

school of electrical, computer and energy engineering

ASU Ira A. Fulton
Schools of Engineering
ARIZONA STATE UNIVERSITY

ASU faculty partner in
groundbreaking community
solar project

page 12

PMC-based technology
products enter the market

page 17

Expanding our capacity:
new faculty

page 18

IRA A. FULTON SCHOOLS OF
engineering

Transcending the traditional

Focusing on the student
experience and student
success

Inspiring future engineers

Pursuing use-inspired
research

Attracting top faculty

Dean
Paul C. Johnson

**school of biological
and health systems
engineering**

School Director
Marco Santello

medical diagnostics
rehabilitation
neuroengineering
biomaterials and therapeutics delivery
synthetic and systems biology
healthcare technology

**school of computing,
informatics, and
decision systems
engineering**

School Director
Ronald G. Askin

personalized learning
educational gaming
energy-efficient data storage and computing
health informatics
haptic interfaces
assisting devices
healthcare system logistics
information assurance
production logistics
artificial intelligence
transportation
production logistics

**school of electrical,
computer and
energy engineering**

School Director
Stephen M. Phillips

photovoltaics
power and energy systems
biosignatures discovery automation
wireless implantable devices
sensors and signal processing
flexible electronics
power grid management and stability
sensors and sensing

**school for engineering
of matter, transport
and energy**

School Director
Kyle Squires

personalized learning
engineering education
K-12 STEM
electrical energy storage
thermal energy storage and conversion
energy production separations
therapeutics and bioseparations
rehabilitation and robotics
adaptive and intelligent materials
high-performance computing simulations
atmospheric processes

**school of sustainable
engineering and the
built environment**

School Director
G. Edward Gibson, Jr.

biofuels
waste conversion to energy
public health-technology-environment interactions
microorganism-human health connections
infrastructure and product life cycle analysis
earth systems engineering
water purification
resource-climate interactions
indoor air quality
SMART innovations
transportation materials and systems
project performance
underground infrastructure

IRA A. FULTON SCHOOLS OF ENGINEERING
School of Electrical, Computer and Energy Engineering
P.O. Box 875706
Tempe, AZ 85287-5706

For more information about ASU, the Ira A. Fulton Schools of Engineering, or the School of Electrical, Computer and Energy Engineering (ECEE), please visit us online at:

ecee.engineering.asu.edu

Annual Report 2011-2012
This publication is written, designed, and produced by the Ira A. Fulton Schools of Engineering for distribution to selected alumni, industry partners and colleagues worldwide.

Contributing writers

Joe Kullman
Natalie Pierce

Photography

Jessica Slater

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year in review

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A record-setting year

Our faculty, students and staff collaborated to set several all-time records for the ECEE School and its programs this past year. These include records for student enrollment, research performance and faculty recruiting.

Annual research expenditures exceeded \$30 million for the first time during the fiscal year ending June



2
Stephen M. Phillips

2012. This is more than triple the expenditure level of seven years ago when the expenditures had not exceeded \$10 million (see chart on page 3). The \$30 million total represents more than \$500,000 in expenditures per tenured or tenure-track faculty member, another record for the School. This expenditure level is also

the highest of any school, department or academic unit at Arizona State University. Several large research centers—described later in this report—contributed to achieving these results.

Our primary focus is the education of students, and they play a prominent role in our research. In addition to the traditional support of graduate students working on sponsored project research, we engage undergraduates and even prospective high-school students in our research labs. We fund our undergraduate research experiences through sponsored projects as well as gifts from generous alumni and donors. The largest of these gifts—from Ira A. Fulton, our Schools' namesake—funds numerous undergraduate research projects.

Annual research expenditures exceeded \$30 million for the first time during the fiscal year ending June 2012. This is more than triple the expenditure level of seven years ago.

Our academic programs have grown significantly over the past few years from about 1,200 students seven years ago to nearly 1,700 students in fall 2012 (see chart on page 8). This includes an all-time high enrollment of 289 Ph.D. students. This enrollment level is an average of more than five doctoral students per tenured or tenure-track faculty member. This large Ph.D. enrollment is consistent with our growth in research expenditures as well as the faculty focus on student recruiting and the improving reputation of our programs.

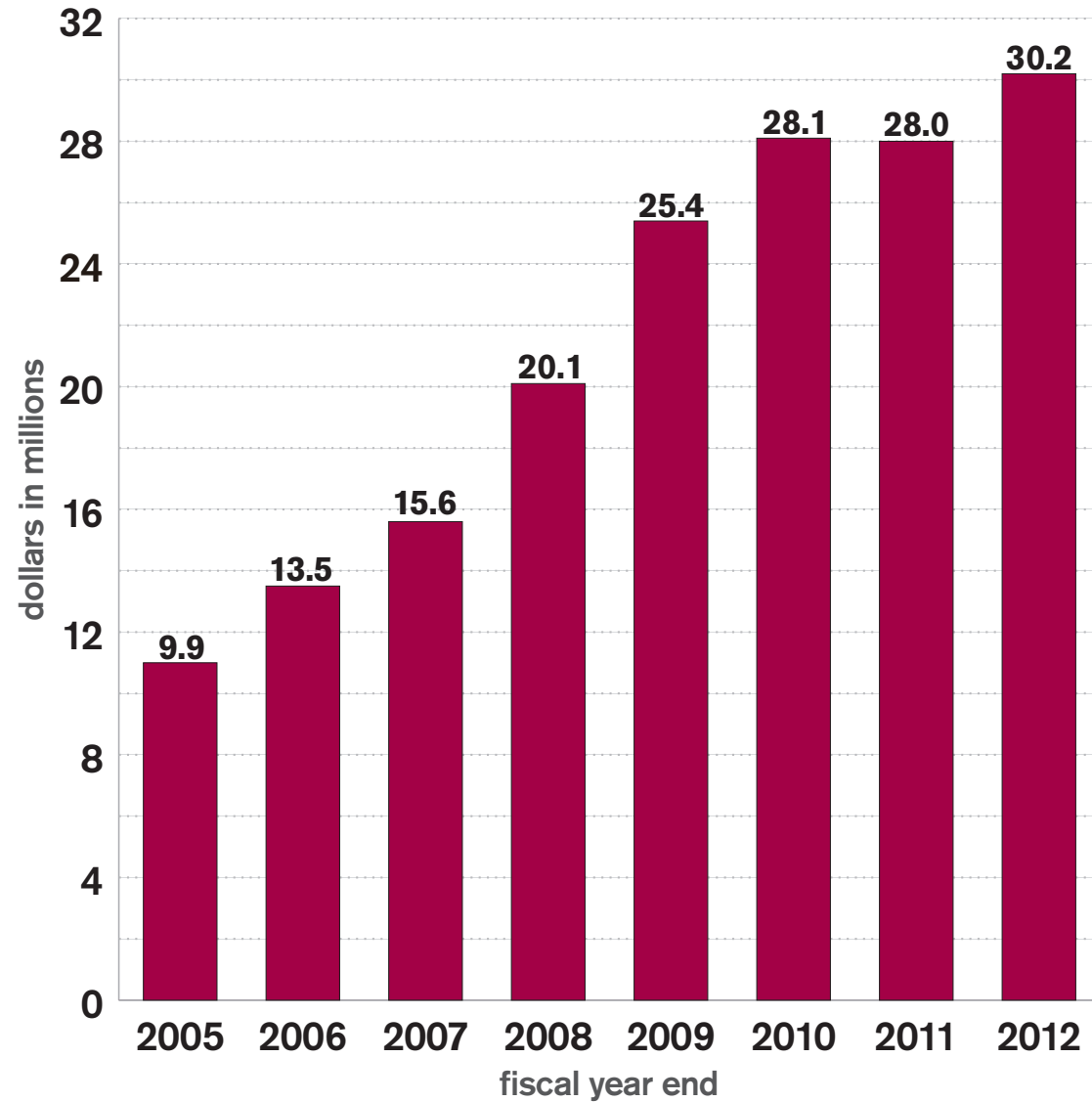
We had a particularly productive faculty recruiting season with nine faculty members scheduled to join ECEE in fall 2012 and spring 2013, the largest number of new faculty members in the past decade. The expertise of these four women and five men span the breadth of research areas in the school from circuits to systems to semiconductors to energy. Supported by the strong enrollment growth and the university administration, we anticipate another aggressive faculty recruiting campaign in the coming year.

Our new M.S. and Ph.D. programs in computer engineering enrolled their first students. Our EE programs remain highly recognized—ranked 31 by U.S. News and World Report and in the top 20 by the National Research Council. The success of our School would not be possible without the extraordinary efforts of our dedicated faculty, staff and students.



Stephen M. Phillips, Ph.D., P.E.
Professor of Electrical Engineering
Director of the School of Electrical, Computer and Energy Engineering

Sponsored Research Expenditures



Faculty Honors

NAE Members	3
IEEE Fellows	19
NSF CAREER	11
DoD/ONR – YIP	5

Chakrabarti, Zhang named IEEE Fellows



Professors Chaitali Chakrabarti and Junshan Zhang have been named to the Class of 2012 IEEE Fellows.

Chakrabarti was elected for contributions to low-power embedded system design and to very large-scale integration architectures for signal processing.

Zhang was elected for contributions to cross-layer optimization of wireless networks.



Clark, Zhang named Fulton Entrepreneurial Professors



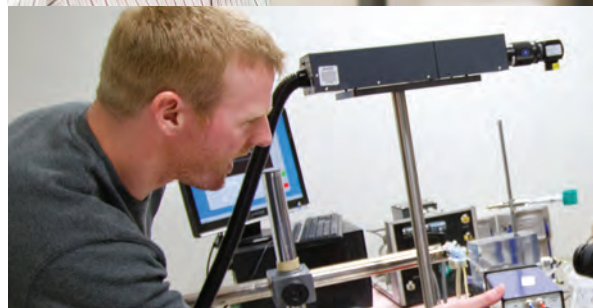
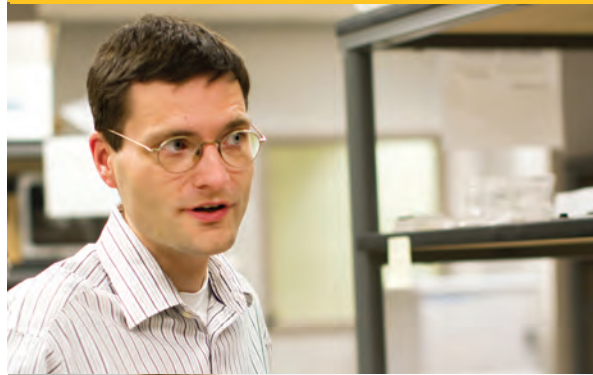
Lawrence Clark and Yong-Hang Zhang have been named Fulton Entrepreneurial Professors.

In its inaugural year, the Fulton Entrepreneurial Professor program was created to support the translational efforts of faculty, particularly as they relate to technology and product commercialization and the formation of new companies. Faculty are appointed for one- to two-year terms and may compete for subsequent appointments.



