

# THE DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING



**100 YEARS**  
1911-2011  
**SCHOOL OF ENGINEERING**

## Calendar of Events

### SoE Fall Open Houses

September 25, 2011  
October 23, 2011  
November 13, 2011

### ECE Centennial Distinguish Speaker Series

September 9, 2011  
October 14, 2011

### ECE's Advisory Committee Meeting

October 14, 2011

### Family Weekend Open House

November 5, 2011

### Career Awareness Day

November 10, 2011

### Thanksgiving Break

November 22- 27, 2011

### Christmas on Campus

December 8, 2011

### Winter Graduation Ceremony

December 17, 2011

### Christmas Break

December 18, 2011- January 16, 2012



## CHAIR'S CORNER

DR. GURU SUBRAMANYAM

Celebrating 100 years of Excellence in Engineering Education and Research! This is the official line for our School of Engineering's Centennial Celebration. As we kicked off the second century of excellence in engineering education and research, we welcome the 101<sup>st</sup> batch of first year students. Our 101<sup>st</sup> batch attests to the global reach of our department with over 20 percent of our first year students representing several foreign countries. We also welcome our first batch of 8 transfer students from Nanjing University of Science and Technology (NUST), Nanjing, China, and 3 from SRM University, Chennai, India. This is the start of new partnerships with these two fine institutions. Our graduate program has grown in strength over the past couple of years, with the Fall 2011 enrollment of over 110 MS students and 45 PhD students in our department. These are record high numbers! Also, we welcome our Electro-optics program (EOP) faculty to our department formally, as they will be tenured in Electrical and Computer Engineering.

I truly believe that our department is strengthened by this initiative and will offer a large number of opportunities for our students. This year is a key year for us as we plan to review our graduate curriculum and revitalize our graduate courses. Several new graduate courses are planned to be offered this year, including Information Theory, Detection and Estimation, Machine Learning, and Adaptive Control. At the undergraduate level, we initiated the Introduction to Robotics and Introduction to Electrical Energy Systems courses, for the Robotics and Electrical Energy Systems Concentrations respectively. Our undergraduate students now have the option to choose Electro-optics, Robotics, and Electrical Energy Systems Concentrations. We plan to introduce Bioengineering concentration fairly soon. Thanks to Professor Andrew Sarangan's efforts, we also have an NSF funding to develop Nanotechnology courses to serve our School of Engineering undergraduate students. It will be exciting to offer courses connecting our Nano fabrication and characterization labs to our

undergraduate curriculum. As part of our Centennial celebration, we will continue to host world-class speakers as part of our Centennial Colloquia Series which was initiated in Spring 2011. We have two more planned for the Spring 2012 term. We are also thankful for our alumni donations this year. Your contributions are always appreciated! Your donations will be used primarily for the undergraduate scholarships. We are thinking of establishing a special fund for supporting women in Electrical and Computer Engineering, perhaps for additional scholarships to cover their text books through-out their undergraduate education in our department. We will need to raise sufficient funds to make this happen. We are delighted to host a few of our Alums this semester. I hope we can host a few more before the academic year ends. We extend our warm welcome to our alumni during this special year!

## UNIVERSITY OF DAYTON SELECTED FOR DOMINION HIGHER EDUCATIONAL GRANT

Dominion Higher Education Partnership (DHEP) is a competitive grant program that funds projects specializing in energy conservation, and preservation of the environment. Dominion, a charitable foundation and its employees donated \$24 million last year, and invested over 150,000 volunteer hours to improve the quality of life for the residents of the states in which it

operates. The University of Dayton was selected out of 40 applicants from Ohio and was one of nine selected to receive the grant. This grant of \$15,000 will launch a new undergraduate concentration in Electrical Energy Systems in order to enhance laboratory facilities to allow students to gain knowledge and equip them with the tools necessary to meet the growing needs of electricity.



Dr. Subramanyam is all smiles as he receives the check for \$15,000.

