Department of Electrical Engineering
2011 Annual Report

PENNSTATE

I. Department Personnel

A. Tenured and Tenure Track Faculty

Kultegin Aydin (Ph.D. Orta Dogu Teknik Universitesi, Ankara, Turkey)
Professor of Electrical Engineering and Interim Department Head
Radar remote sensing, radar meteorology, radiowave propagation, electromagnetic scattering, and computational modeling.
IEEE Fellow

Sven Bilén (Ph.D. University of Michigan)
Associate Professor of Engineering Design, Electrical Engineering, and Aerospace Engineering
Electrodynamic tethers, plasma diagnostics, spacecraft-plasma interactions, spacecraft systems, software-defined radio, wireless sensor networks, innovation in engineering design, and systems engineering.

James Breakall (Ph.D. Case Western Reserve University)
Professor of Electrical Engineering
Antenna modeling and design, numerical modeling, computational and experimental electromagnetic, and ionospheric radio wave propagation and probing.

Suman Datta (Ph.D. University of Cincinnati)
Professor of Electrical Engineering and Material Research Institute Affiliate
Device modeling, nanofabrication and characterization specializing in advanced silicon and non-silicon semiconductor based devices for ultra low-power logic and embedded memory applications.

John Doherty (Ph.D. Rutgers University)
Professor of Electrical Engineering
Signal processing and communications, which includes specific applications to remote sensing, electronic intelligence, and biomedical engineering.

William E. Higgins (Ph.D. University of Illinois – Urbana-Champaign)
Distinguished Professor of Electrical Engineering and Computer Science and Engineering
Image processing, computer vision, scientific visualization, computer graphics, medical imaging, and graphical user interfaces.
IEEE Fellow

Thomas Jackson (Ph.D. University of Michigan)
Robert E. Kirby Chair Professor of Electrical Engineering and Material Research Institute Affiliate
Exploratory electronic devices and microfabrication techniques. Thin film electronics, organic semiconductors, oxide semiconductors, biomolecular motors, biodevices, microelectromechanical systems, and display technology.
IEEE Fellow

Kenneth Jenkins (Ph.D. Purdue University)
Professor of Electrical Engineering
Digital filtering, signal processing algorithms, multidimensional array processing, computer imaging, one and two-dimensional adaptive digital filtering, and VLSI architecture for signal processing.
IEEE Fellow

Timothy Kane (Ph.D. University of Illinois – Urbana-Champaign)
Professor of Electrical Engineering, Adjunct Professor of Meteorology, and Research Associate at the Applied Research

Laboratory
Optical remote sensing (specifically laser radar or LIDAR) atmospheric and oceanic measurements and modeling, data analysis, and interpretation.

Mohsen Kavehrad (Ph.D. Polytechnic Institute of New York University)
W.L. Weiss Chair Professor of Electrical Engineering
Wireless communications and networking RF and optical, communications and signal processing systems and networks, optical fiber communications and networks, and optical network components.
IEEE Fellow

George Kesidis (Ph.D. University of California – Berkeley)
Professor of Computer Science and Engineering and Electrical Engineering
High-speed communication/computer networks; traffic engineering including shaping, routing and scheduling; network security; overlay systems; and performance evaluation including modeling, simulation and emulation.

Iam-Choon Khoo (Ph.D. University of Rochester)
William E. Leonhard Professor Electrical Engineering
Theories and experiments in photonic devices, nonlinear- and electro- optics materials such as liquid crystals, fibers and nano-structured, and novel refractive matamaterials.
IEEE Fellow; Optical Society of America Fellow; United Kingdom Institute of Physics Fellow

Constantino Lagoa (Ph.D. University of Wisconsin)
Professor of Electrical Engineering
Robust control, controller design under risk specifications, system identification, robust and chance constrained optimization, control of computer networks, and discrete event dynamical systems.

Ji-Woong Lee (Ph.D. University of Michigan)
Assistant Professor of Electrical Engineering
Analysis and synthesis of hybrid, stochastic, and decentralized systems and statistical learning.

Yanxi Liu (Ph.D. University of Massachusetts – Amherst)
Associate Professor of Computer Science and Engineering and Electrical Engineering
Computational symmetry group theory and application, machine learning (particularly low-dimensional subspace learning from very large, multi-modality feature set), computer-aided diagnosis, computer vision, computer graphics, biomedical image analysis/indexing/retrieval, and robotics.

Zhiwen Liu (Ph.D. California Institute of Technology)
Associate Professor of Electrical Engineering
Ultrafast and nonlinear optics, optical imaging, nonlinear spectroscopy, and holography.

John Mathews (Ph.D. Case Western Reserve University)
Professor of Electrical Engineering
Radar remote sensing, digital signal processing, ionospheric physical and chemical processes, and radar codes.

Jeffrey Mayer (Ph.D. Purdue University)
Associate Professor of Electrical Engineering
Power systems dynamics, electrical machinery, drive systems, energy conversion, and controls**.**

Theresa Mayer (Ph.D. Purdue University)
Professor of Electrical Engineering and Associate Director of Material Research Institute
III-V and novel semiconductor material systems, molecular beam epitaxy, device fabrication, and modeling.

John Metzner (Ph.D. New York University)
Professor of Computer Science and Engineering and Electrical Engineering

Data and computer communication, error correcting codes, and information theory.
IEEE Fellow

David Miller (Ph.D. University of California – Santa Barbara)
Professor of Electrical Engineering
Pattern recognition, machine learning, source coding, joint source-channel coding, bioinformatics, networking and network intrusion detection, and image segmentation.

John Mitchell (Ph.D. Penn State)
Professor of Electrical Engineering
Electronics, instrumentation, and aeronomy.

Raj Mittra (Ph.D. University of Toronto)
Professor of Electrical Engineering
Computational electromagnetic, EMI/EMC electromagnetic modeling and simulation of electronic packages, RF and wireless systems analysis and design, and communication antenna design.
IEEE Fellow

Vishal Monga (Ph.D. University of Texas – Austin)
Monkowski Professor of Electrical Engineering
Detection theory, lattice theory, optimization and their applications to multimedia security and mining, color image processing and statistical learning for multimedia, document processing, and genomics.

Ram Narayanan, (Ph.D. University of Massachusetts – Amherst)
Professor of Electrical Engineering
Antenna characterization and measurements, microwave system design and development, radar remote sensing theory and applications, and remote sensing image analysis.
IEEE Fellow, SPIE Fellow, and IETE Fellow

Victor Pasko (Ph.D. Stanford University)
Professor of Electrical Engineering
Atmospheric electrodynamics, atmospheric acoustic-gravity waves, gas discharge phenomena, computational plasma physics, and electromagnetics.

Jerzy Ruzyllo (Ph.D. Warsaw University of Technology, Poland)
Distinguished Professor of Electrical Engineering
Semiconductor materials and devices; integrated circuits manufacturing science and engineering; semiconductor surface modification processes and characterization; gate dielectric processing in advanced CMOS technology; and methods of semiconductor, including semiconductor quantum dots, and dielectric thin film formation.
IEEE Fellow and Electrochemical Society Fellow

Jeffrey Schiano (Ph.D. University of Illinois – Urbana-Champaign)
Associate Professor of Electrical Engineering
Control systems and feedback control of quantum mechanical processes.

Srinivas Tadigadapa (Ph.D. Cambridge University, United Kingdom)
Professor of Electrical Engineering and Material Research Institute Affiliate
Design, fabrication, and characterization of microelectromechanical systems (MEMS), integration of smart materials into MEMS devices, biological MEMS, inertial MEMS, and RF MEMS devices.

Kenji Uchino (Ph.D. Tokyo Institute of Technology, Japan)
Professor of Electrical Engineering and Material Research Institute Affiliate
Dielectrics/ferroelectrics/piezo-electrics, device design/fabrication, solid state actuators, transducers, positioners, and ultrasonic motors.

Julio Urbina (Ph.D. University of Illinois – Urbana-Champaign)
Assistant Professor of Electrical Engineering
Radar design, digital systems and space instrumentation, analog design, software designed radio and radars, radio wave propagation, meteor detection, system integration, radio wave remote sensing, and radar studies of the atmosphere and ionosphere.

Douglas Werner (Ph.D. Penn State)
John L. and Genevieve H. McCain Chair Professor of Electrical Engineering
Theoretical and computational electromagnetics, antenna analysis and design, electromagnetic wave interaction with complex materials, fractal and knot electrodynamics, and genetic algorithms in electromagnetics.
IEEE Fellow

Aylin Yener (Ph.D. Rutgers University)
Professor of Electrical Engineering
Wireless communications and networking, information theory, and communication theory.

Shizhuo Yin (Ph.D. Penn State)
Professor of Electrical Engineering
Massive optical memories, medical optics, photo refractive materials, optical computing, and fiber-optic communications.
Optical Society of America Fellow and International Society for Optical Engineering Fellow

Qiming Zhang (Ph.D. Penn State)
Distinguished Professor of Electrical Engineering and Material Research Institute Affiliate
Integrated micro-actuators and microsensors, electroactive polymer and nanomaterial system energy devices for electrical energy storage and conversion, ferroelectric/piezoelectric polymer thin film fabrication and thin film devices, and theory and modeling of electroactive polymers and nanomaterial systems based on them.
IEEE Fellow

B. Non-Tenure Track Teaching Faculty

Svetla Jivkova (Ph.D. Bulgarian Academy of Sciences)
Associate Professor of Electrical Engineering
Optical arbitrary waveform generation using ultra-short pulsed lasers, optical wireless communications, computer-generated holograms, and dynamic holography in photorefractive crystals.

Salvatore Riggio (Ph.D. Florida Atlantic University)
Associate Professor of Electrical Engineering
Discrete and integrated analog and digital circuits and devices, microcontrollers, power electronics, motors and generators, communications, controls, amateur radio and television systems.

David Salvia (M.S. Penn State)
Assistant Professor of Electrical Engineering and Undergraduate Program Coordinator
Teaches courses in the areas of digital signal processing, communications, and signals/systems.

Mark Wharton (M.S. University of Colorado)
Associate Professor of Electrical Engineering
Baseband, IF, RF, and microwave circuit design.
Teaches undergraduate-level courses in electronics and senior project design.

Timothy Wheeler (B.S. Cornell University)
Research Assistant
Design and fabrication of remote sensors for the sounding rocket environment.

C. Additional Faculty Appointments

1. **Courtesy title**
   Mary Jane Irwin, Robert E. Noll Professor, Computer Science and Engineering

Thomas Laporta, Distinguished Professor, Computer Science and Engineering
Suzanne Mohney, Professor, Materials Science and Engineering
Vijaykrishnan Narayanan, Professor, Computer Science and Engineering
Joan Redwing**,** Professor, Materials Science and Engineering

2. **Adjunct title**

Lars Dyrud, John Hopkins University, Applied Physics Laboratory
Ruyan Guo, University of Texas at San Antonio
Heath Hofmann, University of Michigan
Kwang Lee, Baylor University
David Machuga, Northrup Grumman Corporation
David Meisel, State University of New York, Geneseo
David L. Miller, Consultant
Robert Nickel, Bucknell University
Thomas Seliga

D. Instructors

Christopher Barber, Research Associate, Penn State Applied Research Laboratory
Mark Bregar – Research and Development Engineering, Penn State Applied Research Laboratory
Jon Huang, Ph. D. student, Department of Electrical Engineering
Eli Hughes, Research and Development Engineer, Penn State Applied Research Laboratory
David Jenkins, Research Associate, Penn State Applied Research Laboratory
Michael Lin, Ph.D. student, Department of Computer Science and Engineering
Keith Lysiak – Senior Research Associate, Penn State Applied Research Laboratory
Andrew Mayers, Instructor, Department of Electrical Engineering
Christopher Rogan, Research Engineer, Penn State Applied Research Laboratory

E. Emeritus Faculty

William Adams, Professor Emeritus
Larry Burton, Associate Dean Emeritus
Lynn Carpenter, Associate Professor Emeritus
Charles Croskey, Professor Emeritus
L. Eric Cross, Evan Pugh Professor Emeritus
Anthony Ferraro, Distinguished Professor Emeritus
Dale Grimes, Professor Emeritus
Paul Hulina, Associate Professor Emeritus
Stewart Kurtz, Professor Emeritus
Kwang Lee, Professor Emeritus
John Lewis, Professor Emeritus
George McMurtry, Professor Emeritus
John Nisbet, Alumni Professor Emeritus
Russell Philbrick, Professor Emeritus
James Robinson, Professor Emeritus
William Ross, Professor Emeritus
Christopher Wronski, Professor Emeritus
Francis Yu, Evan Pugh Professor Emeritus

F. Visiting Scholars

Ming-yuan Chen (China), sponsored by Constantino Lagoa
Peng Deng (China), sponsored by Mohsen Kavehrad
Tianyu Dong (China), sponsored by Raj Mittra

Zhuqian Gong (China), sponsored by Raj Mittra
Qingxin Guo (China), sponsored by Raj Mittra
Sungtek Kahng (Korea), sponsored by Raj Mittra
Jong-Sung Kim (Korea), sponsored by Raj Mittra
Yong Up Lee (Korea), sponsored by Mohsen Kavehrad
Daquiang Qiu (China), sponsored by Constantino Lagoa
Jihui Wang, sponsored by Stuart Yin

G. Post-doctoral Scholars

Zikri Bayraktar, sponsored by Doug Werner
Jie Li, sponsored by Theresa Mayer
Marcelo Pisani, sponsored by Srinivas Tadigadapa
Alexej Pogrebnyakov, sponsored by Theresa Mayer
Sumanta Sarkhel, sponsored by John Mathews
Kebin Shi, sponsored by Zhiwen Liu
Igor Stanojev, sponsored by Aylin Yener
Safakcan Tuncdemir, sponsored by Kenji Uchino
Jian Wu, sponsored by Theresa Mayer
Heayoung Yoon, sponsored by Theresa Mayer
Seokho Yun, sponsored by Theresa Mayer
Yong Zeng, sponsored by Doug Werner
Yuan Zhuang, sponsored by Kenji Uchino

H. Staff

Connie Burger, Accounting Assistant III
Marsha Church, Senior Systems Analyst
Julie Corl, Administrative Support Assistant
Dave DeCapria, Engineering Lab Manager
Lena Getman, Staff Assistant
MaryAnn Henderson, CSSL/EO Administrative Support Assistant
Claudia Horner, Graduate Admissions Administrative Support Assistant
Fawn Houtz, Clean Room Staff Lab Coordinator
SherryDawn Jackson, Graduate Records Administrative Support Assistant
Anna Kennedy, Graduate Admissions Administrative Support Assistant
Debra Lauder, Signal and Systems Area Administrative Support Assistant
Catherine McClellan, Public Relations Specialist
Kris McNitt, Proposal and Grant Generalist
Dawn Nelson, Department Head Administrative Support Assistant
Donna O'Shea, Systems Administrator
Lloyd Peterson, Supervisor of Engineering Labs
Gabriele Rhinehart, Undergraduate Administrative Support Assistant
Mona Shaw, Department Head Administrative Support Assistant
Pam Stauffer, Administrative Support Coordinator
Lisa Timko, Graduate Admissions Administrative Support Assistant
Janet Woomer, Administrative Support Assistant