Goryll receives CAREER Award to advance natural ion channel research

Michael Goryll



David Frakes

CAREER Award advances Frakes' health research

Michael Goryll, assistant professor, received an NSF CAREER Award to advance his work recreating the functionality of a natural ion channel using a solid-state nanopore. Goryll is working to create a more robust, versatile solution using electrostatically controllable solid-state nanopores.

One aspect of his research is gaining a better understanding of how natural channels allow some ions and molecules to pass through the channel, but not others. That knowledge is used to reproduce electric field geometries that repel or attract molecules in a similar way to natural channels.

Goryll and students in his lab have already made advancements in ion channel research, including development of an acrylic cup array that allows parallel measurement of four channels at the same time and a multichannel, low-noise amplifier, which allows recording of the extremely small ionic current through the ion channels.

Top 5 percent teachers honorees

Yu (Kevin) Cao	Gerald Heydt
Chaitali Chakrabarti	Keith Holbert
Jennifer Blain Christen	Dieter Schroder

David Frakes, assistant professor in ECEE and the School of Biological and Health Systems Engineering, received an NSF CAREER Award to advance his research of cardiovascular fluid dynamics and the impact on the onset, progression and treatment of major diseases such as heart disease, stroke and aneurysms.

Frakes is using imaging-driven engineering tools, physical and computational modeling, and fluid dynamic measurement and simulation as the methodological basis for development of advanced device-based cardiovascular disease treatment.

Hugh Barnaby, associate professor, and Michael Kozicki, professor, received a \$1.7 million grant from the Defense Threat Reduction Agency of the U.S. Department of Defense to research specialized materials—chalcogenide glasses—that are used in components of very small and low-power integrated circuits in electronic sensors and communication systems designed to process, store and wirelessly transmit information from hostile environments. The work is part of larger efforts to provide the nation with enhanced exploration technologies, more reliable public-safety systems and stronger defense systems.

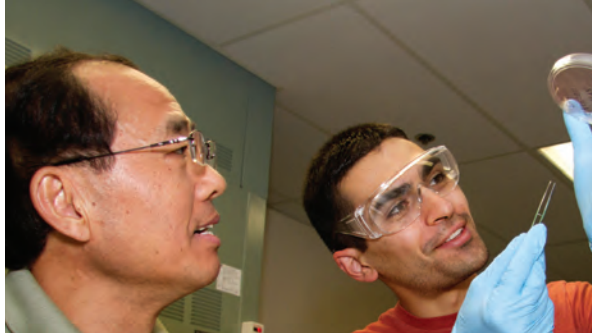
Researchers in the Nanophotonics Lab have created a new compound crystal material that promises to help produce advances in a range of scientific and technological pursuits.

Electrical engineering professor Cun-Zheng Ning says the material, called erbium chloride silicate, can be used to develop the next generations of computers, improve the capabilities of the Internet, increase the efficiency of silicon-based photovoltaic cells to convert sunlight into electrical energy, and enhance the quality of solid-state lighting and sensor technology.

The lab's erbium research is supported by the U.S. Army Research Office and the U.S. Air Force Office of Scientific Research.

Leading the way in 'hostile environment technology' advances

Hugh Barnaby and Michael Kozicki



Cun-Zheng Ning

New material can enhance energy, computer, lighting technologies

new product development

Karam receives Intel award

Lina Karam, professor, received the 2012 Intel Outstanding Researcher Award in High Volume Manufacturing. This award was created by Intel to recognize outstanding contributions by researchers funded by Intel's Semiconductor Technology Council and associated Strategic Research Sectors (SRS). The award recognizes the contributions to fundamental insights, industrial relevance, technical difficulty, communication and potential student hiring associated with the research.



Karady guest lecture on smart grid initiatives

George G. Karady, professor, gave a guest lecture in Calcutta, India, following the invitation of the IEEE Calcutta Section. The lecture, "Interaction between the existing infrastructure and future smart grid with distributed generation," reported the latest results of the NSF-sponsored EFRI-RESIN project and demonstrated ASU's contribution to smart energy grid development. More than 140 people attended the half-day seminar organized and financed under the aegis of the IEEE Power & Energy Society Distinguished Lecture Program.



ECEE research faculty

Richard Akis, Associate Research Professor
Ph.D., McMaster University Hamilton, Ontario, Canada
Quantum transport in mesoscopic semiconductor devices, quantum chaos in open systems connection between classical and quantum mechanics.

Stuart Bowden, Associate Research Professor
Ph.D., University of New South Wales
Characterization of silicon materials for photovoltaic applications.

Sergio Clavijo, Assistant Research Professor
Ph.D., Arizona State University
Artificial electromagnetic materials for antenna applications.

Nikolai Faleev, Associate Research Professor
Ph.D., All-Union Institute of Physical-Technical Measurements, Moscow district, Russia
High-resolution X-ray diffraction, III-nitrides, SiGe, III-V compounds, AFM, PL, X-ray topography, structural investigation of epitaxial structures: crystalline defects at epitaxial structure, defects engineering, design optimization of device structures.

Liang Huang, Assistant Research Professor
Ph.D., Arizona State University
Signal processing with application in epilepsy, nonlinear dynamics, relativistic quantum chaos, electronic properties of graphene quantum dots, and general theoretical studies of complex networked systems, random matrix theory, critical phenomena.

Narayan Kovvali, Assistant Research Professor
Ph.D., Duke University
Statistical signal processing and time-frequency analysis, detection and estimation theory, stochastic filtering and tracking.

Zoe Lacroix, Associate Professor Research
Ph.D., Université Paris XI, Orsay, France
Databases, bioinformatics, Web XML, ontology.

Derrick Lim, Assistant Research Professor
Ph.D., Arizona State University
Circuit model of nanostructures, electromagnetics, RF nanotechnology, MIMO antennas.



Denis Mamaluy, Assistant Research Professor
Ph.D., B. Verkin Institute for Low Temperature Physics and Engineering
Quantum transport simulation in semiconductor nanostructures.

George Maracas, Research Professor
Ph.D., Cornell University
Nanostructures for solar energy conversion, transitioning renewable energy technologies and practices for building a sustainable society.

Sugumar Murugesan, Assistant Research Professor
Ph.D., The Ohio State University
Dynamic resource allocation in wireless networks using incomplete state information, stochastic modeling and optimization in smart power grids, sequential decision making under stochastic uncertainty (POMDPs, Restless Bandits).

Jun Shen, Research Professor
Ph.D., University of Notre Dame
Physics of organic LEDs, MEMS, novel logic, and memory devices and circuits.

John Undrill, Research Professor
Ph.D., University of Canterbury, New Zealand
Power systems and power plant control engineering.

Bert Vermeire, Associate Research Professor
Ph.D., University of Arizona
Solid-state electronics.

Wenxu Wang, Assistant Research Professor
Ph.D., University of Science and Technology, China
Theoretical physics.

ECEE affiliate faculty

Affiliate professors provide additional support to ECEE. They are from other academic units, and their duties are primarily in research, advising and student mentoring.

Terry Alford, Professor; Ph.D., Cornell University; Silver and copper metallization and low-k dielectrics for future integrated circuit (IC) technologies, advanced metallization for low-power electronics.

Sandeep Gupta, Professor; Ph.D., The Ohio State University; Wireless networks, mobile and ubiquitous/pervasive computing, embedded sensor networks for biomedical applications.

Jiping He, Professor; Ph.D., University of Maryland, College Park; Neural interface technologies for neuroprosthetics, rehabilitation robotics for stroke or spinal cord injury, learning and adaptation in neuromuscular control systems.

Leon Iasemidis, Associate Professor; Ph.D., University of Michigan, Ann Arbor; Advanced digital signal processing and global optimization techniques, dynamics and control of spatiotemporal chaotic transitions in spatially coupled systems.

Darryl Morrell, Associate Professor; Ph.D., Brigham Young University; Engineering pedagogy, engineering applications of probability theory, particularly decision theory.

Jitendran Muthuswamy, Associate Professor; Ph.D., Rensselaer Polytechnic Institute; Microelectromechanical systems (MEMS) for neural communication multifunctional neural prosthesis using MEMS.

Nathan Newman, Professor; Ph.D., Stanford University; Semiconductor, superconductor and dielectric materials, thin-film materials synthesis, materials characterization.

Sethuraman Panchanathan, Senior Vice President for Knowledge Enterprise Development; Ph.D., University of Ottawa; Multimedia computer and communication, haptic user interfaces, assistive and rehabilitative device technologies.

Daniel Rivera, Professor; Ph.D., California Institute of Technology; Life cycle and hierarchical issues in process control systems identification, robust process control.



faculty

ECEE adjunct faculty

These are faculty from industry and other institutions, who support ECEE research and teaching.

Alan Chin, n liten Energy Corp.

Larry Cooper, Ret., Office of Naval Research

Jeffrey Cotter, SunPower Corp.

Josef Debbins, Barrows Neurological Institute

Ding Ding, Soitec Phoenix Labs

Frank Jahnke, Sonata Biosciences, Inc.

Bahar Jalali-Farahani, Arizona State University

Elias Kyriakides, University of Cypress

William Lepkowski, SJT Micropower

Denis Mamaluy, Sandia National Laboratories

Michael McGarry, University of Texas at El Paso

Katerina Raleva, SS Cyril and Methodius University

Seth Wilk, SJT Micropower

Recent books by faculty

Constantine A. Balanis, Advanced Engineering Electromagnetics (second edition), John Wiley & Sons, 2012.

Yu Cao, Predictive Technology Model for Robust Nanoelectronic Design, Springer, 2011.

Ying-Cheng Lai and Tamás Tél, Transient Chaos, Springer, 2011.

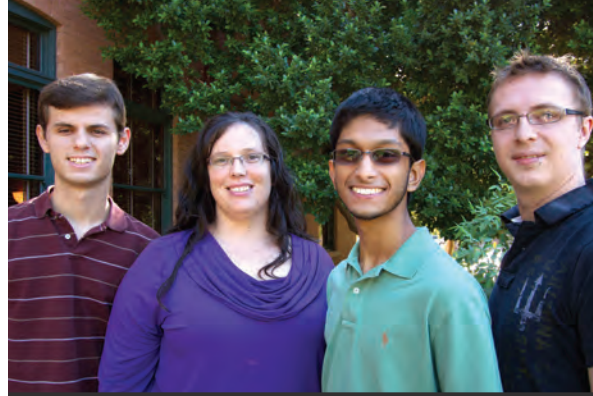
Dragica Vasileska and Stephen M. Goodnick, Nanoelectronic Devices: Semiclassical and Quantum Transport Modeling, Springer, 2011.

Jayaraman J. Thiagarajan and Andreas Spanias, Analysis of the MPEG-1 Layer III (MP3) Algorithm using MATLAB, Morgan & Claypool Publishers, 2012.

undergraduate scholarships and honors

Total undergraduates	719
Total students in Barrett, The Honors College	97
new freshmen in Barrett, The Honors College	32
Merit Scholars	21
Flinn Scholars*	2
National Hispanic Scholars	6
National Merit Scholars*	14

*One student is both a Merit and a Flinn Scholar.