## FACULTY IN THE NEWS



Recently, associate professor of electrical and computer engineering Dr. Tarek Taha, has been having fun working in a room full of PlayStation 3's at the U.S. Air Force Research Laboratory. His goal behind this research is to determine whether computers can think like humans. In Taha's own words, "we can do things better than computers. Our vision system can recognize people and items in pictures that would be impossible

or highly challenging for current generation computers". According to Taha the human brain consists of about 100 billion neurons, with each neuron connecting to 10,000 other neurons to create nearly 100 trillion connections. Due to this complexity, it makes it currently impossible for any existing computer to simulate a human brain. The idea behind using the PlayStation 3s is to replicate actual human brain capabilities on a much larger scale with a network of computers. If successful this sort of technology could lead to self-driving vehicles and smart robots in hospitals. A challenge posed by these brain mimicking computers, is how to find an energy efficient solution to operate these machines. When compar-

ing the human brain to the PlayStation 3, "a human brain consumes about 20 watts of power, while the PlayStation3 clusters consumes megawatts. The brain is very efficient at what it does".

Taha is also working to develop new hardware based on recent technological breakthrough (memristors) that would mimic the brain much more efficiently than the PS3™ cluster. If successful, it could lead to innovations in portable devices such as smart consumer products, and other brilliant devices. Thus far, Taha's groups has been able to model about half a billion neurons, which is about the size of a mouse brain, with only 300 PS3™s.

They are now working on modeling larger systems on the entire PS3™ cluster.

A National Science Foundation CAREER award that supports junior faculty who exemplify the role of teacher-scholar through outstanding research is funding Taha's work.



Thousands of Playstations are hooked together in Rome, New York to simulate the human brain

## UNIVERSITY OF DAYTON RECOGNIZED AS ONE OF SONY'S "10 VALUABLE UNIVERSITIES"

The globally recognized electronics company, Sony, recently ranked the University of Dayton among its "10 Most Valuable Universities." According to our own assistant professor of computer and electrical Engineering, Keigo Hirakawa, "Sony has a sabbatical program that funds some of their employees to attend U.S. universities for a year. The

chosen Sony employees must choose among the list of '10 valuable universities,' which Sony considers as leading in research areas that benefit Sony." Dr. Hirakawa recently traveled to San Jose, California where he met and discussed with Sony officials a continuing research partnership with the University. In his own Intelligent Signals

Systems laboratory, Hirakawa has been working diligently on improving digital cameras, remote sensing, and 3-D quality. In addition to his work with digital cameras, he has developed a one of a kind sensor technology to enhance color, resolution, and quality. He pioneered a sensor technology to improve color, resolution, and overall picture

quality. Hirakawa joined the University of Dayton from Harvard University last year. In 2007, he received the Docomo USA Labs Most Innovative Paper Award. In 2008, he delivered a keynote address at a Society for Imaging Science and Technology conference. He has published in more than 40 peer-reviewed publications.

## NEW CLUB IN TOWN

Electrical and Computer Engineering students are currently working on starting a club called the Satellite Club. Although still in the process of being created it hopes to be actively recruiting members as early as next semester. The club will revolve around engineering students learning about the application of engineering through working with

satellites. It will involve the incorporation of high end sensors, micro-controllers and other various forms of satellite hardware and software. They are currently planning to work on projects given to us by the Air Force Institute of Technology, helping design boards used in satellite prototypes. There will be heavy emphasis on

Electrical and Computer Engineering skills that are not necessarily learned in a classroom environment. In the future they are hoping to get involved in a program that sends student created experiments into space on an actual rocket launch.

REPORTED BY ERIC STEIN



*Students interested in joining or learning more about the Satellite Club can contact Eric Stein by email at [stein.eric@gmail.com](mailto:stein.eric@gmail.com)*

## ETHOS 2011

This past summer, with the assistance of Tim Hartnett and Mary Ellen King, two north eastern Indian Jesuit communities were transformed from electrically starved societies to neighbourhoods producing and storing their own power, harnessing the potential of solar technology. In addition to these installations, a rice patty farming village was taught the principles of electricity, troubleshooting electronics, and proper techniques for establishing a profitable business recharging and distributing handheld solar lanterns. The students proved to be assets during installations and were able to apply the University of Dayton's Electrical Engineering program's circuitry teachings in a desolate area just

below the Nepali border. The projects were determined to be successful as all instalments functioned as intended and the villagers were able to begin the foundational steps in creating portable illumination devices.