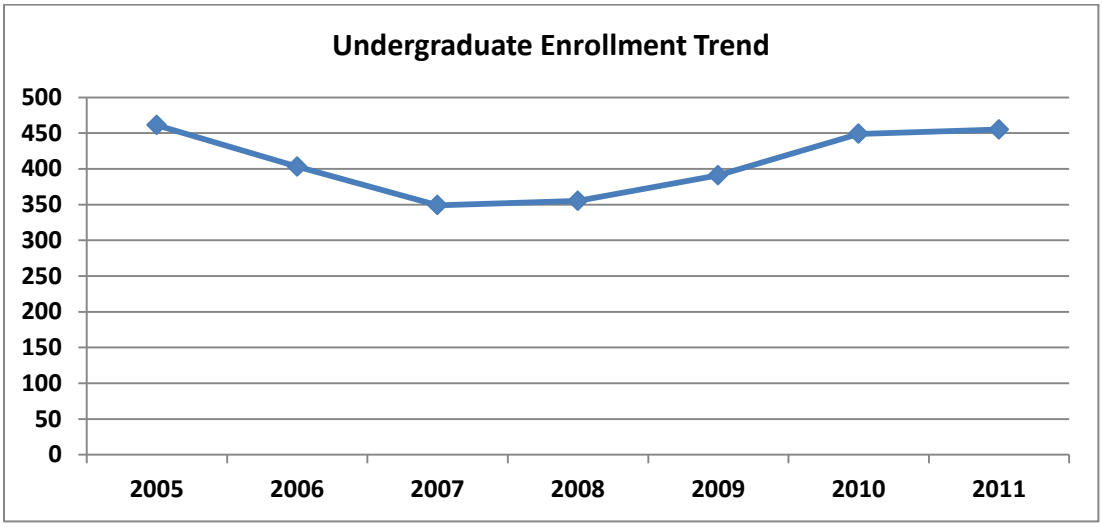
II. Academic Programs

A. Undergraduate Program (juniors and seniors)

1. Enrollment

Fall 2011: 455

2. Enrollment trends



Note: Enrollment follows national trends. These numbers include juniors and seniors only.

3. Bachelor's Degrees Conferred 2011

Spring: 94
Summer: 15
Fall: 46

4. Undergraduate Scholarships and Fellowships

Fred and Kit Bigony Scholarship in Engineering
Chunyan Li
Elorm K. Yador

Bigony Trustee Scholarship
Steven E. Drew

Boeing Helicopters Company Scholarship
Nicole V. Legenski
Keegan S. McCoy

Larry C. and Barbara A. Burton Student Award in Electrical Engineering
Edward Y. Wang

Cobham plc Trustee Matching Scholarship in the College of Engineering
Qian Ye

College of Engineering, Engineering General Scholarship Fund

Jarell T. Mason
Jason B. Morris
Adriyel V. Nieves
Olabimpe A. Ogunmoyero
Quin Ye

College of Engineering, Engineering Minority Scholarship Fund

Jorge L. Calderon Vega III
Landon O. Hernandez
Jarell T. Mason
Jason B. Morris
Adriyel V. Nieves
Olabimpe A. Ogunmoyero
Christian M. Pastor
Christopher J. Payne
Mindy R. Sanchez
Desire' N. Williams
Elorm K. Yador

Donald and Nancy Devorris Scholarship in Electrical Engineering

Luke D. Shepley

Engineering General Scholarship

Muhammed K. Hassan	Jacob A. Huttel	Jorge L. Calderon Vega III
Zhihao Jiang	Mu Li	Kacie M. Long
Jason B. Morris	Tuan N. Ngo	William J. Orosz
Christian M. Pastor	Ryan A. Purcell	Matthew R. Quigley
Rebecca H. Ripley	Elorm K. Yador	Chuan Yang
Athena M. Abate	Mohamed Z. Abdel-Mageed	

Donald G. Ferguson Memorial Honors

Rebecca H. Ripley

Frank Gabron Scholarship in Electrical Engineering

Richard S. Teal

Priscilla E. Guthrie Scholarship in Electrical Engineering

Chirag M. Amin

Donald W. Hamer Scholarship in Electrical Engineering

Justin M. Carbonara
Sean T. Elward

Clifford B. Holt, Jr. Memorial Scholarship in Electrical Engineering

Rebecca H. Ripley
Yufei Wu

James R. Kruest Scholarship in Electrical Engineering

Nicole V. Legenski

Hai-Sup Lee Memorial Scholarship in Electrical & Computer Engineering

Michael V. Bilyk

Kwang Y. and Sangwol Lee Trustee Scholarship in the College of Engineering

Pooua P. Pathak
Jinzhao Wu

James H. Lum Scholarship in Engineering

Patrick K. Lee

William J. Madden and Ethel Harer Madden Memorial Honors Scholarship in Engineering

Sean T. Elward	Nicholas J. Matone	Keegan S. McCoy
Amanda C. Mills	Eric J. Tim	Dominique S. Zwiebel
Michael V. Bilyk		

William J. Madden and Ethel Harer Madden Memorial Scholarship in Engineering

Andriy Bokalo	Kevin R. Brodmerkel	Travis C. Buffington
Ethan J. Cook	Erik M. Duffy	Jeffrey N. Fliegel
Samuel M. Foran	Landon O. Hernandez	Tyler R. Horwat
Ryan E. Kachline	Sung Hoon Kim	Mark A. Liberto Jr.
Aakash H. Mehta	Dominic P. Misja	Shawn M. Moffit
Joshua F. Myers	Joshua A. Noble	Joseph B. Picarelli Jr.
Jeegar A. Shah	Kyle T. Snoddy	Katlyn J. Stepansky
William C. Trego	Anthony J. Villanti	Kyle A. Wagner
Weilin Xue	Elorm K. Yador	Athena M. Abate
Matthew G. Agostinelli	Moustafa K. Ahmed	Ling An

William J. Madden and Ethel Harer Madden Memorial Trustee Scholarship in Engineering

Ryan M. Black	Nathan R. Blinn	Jonathan T. Bogash
Ian M. Brooks	Steven M. Devore	Adam R. Falcsik
Sean E. Flamm	Anthony El Kohr	David W. Lambert
Dylan Levan	Kyle T. Marsh	Aitzaz Nathaniel
Jonathan P. Ore	Sarah E. Parks	Nishith Patel
Kyle C. Scherer	David R. Sedlock	Andrew R. Sharp
Luke D. Shepley	Michael J. Stachnik	Louis W. Wust III
Chirag M. Amin	Michael R. Amthor	

Steven Messori Memorial Scholarship

Christian M. Pastor

Frank Blaise Modruson/Lynne C. Shigley Scholarship

Christopher J. Shotter Jr.

The Shuman H. & Elizabeth B. Moore Engineering Scholarship

Aitzaz Nathaniel
Mark A. Bartels

Paul Morrow Endowed Scholarship

Boni Li
Joseph P. Tucket
Edward Y. Wang

Fred A. Pechter Scholarship

Ryan M. Black
Adam R. Falcsik
Jason A. Gill
Tyler R. Horwat

David W. Lambert
Dylan Levan

Harry P. and Henrietta K. Pierce Scholarship
Zachary C. Bluedorn

Harold I. Tarpley Memorial Scholarship Fund
Dominique S. Zwiebel

Christopher M. Wharton Trustee Scholarship
Thomas M. Connors

Howard J. Waltemeyer Sr. Scholarship
Charles L. Sie

5. Undergraduate Awards

James M. Barnak/Eta Kappa Nu Outstanding Senior Award
Miles H. Frain
Keegan McCoy

Eta Kappa Nu Outstanding Junior Award
Steven Devore

Electrical Engineering student marshal
Spring: Drew Schmitt

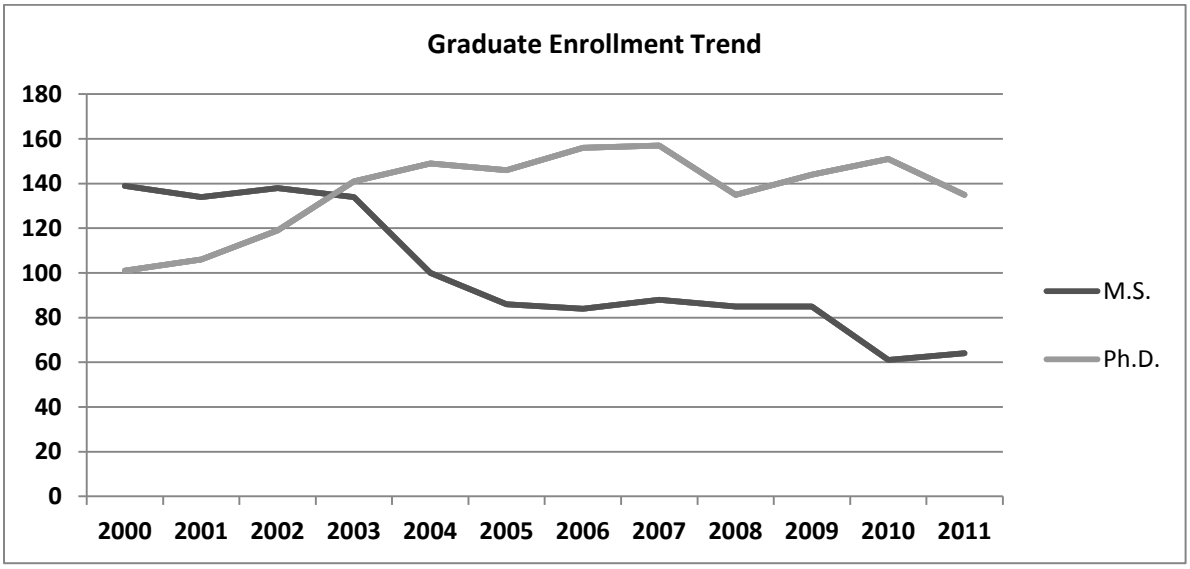
B. Graduate Program

1. Enrollment

Fall 2011 M.S.: 64

Fall 2011 Ph.D.: 135

2. Enrollment trends



3. Master's Degrees Conferred - total 30

a. Spring 2011

Nathawut Homsup, "Performance Comparisons of Channel Coding Techniques for Digital Satellite Communications" (paper), advised by John Metzner

Sneha Kadetotad, "Terrain-Aided Localization using Feature-Based Particle Filtering," advised by Constantino Lagoa

Yifeng Liu, "Review of Recent Advance in WDM Network" (paper), advised by Shizhuo (Stuart) Yin

Chandrasekhar Mothali, "Attacking Anonymization and Constructing Improved Differentially Private Classifiers," advised by David Miller

Salil Mujumdar, "Strain Engineering for Strained P-Channel Non-Planar Tri-Gate Field Effect Transistors," advised by Suman Datta

Anand Raja, "Towards Understanding People in Videos," advised by Kenneth Jenkins

Bharath Ramaswamy, "Kalman Filter Based Estimation of Inertial Measurement Unit Parameters in a Portable Biomechanical Assessment Suite," advised by Kenneth Jenkins

Sucharita Ray, “Metric Driven Mobility Modeling in Tactical Networks,” advised by George Kesidis

Jeremiah Turpin, “Uniaxial Metamaterials for Microwave Far-Field Collimating Lenses,” advised by Douglas Werner

Yaxing Yu, “Investigation of Nanostructure Enhanced Surface Plasmonic Sensor: Principles and Applications” (paper), advised by Shizhuo (Stuart) Yin

b. Summer 2011

Ashish Agrawal, “Experimental Study of Low-Field Transport in Highly Confined Arsenide- Antimonide Quantum Well Heterostructures,” advised by Suman Datta

Rachana Reddy Agumamidi, “Hard Sensor Processing for Data Fusion,” advised by David Miller

Dharav Dantara, “Reconfigurable Accelerators for Neuromorphic Systems,” advised by Suman Datta

Ganesh Iyer, “An Approach to Hard and Soft Sensors' Data Fusion and Analysis” (paper), advised by Kenneth Jenkins

Rajaram Narayanan, “Carbon Nanotube Flow Sensors: A Comprehensive Study,” advised by Theresa Mayer

Madan Parameswaran, “Study of Path Planning Functions,” advised by Constantino Lagoa

Chinmay Rao, “A Study of Intra-Electrode Correlation and Its Application to Neural Spike Detection,” advised by Kenneth Jenkins

Bharath Rengarajan, “An Approximate Expectation-Maximization Like Approach to Spatio- Temporal Belief-Propagation for Moving Object Detection,” advised by David Miller

Clinton Scarborough, “Low-Loss Radio-Frequency Electromagnetic Metamaterials Applied to Antennas and Imaging,” advised by Douglas Werner

Mahadevan Srinivasan, “A Neural Network Based Approach for Predicting a Patient's Conversion to Alzheimer's Disease Based on Brain Scan Data,” advised by David Miller

Thomas Tyson, “Marginal Oscillator Conversion Gain: Prediction Simulation, and Experimental Measurements,” advised by Jeffrey Schiano

Guixi Zou, “A Flow Classifier with Tamper-Resistant Features an an Evaluation of Its Portability to New Domains,” advised by David Miller

C. Fall 2011

Divij Bhatia, “Study of Semiconductor Near-Surface Region using Photoconductive Decay Technique,” advised by Jerzy Ruzyllo

Aarti Chandrashekhar, “A Fine-Grained Dataflow Library for Reconfigurable Streaming Accelerators,” advised by Suman Datta

Jason Dalenberg, “Design and Analysis of a Magnetic Levitation System for Control Systems Courses,” advised by Jeffrey Schiano

Chaitanya Kamath, “Internet Traffic Classification Using Machine Learning Techniques (paper),” advised by George Kesidis

Sina Khaleghi, “Control Methods in Power System Restoration” (paper), advised by George Kesidis

Chanakya Mehta, “Applying Systems Thinking to Develop a Design Space and Business Strategy Exploration Tool for Technology-Based Ventures in Developing Communities,” advised by Sven Bilén

Khoa Tran, “Zebra Recognition Using Wavelets and Machine Learning,” advised by David Miller