IEEE scholars Alban Shemsedini, Carrie Culp, Abhishek Dharan and Anthony Pelot

IEEE Power & Energy Scholars

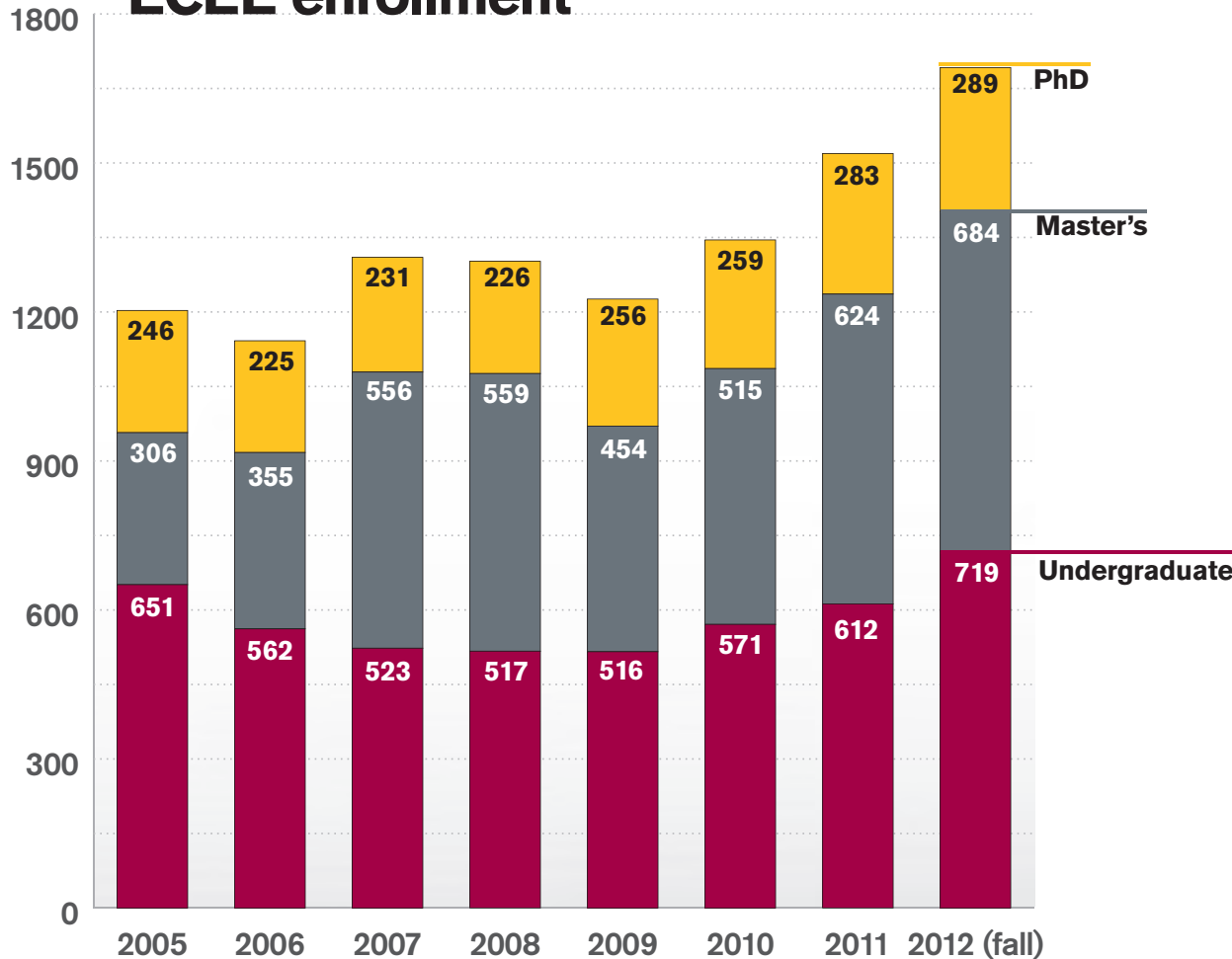
Four Fulton Engineering undergraduate students received scholarships from the IEEE Power & Energy Society in the inaugural round of the Scholarship Plus Initiative™. Carrie Culp, Abhishek Dharan, Anthony Pelot and Alban Shemsedini are among approximately 93 recipients chosen from 51 U.S. universities.

The PES Scholarship Plus Initiative™ is a new program that provides financial assistance for up to three years to high-achieving undergraduate students who are committed to exploring the power and energy field. The program is a response to the challenges facing the power industry. These challenges include responding to enormous growth, replacing aging infrastructure and adapting to new green technologies.

Carrie Culp is a junior and says that she would like to work with power devices or fault protection in high-power transmission. Abhishek Dharan is a sophomore whose interest in renewable energy stems from the experience of living in the Sustainability House at Barrett, The Honors College, where there is a strong mindfulness about alternative energy, particularly solar. Anthony Pelot, a sophomore, is interested in researching new technologies related to power production, storage, conversion and transmission. Alban Shemsedini is a junior with the ultimate goal of using renewable energy resources to create electrically independent housing in third-world countries where constant and stable electricity generation from the government is missing.

The IEEE Power & Energy Society is a worldwide, nonprofit association of more than 28,000 engineers and scientists engaged in all aspects of the power and energy fields.

ECEE enrollment



students

Student receives prestigious NSF Graduate Research Award

Edward Lee was one of seven engineering students at ASU awarded the National Science Foundation Graduate Research Award. The award, considered one of the most prestigious graduate research fellowships in the country, brings a three-year annual stipend of \$30,000, plus allowances for tuition and fees.

Lee graduated from ASU in May, as a Barrett, The Honors College student, with a bachelor's degree in electrical engineering. He'll use his NSF fellowship to pursue a doctoral degree at Stanford University, where he's hoping to focus on development of nanoscale integrated electronic circuits that will deliver medicinal drugs through the bloodstream to destroy cancer cells and remove plaque near the heart.

During his four years at ASU, Lee was a student-worker research assistant at the Flexible Display Center at the ASU Research Park. His work there involved pursuing advances in flexible electronics. This work led to Lee sharing in the award of a patent for a new advance in dual-stage active pixel devices, as well as being a co-author for two articles published in major research journals.

Lee won a national Goldwater Scholar Award and an Arizona Governor's Innovator Award. He was a finalist in a National Junior Science and Humanities Symposium competition and took a second-place award in an International Science and Engineering in Computer Science competition. He also won the top award in 2012 for the electrical engineering senior-year capstone design project.



Graduate fellowships

students

Graduate student awards

The Graduate and Professional Student

Association recognized ASU graduate and professional students who have demonstrated excellence in classroom instruction and mentoring of other students during the 2011-2012 academic year. ECEE students Berkay Kanberoglu and Samuel Dodge were honored with 18 other student instructors at a luncheon hosted by GPSA.

Achievement Rewards for College Scientists

Derek Caselli, Michael DiNezza, Elizabeth Steenbergen

Dean's Award

Jennie Appel, Jacob Becker, Alfonso Dominguez, David Ganger, Mariam Hoseini, George Kunnen, Brian O'Donnell, Jay Prigmore, Brian Proulx, Preston Webster

University Graduate Fellowship

Makram Abd el Qader, Robin Daugherty, Samuel Dodge, Garret LaBove, James Lebeau, Pinakpani Nayak, Kevin O'Connor, Brian Pierre, Karthikeyan Ramamurthy, Di Shi, Balasubramania Sivakumar, Dhankar Thirunakkarasu, Trevor Werho

Fulton Fellow

Jennie Appel, David Ganger, Mariam Hoseini, Garret LaBove, Brian O'Donnell

NASA Training Grant: GSRP

Helen Schwerdt

NSF Graduate Research Fellowship

Paul Hale

Barrett Electronic Materials Fellowship

Garret LaBove, Patricia Nichols

Ford Graduate Engineering Fellowship

Marcus Schaffer

Fulbright

Raj Kumar

SDSI Award

Brian O'Donnell

Summer 2011

Sunil Baliga—Programmable Metallization Cell Devices for Flexible Electronics. Chair: Michael Kozicki.

Seokheun Choi—Advancing Microfluidic-Based Protein Biosensor Technology for Use in Clinical Diagnostics. Chair: Junseok Chae.

Som Nath Dahal—III-V and Silicon-Based Materials for Advanced Nanostructured Concepts in High-Efficiency Solar Cells. Chair: Christiana Honsberg.

Sixifo Falcones—A DC-DC Multiport Converter Based Solid-State Transformer Integrating Distributed Generation and Storage. Chair: Raja Ayyanar

Arif Hossain—Self-Heating Effects in Nanowire Transistors. Chair: Dragica Vasileska.

Syed Roomi Naqvi—Fully Differential Difference Amplifier Based Microphone Interface Circuit and an Adaptive Signal-to-Noise Ratio Scaling Analog Front-End for Dual-Channel Digital Hearing Aids. Chair: Sayfe Kiaei.

Bo Peng—Invariant Human Pose Feature Extraction for Movement Recognition and Pose Estimation. Chair: Gang Qian.

Lakshminarayan Ravichandran—Waveform Mapping and Time-Frequency Processing of Biological Sequences and Structures. Co-chairs: Antonia Papandreou-Suppappola, Andreas Spanias.

Xiaonan Shan—Plasmonic-Based Label-Free Detection and Imaging of Molecules. Chair: Nongjian Tao.

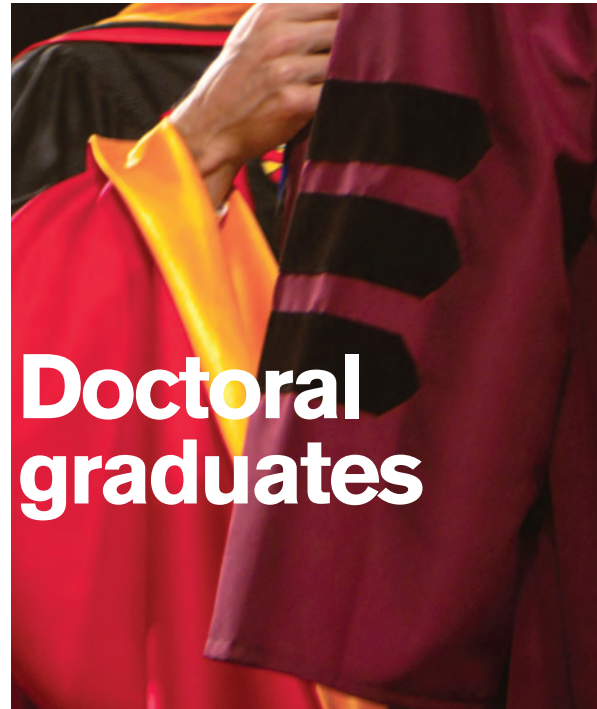
Hyunsoo Yeom—Temperature Compensated, High Common Mode Range, Cu-Trace Based Current Shunt Monitors Design and Analysis. Chair: Bertan Bakkaloglu.

