculty members:

Bill Higgins, distinguished professor of electrical engineering, presented three papers at SPIE Medical Imaging 2010 in San Diego,CA, on Feb. 13-17. Student co-authors on these papers included Pinyo Taeprasartsit, Rahul Khare, and Kongkuo Lu.

Ken Jenkins, professor and department head, attended the Electrical and Computer Engineering Department Heads Association annual conference and ECExpo on March 12-16 in Clearwater Beach, FL. Jenkins participated on a panel discussing multidisciplinary programs.

Raj Mittra, professor of electrical engineering, presented an invited speech titled "A New Look at the Performance Limitations of Small Antennas from the Viewpoint of an Antenna Designer" at the Singapore section of the IEEE in February.

Vishal Monga, assistant professor of electrical engineering, presented a paper titled: "Algorithms for Joint Optimization of Color Look-Up-Table (LUT) Node Locations and Output Values" at the IEEE International Conference on Acoustics, Speech and Signal Processing on March 14-19 in Dallas, TX. He also chaired a session titled Inverse Problems in Image and Multi-dimensional Signal Processing and attended the Editorial Board Meeting of IEEE Transactions on Image Processing which discussed future directions for IEEE image processing journals.

Jerzy Ruzyllo, distinguished professor of electrical engineering, presented an invited talk titled "Wafer Cleaning as an Integral Part of Etch-Strip Sequence" during the 3rd International Symposium on Plasma Etch and Strip in Microelectronics held in Grenoble, France, March 4-5.

Contact Information:

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Web: www.ee.psu.edu

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