Yuhao Wang, “Model Analysis and Robust Control Design in VSC-HVDC Systems Based on Direct Power Control” (paper), advised by Jeffrey Mayer

4. Doctoral Degrees Conferred – total 22

a. **Spring 2011**

Zikri Bayraktar, “Novel Meta-Surface Design Snythesis via Nature-Inspired Optimization Algorithms,” advised by Douglas Werner

Haifeng Li, “Nonlinear Nanoprobes for Characterizing Ultrafast Optical Near Field,” advised by Zhiwen Liu

Justin Liou, “All-Optical Switching with Dye-Doped Liquid Crystals,” advised by Iam-Choon Khoo

Chandrasekhar Radhakrishnan, “Fault Tolerant Signal Processing for VLSI Circuits,” advised by Kenneth Jenkins

Aaron Vallett, “Fabrication and Characterization of Semiconducting Nanowires for Tunnel Field Effect Transistors,” advised by Theresa Mayer

Qian Xu, ”Nonlinear Microscopy and Spectroscopy,” advised by Zhiwen Liu

Michael Zugger, “Modeling Radiometric and Polarized Light Scattering from Exoplanet Oceans and Atmospheres,” advised by Timothy Kane

b. **Summer 2011**

Okhtay Azarmanesh, “A Novel Approach to Modulation Classification in Cognitive Radios,” advised by Sven Bilén

Junbin Huang, “Nonlinear Liquids and Mechanisms for All-Time-Scale Optical Limiting Effects,” advised by Iam-Choon Khoo

Thomas Latempa, “Visible Light Active, Nano-Architectured Metal Oxide Photo-Catalysts for Solar Fuel Applications,” advised by Constantino Lagoa

Chu-Fang Lin, “Novel Generative Semisupervised Learning Based on Fine-Grained Component-Conditional Class Labeling,” advised by David Miller

Ming-Wei Liu, “Joint Specific Emitter Identification and Tracking using Device Non- linearity Estimation,” advised by John Doherty

Valerie Mistoco, “Modeling of Small Scale Radio-Frequency Inductive Discharges for Electric Propulsion Applications,” advised by Sven Bilén

Aria Pezeshk, “Feature Extraction and Text Recognition from Scanned Color Topographic Maps,” advised by Kenneth Jenkins

Chinmay Rao, “Validation of Symbolic Dyanmics Filtering Using Bayesian Filtering Approaches,” advised by Kenneth Jenkins

Arnab Roy, “Signal Analysis using Raised Cosine Empirical Mode Decomposition,” advised by John Doherty

Safakcan Tuncdemir, “Design, Modeling and Control of a Novel Multi Functional Transla- tional-Rotary Micro Ultrasonic Motor,” advised by Kenji Uchino

Seok Ho Yun, “Novel Optical Metamaterials, Absorbers, and Filters Based on Periodic Nanostructures,” advised by Theresa Mayer

Yuan Zhuang, “Loss Phenomenology and the Methodology to Derive Loss Factors in Piezoelectric Ceramics,” advised by Srinivas Tadigadapa

C. Fall 2011

James Basham, “Broadening Spectral Response in Solid-State Dye-Sensitized Solar Cells via Forster Resonance Energy Transfer,” advised by James Breakall

Zhao Fang, “Ultra Sensitive Magnetic Sensors Integrating the Giant Magneto- electric Effect with Advanced Microelectronics,” advised by Qiming Zhang

Qihe Pan, “RFID Radar Tag System Design using Ultrawideband Noise Waveforms,” advised by Ram Narayanan

5. Graduate Scholarships and Fellowships

Paul F. Anderson Graduate Fellowship in Electrical Engineering
Benjamin D. McPheron
Peter E. Siebert

Luther B. and Patricia A. Brown Graduate Fellowship
Dustin P. Fairchild
Philip J. Gorman
Benjamin D. McPheron
Andrew M. Swisher

Joseph R. and Janice M. Monkowski Graduate Fellowship in EE
Dustin P. Fairchild
Philip J. Gorman

Pontano Family Scholarship in Electrical Engineering
Sonny Smith

Fred C. and M. Joan Thompson Graduate Fellowship in Electrical Engineering
Jose I. Ramirez

Allan L. Rayfield Graduate Fellowship
Matthew J. Hollander

Society of Penn State Electrical Engineers Graduate Fellowship
Donovan E. Brocker
Dustin P. Fairchild
Spencer Martin
Robert M. Sorbello Jr.

Bess L. and Mylan R. Watkins Graduate Fellowship in Electrical Engineering
Patrick D. Byrnes

6. Graduate Awards

Melvin P. Bloom Memorial Outstanding Doctoral Research Award
Qian Xu
Yuan Zhuang

Nirmal K. Bose Dissertation Excellence Award
Haifeng Li
Chandrasekhar Radhakrishnan

The A. J. Ferraro Graduate Research Award
Clinton Scarborough
Haifeng Li

C. Courses

First Year Seminars: **EE007** Adventures in Electrical Engineering **EE008** Digital Music **EE009** Intro to Ham Radio **EE009** This is Rocket Science **EE009** Loudspeaker Design	
EE200 Design Tools	**EE210** Circuits and Devices
EE211 Electrical Circuits and Power Distribution (non majors)	**EE212** Introduction to Electronic Measuring Systems (non majors)
EE300W Design Process	**EE310** Electronic Circuit Design I
EE311 Electronic Circuit Design II	**EE316** Introduction to Embedded Microcontrollers
EE320 Introduction to Electro-Optical Engineering	**EE330** Engineering Electromagnetics
EE340 Introduction to Nanoelectronics	**EE350** Continuous-Time Linear Systems
EE351 Discrete-Time Linear Systems	**EE353** Signals and Systems (non majors)
EE360 Communications Systems I	**EE362** Communication Networks
EE380 Linear Control Systems	**EE387** Energy Conversion
EE403W Senior Project Design	**EE410** Linear Electronic Design
EE413 Power Electronics	**EE416** Digital Integrated Circuits
EE417 Digital Design Using Field Programmable Devices	**EE420** Electro-optics: Principles and Devices
EE421 Optical Fiber Communications	**EE422** Optical Engineering Laboratory
EE424 Principles and Applications of Lasers	**EE430** Principles of Electromagnetic Fields
EE432 UHF and Microwave Engineering	**EE438** Antenna Engineering
EE439 Radiowave Propagation in Communications	**EE441** Semiconductor Integrated Circuit Technology
EE442 Solid State Devices	**EE453** Fundamentals of Digital Signal Processing
EE454 Fundamentals of Computer Vision	**EE455** An Introduction to Digital Image Processing
EE460 Communication Systems II	**EE471** Introduction to Plasmas
EE472 Space Astronomy and Introduction to Space Science	**EE474** Satellite Communications Systems
EE477 Fundamentals of Remote Sensing Systems	**EE482** Introduction to Digital Control Systems
EE487 Electric Machinery and Drives	**EE488** Power Systems Analysis I
EE497	**EE 497**

Software Defined Radio	Probability and Random Processes for Electrical Engineers
EE497 Space Systems Engineering Seminar	**EE500** Graduate Colloquium
EE510 Linear Integrated Circuits	**EE520** Electro Optics--Systems and Computing
EE521 Fiber Optics and Integrated Optics	**EE522** Electro-Optics Laboratory
EE524 Lasers and Optical Electronics	**EE526** Nonlinear Optical Materials
EE531 Engineering Electromagnetics	**EE534** Conformal Antennas
EE535 Boundary Value Methods of Electromagnetics	**EE537** Numerical and Asymptotic Methods of Electromagnetics
EE538 Antenna Engineering	**EE541** Manufacturing Methods in Microelectronics
EE542 Semiconductor Devices	**EE543** Ferroelectric Devices
EE544 Micromechatronics	**EE545** Semiconductor Device Reliability
EE546 Field-Effect Devices	**EE547** Dielectric Devices
EE549 Acoustic Wave Devices	**EE551** Wavelets, Filter Banks And Multi-Resolution Analysis
EE552 Pattern Recognition--Principles and Applications	**EE553** Topics in Digital Signal Processing
EE554 Topics in Computer Vision	**EE555** Digital Image Processing II
EE556 Graphs, Algorithms and Neural Networks	**EE557** Multidimensional Signal Processing
EE560 Probability, Random Variables, and Stochastic Processes	**EE561** Information Theory
EE562 Detection and Estimation Theory	**EE564** Error Correcting Codes for Computers and Communication
EE565 Reliable Data Communications	**EE567** Wireless and Mobile Communications
EE568 Digital Communications I	**EE569** Digital Communications II
EE574 Propagation Through Random Media	**EE576** Inversion Techniques in Remote Sensing
EE579 Microwave Radar Remote Sensing	**EE580** Linear Control Systems
EE581 Optimal Control	**EE582** Adaptive and Learning Systems
EE584 Robust Control Theory	**EE587** Nonlinear Control and Stability
EE588 Power Systems Control and Operation	
EE597 Special Topics Courses Nanoscale Transport Probablity Limit Theories Radar Systems Semiconductor Characterization Stochastic Control	

III. Department Research

A. Research Areas

Communications and Networking

Digital communications, computer networking, intelligent networks, multimedia communications, mobile computing, local area wireless networks (RF and optical), portable and mobile communications, optical fiber communications, optical networking, coding and information theory, satellite communications, and propagation measurements and modeling

Faculty members: John Doherty, Mohsen Kavehrad, George Kesidis, John Metzner, and Aylin Yener

Control Systems

Multiobjective and probabilistic robust control, nonlinear systems, intelligent distributed control, adaptive control, active vision, and quantum control

Faculty members: Constantino Lagoa, Ji-Woong Lee, and Jeffrey Schiano

Electromagnetics

Computational electromagnetics, wave scattering and propagation, interactions with complex media and novel materials, electrodynamics, antenna analysis and design, scattering cross section and antenna measurements, computer visualization, RF and microwave systems, MMIC, EMI, and EMC, and electronic packaging

Faculty members: James Breakall, Raj Mittra, and Douglas Werner

Electronic Materials and Devices

Materials and devices for electronic, photonic, bioelectronic and MEMS applications: amorphous and crystalline silicon, III-V compounds, organic thin films, ferroelectric and piezo-electric; development of novel device structures and manufacturing methods, device and circuit simulation and modeling, and device and material characterization

Faculty members: Suman Datta, Thomas Jackson, Theresa Mayer, Jerzy Ruzyllo, Srinivas Tadigadapa, Kenji Uchino, and Qiming Zhang

Optical Materials and Devices

Electro-optics, photonic and nonlinear optical materials, devices and applications; tunable photonic crystals; laser switching and optical information processing; liquid crystalline materials and devices; fiber optics and waveguides, holography

Faculty members: Iam-Choon Khoo, Zhiwen Liu, and Shizhuo Yin

Power Systems

Power system planning, operation, and control, intelligent system applications to power systems, computational tools for power electronic design, and quiet motor drives

Faculty members: Jeffrey Mayer

Remote Sensing and Space Systems

Active (radar and LIDAR) and passive (radiometry) remote sensing of the atmosphere; radar, radiometer, and LIDAR systems; rocket and satellite instrumentation; atmospheric electrodynamics; meteoric effects in the ionosphere; modeling of atmospheric processes; and plasma physics

Faculty members: Kultegin Aydin, Sven Bilén, Timothy Kane, John Mathews, John Mitchell, Ram Narayanan, Victor Pasko, and Julio Urbina

Signal and Image Processing

Multidimensional signal processing, signal reconstruction theory and algorithms, signal compression, spectral estimation, image processing, medical image analysis, neural networks, multiple target tracking in clutter, adaptive filtering, and data fusion

Faculty members: William Higgins, Kenneth Jenkins, Yanxi Liu, David Miller, and Vishal Monga

B. Articles Published in Refereed Journals

Listed by author, title, journal, and date.

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S. Sodagari, A. Attar, and **S.G. Bilén**, "On a Truthful Mechanism for Expiring Spectrum Sharing in Cognitive Radio Networks," IEEE Journal on Selected Areas in Communications, 2011.

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A. Roy and **J. F. Doherty**, "Overlay Communications using Empirical Mode Decomposition," IEEE Systems Journal, March 2011.

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S. U. Pawar and **J. F. Doherty**, "Modulation Recognition in Continuous Phase Modulation using Approximate Entropy," IEEE Transactions on Information Forensics & Security, Special Issue on Using the Physical Layer for Securing the Next Generation of Communications Systems, September 2011.

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R. J. Kline, S. D. Hudson, X. Zhang, D. J. Gundlach, Andrew J. Moad, O. D. Jurchescu, **T. N. Jackson**, S. Subramanian, J. E. Anthony, M. F. Toney, and L. J. Richter , "Controlling the Microstructure of Solution-Processable Small Molecules in Thin-Film Transistors through Substrate Chemistry," Chemistry of Materials 2011.

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Brigita Rozic, Marija Kosec, Hana Ursic, Janez Holc, Barbara Malic, **Q. M. Zhang**, Robert Blinc, Rasa Pirc, and Zdravko Kutnjak," Influence of the critical point on the electrocaloric response of relaxor ferroelectrics," Journal of Applied Physics, 2011.

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C. Articles Published in Refereed Proceedings

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P. W. A. Roming, **S. G. Bilén**, D. N. Burrows, A. D. Falcone, D. B. Fox, T. L. Herter, J. A. Kennea, M. L. McConnell, and J. A. Nousek, "Joint Astrophysics Nascent Universe Satellite: Utilizing GRBs as High Redshift Probes," Conference on GRBs as Probes: From the Progenitor's Environment to the High Redshift Universe, Como, Italy, May 2011.

James Nemes, Kriten S. Hochstedt, Mary Lynn Brannon, Elizabeth C. Kisenwether, Robert M. Capuro, and **Sven G. Bilén**, "SE Capstone: Introduction of Systems Engineering into an Undergraduate Multidisciplinary Capstone Course," 2011 ASEE Annual Conference, Vancouver, British Columbia, Canada, June 2011.

Y.C. Chen, S. Soumya, G. Sun, Y. Xie, **S. Datta** and V. Narayanan, "Automated Mapping for Reconfigurable Single Electron Transistor Arrays," Design Automation Conference, June 2011.

V. Saripalli, A. Misra, **S. Datta,** and V. Narayanan, "An Energy-Efficient Heterogeneous CMP based on Hybrid TFET-CMOS Cores," Design Automation Conference, June 2011.

L. Liu, V. Saripalli, E. Hwang, V. Narayanan, and **S. Datta**, "Multi-Gate Modulation Doped In0.7Ga0.3As Quantum Well FET for Ultra Low Power Digital Logic," 219th Electro chemical Society Meeting, May 2011.