Fall 2011

Zeqin Zhu—Accurate RTA-Based Non-Quasi-Static Compact MOSFET Model for RF and Mixed-Signal Simulations. Chair: Gennady Gildenblat.

Chi-Li Yu—Bandwidth Efficient Multidimensional DFT IP Generators for FPGA Platforms. Chair: Chaitali Chakrabarti.

Eric Aboussouan—Magnetic Resonance Imaging of the Brain: Enabling Advances in Efficient Non-Cartesian Sampling. Co-chairs: David Frakes, James Pipe.



Nabil Gergi Sadaka—Efficient Perceptual Super-Resolution. Chair: Lina J. Karam.

Benjamin C. Green—Dual-Wavelength Internal-Optically-Pumped Semiconductor Laser Diodes. Chair: Yong-Hang Zhang.

Aritra Dey—Mixed-Signal Design in Thin-Film Transistors. Chair: David R. Allee.

Diego Guerra—GaN HEMT Modeling and Design for Millimeter and Sub-Millimeter Wave Power Amplifiers Through Monte Carlo Particle-Based Device Simulations. Chair: Marco Saraniti.

Saurabh Sinha—Neuromorphic Controller for Low-Power Systems from Devices to Applications. Chair: Yu Cao.

Seungkee Min—A 5 GHz Ring-Oscillator PLL with Active Delay-Discriminator Phase Noise Cancellation Loop. Chair: Sayfe Kiaei.

Kai Tu—Multi-Carrier Communications Over Underwater Acoustic Channels. Chair: Tolga Duman.

Uttam Bhat—Practical Coding Schemes for Multi-User Communications. Chair: Tolga Duman.

Feng Ma—Improved Coherency-Based Dynamic Equivalents. Chair: Vijay Vittal.

Nabil Shovon Ashraf—Comparative Analysis of Simulation of Trap-Induced Threshold Voltage Fluctuations for 45 nm Gate Length n-MOSFET and Analytical Model Predictions. Chair: Dragica Vasileska.

Prasun Mahanti—Micro-Particle Streak Velocimetry - Theory, Simulation Methods and Applications. Co-chairs: Thomas Taylor, Douglas Cochran.

Tao Liu—Digitally Controlled DC-DC Buck Converters with Lossless Current Sensing. Chair: Bertan Bakkaloglu.

Kunal Ghosh—Heterojunction and Nanostructured Photovoltaic Device: Theory and Experiment. Co-chairs: Stuart Bowden, Christiana Honsberg.

Behnam Kia—Chaos Computing: from Theory to Architecture. Chair: William Ditto.

Sung Kim—Low-Power Design of a Neuromorphic IC and MICS Transceiver. Chair: Bertan Bakkaloglu.

Wencheng Xu—Film Bulk Acoustic Resonators of High Quality Factors in Liquid Environments for Biosensing Applications. Chair: Junseok Chae.

Spring 2012

Mohammad Reza Ghajar—Energy-Efficient RF Transmitter Design Using Enhanced Breakdown Voltage SOI-CMOS Compatible MESFETs. Chair: Trevor Thornton.

Balu Krishnan—On the Dynamics of Epileptic Spikes and Focus Localization in Temporal Lobe Epilepsy. Chair: Leon Isasemidis.

Guanji Hou—Trajectory Sensitivity Based Power System Dynamic Security Assessment. Chair: Vijay Vittal.

Victor Kononov—Analysis, Simulation and Measurement of CBS Antennas Loaded with Non-Uniformly Biased Ferrite Material. Chair: Constantine Balanis.

Satendra Kumar Maurya—A Structured Design Methodology for High-Performance VLSI Arrays. Chair: Lawrence Clark.

Alvaro Diaz Aguila—Detection of Nitroaromatic Explosives Using an Electrical-Electrochemical and Optical Hybrid Sensor. Chair: Nongjian Tao.

Elizabeth H. Steenbergen—Strain-Balanced InAs-InAsSb type-II Superlattices on GaSb Substrates for Infrared Photodetector Applications. Chair: Yong-Hang Zhang.

Rui Yang—Dynamical System Reconstruction via Compressive Sensing and Quantum Transport Control by Chaos. Chair: Ying-Cheng Lai.

Chenhui Yang—Robust Signal Detection and Modeling with Applications to the Analysis of Cognitive Neural Control and Video Target Tracking. Chair: Jennie Si.

Debin Li—Design, Modeling and Simulation of Nanoscale Optoelectronic Devices: Semiconductor Nano-Lasers and Plasmonic Waveguides. Chair: Cun-Zheng Ning.

Yongping Han—A CMOS Sigma-Delta Digital Intermediate Frequency to Radio Frequency Transmitter. Chair: Sayfe Kiaei.

Mark Stevens—Medical Implant Receiver System. Chair: Sayfe Kiaei.



ECEE Director Stephen Phillips presents the Palais Doctoral Award to Elizabeth Steenbergen

Palais Award

Outstanding doctoral student

Professor Joseph Palais, graduate program

chair, and his wife Sandra established the Palais Outstanding Doctoral Student Award. The award is presented annually to the best graduating doctoral student in the electrical engineering program. Candidates must have a minimum 3.75 GPA and at least one journal or conference publication. Faculty members nominate students within the program each year. The recipient receives \$1,000 and a commemorative plaque.

Elizabeth Steenbergen is the 2011-2012 recipient. Her mentor was professor Yong-Hang Zhang. She was one of the top in her class with a 4.0 GPA that she maintained since her undergraduate study. Steenbergen has several publications and has received many awards for her outstanding contributions to the field. She is currently working as an intern at the Air Force Research Lab with the career aspiration to work at a DoD or national laboratory to advance the country in technological applications and to teach young engineering students at a university.

ASU faculty partner in groundbreaking community solar project

Three ECEE professors are partnering

with Arizona Public Service (APS) on an ambitious project to research the effects of high penetration of solar energy on an electric grid system. Working with General Electric, National Renewable Energy Laboratory and ViaSol Energy Solutions, the Community Power Project is bringing more renewable energy to the Flagstaff, Ariz. area than ever before. The pilot program also is providing valuable data to guide larger scale distributed generation from solar panels nationwide.

In 2010, APS recruited 125 Flagstaff residents to host solar panels on their rooftops and feed into the power grid in return for a fixed rate on their electric bill. The power company owns the equipment and will maintain it over the next 20 years for the course of the study. The Department of Energy provided a \$3.3 million grant to the project in 2009.

The solar energy generated by the residential rooftops accounts for one-third of the total 1.5 megawatts of solar energy that APS is producing from this stretch of the power grid. Another third comes from a commercial installation at an elementary school. The final portion comes from a small solar power plant APS built in the neighborhood.

Having this variety of power sources allows for the exploration of the distribution system in a way that one large generating facility would not be able to. Spread out across nine miles, the amount of equipment and the various points where the power travels to and from, provides a much more complicated model for the ASU team to simulate and test.

The area power lines currently have a peak load of seven megawatts. Under certain conditions, solar power may account for 30 percent of the total power on the lines. This is the first time such a high percentage of solar power on the grid will be studied. Ordinarily, solar power on a feeder—or primary distribution line—amounts to well below five percent of the power.

Raja Ayyanar, associate professor, Vijay Vittal, professor, and Gerald Heydt, Regents' Professor, are working together to model the entire system and simulate the behavior of the grid as it responds to the varying levels of energy feeding in from the solar project.

Ayyanar explains that, “We want to understand what can go wrong with the power grid in simulations and



“We want to understand what can go wrong now with the power grid, before similar systems are installed in other feeders.”

field tests in a controlled and safe manner, before similar systems are installed on a larger scale and on several other feeders.” They are producing a simulation using a geographical information system (GIS) that has the location of the 10,000 pieces of individual equipment and conductor segments that APS has installed.

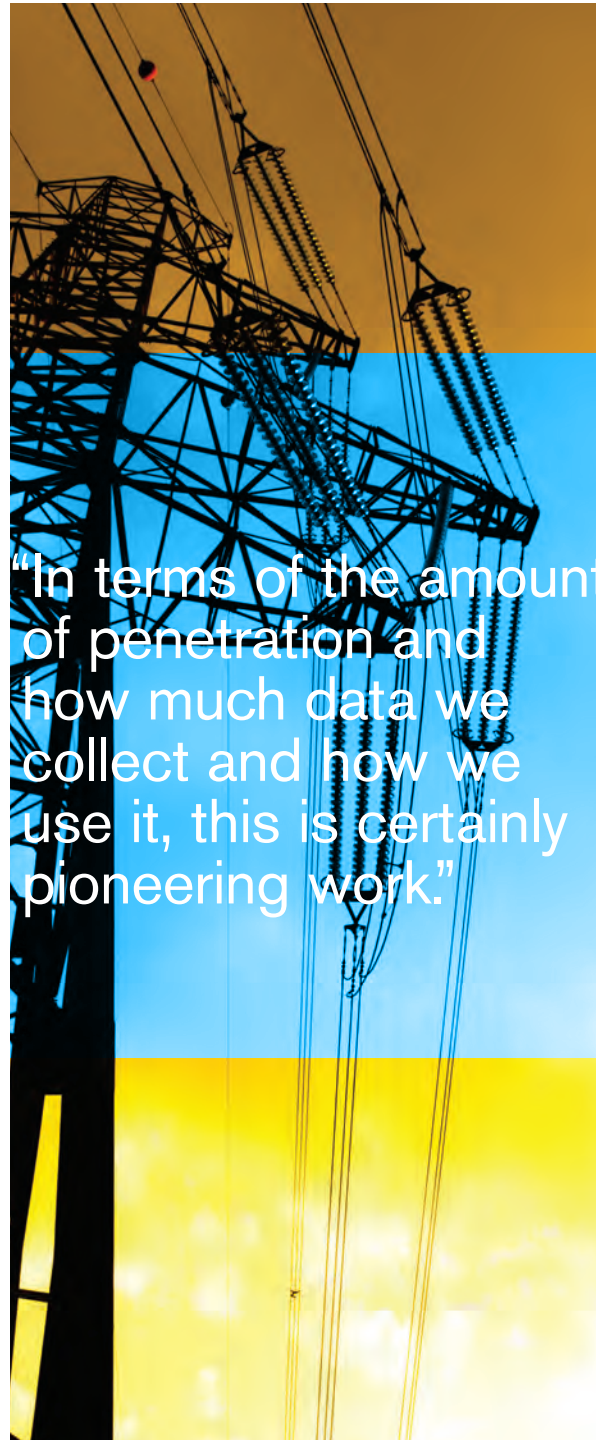
“Our role is modeling the entire feeder, the photovoltaic systems and the protection systems,” he says. “They added the electrical circuit diagram to the GIS, and now the model can show the voltage at any node of the system and the current flowing through each of the segments at any given time.”