Both Tim and Mary Ellen thoroughly enjoyed their experience in India and based on their testimonies, their journey through India was certainly a once in a life time voyage. The friendships they made while in India will last well past the eleven weeks they spent there. Whether it was playing Cricket for the first time, travelling via train, plane, and make-shift automobile, or eating curry for breakfast, lunch, and dinner, India was full of cultural surprises. The pair discovered

what it means to live in a 3<sup>rd</sup> world country with sparse electricity and showers via buckets from a well. The ETHOS (Engineers in Technical, Humanitarian Opportunities of Service Learning) program made the volunteer service trip possible. Even though the students were gone from May 18-July 26, they both agreed this was the best way they could have spent their summer months.

For more information on how you too can get involved, please contact Malcolm.daniels@notes.udayton.edu



**ETHOS's Mission**

*ETHOS is founded on the belief that engineers are more apt and capable to serve our world more appropriately when they experience opportunities that increase their understanding of technology's global linkage with values, culture, society, politics, and economy.*

## FALL 2011 ECE'S CENTENNIAL DISTINGUISHED SPEAKERS



**Andrew Steckl** (Fellow, IEEE and AAAS) is Ohio Eminent Scholar & Gieringer Professor of Solid State

Electronics at the University of Cincinnati. His current research activities are focused on rare earth doped nitride semiconductors for light emitting applications, organic and biopolymeric materials for photonic and electronic de-

vices, electrofluidic materials, and devices for nano/bio applications. Dr. Steckl's research has resulted in over 400 publications and 450 conference presentations. He received the Rieveschl Award for Distinguished Research and was elected Scientific Member of the Bohmische Physikalische Gesellschaft. Dr. Steckl provided his audiences with a talk on "Electronics on Paper and Other 'Exotic' Materials".



**Vladimir M. Shalaev** (Fellow, IEEE, OSA, SPIE, APS) is Bob and Anne Burnett Distinguished Professor of ECE, and

Professor of Physics and Professor of Biomedical Engineering at Purdue University, and specializes in nanophotonics, plasmonics, and optical metamaterials. Dr. Shalaev has received several awards for his research

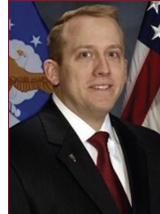
in the field of nanophotonics and metamaterials, including the Max Born Award of the Optics Society of America for his pioneering contributions to the field of optical metamaterials and the Willis E. Lamb Award for Laser Science and Quantum Optics. Prof. Shalaev has authored three books, twenty one book chapters and over 300 research publications. Dr. Shalaev spoke on "Transforming Light with Optical Metamaterials".



**Sanjay Banerjee** Fellow, IEEE, APS, AAAS, Cockrell Family Regents Chair Professor of ECE, Director of Microelec-

tronics Research Center at the University of Texas at Austin. He worked at TI from 1983-87 on the world's first 4Mega-bit DRAM, for which he was co-recipient of the Best Paper Award, ISSCC in 1986. His awards include the Hocott

Research Award from UT Austin (2007), Distinguished Alumnus Award, IIT (2005), Industrial R&D 100 Award (2004), ECS Callinan Award (2003), IEEE Millennium Medal (2000), and NSF Presidential Young Investigator Award in 1988. He is active in the areas of silicon heterostructure MOSFET's, nanoparticle flash and spintronic memories, and graphene electronics. Dr. Banerjee will present on the topic of "Graphene Nanoelectronics".