C. D. Young, M. Baykan, A. Agrawal, H. Madan, K. Akarvardar, C. Hobbs, I. OK, W. Taylor, C. E. Smith, M. M. Hussain, T. Nishida, S. Thompson, P. Majhi, P. Kirsch, **S. Datta,** and R. Jammy, "Critical Discussion on (100) and (110) Orientation Dependent

Transport : nMOS Planar and FinFET", International Symposium on VLSI Technology, June 2011.

H. Madan, D. Veksler, Y.T. Chen, J. Huang, N. Goel, G. Bersuker, and **S. Datta**, "Interface States at high-k/InGaAs interface: H2O vs. O3 based ALD Dielectric," Device Research Conference, June 2011.

L. Liu, V. Saripalli, V. Narayanan and **S. Datta**, "Experimental Investigation of Scalability and Transport in In0.7Ga0.3As Multi-Gate Quantum Well FET (MuQFET)," Device Research Conference, June 2011.

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A. Agrawal, A. Ali, R. Misra, P. E. Schiffer, J. B. Boos, B. R. Bennett and **S. Datta**, "Low Field Electron Transport in Mixed Arsenide Antimonide Quantum Well Heterostructures," Electronic Materials Conference, June 2011.

V. Saripalli, J. P. Kulkarni, N. Vijaykrishnan and **S. Datta**, "Variation-Tolerant Ultra Low- Power Heterojunction Tunnel FET SRAM Design," IEEE/ACM International Symposium on Nanoscale Architectures, July 2011.

L. Liu, V. Saripalli, V. Narayanan and **S. Datta**, "Device Circuit Co-Design Using Classical and Non-Classical III-V Multi-Gate Quantum-Well FETs (MuQFETs)," IEEE International Electron Devices Meeting , December 2011.

A. Roy and **J. F. Doherty,** "Weak signal sensing using empirical mode decomposition and stochastic data reordering," IEEE Military Communications Conference, November 2011.

Brett Flood, **William E. Higgins**, and Lav Rai. "System for Robust Bronchoscopic Video Distortion Correction,'' SPIE Medical Imaging 2011: Visualization, Image-Guided Procedures, and Modeling, February 2011.

Duane C. Cornish and **William E. Higgins**, "Real-time method for bronchoscope motion measurement and tracking,'' SPIE Medical Imaging 2011: Visualization, Image-Guided Procedures, February 2011.

Rahul Khare and **William E. Higgins**, "Image-based global registration system for bronchoscopy guidance,'' SPIE Medical Imaging 2011: Visualization, Image-Guided Procedures, and Modeling, February 2011.

C. Radhakrishnan and **W. K. Jenkins**, "Fault Tolerant Adaptive Filters Based on Modified Discrete Fourier Transform Architectures**,"** IEEE International Symposium on Circuits and Systems, May, 2011.

C. Radhakrishnan and **W. K. Jenkins**, "The 2-D Modulated Disctrete Fourier Transform for 2-D Fast Convolution and Digital Filtering**,"** IEEE International Symposium on Circuits and Systems, May, 2011.

C. Radhakrishnan and **W. K. Jenkins**, "Reliable transform domain adaptive filters designed with a hybrid combination of redundant hardware modules and algorithmic error detection and correction" IEEE International *Midwest* Symposium on Circuits and Systems, August 2011.

C. Radhakrishnan and **W. K. Jenkins**, "Nested Quadratic Arithmetic for Efficient Convolution of Complex Sequences with Quadratic Modified Fermat Number Transforms," Forty-Fifth Annual Asilomar Conference on Signals, Systems, and Computers, November 2011.

M. Kavehrad, J. Fadlullah, Z. Hajjarian, "MIMO FSO Communications in Cloud and Turbulence," OSA Topical Meeting, July 2011.

M. Kavehrad, J. Fadlullah, "Optical Wireless Networked Systems: Applications to Aircrafts,"SPIE Photonics West, January 2011.

A. Kurve, C. Griffin, **G. Kesidis**, "A Graph Partitioning Game for Distributed Simulation of Networks," International Workshop of Modeling, Analysis, and Control of Complex Networks, September 2011.

B. Celik, J. Raghuram, **G. Kesidis, D.J. Miller,** "Salting Public Traces with Attack Traffic to Test Flow Classifiers," USENIX Cyber Security Experimentation and Test Workshop, August 2011.

A. Kurve , C. Griffin , **G. Kesidis,** "Iterative Partitioning Scheme for Distributed Simulation of Dynamic Networks," Sixteenth IEEE International Workshop on Computer-Aided Modeling Analysis and Design of Communication Links and Networks , June 2011.

A. Kurve, **G. Kesidis**, "Sybil Detection via Distributed Sparse Cut Monitoring," IEEE International Conference on Communications, June 2011.

C. Griffin, **G. Kesidis**, P. Antoniadis, S. Fdida, "An Epidemic Model of BitTorrent for Acquisition Performance, Content Availability, and Cooperation Incentive," IEEE International Conference on Communications, June 2011.

I. C. Khoo, J. Huang, S. Zhou, J. Liou, K. L. Hong and Yi Ma, "Liquid-crystals-plasmonics for ultrafast broadband all-optical switching," in Material Research Society, Symposium on Liquid Crystals - Beyond Displays, 2011.

B. Yilmaz, M. Ayazoglu, M. Sznaier and **C. Lagoa**, "Convex Relaxations for Robust Identification of Wiener Systems and Applications," Joint 50th IEEE Conference on Decision and Control and European Control Conference, 2011.

S. Kadetotad, P. Vemulapalli, S. Brennan and **C. Lagoa**, "Terrain-Aided Localization Using Feature-Based Particle Filtering," 4th Annual Dynamic Systems and Control Conference, 2011.

Chao Feng, **Constantino M. Lagoa**, Mario Sznaier, "Identifying Stable Fixed Order Systems from Time and Frequency Response Data," American Control Conference, 2011.

J.-W. Lee and G. E. Dullerud, "Joint synthesis of switching and feedback for linear systems in discrete time," 14th ACM International Conference on Hybrid Systems: Computation and Control, 2011.

S. Ghosh and **J.-W. Lee,** "Optimal synthesis for finite-time consensus under fixed graphs," 50th IEEE Conference on Decision and Control, 2011.

S. Mirzazad-Barijough and **J.-W. Lee**, "Finite-state simulations and bisimulations for discrete-time piecewise affine systems," 50th IEEE Conference on Decision and Control, 2011.

J. Ouyang, C. Yang, D. Niu, Y. Xie, and **Z. Liu,** "F2BFLY: an on-chip free-space optical network with wavelength-switching," International Conference on Supercomputing, 2011.

J. D. Mathews, "Underdense, overdense, and Bragg scattering in radar meteors," URSI General Assembly and Scientific Symposium of the International Union of Radio Science, August 2011.

I. Seker, W. E. Swartz**, J. D. Mathews**, and N. Aponte, "A new 3D display format relating azimuth-scanning radar data and all-sky images," URSI General Assembly and Scientific Symposium of the International Union of Radio Science, August 2011.

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over Arecibo Observatory," URSI General Assembly and Scientific Symposium of the International Union of Radio Science, August 2011.

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D. K. Mohata, R. Bijesh, V. Saripalli, **T. S. Mayer, S. Datta**, "Self-Aligned Gate Nanopillar In0.53Ga0.47As Vertical Tunnel Transistors," 69th Device Research Conference, June 2011.

F. Namin, S. Yun, **T. S. Mayer, D. H. Werner,** C. Rivero-Baleine, "Near-Perfect Optical Mirrors Based on Thin All-Dielectric Zero Index Metamaterial Coatings," IEEE AP-S International Symposium and USNC/URSI National Radio Science Meeting, July 2011.

U. Srinivas, **V. Monga** and R. Raj, "Meta-classifiers for exploiting feature dependencies in automatic target recognition", IEEE International Radar Conference, May 2011.

D. Vats, **V. Monga**, U. Srinivas, and J. Moura, "Scalable Robust Hypothesis Tests Using Graphical Models" IEEE International Conference on Acoustics, Speech and Signal Processing, May 2011.

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M. Li, **V. Monga**, "Desynchronization Resilient Video Fingerprinting via Randomized, Low-rank Tensor Approximations," IEEE International Workshop on Multimedia Signal Processing, October 2011.

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U. Srinivas, **V. Monga**, Y.Chen and T. D. Tran, "Sparsity-based face recognition using discriminative graphical models," IEEE Asilomar Conference on Signals, Systems and Computers, November 2011.

C. Fillion, Z. Fan and **V. Monga**, "Adaptive removal of background and white space from document images using seam categorization," SPIE Electronic Imaging, January 2011.

M.S. Huang and **R.M. Narayanan**, "Non-Cooperative Collision Avoidance Concept for Unmanned Aircraft System using Satellite-Based Radar and Radio Communication," 30th Digital Avionics Systems Conference, October 2011.

J.J. Zhang, S. Bhat, Q. Ding, A. Papandreou-Suppappola, **R.M. Narayanan**, S. Kay, and M. Rangaswamy, "Design and Performance of an Integrated Waveform-Agile Multi-Modal Track-Before-Detect Sensing System," 45th Annual Asilomar Conference on Signals, Systems, and Computers, November 2011.

R.M. Narayanan, "Earthquake Survivor Detection using Life Signals from Radar Micro-Doppler," International Conference on Wireless Technologies for Humanitarian Relief, December 2011.

R. Vela, G. Woodington, M.R. Deluca, and **Ram M. Narayanan**, "Direct Digitization of Ultra-Wideband (UWB) Noise Signals using Frequency Band Folding," SPIE Conference on Radar Sensor Technology XV, April 2011.

R. Vela, D. Erisman, and **R.M. Narayanan**, "A Technique for the Generation of Customizable Ultra-Wideband Pseudo-Noise Waveforms," SPIE Conference on Radar Sensor Technology XV, April 2011.

R. Vela, **R.M. Narayanan**, and D. Erisman, "A Technique for the Extraction of Ultra-Wideband (UWB) Signals Concealed in Frequency Band Folded Responses," SPIE Conference on Radar Sensor Technology XV, April 2011.

G. Woodington, M. DeLuca, R. Moro, D. Lemus, R. Vela, and **R.M. Narayanan**, "Target Discrimination Technique Utilizing Noise Waveforms," SPIE Conference on Radar Sensor Technology XV, April 2011.

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S. Smith and **R.M. Narayanan,** "Cross-Correlation Analysis of Noise Radar Signals Propagating through Lossy Dispersive Media," SPIE Conference on Radar Sensor Technology XV, April 2011.

R.M. Narayanan, "Advances in Noise and Chaotic Radar," International Radar Symposium India December 2011.

R.M. Narayanan, "Human Detection and Characterisation Through Barriers," International Conference on Wireless Technologies for Humanitarian Relief, December 2011.

R.M. Narayanan, "Radar Tags for Communications and Information Transfer," International Radar Symposium India, December 2011.

S. Celestin, and **V. P. Pasko**, "Physical processes in lightning leaders producing high energy electrons," 14th International Conference on Atmospheric Electricity August 2011.

V. P. Pasko, "Electrostatic mechanism of lightning associated infrasonic pulses from thunderclouds," 14th International Conference on Atmospheric Electricity, August 2011.

A. Kshirsagar, S. Pickering, J. Xu, and **J. Ruzyllo,** "Light Emitting Diodes Formed Using Mist Deposition of Colloidal Solution of CdSe Nanocrystalline Quantum Dots", ECS Spring Meeting, May 2011.

F. Li, Z. Fang, R. Misra, **S. Tadigadapa, Q. Zhang** and **S. Datta**, "Giant magnetoelectric effect in nanofabricated Pb(Zr0.52Ti0.48)O3-Fe85B5Si10 Cantilevers and resonant gate transistors", Device Research Conference, June 2011.

Ping Kao, David Allara, **Srinivas Tadigadapa**, "Label Free Piezoelectric Dna Sensor Arrays Using Novel Selective Immobilization Techniques," IEEE MEMS Conference, January 2011.

Ping Kao, David Allara, **Srinivas Tadigadapa,** 'Label Free Piezoelectric DNA Sensor Arrays Using Novel Selective Immobilization Techniques," IEEE MEMS Conference, January 2011.

Son Vu Hoang Lai, Ping Kao, **Srinivas Tadigadapa**, "Thermal Biosensors From Micromachined Bulk Acoustic Wave Resonators," Eurosensors XXV, September 2011.

Hwall Min, David Allara, **Srinivas Tadigadapa**, "Investigation Of The Viscoelastic Properties Of Liquids Trapped In Nanoporous Cavities Using Micromachined Acoustic Transducers," Eurosensors XXV, September 2011.

Hwall Min, Nichole Sullivan, David Allara, **Srinivas Tadigadapa**, "Nanoporous Gold: A High Sensitivity And Specificity Biosensing Substrate," Eurosensors XXV, September 2011.

J. Urbina, R. Seal, and L. Dyrud, "The New Meteor Radar at Penn State: An Approach for Open Source Software Defined Radar for Aeronomy," XXX URSI General Assembly and Scientific Symposium of International Union of Radio Science Meeting, August 2011.

F. Galindo, **J. Urbina**, J. Chau, and L. Dyrud, "On the effect of the signal processing in the meteor-head data at Jicamarca," XXX URSI General Assembly and Scientific Symposium of International Union of Radio Science Meeting, August 2011.

Z. H. Jiang, S. Yun, F. Toor, **D. H. Werner, T. S. Mayer**, "Experimental Demonstration of a Conformal Optical Metamaterial Absorber," IEEE AP-S International Symposium and USNC/URSI National Radio Science Meeting, July 2011.

Z. H. Jiang, S. Yun, Q. Xu, **D. H. Werner, Z. Liu, T. S. Mayer**, "Experimental Verification of a Zero-Index Near Infrared Metamaterial," IEEE AP-S International Symposium and USNC/URSI National Radio Science Meeting, July 2011.

Kaya Tutuncuoglu and **Aylin Yener**, "Transmission Policies for Asymmetric Interference Channels with Energy Harvesting Nodes," International Workshop on Computational Advances in Multi-Sensor Adaptive Processing, December 2011.

Basak Guler and **Aylin Yener**, "Interference Alignment for Cooperative MIMO Femtocell Networks," IEEE Global Telecommunications Conference, December 2011.

Xiang He, Ashish Khisti and **Aylin Yener**, "MIMO Broadcast Channel with Arbitrarily Varying Eavesdropper Channel: Secrecy Degrees of Freedom," IEEE Global Telecommunications Conference, December 2011.

Xiang He and **Aylin Yener**, "Gaussian Two-way Wiretap Channel with an Arbitrarily Varying Eavesdropper," IEEE Global Telecommunications Conference Workshop on Physical Layer Security, December 2011.