With this system, the ASU team is able to predict the behavior of the grid and whether there will be any problems involving the direction of electrical flow or negative effects on the protection system or if there will be any chance of unsafe conditions for workers when repairing the power grid. The team also can quantify the benefits in terms of reduced losses, reduced energy from fossil fuels and better power quality.

“We get a huge amount of measurements from the field and match them to see if there are any discrepancies within our simulation and, if needed, we fine-tune our model,” says Ayyanar. Vittal explains that the system monitors the penetration level at varying times from seconds to minutes, providing a range of data for the team to compare to their model.

“Diversity is an important thing to measure,” Vittal says. The frequency and rate of measurements is another feature of the project that makes it stand out from previous studies.

“In terms of the amount of penetration and how much data we collect and how we use it, this is certainly pioneering work,” says Ayyanar, “It will lead into much wider adoption of PV systems as a whole.”



“In terms of the amount of penetration and how much data we collect and how we use it, this is certainly pioneering work.”

Heydt notes that the detailed instrumentation will identify any problematic operating conditions. One area that is being studied in detail is known as “electric power quality” says Heydt. Data from the study is being used by ASU students in graduate-level projects.

Their simulation will help provide answers as to what still needs to be improved with power grids before solar power can be implemented on a grand scale. It will also help the team discover how much farther they can push solar penetration on the grid beyond 30 percent.

With this implementation on such a grand scale, Ayyanar and his associates are beginning to brainstorm future steps to improve similar projects. Microgrids are one idea with which the team is toying. A microgrid is connected to the grid under normal conditions but during a grid disturbance can disconnect and form a small grid of its own supporting local loads with local generation.

Microgrids are one aspect of a “smart grid” which is the effort to bring the electric grid in to the computer age. With a smart grid, the grid operator has precise and real-time information on the status of every piece of equipment and can respond instantly to failures and disturbances. Similarly the consumer is empowered with information on their own load and grid conditions to make informed choices about their electricity use patterns.

As part of the Community Power Project, the ASU team will study all aspects of smart grid and make recommendations to APS for future implementations that would benefit APS and its customers.

For more information about the Community Power Project:

aps.com/main/various/CommunityPower/index.html

Zhang pioneering communication network advances

Junshan Zhang, professor, joined ASU in 2000 with a focus in cross-layer optimization of wireless networks. At this time his group was one

of the first to research cross-layer optimization and control for different network models, including wireless cellular networks, ad-hoc networks and sensor networks.

He recognized very early on the need to jointly optimize several layers, including physical, MAC and higher layers, in order to improve the performance of wireless networks. His work on cross-layer optimization

has combined rigorous quantitative analysis with insight into the problems of wireless networking and has been influential in the field.

His work has been supported by federal funding agencies and private organizations including Intel Corp., National Science Foundation, Department of Defense and Department of Energy.

As wireless communications continues to grow at a rapid pace, Zhang's research is having a broader impact on applications from smart grids to social networks.

In a project funded by NSF, Zhang is working on spatio-temporal analysis for wind farms to develop more accurate generation forecast models. A typical wind farm has 200-300 turbine towers. Wind speeds can vary widely, and power outputs from different turbines are often unequal. Zhang takes a network approach, using graphical learning tools to develop a Markov chain forecast model for aggregate power output.

This foundational research could help enable more significant penetration of renewable energy, and contribute to a smart grid in the making.

The Department of Defense is funding a project in which Zhang is looking at the interplay between mobile communications and social networks to facilitate information flow and find ways to reduce high peaks. One primary goal is to deliver timely information reliably, but also to investigate how information propagates across networks.



This foundational research could help enable more significant penetration of renewable energy, and contribute to a smart grid in the making.

Summer program uses cockroaches to teach kids about brain's electric signals

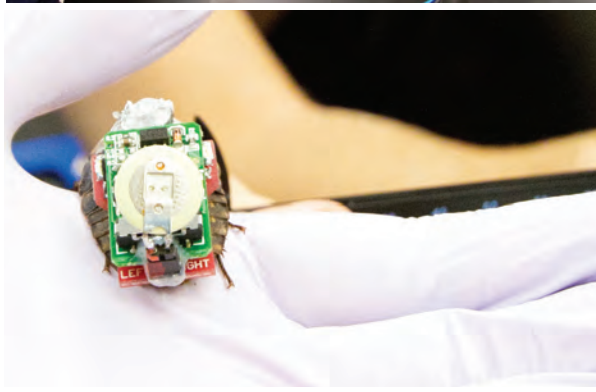
Five high-school students experienced a unique fusion of electrical engineering and biological science with the help of a few critters. Assistant professor Jennifer Blain Christen hosted a Summer Engineering Research Experience in June, featuring the nervous system of cockroaches.

"We were trying to look at how the cells in the brain work," explains Blain Christen. Similar to humans, the brains of cockroaches send and receive signals in response to stimuli throughout the body. The first experiment familiarized the students with the electrical signals in the body.

By amputating a cockroach leg and pinning it to a circuit the students built from a kit, the students could measure the variation of electrical stimulation that the receptors in the leg give off with different amounts of pressure. The circuit measured the electrical impulses of the leg by producing an audible response through speakers.

Once the students understood this concept, Blain Christen had them use music with a heavy bass beat to act as brain signals. The students were able to stimulate the muscles in the cockroach leg and watch it move to the beat of the songs.

Blain Christen says, "There are good reasons for trying to understand this science and how this signaling works." For instance: prosthetic limbs. False limbs with advanced technology use simple electric signals but do not allow a person to "feel" the action. Research in this field aims to create prosthetics that imitate physiology as closely as possible; making an artificial limb mimic precisely the function of the missing limb.



Students also inserted wire into the severed end of a cockroach's antenna. The wire attached to a small device called the "backpack" that received electrical impulses from the remote control of a modified HEXBUG toy. Blain Christen and the students were able to guide the cockroach to move in certain directions based on the signals.

The Summer Engineering Research Experience is meant to introduce young students to engineering when they are preparing to decide on a field to pursue in college.

Blain Christen teaches a low-power bioelectronics course where her students examine the electrical signals of the human brain, and she struggles to make the lessons tangible for her students.

"Its very abstract, so every year I try to include more things that bring it to reality," she explains. Hands-on activities, interactive lessons and guest presentations are a few of her strategies, but the cockroach program is a future candidate given its engaging and applicable qualities.

Blain Christen had assistance during the summer program from a visiting professor, Dixie Kullman, from Central Arizona College. Her focus is physiology and she spent the summer at ASU through the National Nanotechnology Infrastructure Network Research Experience for Teachers program sponsored by the National Science Foundation.

Kullman explained, "She inspired me! I am going to take this program back to my 100- and 200-level students." The biological aspect of the experiment makes this program a great resource for students of all levels in multiple fields of study.

NSF CAREER Award workshop led by ASU faculty member

ECEE professor Sule Ozev was sought out by the National Science Foundation to organize and run a CAREER Award workshop in Tempe, Ariz., in May. This NSF-funded educational workshop drew 100 faculty members who desired training in how to apply for this prestigious award.

The CAREER Award can play a significant part in the future of a faculty member. Ozev explains, "It is a very prestigious award and statistically speaking, if you get it, you are likely to be very successful in terms of research and university impact." There is a strong correlation between the CAREER Award and recipients who receive tenure at a university.

Ozev was selected to organize the workshop because of her ample experience with previous panel and event organizing as well as winning the CAREER Award in 2006. She has been at ASU since 2008 and recently made tenure.

The workshop was developed because "the NSF feels that some professors may not have the necessary mentorship and guidance to write good proposals," Ozev says. The 15-page document must reflect the professor's vision for their long-term career. Their research agenda must be ambitious and original with impact beyond their discipline and into society.

Dealing with such an important award, the NSF decided to begin a series of workshops to provide the necessary instruction for young professors to produce their proposals in the correct format. This was the third workshop in the last three years, and it received a very positive response.

Ozev received many emails and letters from the faculty that attended expressing their gratitude and appreciation for the workshop. "They all feel that they have learned a lot from the workshop," she says.

Recalling her own experience and the excitement at winning the CAREER Award, Ozev explains, "It's really heartening to help these people learn and write their proposals and turn their ideas into grants."



The NSF CAREER Award began in the 1980s as a grant program to jumpstart a young faculty member's research career. They are now trying to reach a broader range of professors, particularly underrepresented populations in terms of gender and ethnicity.

The workshop provided some funding for professors to travel to Arizona. This helped boost the diversity of

the workshop to about half of the participants from underrepresented groups. Ozev comments, "This was a big success."

Originally intended for West Coast professors, the workshop received attendees from all over the country seeking instruction for the CAREER Award. Ozev worked with the program director of the NSF, Mahamad Gouda, and CNS Division Director, Keith Marzullo to organize the entire event.

"It provided good visibility for ASU," says Ozev, "Dean Johnson got to introduce our school and our programs." It was the first CAREER Award workshop that ASU had hosted. "It takes a lot of time and I've been very thankful to all the staff that have helped me," says Ozev. Electrical engineering staff members, Nancy Osgood, Evie Selberg and Margaret Creedon each played an integral role in assisting Ozev with the event.

The workshop included Ozev's main presentation, a segment for three guest speakers who had received the CAREER Award, an explanation of how NSF panels work and what they are looking for, a mock panel and reversing roles to experience being a panelist with a sample proposal to look over with the NSF director. There was also a question and answer session at the end for the attendees to speak with the program directors.

The NSF is hoping to increase the frequency of the CAREER Award workshops to include two each year. ASU recorded the workshop to use as a resource for new faculty that come to ASU and need guidance with their proposals.

PMC-based technology products enter the market

Products based on the Programmable

Metallization Cell (PMC) technology developed by ECEE professor Michael Kozicki entered the commercial market this year. Adesto, a technology company founded in 2007 with a focus in PMC, or conductive-bridging random access memory (CBRAM) technology, licensed the technology from ASU with a goal of developing PMC into a platform that spans from high-performing embedded memory technology to lowest-cost solid-state storage. Adesto began releasing memory products based on Kozicki's technology in early 2012.

"There is real product out there as of the start of this year," says Kozicki.

Kozicki, who is director of the Center for Applied Nanoionics, also received three new patents on the PMC technology this year. In total, Kozicki holds 40 U.S. patents along with 30 international patents for developments across a variety of applications.

The PMC utilizes the motion of ions and electrochemical reactions at the nanoscale. As Kozicki explains, "What this means in real terms is that we can create large changes in a material property, such as its electrical resistance, by applying very small voltages and currents." This allows for a vast improvement in memory applications compared to the current solid-state memory.

"We can store data using a tiny fraction of the energy required for current technologies," says Kozicki, "The devices are also a lot smaller than existing memory cells so we can get a much higher data storage density for reduced cost."



Kozicki began studying PMC technology in 1995. Research into the materials used for PMC had already been explored, but the memory application had yet to be researched.