**Morley Stone** (AFRL, Fellow, SPIE), is Chief Scientist, 711th Human Performance Wing, AFRL. Prior to this assignment,

Dr. Stone was appointed Senior Scientist (ST), Molecular Systems Biotechnology, Human Effectiveness Directorate, AFRL/RH, and Chair, Bio-X strategic Technology Thrust (STT) for AFRL. From 2003-2006, he was detailed as a Pro-

gram Manager with the Defense Sciences Office of the Defense Advanced Research Projects Agency (DARPA/DSO). In 2005, he was elected Fellow of AFRL and received Carnegie Mellon's Alumni Merit Award. In 2006, he was awarded the Secretary of Defense Medal for Exceptional Civilian Service. Dr. Stone's topic of discussion will be "Air Force S&T Priorities and the Future of Human Performance Research".

**Theus H. Aspiras and Vijayan K. Asari**, won the Best Paper Award at the Fifth International Conference on Information Processing 2011, titled “Analysis of Spatiotemporal Relationship of Multiple Energy Spectra of EEG data for Emotion Recognition”.

**Alex Mathew** received the Best Presentation Award at the 6th Dayton Engineering Sciences Symposium, May 2011.

**Patha Banerjee’s** new book entitled “Computational Methods for Electromagnetic and Optical Systems” second edition, was released in April, 2011.

**Guru Subramanyam** was one of the six invited plenary speakers in the International Symposium on Integrated Functionalities (ISIF2011), held at the University of Cambridge, Cambridge, England.

**Professor Subramanyam** was one of the 30 US experts invited by the Indo-US Collaboration on Engineering Education (IUCEE) to conduct a one week Faculty Leadership Institute (FLI) course for engineering faculty in India. Professor Subramanyam presented the FLI on “Advanced Electronic and Electro-Optic Materials” at the Jaypee University of Information Technology, Wakanghat, India. The workshop was attended by more than 35 faculty from all around India.

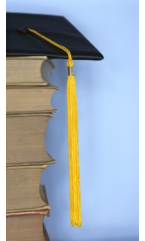
The **University of Dayton’s School of Engineering** graduate programs move up five spots to #52 in U.S. News & World Report’s annual ranking—April 13, 2011.

### August 2011 ECE Doctoral Graduates (w/dissertation)

Jacob D. Foytik – “Locally Tuned Nonlinear Manifold For Person Independent Head Pose Estimation”

R. Cortland Tompkins – “Multimodal Recognition Using Simultaneous Images of Iris and Face with Opportunistic Feature Selection”

Menatoallah M. Youssef – “Hull Convexity Defect Features For Human Action Recognition”



### MS Graduates—May and August 2011

Andargachew Alemayehu	Matthew Santoro
Andrew Kordik	Maydaykarrao Chinthapandu
Anitha Seenivasagam	Paul Simon
Bharath Gondhi	Qiyao Chen
Brett Ballard	Sathish Pakala
Candace Castillo	Satvik Gangam
Chandana Samala	Sravan Cherlapally
Christopher Cummings	Sreekanth Vemulapalli
Christopher McGuinness	Srikanth Kodeboyina
Christopher Yakopcic	Syed Hassan
Jason Heebl	Syedashfaquiddin Quadri
Jie Jia	Venkateswarulu Gollapudi
Kyle Hardin	Vikram Namireddy
Lamar Westbrook	Zhe Wang

### BS/BE Graduates—May and August 2011

Adam Clutter	Lauren Berning
Allyson Denzinger	Luke Keller
Benjamin Dapore	Mary King
Carilyn Dixon	Matthew Grundtisch
Carly Tobin	Matthew Lemon
Charles Gala	Michael Riedl
Christine Roots	Nelson Doe
Cody Berman	Ouboti Djaneye-Boundjou
Cory Bowling	Rachel Pastor
Heather Czajkowski	Shawn O'Malley
Jonathon Reinhart	Stephen Germak
Joseph Klein	Thomas Kleingers
Joshua Barnheiser	William Bolsen
Kelly Cashion	William Dresher
Kevin Jackovitz	Zachary Malosh
Kevin Pitstick	Ziad Mohi