Scott T. Rager, Ertugrul N. Ciftcioglu, **Aylin Yener**, Thomas F. La Porta, and Michael J. Neely, "Distributed Backpressure Protocols with Limited State Feedback," IEEE Military Communications Conference, November 2011.

Ertugrul N. Ciftcioglu and **Aylin Yener**, "Quality-of-Information Aware Transmission Policies with Time-Varying Links," IEEE Military Communications Conference, November 2011.

Ye Tian and **Aylin Yener**, "Relaying for Multiple Sources in the Absence of Codebook Information," Asilomar Conference on Signals, Systems, and Computers, November 2011.

Kaya Tutuncuoglu and **Aylin Yener**, "Optimal Power Control for Energy Harvesting Transmitters in an Interference Channel," Asilomar Conference on Signals, Systems, and Computers, November 2011.

Xiang He, Ashish Khisti and **Aylin Yener**, "MIMO Multiple Access Channel with an Arbitrarily Varying Eavesdropper," 49th Annual Allerton Conference on Communication, Control, and Computing, September 2011.

Aylin Yener and Igor Stanojev, "Recruiting Multi-Antenna Transmitters as Cooperative Jammers: An Auction-Theoretic Approach," 49th Annual Allerton Conference on Communication, Control, and Computing, September 2011.

Xiang He and **Aylin Yener**, "Secrecy When the Eavesdropper Controls its Channel States," IEEE International Symposium on Information Theory, July 2011.

Min Li, Osvaldo Simeone and **Aylin Yener**, "Leveraging Strictly Causal State Information at the Encoders for Multiple Access Channels," IEEE International Symposium on Information Theory, July 2011.

Ertugrul N. Ciftcioglu, **Aylin Yener**, Ramesh Govindan, and Konstantinos Psounis, "Operational Information Content Sum Capacity: Formulation and Examples," ISIF International Conference on Information Fusion, July 2011.

Forrest Iandola, Latemeh Saremi, Tarek Abdelzaher, Praveen Jayachandran and **Aylin Yener**, “Real-Time Capacity of Networked Data Fusion,” ISIF International Conference on Information Fusion, July 2011.

Ye Tian and **Aylin Yener**, “Harnessing Interference with an Out-of-Band Relay: an Approximate Capacity Result,Proceedings of the IEEE International Conference on Communications, ICC'11, Kyoto, Japan, June 2011.

Kaya Tutuncuoglu and **Aylin Yener**, “Short-Term Throughput Maximization for Battery Limited Energy Harvesting Nodes,” IEEE International Conference on Communicationsn, June 2011.

Igor Stanojev and **Aylin Yener**, “Cooperative Jamming via Spectrum Leasing,” 2011 International Symposium of Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, May 2011.

Rahul Urgaonkar, Ertugrul N. Ciftcioglu, **Aylin Yener**, and Michael J. Neely, “Quality of Information Aware Scheduling in Task Processing Networks,” 7th International Workshop on Resource Allocation and Cooperation in Wireless Networks, May 2011.

Omur Ozel, Kaya Tutuncuoglu, Jing Yang, Sennur Ulukus, and **Aylin Yener**, “Resource Management for Fading Wireless Channels with Energy Harvesting Nodes,” IEEE International Conference on Computer Communications - Mini Conference, April 2011.

Omur Ozel, Kaya Tutuncuoglu, Jing Yang, Sennur Ulukus, and **Aylin Yener**, “Adaptive Transmission Policies for Energy Harvesting Wireless Nodes in Fading Channels,” Conference of Information Sciences and Systems, March 2011.

A. Bar-Noy, G. Cirincione, R. Govindan, S. Krishnamurthy, T. F. LaPorta, P. Mohapatra, M. Neely, and **A. Yener**, “Quality-of-Information Aware Networking for Tactical Military Networks,” Third International Workshop on Information Quality and Quality of Service for Pervasive Computing, March 2011.

Min Li, Osvaldo Simeone and **Aylin Yener**, “Message and State Cooperation in a Relay Channel When the Relay Has Strictly Causal State Information,” Information Theory and Applications Workshop, February 2011.

G. Xiong, C. Chen, S. Kishore and **A. Yener**, “Smart (In-home) Power Scheduling for Demand Response on the Smart Grid,” IEEE Power and Energy Society Conference on Innovative Smart Grid Technologies, January 2011.

J. Yao, T. Li, Y. Gao, Q. Li, and **S. Yin**, "Growth and characterization of ZnO/MgZnO composite structures grown by pulsed laser deposition,"International Society for Optics and Photonics, 2011.

C. Wang, Y. Chang, J. Yao, C. Luo, **S. Yin,** P. Ruffin, C. Brantley, and E. Edwards, "Nanostructures created by interfered femtosecond laser," International Society for Optics and Photonics, 2011.

Y. Gao, J. Yao, and **S. Yin,** "Terahertz wave generation with multi-physics mechanisms," International Society for Optics and Photonics, 2011.

Y. Chang, **S. Yin,** C. Wang, and C. Luo, "Electrically and mechanically tunable photonic metamaterials," International Society for Optics and Photonics, 2011.

S. Yin, P. Ruffin, C. Brantley, and E. Edwards, "High efficiency IR supercontinuum generation and applications: a review," International Society for Optics and Photonics, 2011.

T. Levard, P. J. Diglio, S. G. Lu, L. J. Gorny, C. D. Rahn, and **Q. M. Zhang**, “PVDF Core-free actuators for Braille displays: design, fabrication process and testing,” International Society for Optics and Photonics, 2011.

S. G. Lu, X. Y. Li, J. P. Cheng, L. Gorny and **Q. M. Zhang**, “Giant Electrocaloric Effect in High-Energy Electron Irradiated P(VDF-

TrFE) Copolymers," Materials Research Society Symposium, 2011.

Shan Wu, Minren Lin, David S-G. Lu and **Qiming Zhang**, "Polar-fluoropolymer Blends for High Energy Density Low Loss Capacitor Applications, Polymer-Based Materials and Composites-Sythesis, Assembly and Applications," Materials Research Society Symposium, 2011.

Gokhan Hatipoglu, Yang Liu, Dean Tigelaar, Mitra Yoonessi, **Qiming Zhang, Srinivas Tadigadapa**, "Fabrication And Electromechanical Performance Of A Novel High Modulus Ionogel Micro-Actuator," Eurosensors XXV, September 2011.

D. Papers Refereed by Abstract

Listed by author, title, meeting, and date

Andras Gordon, Kathryn W. Joblokow, and **Sven G. Bilén**, "Bringing the Systems Approach to Introductory Engineering Design," 2011 Middle Atlantic Regional Conference, April 2011.

Christopher N. Davis, Peter Y. Peterson, and **Sven G. Bilén**, "Communication through Hypersonic or Re-Entry Plasmas," 49th AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition, January 2011.

Christopher N. Davis, Peter Y. Peterson, and **Sven G. Bilén**, "Hypersonic or Re-Entry Plasma Communication," 17th AIAA International Space Planes and Hypersonic Systems and Technologies Conference, April 2011.

Allen T. Kummer, Erik D. Weir, Trey J. Morris, Corey W. Friedenberger, Aseem Singh, Robert M. Capuro, **Sven G. Bilén**, Johnny Fu, Gregory T. Swanson, and David B. Hash, "Testing of a Wireless Sensor System for Instrumented Thermal Protection Systems," 17th AIAA International Space Planes and Hypersonic Systems and Technologies Conference, April 2011.

Jesse K. McTernan, **Sven G. Bilén**, "Development of a Modeling Capability for Energy Harvesting Modules in Electrodynamic Tether Systems," AIAA SPACE 2011 Conference & Exposition, September 2011.

Iverson C. Bell, Brian E. Gilchrist, Jesse K. McTernan, **Sven G. Bilén**, Robert P. Hoyt, Nestor R. Voronka, Mason A. Peck, "Enabling Ultra-small Sensor Spacecraft for the Space Environment using Small-Scale Electrodynamic Tethers," AIAA SPACE 2011 Conference & Exposition, September 2011.
Erica E. Capalungan, Michael M. Micci, and **Sven G. Bilén**, "The Design and Development of a 30-GHz Microwave Electrothermal Thruster," 32nd International Electric Propulsion Conference, September, 2011.

Daniel P. Lubey, **Sven G. Bilén**, Michael M. Micci, and Pierre-Yves Taunay, "Design of the Miniature Microwave-Frequency Ion Thruster," 32nd International Electric Propulsion Conference, September, 2011.

Sven G.Bilén, Jesse K. McTernan, Brian E. Gilchrist, Iverson C. Bell, Robert P. Hoyt, and Nestor R. Voronka, "Harnessing the 'Orbital Battery' for Propulsion via Energy-Harvesting Electrodynamic Tethers," 32nd International Electric Propulsion Conference, September, 2011.

Iverson C. Bell, Brian E. Gilchrist, Jesse K. McTernan, **Sven G., Bilén**, Robert P. Hoyt, Nestor R. Voronka, and Mason A. Peck, "The Potential of Miniature Electrodynamic Tethers to Enhance Capabilities of Femtosatellites," 32nd International Electric Propulsion Conference, September, 2011.

Okhtay Azarmanesh and **Sven G. Bilén**, "Novel Modulation Classification Technique for Multi-Carrier and Single-Carrier Signals in Cognitive Radio Applications," 2011 Tactical Communications and Interoperability Conference, June 2011.

Allen T. Kummer and **Sven G. Bilén**, "The Role of Suborbital Flights for Education and Technology Development within Penn State's Student Space Programs Laboratory," 2011 Next-Generation Suborbital Researchers Conference, February 2011.

W.E. Higgins, K. Lu, R. Bascom, and R.P.M. Mahraj, "Automatic Lymph-Node Station Definition in 3D MDCT Images," American Thoracic Society 2011, American Journal of Respiratory and Critical Care Medicine, May 2011.

W.E. Higgins, K. Lu, R. Bascom, R.P.M. Mahraj, D. Campbell, and J. Toth, "Toward Exhaustive Identification of the Central-Chest Lymph Nodes in 3D MDCT Scans," American Thoracic Society (ATS) 2011, American Journal of

Respiratory and Critical Care Medicine, May 2011.

T. J. Jackson, "Oxide Semiconductor Thin Film Transistor Material and Device Understanding," Materials Research Society Fall Meeting, November 2011.

T. J. Jackson, "Weak Reactant Plasma Enhanced Atomic Layer Deposition ZnO Thin Film Transistors for Large Area and Flexible Substrate Applications," Materials Research Society Fall Meeting, November 2011.

J. I. Ramirez, Y. V. Li, D. A. Zhao, and **T. N. Jackson**, "ZnO Thin Film Transistors by Low Temperature Deposition Plasma-Enhanced Atomic Layer Deposition in a Showerhead Reactor," International Semiconductor Device Research Symposium, December 2011.

Y. V. Li, J. I. Ramirez, H. U. Li, and **T. N. Jackson**, "Low-Temperature PEALD ZnO Double-Gate TFTs," International Semiconductor Device Research Symposium, December 2011.

B. D. Gauntt, J. Li, O. M. Cabarcos, H. A. Basantani, C. Venkatasubramanian, S. Bharadwaja, N. J. Podraza, **T. N. Jackson,** D. L. Allara, S. Antrazi, M. W. Hor, and E. C. Dickey, "Microstructure of Vanadium Oxide Used in Microbolometers," SPIE, Infrared Technology and Applications, April 2011.

H. B. Shin, D. B. Saint John, M. Y. Lee, N. J. Podraza, and **T. N. Jackson**, "Hydrogenated Amorphous Silicon-Carbon Alloy Thin Films for Uncooled Microbolometers," Electronic Materials Conference, June 2011.

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D. B. Saint John, H. B. Shin, M. Y. Lee, E. C. Dickey, N. J. Podraza, and **T. N. Jackson**, "Thin Film Silicon and Germanium for Uncooled Microbolometer Applications," SPIE, Infrared Technology and Applications XXXVII, April 2011.

M. D. Zhou, C. Yang, **Z. Liu,** J. P. Cysyk, S. Y. Zheng, "A Fabry-Pérot pressure sensor fabricated on left ventricular assist device for heart failure implant," 16th International Conference on Solid-State Sensors, Actuators and Microsystems, June 2011.

Y. A. Yuwen, W. Hu, S. Yun, **T. S. Mayer**, M. Krishnamurthy, K. G. Eyink, "Self-Organized Freestanding One-Dimensional Gold Nanoparticle Arrays," Material Research Society Fall Meeting, November 2011.

T. S. Mayer, J. Kim, B. Won, M. Li, T. Morrow, W. Hu, S. Dean, H. Liu, A. Vallett, C. D. Keating, and **J. S. Mayer**, "Adding New Capabilities to Si CMOS Via Deterministic Nanowire Assembly," American Vacuum Society Annual Meeting, November 2011.

K. L. Liddell, X. Zhong, K. Sun, S. L. Dean, **T. S. Mayer**, and C. D. Keating, "Fabrication and Characterization of Phosphonic Acid Monolayers for Use in Biosensing," 241st National Meeting and Exposition of the American-Chemical-Society, March 2011.

M.C. Shastry and **R.M. Narayanan**, "Performance of Basis Pursuit Denoising Algorithms for Compressive Sensing Applications Involving Partial Toeplitz Random Matrices," February Fourier Talks, February 2011.

Y. Kwon and **R.M. Narayanan,** "Detection Performance of Distributed Radar Systems using Compressive Sensing," February Fourier Talks, February 2011.

R.M. Narayanan and S.C. Small, "National Small Arms Center Educational Initiative," NDIA International Infantry & Joint Services Small Arms Systems Symposium, Exhibition & Firing Demonstration, May 2011.

R.M. Narayanan, "Wireless Technologies for Enhancing Small Arms Effectiveness," NDIA International Infantry & Joint Services

Small Arms Systems Symposium, Exhibition & Firing Demonstration, May 2011.

R.M. Narayanan, "Advances in Noise Radar: Tomographic Imaging and Target-Matched Adaptive Illumination," AFOSR Sensing, Surveillance, and Navigation Workshop, June 2011.

S. Celestin, and **V. P. Pasko**, "Physical processes in lightning leaders producing high energy electrons," 14th International Conference on Atmospheric Electricity, August, 2011.

S. J. Celestin , W. Xu, and **V. P. Pasko**, "Terrestrial gamma-ray flashes produced by energetic electrons during the stepping of lightning leaders," Fall Meeting, American Geophysical Union, December 2011.