He co-founded an ASU spinoff company, Axon Technologies, in 1996 to handle the financing, development, intellectual property protection and commercialization for PMC. Over the years, Axon has sponsored nearly 1.5 million dollars in research at ASU.

"In return for strong rights to the technology," says Kozicki, "The company has sponsored the research, paid for all patent and legal work, and paid licensing fees and royalties to ASU." Axon Technologies effectively acts as the liaison between ASU and the semiconductor industry for PMC.

Since Kozicki's start in 1995 with PMC, a strong trend has developed. There are now symposia and conferences on PMC technology. "The industry is taking the technology very seriously and say that it is a leading contender to replace all solid-state memory by the end of this decade," explains Kozicki.

To stay at the front of this trend, two other professors in ECEE are performing research with this same technology. Associate professor Hugh Barnaby is investigating the use of PMC technology in harsh environments such as radiation and outer space. Associate professor Junseok Chae is working in the application of PMC in microelectromechanical systems (MEMS) and microfluidics.

Expanding our capacity: new faculty

Our expertise spans all Fulton Engineering

research themes: education, energy, health, security and sustainability.

In 2012-2013, nine new faculty members are joining us, bringing complementary research strengths and a strong commitment to student success.

Mariana Bertoni, assistant professor

research expertise: solar cells, defect engineering, transparent conducting oxides; synthesis, growth and deposition, electrical and optical characterization

biosketch: Bertoni joined ASU in 2012 as assistant professor. Previously, she was senior scientist for Integrated Photovoltaics, Inc., a producer of scalable solar power technology solutions, and visiting scientist, Massachusetts Institute of Technology. Her prior experience also includes work with 1366 Technologies, Inc. as senior photovoltaic engineer and postdoctoral fellow at MIT. Bertoni holds a Ph.D. in materials science and engineering, Northwestern University, diploma, chemical engineering, Instituto Tecnológico de Buenos Aires.

Daniel Bliss, associate professor

research expertise: multiple-input multiple-output (MIMO) wireless communications, distributed cooperative communications, full-duplex relays, geolocation techniques, MIMO radar, nonlocal Bayesian estimation bounds, channel phenomenology, and signal processing for anticipatory medical applications

biosketch: Bliss joined ASU in 2012 from the Massachusetts Institute of Technology Lincoln Laboratory, where he was a senior member of the technical staff in the Advanced Sensor Techniques Group. His research focus is on adaptive signal processing and information theoretic performance bounds for multisensor systems, primarily for wireless communications. He also investigates parameter estimation techniques and bounds. Bliss brings prior experience from General Dynamics, where he was a member of the superconducting magnet group and designed avionics for the Atlas-Centaur launch vehicle.

Srabanti Chowdhury, assistant professor

research expertise: power electronics, gallium nitride material for device application in high voltage and high frequency electronics, High Electron Mobility Transistors (HEMTs), device reliability, understanding failure modes (at a product level), device physics, study of dielectric materials and its characterization and device simulation

biosketch: Chowdhury joined ASU in fall 2012. Her Ph.D. research was focused on gallium nitride vertical devices for power electronic application. She worked as part of the Transphorm team and her ideas and designs have resulted in over eight patent applications in the last two years. Her work has led to renewed contracts and revenue earnings in the company, and has been recognized with internal awards of appreciation in the company. She has coauthored over eight journal publication and presented in over 15 conferences.

Rajib Datta, associate professor

research expertise: utility power conversion, power conversion for renewable and distributed generation, high power converters—topologies and control and modulation strategies, industrial drives

biosketch: Datta will join ASU in spring 2013 from General Electric Global Research Center where he manages the Electronic Power Conversion Lab. Previously, Datta was a scientist in the high power converter group at ABB Corporate Research Center. His expertise is in high-power electronics, particularly in wind and utility-scale applications at the multi-megawatt power level. Datta has led several multi-million dollar programs funded by the Department of Energy, Office of Naval Research and



new faculty

the Advanced Research Projects Agency-Energy. He has been granted 13 patents and holds a strong publication record, of which two IEEE Transactions publications have over 200 citations. Datta holds a Ph.D. in electrical engineering from the Indian Institute of Science.

Zachary Holman, assistant professor

research expertise: novel uses of nanoparticles in solar cells, light management in crystalline and thin-film silicon solar cells, semiconductor nanoparticles, optical and electronic properties of nanoscale materials, plasma synthesis of powders, deposition of powders and thin films

biosketch: Holman will join ASU in spring 2013. He is currently a postdoctoral researcher at École Polytechnique Fédérale de Lausanne in Switzerland. Holman's research interests include solar cells, nanotechnology, semiconductors, plasmas and aerosols. He received the NSF East Asia and Pacific Summer Institutes Fellowship in Japan in 2010 and several fellowships from the University of Minnesota between 2005 and 2010. He won the International Symposium on Plasma Chemistry Best Paper Award in 2007 and was a finalist in 2009. Holman holds a Ph.D. in mechanical engineering from University of Minnesota.

Jennifer Kitchen, assistant professor

research expertise: efficiency and power management for high-frequency circuits and systems

biosketch: Kitchen joined ASU in 2012 from Viasat, a provider of digital communication products for satellites, military applications and consumer products. Previously, she was with Ubidyne, a start-up company developing digital, antenna-embedded radio systems for wireless communications to improve cost and efficiency for base stations. Kitchen's research focuses

on exotic materials such as gallium nitride and gallium arsenide to create high-efficiency power management systems for solar arrays and batteries. Kitchen holds a B.S. in electrical engineering from the University of Arizona, and M.S. and Ph.D. degrees in electrical engineering from Arizona State University.

Oliver Kosut, assistant professor

research expertise: information theory, power systems and smart grids, security and sparse recovery

biosketch: Oliver Kosut joined ASU in 2012. Previously, he was a postdoctoral researcher in the Stochastic Systems Group at the Massachusetts Institute of Technology. Kosut's research focuses on security and stochastic systems, with the goal of bringing theoretical insights to bear on complex interconnected systems, such as power grids and communication networks. Kosut holds a Ph.D. in electrical and computer engineering from Cornell University and B.S. degrees in electrical engineering and mathematics from the Massachusetts Institute of Technology.



new faculty

Lalitha Sankar, assistant professor

research expertise: information privacy in distributed and cyberphysical systems, wireless communications, network information theory

biosketch: Sankar joined ASU in 2012 from Princeton University, where she was a research scholar. At Princeton, she was also a Science and Technology Postdoctoral Teaching and Research Fellow, supported by the Council on Science and Technology. Prior to her doctoral studies, she was a senior member of the technical staff at AT&T Shannon Laboratories. Sankar holds a Ph.D. in electrical engineering from Rutgers, M.S. in electrical engineering from the University of Maryland, and B.Tech in engineering physics from the Indian Institute of Technology.

Lei Ying, associate professor

research expertise: information networks including wireless, mobile ad hoc, P2P and social networks

biosketch: Ying joined ASU in 2012 from Iowa State University where he was a Northrop Gruman Assistant Professor in the Department of Electrical and Computer Engineering. His research focuses on developing fundamental models and basic theories for the design of next-generation, large-scale, complex and socially aware information networks. In 2009, Ying won the Young Investigator Award from the Defense Threat Reduction Agency and an NSF CAREER Award in 2010. Ying holds Ph.D. and M.S. degrees in electrical engineering from the University of Illinois at Urbana-Champaign and a B.E. from Tsinghua University.

CANi: Center for Applied Nanoionics

The Center for Applied Nanoionics (CANi) lies at the cutting edge of worldwide research in nanoionic materials and devices. Whereas nanoelectronics involves the movement of electrons within their nanostructured settings, nanoionics involves materials and devices that rely on ion transport and chemical change at the nanoscale. The center is affiliated with the ASU Nanofab and the Center for Solid State Electronics Research.

20 Rising interest in nanoionics has been fueled by a wide range of demonstrated and potential applications. Accomplishments of CANi include the generation of several dozen U.S. and foreign patents and the licensing of the Programmable Metallization Cell (PMC) platform to industry. PMC technology, which can lead to smaller, cheaper and more efficient memory, started appearing in commercial products at the start of 2012.

partners

Axon Technologies
Adesto Technologies

Director: Michael Kozicki
asu.edu/aine/cani/cani_main.html



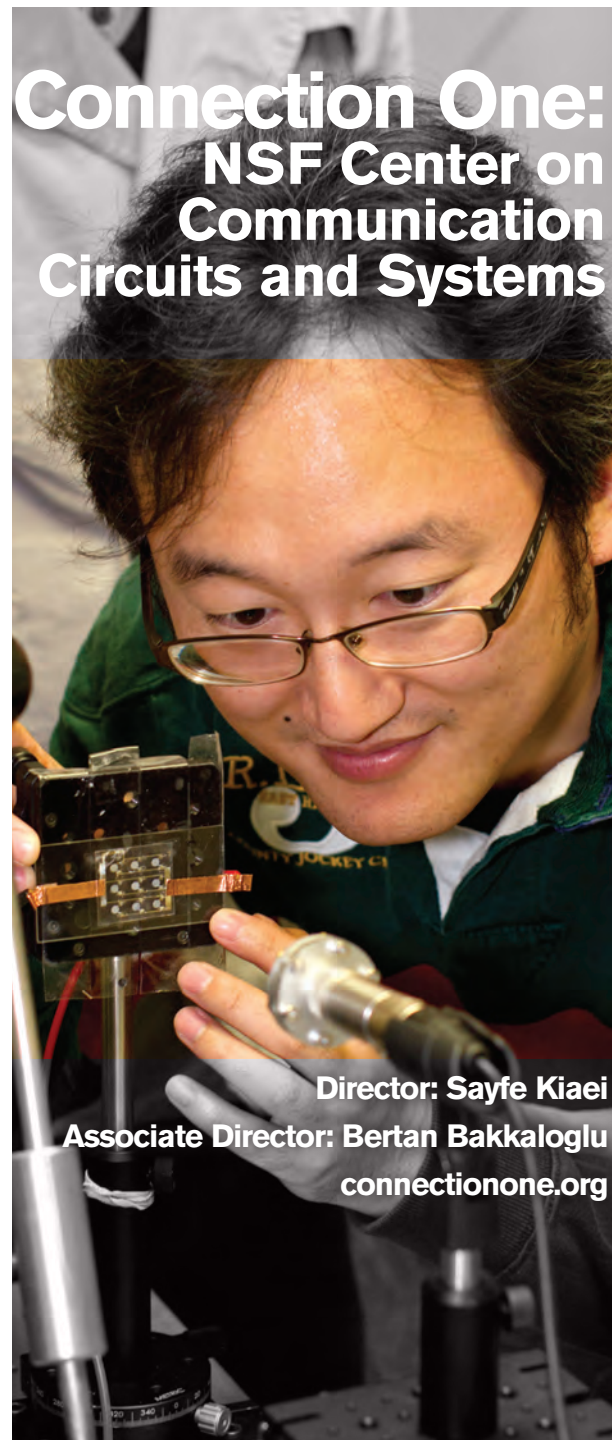
Connection One, a National Science Foundation Industry/University Cooperative Center, was established at Arizona State University in 2002 with five industry members. Ten years later, Connection One is funding over 35 projects with five university partners, 25 industry members and eight federal government members.