W. A. Lyons, S. A. Cummer, T. Samaras, T. J. Lang, P. R. Krehbiel, W. L. Beasley, **V. P. Pasko**, and E. W. McCaul, "Transient luminous events and storms which produce them," National Radio Science Meeting, January 2011.

S. Mallios and **V. P. Pasko**, "Charge transfer to the ionosphere and to the ground during thunderstorms," Fall Meeting, American Geophysical Union, December 2011.

V.P. Pasko and M. Fullekrug, "Waveforms of nighttime atmospherics as a measure of the lower ionospheric electron density profiles over UK and France on August 31, 2008," National Radio Science Meeting, January 2011.

V. P. Pasko, "Finite-difference time-domain modeling of infrasonic waves generated by supersonic auroral arcs," CEDAR-GEM Joint Workshop, June -July 2011.

V. P. Pasko, "Lightning-related transient luminous events at high altitude in the Earth's atmosphere," Symposium on Space Plasmas, Brazilian Physics Meeting, June 2011.

V. P. Pasko, "Electrostatic mechanism of lightning associated infrasonic pulses from thunderclouds," 14th International Conference on Atmospheric Electricity, August 2011.

V.P. Pasko and M. Fullekrug, "Waveforms of nighttime atmospherics as a measure of the lower ionospheric electron density profiles over UK and France on August 31, 2008," 30th URSI General Assembly and Scientific Symposium of International Union of Radio Science, August 2011.

V. P. Pasko, "Numerical modeling of initiation of lightning leaders from tall structures by sprite producing lightning discharges," Fall Meeting, American Geophysical Union, December 2011.

J. Qin, S. J. Celestin, and **V. P. Pasko**, "Impact of mesospheric ion conductivity variations on the initiation of long delayed sprites," CEDAR-GEM Joint Workshop, June -July 2011.

J. Qin, S. J. Celestin, **V. P. Pasko**, J. Li, and S. A. Cummer, "Impact of successive lightning strokes on the initiation and propagation of sprite streamers," Fall Meeting, American Geophysical Union, December 2011.

J. A. Riousset, **V. P. Pasko**, and A. Bourdon, "Air-density-dependent model for analysis of air heating associated with streamers, leaders, and transient luminous events," CEDAR-GEM Joint Workshop, June -July 2011.

W. Xu, S. J. Celestin, and **V. P. Pasko**, "Monte Carlo simulation of terrestrial gamma-ray flashes," CEDAR-GEM Joint Workshop, June -July 2011.

W. Xu, S. J. Celestin, and **V. P. Pasko**, "Estimation of source altitudes of terrestrial gamma-ray flashes produced during the stepping of lightning leaders," Fall Meeting, American Geophysical Union, December 2011.

J. Urbina, L. Dyrud, Freddy Galindo, and Ryan Seal, "Observations, Validation and Calibration of the Penn State Meteor Radar," URSI National Radio Science Meeting, January 2011.

F. R. Galindo, **J. Urbina**, J. L. Chau, and L. P. Dyrud, "On the Possible Effect of Signal Processing on Meteor-Head Data from Jicamarca," URSI National Radio Science Meeting, January 2011.

L. P. Dyrud, **J. Urbina**, and F. Galindo, "Plasma Turbulence effects on specular trail observations," URSI National Radio Science Meeting, January 2011.

Z. H. Jiang, S. Yun, Q. Xu, **D. H. Werner, Z. Liu**, and **T. S. Mayer**, "Experimental verification of a zero-index near-infrared metamaterial," IEEE International Symposium on Antennas and Propagation 2011.

E. Book or Book Chapter
Listed by author, year, title, and publisher

M. Kavehrad, 2011. "Equalization and Markov Chains in Cloud Channel," in *Advanced Optical Wireless Communication Systems*, Cambridge University Press.

G. Kesidis, 2011. *An Introduction to Models of Online Peer-to-Peer Social Networking*, Morgan & Claypool.

G. Kesidis, 2011. "Denial-of-Service Defense" in the *Encyclopedia of Cryptography and Security*, 2nd Edition. Springer, Berlin.

A. Diaz and **I. C. Khoo**, 2011. "Liquid crystalline nano-structured optical metamaterials," in *Comprehensive Nanoscience and Technology*, Vol. 3, Elseier.

C. Feng, N. Ozay, **C. M. Lagoa** and M. Sznaier, 2011. "Identification and Model (In)validation of Switched ARX Systems: Moment-Based Approaches," in *Linear Parameter-Varying System Identification: New Developments and Trends*, World Scientific.

Y. Wang, H. Li, **D.J. Miller**, and J. Xuan, 2011."Bioinformatics and Public Access," in *Genetic and Molecular Aspects of Sports Performance*, Wiley-Blackwell.

W. Yu, X. Yang, Y. Liu, **R. Mittra**, A. Muto, 2011. *Advanced FDTD method: Parallelization, acceleration, and engineering applications*, Artech House.

D.H. Werner, M. D. Gregory, F. D. Namin, J. S. Petko, and T. G. Spence, 2011. "Ultra-Wideband Antenna Arrays," in *Frontiers in Antennas*, McGraw Hill.

David S-G. Lu, **Q. M. Zhang**, Z. Kutnjak *,* 2011. "The Electrocaloric Effect in Ferroelectric Polymer Films," in *Thin Film Growth: Physics, Materials Science, and Applications* Woodhead Publishing Ltd.

F. Papers Presented at Technical and Professional Meetings
Listed by author, title, meeting, location, and date

G. Botta, **K. Aydin**, J. Verlinde, "Evaluation Of Electromagnetic Scattering Modeling Techniques For Irregular Ice Hydrometeors**,**" 35th Conf. On Radar Meteorology, Pittsburg, PA, September 2011.

G. Yu, J. Verlinde, E. E. Clothiaux, G. Botta, **K. Aydin**, A. Avramov, A. S. Ackerman, and A. M. Fridlind, "A method for extraction of cloud microphysical properties using a continuous wavelet transform of cloud radar spectra: Preliminary results," 35th Conf. On Radar Meteorology, Pittsburg, PA, September 2011.

Y.C. Chen, S. Soumya, G. Sun, Y. Xie, **S. Datta** and V. Narayanan, "Automated Mapping for Reconfigurable Single Electron Transistor Arrays," Design Automation Conference, San Diego, CA, June 2011

V. Saripalli, A. Misra, **S. Datta** and V. Narayanan, "An Energy-Efficient Heterogeneous CMP based on Hybrid TFET-CMOS Cores," Design Automation Conference, San Diego, CA, June 2011.

L. Liu, V. Saripalli, E. Hwang, V. Narayanan and **S. Datta**, "Multi-Gate Modulation Doped In0.7Ga0.3As Quantum Well FET for Ultra Low Power Digital Logic", 219th Electro chemical Society Meeting, Montreal, Canada, May 2011.

H. Madan, D. Veksler, Y.T. Chen, J. Huang, N. Goel, G. Bersuker and **S. Datta**, "Interface States at high-k/InGaAs interface: H2O vs. O3 based ALD Dielectric", Device Research Conference), Santa Barbara, CA, June 2011.

L. Liu, V. Saripalli, V. Narayanan and **S. Datta**, "Experimental Investigation of Scalability and Transport in In0.7Ga0.3As Multi-Gate Quantum Well FET (MuQFET)", Device Research Conference), Santa Barbara, CA, June 2011.

R. Bijesh, I. OK, M. Baykan, C. Hobbs, P.Majhi, R.Jammy and **S.Datta**, "Hole Mobility Enhancement in Uniaxially Strained SiGe FINFETs: Analysis and Prospects", Device Research Conference Santa Barbara, CA, June 2011.

A. Agrawal, A. Ali, R. Misra, P. E. Schiffer, B. R. Bennett, J. B. Boos and **S. Datta**, "Experimental Determination of Dominant Scattering Mechanisms in Scaled InAsSb Quantum Well," Device Research Conference, Santa Barbara, CA, June 2011.

A. Agrawal, A. Ali, R. Misra, P. E. Schiffer, J. B. Boos, B. R. Bennett and **S. Datta**, "Low Field Electron Transport in Mixed Arsenide Antimonide Quantum Well Heterostructures", Electronic Materials Conference, Santa Barbara, CA, June 2011.

V. Saripalli, J. P. Kulkarni, N. Vijaykrishnan and **S. Datta**, "Variation-Tolerant Ultra Low- Power Heterojunction Tunnel FET SRAM Design" IEEE/ACM International Symposium on Nanoscale Architectures, San Diego, CA, July 2011.

L. Liu, V. Saripalli, V. Narayanan and **S. Datta,** "Device Circuit Co-Design Using Classical and Non-Classical III-V Multi-Gate Quantum-Well FETs (MuQFETs)," IEEE International Electron Devices Meeting , Washington D.C., December 2011.

E.C. Hwang, C. Eaton, S. Mujumdar, H. madan, A. Ali, D. Bhatija, **S. Datta**, and **J. Ruzyllo,** "Processing and Characterization of GaSb/High-k Dielectric Interfacees", The Electrochemical Society Meeting, Boston, MA, October 2011.

A. Roy and **J. F. Doherty**, "Weak signal sensing using empirical mode decomposition and stochastic data reordering," IEEE Military Communications Conference, pp.37-41, Baltimore, MD, 7-10 Nov. 2011.

W.E. Higgins, K. Lu, R. Bascom, and R.P.M. Mahraj, "Automatic Lymph-Node Station Definition in 3D MDCT Images," American Thoracic Society, Denver, CO, May 2011.

Brett Flood, **William E. Higgins**, and Lav Rai, "`System for Robust Bronchoscopic Video Distortion Correction," SPIE Medical Imaging 2011: Visualization, Image-Guided Procedures, and Modeling, Orlando, FL, February 2011.

W.E. Higgins, K. Lu, R. Bascom, R.P.M. Mahraj, D. Campbell, and J. Toth, "Toward Exhaustive Identification of the Central-Chest Lymph Nodes in 3D MDCT Scans American Thoracic Society, Denver, CO, May 2011.

Duane C. Cornish and **William E. Higgins**, "`Real-time method for bronchoscope motion measurement and tracking," SPIE Medical Imaging 2011: Visualization, Image-Guided Procedures, and Modeling, Orlando, FL, February 2011.

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B. D. Gauntt, J. Li, O. M. Cabarcos, H. A. Basantani, C. Venkatasubramanian, S. Bharadwaja, N. J. Podraza, **T. N. Jackson**, D. L. Allara, S. Antrazi, M. W. Hor, and E. C. Dickey, "Microstructure of Vanadium Oxide Used in Microbolometers," SPIE, Infrared Technology and Applications XXXVII, April 2011.

D. B. Saint John, H. B. Shin, M. Y. Lee, E. C. Dickey, N. J. Podraza, and **T. N. Jackson**, "Thin Film Silicon and Germanium for Uncooled Microbolometer Applications," SPIE, Infrared Technology and Applications XXXVII, April 2011.

H. B. Shin, D. B. Saint John, M. Y. Lee, N. J. Podraza, **and T. N. Jackson**, "Hydrogenated Amorphous Silicon-Carbon Alloy Thin Films for Uncooled Microbolometers," 2011 Electronic Materials Conference, Santa Barbara, CA, June 2011.

Y. V. Li, J. I. Ramirez, and **T. N. Jackson**, "ZnO and Al2O3 Thin Films Deposited by Plasma Enhanced Atomic Layer Deposition and Plasma Enhanced Chemical Vapor Deposition," 2011 Electronic Materials Conference, Santa Barbara, CA, June 2011.

T. J. Jackson, "Oxide Semiconductor Thin Film Transistor Material and Device Understanding," 2011 Materials Research Society Fall Meeting, Boston, MA, November 2011.

T. J. Jackson, "Weak Reactant Plasma Enhanced Atomic Layer Deposition ZnO Thin Film Transistors for Large Area and Flexible Substrate Applications," 2011 Materials Research Society Fall Meeting, Boston, MA, November 2011.

J. I. Ramirez, Y. V. Li, D. A. Zhao, and **T. N. Jackson**, "ZnO Thin Film Transistors by Low Temperature Deposition Plasma-Enhanced Atomic Layer Deposition in a Showerhead Reactor," 2011 International Semiconductor Device Research Symposium, 978-1-4577-1755-0 (December 2011).

Y. V. Li, J. I. Ramirez, H. U. Li, and **T. N. Jackson**, "Low-Temperature PEALD ZnO Double-Gate TFTs," 2011 International Semiconductor Device Research Symposium, College Park, MD, December 2011.

M. Kavehrad, J. Fadlullah, Z. Hajjarian, "MIMO FSO Communications in Cloud and Turbulence," OSA Topical Meeting, Toronto, Canada, July 2011.

M. Kavehrad, J. Fadlullah, "Optical Wireless Networked Systems: Applications to Aircrafts," SPIE Photonics West, San Francisco, CA, January 2011.

A.Kurve, C. Griffin, **G. Kesidis**, "A Graph Partitioning Game for Distributed Simulation of Networks" International Workshop of Modeling, Analysis, and Control of Complex Networks, San Francisco, CA, September 2011.

B.Celik, J. Raghuram, **G. Kesidis**, **D.J. Miller**, "Salting Public Traces with Attack Traffic to Test Flow Classifiers," USENIX Cyber Security Experimentation and Test Workshop, San Francisco, CA, August 2011.

A.Kurve, C. Griffin **, G. Kesidis**, "Iterative Partitioning Scheme for Distributed Simulation of Dynamic Networks," Sixteenth IEEE International Workshop on Computer-Aided Modeling Analysis and Design of Communication Links and Networks, Kyoto, Japan, June 2011.

A.Kurve, **G. Kesidis,** "Sybil Detection via Distributed Sparse Cut Monitoring," IEEE International Conference on Communications),Kyoto, Japan, June 2011.

C.Griffin, **G. Kesidis**, P. Antoniadis, S. Fdida, "An Epidemic Model of BitTorrent for Acquisition Performance, Content Availability, and Cooperation Incentive," IEEE International Conference on Communications, Kyoto, Japan, June 2011.

I. C. Khoo, "Liquid Crystals Nonlinear Optics CW to Femtoseconds All- Optical Signal Processing," Conference on Lasers and Electro-Optics, Balitmore, MD, May 2011.

I. C. Khoo, "Liquid-Crystals-Plasmonic Metamaterials for High Speed All-Optical Processing," International Metamaterials Workshop, Hangzhou, China, April 2011.

I. C. Khoo, "Liquid-crystals-plasmonic optical materials for high speed electro- and nonlinear-optics," 10th Mediterranean School and International Topical Meeting on Novel Optical Materials and Applications, Cetraro, Italy, June 2011.

I. C. Khoo, "Review of Electronics and non-electronics optical nonlinearities of liquid crystals," Advanced School on Liquid crystals Photonics, Erice, Italy, July 2011.

Grzegorz Pawlik, Wlodzimierz Salejda, Karol Tarnowski, Wiktor T. Walasik, Antoni C. Mitus **and I. C. Khoo**, "Toward cloaking in nanosphere dispersed liquid crystal," SPIE Optics and Photnics Symposium, Liquid Crystals Conference XV, San Diego, CA, August 2011.

Kuan-Lun Hong, Shuo Zhao**, Iam Choon Khoo**, "Broadband ultrafast all-optical processing with nematic liquid crystals," SPIE Optics and Photonics Symposium, Liquid Crystals Conference XV, San Diego, CA, August 2011.

Iam Choon Khoo, Junbin Huang, Yi Ma, "Plasmonics-enhanced optical fi elds and nonlinearities in liquid crystals," SPIE Optics and Photnics Symposium , Liquid Crystals Conference XV, San Diego, CA, August 2011.

I. C. Khoo, Invited Keynote Lecture, "Plasmonic-liquid-crystals for advanced electro- and nonlinear-optics," International Workshop on Nano- and Bio-Photonics, Lyon, France, October 2011.

I. C. Khoo, "Liquid-crystals-plasmonic metamaterials for advanced optical processing," Advanced School on Liquid crystals Photonics, Erice, Italy, July 2011.

I. C. Khoo, "Liquid Crystals-Plasmonic - Route to Next Generation Electro- and Nonlinear- Optics," 1st International Conference on Advanced Photonic Polymers, Yokohama, Japan, December 2011.

Chao Feng, **Constantino M. Lagoa,** Mario Sznaier, "Identifying Stable Fixed Order Systems from Time and Frequency Response Data," 2011 American Control Conference, San Francisco, CA, June-July 2011.

B. Yilmaz, M. Ayazoglu, M. Sznaier and **C. Lagoa**, "Convex Relaxations for Robust Identification of Wiener Systems and Applications," Joint 50th IEEE Conference on Decision and Control and European Control Conference, Orlando, FL, December 2011.

S. Kadetotad, P. Vemulapalli, S. Brennan and **C. Lagoa**, "Terrain-Aided Localization Using Feature-Based Particle Filtering," 4th Annual Dynamic Systems and Control Conference, Arlington, VA, October-November, 2011.

J.-W. Lee and G. E. Dullerud, "Joint synthesis of switching and feedback for linear systems in discrete time," The 14th ACM International Conference on Hybrid Systems: Computation and Control, Chicago, IL, April 2011.

S. Ghosh and **J.-W. Lee,** "Optimal synthesis for finite-time consensus under fixed graphs," 50th IEEE Conference on Decision and Control, and the European Control Conference, Orlando, FL, December 2011.

S. Mirzazad-Barijough and **J.-W. Lee,** "Finite-state simulations and bisimulations for discrete-time piecewise affine systems," 50th IEEE Conference on Decision and Control, and the European Control Conference, Orlando, FL, December 2011.

K. Shi, P. S. Edwards, H. Li, Q. Xu, D. Psaltis, **Z. Liu**, "Coherent anti-Stokes Raman scattering holography," Photonics West, San Francisco, CA, January 2011.

M. D. Zhou, C. Yang, **Z. Liu,** J. P. Cysyk and S. Y. Zheng, "A Fabry-Perot pressure sensor fabricated on left ventricular assist device for heart failure implant," 16th International Conference on Solid-State Sensors, Actuators and Microsystems, Beijing, China, June 2011.

J. Ouyang, C. Yang, D. Niu, Y. Xie and **Z. Liu**, "F2BFLY: An On-Chip Free-Space Optical Network with Wavelength-Switching," 25th International Conference on Supercomputing, Tucson, AZ, May -June 2011.

H. Li, Z. Zhang, Q. Xu, K. Shi, Y. Jia, B. Zhang, Y. Xu, and **Z. Liu,** "Second Harmonic Nanoprobes for Femtosecond Laser Pulse Characterization in Complex Microstructures," Conference on Lasers and Electro-Optics, Baltimore, MD, May 2011.

P. Edwards, K. Shi, J. Hu, Q. Xu, Y. Wang, D. Psaltis, and **Z. Liu,** "Coherent anti-Stokes Raman scattering (CARS) holographic biological imaging," Conference on Lasers and Electro-Optics, Baltimore, MD, May 2011.

Q. Xu, K. Shi, H. Li, K. Choi, R. Horisaki, D. Brady, D. Psaltis, **Z. Liu,** "In-line holographic CARS microscopy," Conference on Lasers and Electro-Optics, Baltimore, MD, May 2011.

C. Yang, K. Shi, H. Li, Q. Xu, V. Gopalan, and **Z. Liu**, "Non-axial-scanning Second Harmonic Microscopy," Conference on Lasers and Electro-Optics, Baltimore, MD, May 2011.

C. Yang, P. Edwards, K. Shi, and **Z. Liu,** "Hybrid Diffractive Optical Element Based Spectrometer," Conference on Lasers and Electro-Optics, Baltimore, MD, May 2011.

S. J. Briczinski, and **J. D. Mathews**, "Statistical implications of UHF diurnal meteor observations," USNC-URSI National Radio Science Meeting, Boulder, CO, January 2011.

J. D. Mathews and F. T. Djuth, "Radar meteor evidence that meteoroid flares generate intense plasma waves," USNC-URSI National Radio Science Meeting, Boulder, CO, January 2011.

J. D. Mathews, "On the role of Bragg scattering in radar meteor head-echoes," USNC-URSI National Radio Science Meeting, Boulder CO, January 2011.

J. D. Mathews, "How do we make sense of non-smooth radar 'light curves'?" CEDAR Workshop, Santa Fe NM, June - July 2011.

J. H. Klenzing, I. Seker, R. F. Pfaff, D. E. Rowland, S. F. Fung, and **J. D. Mathews**, "Multi-Instrument Observations of an MSTID over Arecibo Observatory," XXX URSI General Assembly and Scientific Symposium of the International Union of Radio Science, Istanbul, Turkey, August 2011.

I. Seker, W. E. Swartz, **J. D. Mathews**, and N. Aponte, "A new 3D display format relating azimuth-scanning radar data and all-sky images," XXX URSI General Assembly and Scientific Symposium of the International Union of Radio Science, Istanbul, Turkey, August 2011.

J. D. Mathews, "Underdense, overdense, and Bragg scattering in radar meteors," XXX URSI General Assembly and Scientific Symposium of the International Union of Radio Science, Istanbul, Turkey, August 2011.

S. Sarkhel, S. Raizada, **J. D. Mathews**, C. A. Tepley, and S. A. Gonzalez, "Identification of large scale billows-like structure in the neutral Na layer over Arecibo," American Geophysical Union Fall Meeting, San Francisco, CA, December 2011.

T. S. Mayer, J. Kim, B. Won, M. Li, T. Morrow, W. Hu, S. Dean, H. Liu, A. Vallett, C. D. Keating, and **J. S. Mayer**, "Adding New Capabilities to Si CMOS Via Deterministic Nanowire Assembly," American Vacuum Society Annual Meeting, Nashville, TN, November 2011.

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Y. A. Yuwen, W. Hu, S. Yun, **T. S. Mayer**, M. Krishnamurthy, K. G. Eyink, "Self-Organized Freestanding One-Dimensional Gold Nanoparticle Arrays," Material Research Society Fall Meeting, Boston, MA, November 2011.

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K. L. Liddell, X. Zhong, K. Sun, S. L. Dean, **T. S. Mayer**, and C. D. Keating, "Fabrication and Characterization of Phosphonic Acid Monolayers for Use in Biosensing," 241st National Meeting and Exposition of the American-Chemical-Society, Anaheim, CA, March 2011.

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D. K. Mohata, R. Bijesh , S. Mujumdar, C. Eaton, R. Engel-Herbert, **T. Mayer**, V. Narayanan, J. Fastenau, D. Loubychev, A. Liu and **S. Datta**, "Demonstration of MOSFET-Like On-Current Performance in Arsenide/Antimonide Tunnel FETs with Staggered Hetero-junctions for 300mV Logic Applications", IEEE International Electron Devices Meeting, Washington DC, December 2011.

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Q. M. Zhang, Xinyu Li, Haiming Gu, Minren Lin, Xiaoshi Qian, J. P.Cheng, Ailen Cheng, Greg Nellis, and Brent Craven, S. G. Lu, "Giant electrocaloric effect in ferroelectric polymers and their applications for high efficiency cooling devices," 30th International Conference on Thermoelectrics, Traverse City, MI, July 2011.

Q. M. Zhang, "Giant Electrocaloric Effect in Ferroelectrics--A New Frontier in Ferroelectric Research With Great Impact on Energy and Environment," The Molecular Materials Meeting @ Singapore, International Conference On "Big Ideas In Molecular Materials", Singapore, January 2011.

Q. M. Zhang, "Electrocaloric Effect (ECE) in Ferroelectric Polymers and Related Cooling Devices-- What We Have Learned?" International Society of Information Fusion, Cambridge, UK, August 2011.

Q. M. Zhang, "Multifunctional electroactive polymers and related devices," International materials research congress, Mexico, August 2011.

Q. M. Zhang, "Beyond the traditional polarization responses in electrets: some amazing properties of the ferrorelaxor polymers," 14th International Symposium on Electrets, Montpelier, France, September 2011.

Gokhan Hatipoglu, Yang Liu, Dean Tigelaar, Mitra Yoonessi, **Qiming Zhang, Srinivas Tadigadapa,** "Fabrication and electromechanical performance of a novel high modulus ionogel micro-actuator," Eurosensors XXV, Athens, Greece, September 2011.

G. Patents

Listed by inventor, title, issue date, and patent number

William E. Higgins, Scott A. Merritt, and Lav Rai, "A Fast 2D-3D Image Registration Method with Application to Continuously Guided Endoscopy," issued February 15, 2011, #7,889.905

William E. Higgins, Scott A. Merritt, and Lav Rai, "A Fast 2D-3D Image Registration Method with Application to Continuously Guided Endoscopy," issued November 22, 2011, #8,064,669

*Note: It is the same technology, but two separate patents.

H. Research Projects Active in 2011

Listed by title, sponsoring agency, and faculty member(s)

"Midwest Institute for Nanoelectronics Discovery Project 1.5 (MIND 1.5)"
University of Notre Dame, Subcontract
Suman Datta and Theresa Mayer

"Multi-Gate III-V QWFET"
Semiconductor Research Corporation, Contract
Suman Datta

"Correlated Electron Switching Based Tunnel Transistors"
Office of Naval Research, Grant
Suman Datta

"Development and Demonstration of Next Generation Electronic Warfare Components based on Graphene Technologies"
Office of Naval Research, Contract
Suman Datta

"Ultra-Low Resistance Ohmic Contacts for III-V Digital Logic"
Intel Corp, Contract
Suman Datta

"Ultrafast Spectroscopy in Heterojunction Tunnel Transistors"
National Institute of Standards and Technology, Grant
Suman Datta

"Architecture-Device Co-Design for Ultra-Low Power Systems"
National Security Agency, Contract
Suman Datta

"Heterojunction Tunnel Transistors for Ultra Low Power Logic Applications"
Intel Corp., Sponsored Research Agreement
Suman Datta

"Combining Biology with CMOS through Programmed Nanowire Assembly"
Massachusetts Institute of Technology, Subcontract
Suman Datta and Theresa Mayer

"Multimodal Image-Guided Intervention System for Lung-Cancer Diagnosis and Staging"
National Cancer Institute, Grant
William E. Higgins

"1/f Noise Characterization of VOx films"
Raytheon Company, Sponsored Research Agreement
Thomas N. Jackson

"Growth, Characterization and Modeling of Monolithic Silicon Microbolometer Materials for Uncooled Infrared Detectors"
U.S. Army Research, Development and Engineering Command Acquisition Center, Coopertive Agreement
Thomas N. Jackson

"High performance Tunable Materials Program Phase II Cost Proposal (Task 09-9C3)"
North Carolina State University, Subcontract
Thomas N. Jackson

"Radiation-Hard and Self-Healing Substrate-Agnostic Nanocrystalline ZnO Thin Film Electronics"
Air Force Office of Scientific Research, Grant
Thomas N. Jackson

"Flexible and Printed Electronics Program"
Dow Chemical Company, Sponsored Research Agreement
Thomas N. Jackson

"Nets:Small:Collaborative Research: Inter-provider dynamics in neutral and non-neutral networks"
National Science Foundation, Grant
George Kesidis

"STTR: Saliency Annotation of Image and Video"
Toyon Research Corporation, STTR Sub
George Kesidis

"Collaborative: GENI: EAGER: GENI Experiments to Explore Adoption of New Security Services"
National Science Foundation, Grant
George Kesidis

"Nonlinear Electro-Optical Liquid Crystalline Materials for High Speed Optical Switching and Signal Processing"
Air Force Office of Scientific Research, Grant
Iam-Choon Khoo

"Nanodielectrics for Pulsed Power Applications"
Air Force Research Laboratory, Contract
Iam-Choon Khoo and Theresa S. Mayer

"Tunable and reconfigurable negative index materials with low loss"
Purdue University, Subcontract
Iam-Choon Khoo and Douglas H. Werner

"Optoelectronic nanohand"
National Science Foundation, Grant
Zhiwen Liu

"Long-range Standoff Mobile IED Detection Using Mobile Glass Generated THz Waves"
Office of Naval Research, Grant
Zhiwen Liu and Shizhuo (Stewart) Yin

"Nanoprobes for nano-femto optics"
National Science Foundation, Grant
Zhiwen Liu

"Welding fume sensing for the construction safety"
Virginia Polytechnic Institute and State University, Subcontract
Zhiwen Liu

"EAGER: Adapting the New Arecibo On-Dish HF Transmitter System to Radar Mode"
National Science Foundation, Grant
John D. Mathews and Julio V. Urbina

"High-Resolution E/F Region Waves and Electrodynamics Studies Using the Arecibo Observatory Instrument Cluster and the Chain Radars"
National Science Foundation, Grant
John D. Mathews

"ARRA: Grid STAR: Smart Grid Training and Application Resource Center"
National Energy Technology Laboratory, Grant
Jeffrey Mayer

"Penn State GATE Center of Excellence: In-Vehicle, High-Power Energy Storage Technologies"
National Energy Technology Laboratory, Contract
Jeffrey S. Mayer

"DOE/PSU Graduate Student Fellowship Program for Hydropower Research"
U.S. Department of Energy, Grant
Jeffrey S. Mayer

"Applied Metamaterials: Metamaterials-Enhanced Technical Applications"
Lockheed Martin Corporation, Inc., Subcontract
Theresa S. Mayer and Douglas H. Werner