This world-class consortium is focused on developing the next-generation integrated circuits, systems and sensors to enhance technologies ranging from cellular to environmental and defense applications.

Over the last 10 years, Connection One's technical and scientific breakthroughs have included integrated radio IC, new technology for digital hearing aids, implantable neuron sensors, nanosensors and ultra-wideband radar. This year, noted accomplishments include: a multi-mode transceiver integrated on a single chip that enables reduced size and complexity and greater efficiency, and a meta-ground plane that reduces the size of bulky antenna systems and provides extremely wide bandwidth.

The center has established an active cooperative program that has enabled a wide range of opportunities for student internships, faculty exchange and rapid tech transfer. On average, Connection One places 10 to 15 students in internships each year.

As the center enters Phase III, the focus will be on the development of integrated solutions for wireless systems ranging from sensor nodes to fifth and sixth generation wireless systems.



university partners

The Ohio State University
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Rensselaer Polytechnic Institute
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Air Force Research Laboratory
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U.S. Army Research Laboratory
U.S. Department of Energy
U.S. Department of Homeland Security
UTC Aerospace Systems (formerly Goodrich)
Zomega Terahertz Corp.

PSERC: Power Systems Engineering Research Center

The Power Systems Engineering Research Center (PSERC) is a National Science Foundation industry/ University Cooperative Research Center (I/UCRC) that addresses a broad array of power systems technology, research and theory. The center draws on multi-university expertise, researching the diverse challenges facing the electric power industry and educating the next generation of power engineers.

22 The Future Grid Initiative, a U.S. Department of Energy project started in 2011, is investigating the requirements for a transformation of the grid to support high penetrations of variable distributed sustainable energy such as wind, solar and hydro resources, along with large central generation sources, energy storage and responsive users equipped with embedded intelligence and automation.

Through this initiative, PSERC has identified a set of technical challenges in six thrust areas. In collaboration with industry and government, they are seeking solutions by looking at broad analysis needs. Researchers have created white papers and led workshop discussions on: The Information Hierarchy for the Future Grid, and Grid Enablers of Sustainable Energy Systems.

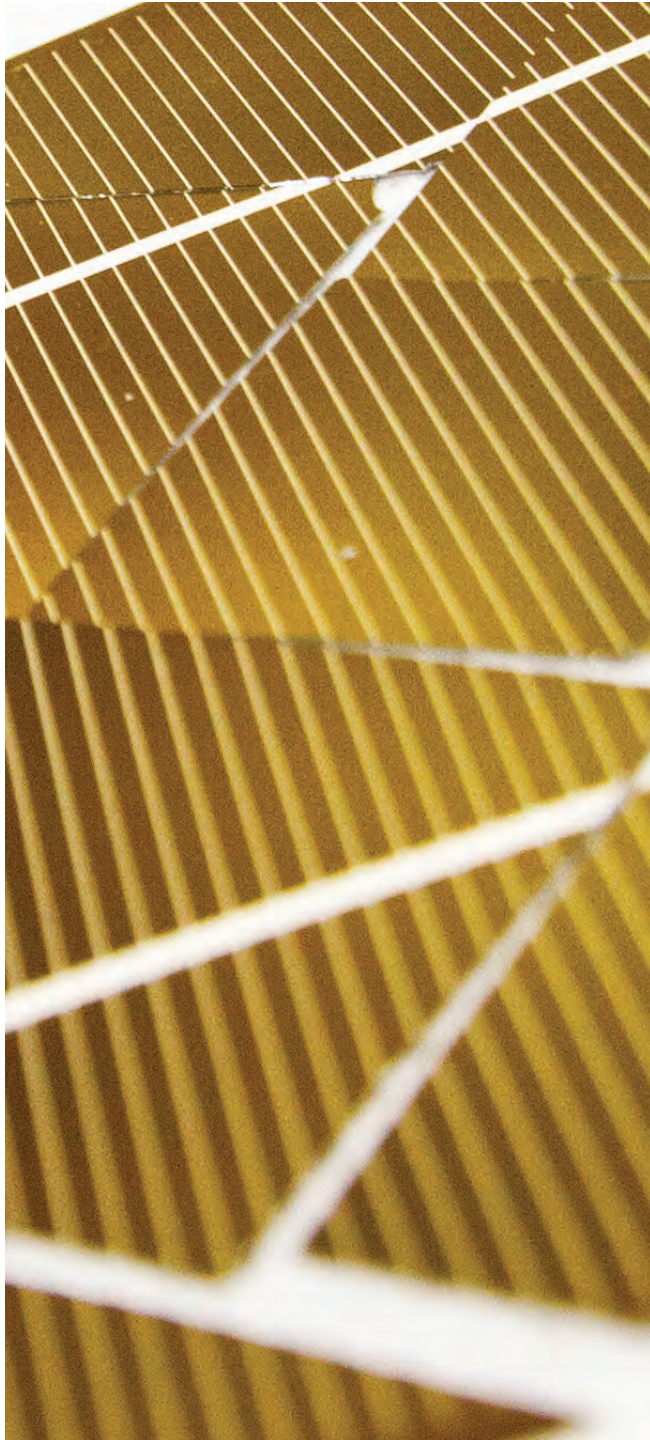
By informing others about PSERC's research and education efforts, the center hopes to serve as a catalyst for other initiatives that pursue the solutions needed for the future grid.

Director: Vijay Vittal
Site Director: Gerald Heydt
pserc.org



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Western Area Power Administration



QESST: Quantum Energy and Sustainable Solar Technologies

Director: Christiana Honsberg
Deputy Director: Dieter Schroder
qesst.asu.edu

The Quantum Energy and Sustainable Solar Technologies (QESST) Engineering Research Center was launched in 2011 with funding from the National Science Foundation and the U.S. Department of Energy. QESST leverages the collaboration of university, industry and government researchers to advance photovoltaic science and technology in order to address one of society's greatest challenges: transforming electricity generation to sustainably meet the growing demand for energy.

Through a wide range of programs—cutting-edge research, industrial engagement, university education, public engagement and outreach, pre-college curriculum development, teacher training, participation with policymakers and external stakeholders—QESST aims to use sustainable energy as a vehicle to revitalize the popular perception of science and engineering.

QESST is headquartered in state-of-the-art laboratory, clean room and office space in the MacroTechnology Works building at the ASU Research Park—a venue ideally suited for leading a collaborative network of industry-relevant research.

- university partners**
-
- California Institute of Technology
 - Massachusetts Institute of Technology
 - University of Delaware
 - The University of New Mexico
 - Georgia Institute of Technology
 - The University of Arizona
 - University of Houston
 - Imperial College London
 - The University of New South Wales
 - The University of Tokyo

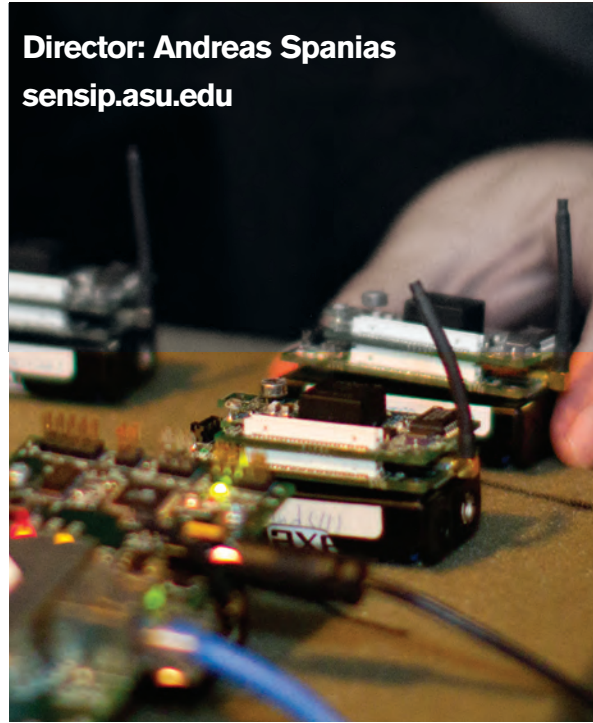
SenSIP: Sensor, Signal and Information Processing Center

The Sensor, Signal and Information Processing Center (SenSIP), is an Industry/University Cooperative Research Center (I/UCRC) in partnership with the Texas Net-Centric I/UCRC. The center's research encompasses development of a broad array of digital signal processing, imaging and communications algorithms for sensor technologies, including those used in chemical sensors, cell phones and radar and sonar systems.

24 Last year, SenSIP joined in two separate partnerships with international universities. One of these is a collaboration between University of Cyprus, Polytechnic Milano in Italy, ETH Zurich (the Swiss Federal Institute of Technology) and Boston University. SenSIP will work with the partners to accelerate technological advancements for use in sensor networks, "smart" power grids and telecommunications systems. The endeavor is being supported by the European Union through funding from the Cyprus Research Promotion Foundation for four years. SenSIP participated in the annual review meeting February 2012 and the joint KIOS-UCy workshop on April 2012 that included presentations from all four partners. One jointly advised KIOS-SenSIP Ph.D. student from the University of Cyprus successfully defended his dissertation on speech recognition in June 2012.

SenSIP also continues its partnership with Imperial College London's University Defence Research Centre. In spring 2012, SenSIP and Imperial College EEE signed a collaborative memorandum of understanding.

Director: Andreas Spanias
sensip.asu.edu



The partnership earned continuing funding from the prestigious British Council UK Prime Minister Fund. The focus is to accelerate the advance of sensor-array technology for use in national defense and security systems. The proposal was one of under 30 selected for funding out of more than 230 other proposals to the British Council. The group has already produced two joint publications and had two visitor Ph.D. student exchanges.

Sprint Communications signed an agreement with SenSIP to donate a \$300,000 4G/LTE facility for use in research and education. Working with Sprint management and ASU's UTO office, the SenSIP team plans to deploy the facility in fall 2012. Research will include mobile health, defense and security communications, and Net Centric research with SenSIP partners at UTD and SMU.

SenSIP recruited two new industry members in 2011 which include Sprint Communications (signed membership for four years) and Brainstorm Technologies (signed membership agreement starting in 2011 for two years). SenSIP also renewed Raytheon Missile Systems for two years starting January 2012. In all, SenSIP has six industry members including Intel, Lockheed Martin and LG Electronics.

SenSIP funded research on solar panel monitoring continued with Mitsui in 2011-2012. New fault detection and monitoring algorithms have been developed. Two IEEE papers have been published and a SenSIP-Mitsui joint research monograph is being published by Morgan and Claypool publishers.