"Self-Organized One Dimensional Gold Nanoparticle Arrays"
UES, Inc., Purchas Order
Theresa S. Mayer

"SOLAR Collaborative: Multiplasmonic light harvesting for thin film solar cells"
National Science Foundation, Grant
Theresa S. Mayer

"Nanoscale Contacts"
U.S. Army Research, Development and Engineering Command Acquisition Center, Grant
Theresa S. Mayer

"NNIN: National Nanotechnology Infrastructure Network"
Cornell University, Subcontract
Theresa S. Mayer

"Modeling and Fabrication of Nano-enabled Phased Array Antenna"
Lockheed Martin Corporation, Inc., Sponsored Research Agreement
Theresa S. Mayer and Douglas H. Werner

"Multilayer Coating on Substrate"
Lockheed Martin Corporation, Inc., Sponsored Research Agreement
Theresa S. Mayer

"RET Site: National Nanotechnology Infrastructure Network (NNIN) RET"
Georgia Institute of Technology, Subcontract
Theresa S. Mayer

"Combining Biology with CMOS through Programmed Nanowire Assembly"
Massachusetts Institute of Technology, Subcontract
Theresa S. Mayer

"Pattern Shaping of Reflector and Lens Antennas for Satellite Applications Using Metamaterials"
Office of Naval Research, Grant
Raj Mittra

"Directionally-Tailored Infrared Emission and Transmission"
Office of Naval Research, Grant
Raj Mittra

"Metamaterial Antennas for Communication and High Power Applications"
Office of Naval Research. Grant
Raj Mittra

"Intelligent Video Search and Retrieval for Transportation Applications"
Xerox Corp., Sponsored Research Agreement
Vishal Monga

"SERC: Understanding and Exploiting Feature Dependencies in Robust Image Classification"
Ball State University, Subcontract
Vishal Monga

"Integrated Multi-Modal Targeting Sensor Concept for Next Generation Small Arms"
U.S. Army Research, Development and Engineering Command, Contract
Ram M. Narayanan

"Instrumentation For Flexible Adaptive Multimodal Radar"
Air Force Office of Scientific Research, Grant
Ram M. Narayanan

"Ultrawideband Radar System Development for Landmine and IED Detection"
Delaware State University, Subcontract
Ram M. Narayanan

"Noise Radar Implementation of Compressive Sensing"
Air Force Office of Scientific Research, Grant
Ram M. Narayanan

"Radar Test-Bed Development in Support of Multi-Modal Sensing Approaches"
Dynetics, Inc., Purchase Order
Ram M. Narayanan

"Energetic Radiation From Lightning Leaders: Effects and Origins"
National Science Foundation, Grant
Victor P. Pasko

"CEDAR: Modeling Studies of Infrasonic Waves from Thunderstorms and Aurora"
National Science Foundation, Grant
Victor P. Pasko

"FESD Type-1: Electrical Connections and Consequences within the Earth System"
University of Colorado, Subaward
Victor P. Pasko

"Physical Origins of Coupling to the Upper Atmosphere from Lightning (PhOCAL)"
Duke University, Subcontract
Victor P. Pasko

"Development of Efficient Three-Dimensional Models of Lightning Discharges"
National Science Foundation, Grant
Victor P. Pasko

"Simulations and Theory of Streamer Discharges in Transient Luminous Events"
National Science Foundation, Grant
Victor P. Pasko

"CAREER: A Cognitive VHF Radar System Approach to Study Ionospheric Irregularities"
National Science Foundation, Grant
Julio V. Urbina

"Eager: Satellite TV Signal Measurement of Precipitable Water Content"
Johns Hopkins University, Subcontract
Julio V. Urbina

"Equatorial Vortex Experiment (EVEX): A Study of the Ionospheric Plasma Circulation and Sunset Layer from Kwajalein"
University of Illinois at Urbana-Champaign, Subcontract
Julio V. Urbina

"Collaborative Research: A New 50 MHz Radar for Meteor and Aeronomical Science"
National Science Foundation, Grant
Julio V. Urbina

"Structural Acoustic and Metamaterial Modeling and Measurements"
Office of Naval Research, Contract
Douglas H. Werner

"Full-wave Modeling of Medium Frequency Propagation in Coal Mines"
Office of Naval Research, Contract
Douglas H. Werner

"Engineering Materials with Customized Electromagnetic Properties"
Lockheed Martin Corporation, Inc., Sponsored Research Agreement
Douglas H. Werner

"Meta-Designs for DMI and Beam Steering"
Lockheed Martin Corporation, Inc., Sponsored Research Agreement
Douglas H. Werner

"8.5MHz Magnetic Meta-Lens"
Lockheed Martin Corporation, Inc., Sponsored Research Agreement
Douglas H. Werner

"Full-wave Modeling of Medium Frequency Propagation in Coal Mines"
NIOSH-Pittsburgh Research Center, Contract
Douglas H. Werner

"Metamaterial RF Current Filter"
Medtronic, Inc., Sponsored Research Agreement
Douglas H. Werner

"The Network Science (NS) Collaborative Technology Alliance (CTA)"
BBN Technologies, Cooperative Agreement
Aylin Yener

"Rethinking Mobile Ad Hoc Networks: A Non-Equilibrium Information Theory"
University of Texas at Austin, Subcontract
Aylin Yener

"NeTS: Medium: Collaborative Research: Rechargeable Networks"
National Science Foundation, Grant
Aylin Yener

"CIF: Medium: Collaborative Research: Interactive Security"
National Science Foundation, Grant
Aylin Yener

"Development of battery safety guidelines for underground coal mine communications and personnel tracking equipment"
National Institute for Occupational Safety & Health, Contract
Aylin Yener

"Unconventional High Density Vertically Aligned Conducting Polymer/Carbon Nanotube Composites for Ultrahigh Energy Density and Power Density Energy Storage Devices"
Air Force Office of Scientific Research, Grant
Qiming Zhang

"Ferroelectric Polymers with Ultrahigh Energy Density, Low Loss, and Broad Operation Temperature For Navy Pulse Power Capacitors"
Office of Naval Research, Grant
Qiming Zhang

"Ionic Liquids in Electroactive Devices (ILEAD) MURI"
Virginia Polytechnic Institute and State University, Subcontract
Qiming Zhang

"Ionic Electroactive Polymer Actuators with Tailored NanoStructure Morphology"
National Science Foundation, Grant
Qiming Zhang

"Giant Electrocaloric Effect in Ferroelectric Polymers with Tailored Polar-Nanostructures"
U.S. Department of Energy, Grant
Qiming Zhang

"Understanding the Scientific Basis of Electrocaloric Effect In Defects Modified Ferroelectric Polymers"
Army Research Office, Grant
Qiming Zhang

"SBIR-Multiferroic Heat Pumps (Phase II)"
Strategic Polymer Sciences, SBIR Sub
Qiming Zhang

I. Editorship in Journals

Listed by publication, title and faculty member

ECS Interface, Guest Editor, **Jerzy Ruzyllo**

Electron Technology, Editorial Board, **Jerzy Ruzyllo**

Ferroelectrics, Editorial Board Member, **Kenji Uchino**

IEEE Antennas and Propagation Magazine, Editor, **Doug Werner**

IEEE Transactions on Aerospace and Electronic Systems, Associate Editor for Radar, **Ram Narayanan**

IEEE Transactions on Communications, Editorial Board, **Aylin Yener**

IEEE Transactions on Control Systems Technology, Associate Editor, **Constantino Lagoa**

IEEE Transactions on Ferroelectrics, Ultrasonics, and Frequency Control, Associate Editor, **Qiming Zhang**

IEEE Transactions on Geoscience and Remote Sensing, Associate Editor, **Kultegin Aydin**

IEEE Transactions on Image Processing, Associate Editor. **Vishal Monga**

IEEE Transactions on Medical Imaging, Associate Editor, **William Higgins**

IEEE Transactions on Wireless Communications, Editorial Board, **Aylin Yener**

IEEE Control Systems Society Conference Editorial Board, Associate Editor, **Ji-Woong Lee**

International Journal of Wireless Information Networks, Editorial Board, **Mohsen Kavehrad**

International Symposium on Semiconductor Cleaning Science and Technology, Edi**tor, Jerzy Ruzyllo**

Journal of Atmospheric and Solar-Terrestrial Physics, Guest Editor, **Julio Urbina**

Journal of Electroceramics, Editorial Board Member, **Kenji Uchino**

Journal of Emerging Technologies in Computing Systems, Associate Editor, **Suman Datta**

Journal of Engineering, Editorial Board, **Qiming Zhang**

Journal of Geophysical Research, Associate Editor, **Victor Pasko**

Journal of Micro/Nanolithography, MEMS and MOEMS, Associate Editor, **Srinivas Tadigadapa**

Journal of Nonlinear Optical Physics and Materials, Editor-in-Chief, **Iam-Choon Khoo**

Materials Technology, Associate Editor, **Kenji Uchino**

Measurement Science and Technology, Associate Editor, **Srinivas Tadigadapa**

Optical Memory and Neural Networks, Associate Editor, **Shizhuo (Stuart) Yin**

Photonic Fiber and Crystal Devices V - SPIE Symposium on Optics and Photonics, Co-Editor, **Shizhuo (Stuart) Yin**

Radio Science, Associate Editor, **Victor Pasko**

Sensors and Materials, Editorial Board Member, **Kenji Uchino**

IV. Awards

A. Penn State Engineering Alumni Society Awards

Premier Research Award
Kenji Uchino

B. Faculty Promotions

Assistant Professor
Tim Wheeler

Professor
Suman Datta

C. College of Engineering Awards

Outstanding Engineering Alumni Award
Dale Hoffman

D. Penn State Electrical Engineering Society Awards

Early Career Recognition Alumni Award
Brandon Ritrovato, Lockheed Martin

V. Department Activities

A. Bose Memorial Library Dedication

The Bose Memorial Library was dedicated on April 22, 2011 in 204 Electrical Engineering West. Nirmal Bose, HRB-Systems Professor of Electrical Engineerinf died on Nov. 22, 2009, at the age of 69, while on sabbatical at the university of Wuppertal in Germany. Bose's wife, Chandra Bose, donated his extensive library to the Department of Electrical Engineering. The library will be housed in the Christopher Raspanti Memorial Digital Signal Processing Laboratory.

B. Research Experience for Undergraduates

The Research Experience for Undergraduates (REU) is a National Science Foundation (NSF) funded program which supports active research participation by undergraduate students who come to Penn State from other universities. 2011 marks the ninth year for the program at Penn State.

The 2011 participates are listed along with their, university, research topic, and faculty mentor.

Christopher Curven
Penn State University
Potential Effects of Thundercloud Induced Radiation Bursts on Aircraft Passengers and Crew
Victor Pasko

Sean McDonough
University of Rochester
Accurate Modeling of Ion Conductivity in the Earth's Atmosphere
Victor Pasko

Christopher Hong
Cooper Union College
Study of Doppler Velocity Estimation Techniques on Meteor-Head Radar Reflections
Julio Urbina

Dimitri Ressetar
Penn State – Harrisburg
Study of Processing Techniques for Removal of Equatorial Electrojet Echoes to Enhance Meteor Detection at Jicamarca
Julio Urbina

Christopher Jones
Washington State University
Considerations for an Intra-Solar System Laser Satellite Data Network
John Mathews

Christopher Galvan
New Mexico State University
System Development and Integration Of Communication and Power Link Between Olite 2 Satellite and High Altitude Student Platform
Sven Bilén

Luis Olique
University of Puerto Rico at Mayaguez
Development of a Charging Method for the Geopebbles Using Wireless Power Transmission
Sven Bilén

Danielle Sova
George Mason University
Robustness and Fault Tolerant Capabilities of Transform Domain Fir Filters Working on Real Signals
Ken Jenkins and Dave Salvia

Jacob Wilson
West Virginia Wesleyan College
Verification of a Marginal Oscillator for Continuous-Wave Quadrupole Resonance Spectroscopy
Jeff Schiano

Bahareh Ardestani
American River College
Optical and Electrical Characterizations of Free Standing Microelectromechanical Structures
Srinivas Tadigadapa

Christina DiMarino
James Madison University
Growth and Optical Analysis of Branching Silicon Wire Arrays
Joan Redwing

Ruth Nan
Washington University in St. Louis
Development of a Near-Field Scanning Optical Microscope System
Zhiwen Liu

Matthew Feldman
University of Florida
MRI Microcoils for Imaging Individual Cells
Mike Lanagan

C. Industrial and Professional Advisory Council (IPAC)

IPAC is a select group of Penn State alumni from industry, government agencies, and academia who advise the department on academic issues and on current trends and future directions in engineering. The group met in March on the Penn State campus and had discussions with faculty and students. A report was prepared outlining their recommendations for the department.

IPAC members are listed with their companies.

John Croteau, NXP Semiconductors

John Golombeck, Northrop Grumman

Dale Hoffman, retired U.S. Navy civilian

Forrest Hunsberger, MIT Lincoln Laboratory

Leslie Melaragno, Rockwell Automation

Richard Pieper, Henkels & McCoy

Thomas Roell, Parsons Infrastructure & Technology Group

Douglas Schultz, Key North, LLC

Edward Singel, retired

Scott Thompson, Oberon Inc.

Joseph Trench, Lockheed Martin

William Wannisky, Fitzpatrick, Cella, Harper, and Scinto

D. Arthur H. Waynick Memorial Lecture

Neil DeGrasse Tyson, director of the Hayden Planetarium, was the 2011 Waynick speaker on April 6. Tyson has a bachelor's degree in physics from Harvard University and a Ph.D. in astrophysics from Columbia University. Tyson is the recipient of twelve honorary doctorates and the NASA Distinguished Public Service Medal. His contributions were recognized by the International Astronomical Union in their official naming of asteroid 13123, Tyson.

E. Mentoring Program

2011 was the first full year of the department mentoring program with a group of 85 mentor/student pairs.

F. Sabbatical

Spring2011

John Doherty
Zhiwen Liu
Kenji Uchino

Fall 2011

Jim Breakall
David Miller
Doug Werner
Kenji Uchino

G. Retirements

Anna Kennedy, graduate admissions administrative assistant
Mona Shaw, department head administrative assistant
Janet Woomer, administrative support assistant

H. New Hires

Kris McNitt, proposal and grant generalist
Dawn Nelson, department head administrative assistant
Donna O'Shea, systems administrator
Lisa Timko, graduate admissions administrative assistant

I. Penn State Electrical Engineering Society

Officers
President: Dale Hoffman
Vice President: Jim Blazer
Secretary/Treasurer: Eric Kline