ASU NanoFab is the Southwest regional node of the NSF-supported National Nanotechnology Infrastructure Network (NNIN), one of the fourteen NNIN university sites. It is a flexible foundry, offering a wide range of device processing and characterization tools. The 4,000-square-foot, class-100 cleanroom, state-of-the-art equipment and knowledgeable technical staff provide the facility, equipment and resources to enable full range of operations—from the wet world of biosystems and chemistry to the dry world of inorganic materials, as well as hybrid structures in between.

Project highlights

Carbon Nanotubes for Nanofluidics: carbon nanotubes (CNT) are attracting a lot of interest for use in DNA sequencing and for chem/bio-sensing. CNT based nanofluidic integrated devices have been fabricated to understand the fluid dynamics at sub-2nm dimensions.

Plasma Lithography for Cell Networks Formation: a versatile plasma lithography technique has been developed and applied to create cell networks, including those that mimic natural tissues for studying several distinct cell types.

Autonomous Brain Implant: The overall goal of this NIH-funded research is to develop a novel MEMS technology that will allow sensors to seek and monitor single neurons of interest in the brain over long periods of time. Novel packaging techniques and interconnect components for MEMS implantable devices have been developed.

MEMS Resonator for Monitoring Blood Coagulation: a small-size, light-weight, low-power, and disposable device for monitoring blood coagulation in real time is being developed. A piezoelectric thin film is sandwiched between two electrodes. As a droplet of blood coagulates on the electrodes, the viscosity increases and consequently lowers the resonant frequency of the resonator.



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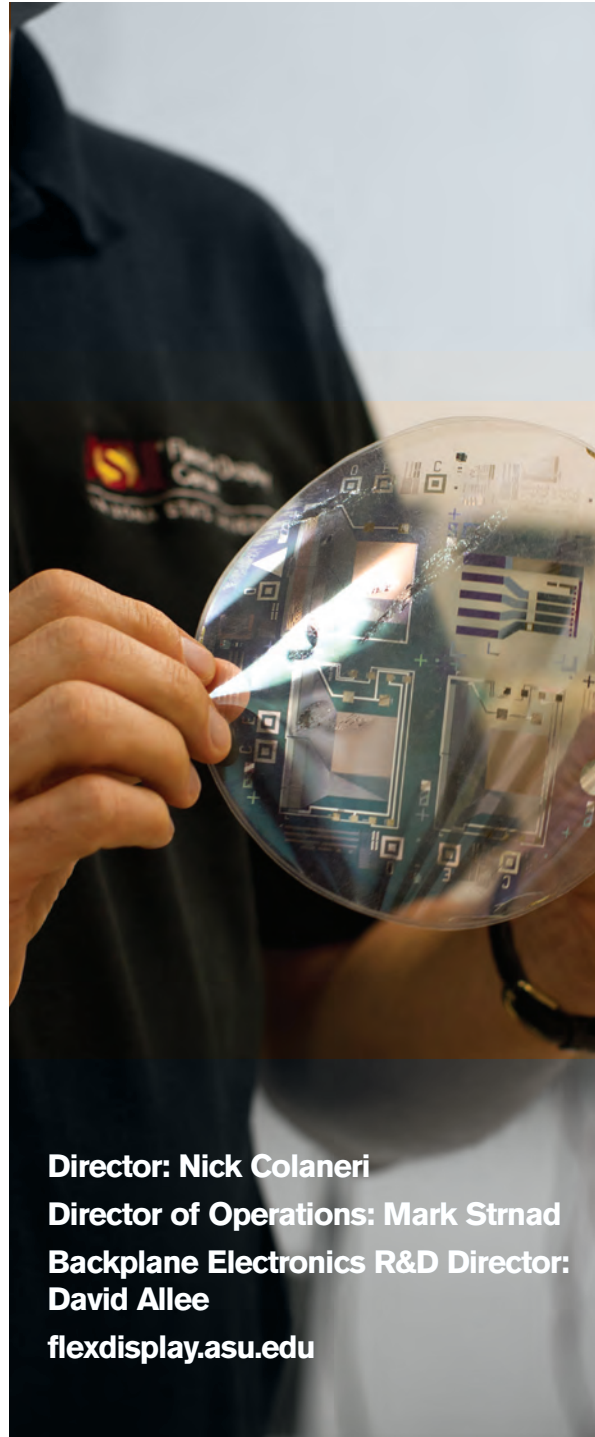
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- Nabsys
- NthDegree Technologies
- Sonata Biosciences, Inc.
- SJT Micropower

Flexible Display Center

The Flexible Display Center is a government–industry–academia partnership to advance full-color flexible display technology and foster development of a manufacturing ecosystem to support the rapidly growing market for flexible electronic devices. The center partners include many of the world's leading providers of advanced display technology, materials and process equipment. The Flexible Display Center is unique among the U.S. Army's University centers, having been formed through a 10-year cooperative agreement with Arizona State University in 2004.

This adaptable agreement has enabled the Flexible Display Center to create and implement a proven collaborative partnership model with over 26 active industry members, and to successfully deploy world class wafer-scale R&D and GEN-II display-scale pilot production lines for rapid flexible technology development and manufacturing supply chain commercialization.

In a significant advancement in 2012, FDC researchers successfully manufactured the world's largest flexible color organic light emitting display (OLED) prototype using advanced mixed-oxide thin-film transistors (TFTs). Measuring 7.4 diagonal inches, the device was developed in conjunction with Army Research Labs scientists. It also meets a critical target set by the U.S. Department of Defense to advance the development of full-color, full-motion video flexible OLED displays for use in thin, lightweight, bendable and highly rugged devices.



Director: Nick Colaneri

Director of Operations: Mark Strnad

**Backplane Electronics R&D Director:
David Allee**

flexdisplay.asu.edu

government partners

The Army Research Laboratory
The Natick Soldier RD&E Center (NSRDEC)
The U.S. Army Manufacturing Technology (ManTech) Program
The Office of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology (OASA(ALT))
The U.S. Army Research, Development and Engineering Command (RDECOM)

industry partners

AKT America, Inc.
Corning Incorporated
Cytec Industries Inc
dpiX
DuPont Teijin Films
E Ink Corporation
Etched In Time, Inc.
EV Group
FlexTech Alliance
Henkel
HP
Honeywell
Ito America
Kolon Industries, Inc.
L-3 Communications Display Systems
LG Display
MOCON
Physical Optics Corporation
Plextronics, Inc.
Raytheon
Universal Display Corporation

LightWorks is a university-wide initiative that pulls light-inspired research at ASU under one strategic framework. It is a multidisciplinary effort to leverage ASU's unique strengths, particularly in renewable energy fields including artificial photosynthesis, biofuels and next-generation photovoltaics.

LightWorks fosters cooperation among academia, industry and government to advance innovation, facilitate technology transfer and guide energy education and policy advancement.

Research is aimed at a variety of applications, including low-cost, high-efficiency solar panel technologies, renewable biofuel and biohydrogen production, fungible fuels from CO₂, water and sunlight, and high-efficiency lighting, cooling and flexible display technologies.

Cross-disciplinary efforts that address the energy grid infrastructure, supply chain, policy and transition involve participation of many ASU centers, academic programs and institutes.

In addition to QESST and PSERC, ECEE-led centers contributing to the LightWorks initiative include:

Center for Computational Nanoscience

Director: Marco Saraniti

The Center for Computational Nanoscience brings together multidisciplinary working on modeling and simulation of nanoscale systems. Typical projects focus on the development of novel numerical methods and algorithms, as well as applications to the study of phenomena with nanoscale resolution. Of particular relevance for the center is the study of phenomena that originate at the nanoscale, but evolve on much greater time and space domains.



ASU LightWorks

Director: Gary Dirks

Deputy Director: Stephen Goodnick

asulightworks.com

Center for Photonics Innovation

Director: Yong-Hang Zhang

The Center for Photonics Innovation integrates a broad spectrum of research areas, ranging from the fundamental study of photon-matter interactions to practical devices, such as solar cells, lasers, and optical sensors for medical and biological applications. The center's goal is to seamlessly integrate education and research, while offering a high standard of scholarship as well as opportunities for promoting technology commercialization.

The Solar Power Laboratory

Director: Christiana Honsberg

Researchers in the Solar Power Laboratory, part of the QESST Engineering Research Center, are working to overcome the barriers for existing solar cells reaching theoretical limits, focusing on increasing efficiency and reducing cost. Efforts include development of new cell structures, kerfless silicon substrates, tandem solar cells and nanostructures.

SPL is home to the student-led pilot line, an industrial-scale that enables students and collaborators to make full-size silicon solar cells, and is used in training students, comparing new research results on commercial equipment and allowing commercial collaborators to test ideas. Other key educational activities focus on the development of a PV educational site, www.pveducation.org, which includes an on-line textbook attracting 300,000 unique visitors a year.

**James T. Aberle**

Associate Professor
Ph.D., University of Massachusetts
aberle@asu.edu
480-965-8588

research expertise:

antennas and RF systems
for wireless communications,
modeling of complex
electromagnetic phenomena

biosketch: James T. Aberle received his B.S. and M.S. degrees in electrical engineering from the Polytechnic Institute of New York (now Polytechnic University) in 1982 and 1985, respectively, and a Ph.D. degree in electrical engineering from the University of Massachusetts in 1989. From 1982 to 1985, he was employed by Hazeltine Corporation, Greenlawn, N.Y., where he worked on the development of wide-band phased array antennas. As a graduate research assistant at the University of Massachusetts from 1985 to 1989, Aberle developed and validated computer models for printed antennas. He has been a faculty member at Arizona State University since 1989. His research interests include the design of radio frequency systems for wireless applications as well as the modeling of complex electromagnetic phenomena. Aberle has also been a NASA/ASEE summer faculty fellow at NASA Langley Research Center (1993), a visiting academic at the Royal Melbourne Institute of Technology in Melbourne, Victoria, Australia (1997), a visiting researcher at Atlantic Aerospace Electronics Corp. in Greenbelt, Md. (1998), and a senior member of the technical staff at a start-up company (2000-2002).

selected publications:

Hang Song, J. T. Aberle, and B. Bakkaloglu, "A mixed-signal matching state search based adaptive antenna tuning IC," *IEEE Microwave and Wireless Components Letters*, vol. 20, no. 10, pp. 581-583, Oct. 2010.

Hang Song, B. Bakkaloglu, and J. T. Aberle, "A CMOS adaptive antenna-impedance-tuning IC operating in the 850MHz-to-2GHz band," *Solid-State Circuits Conference—Digest of Technical Papers, 2009, ISSCC 2009. IEEE International*, 385a, pp. 384-385, 8-12 Feb. 2009.

J. T. Aberle, "Two-port representation of an antenna with application to non-foster matching networks," *IEEE Transactions on Antennas and Propagation*, vol. 56, no. 5, pp. 1218-1222, May 2008.

J. T. Aberle, S.-H. Oh, and G. A. Taylor, "Frequency-agile antennas for a software-defined and cognitive radio," in *Printed Antennas for Wireless Communications*, R. Waterhouse, Ed. John Wiley and Sons, 2007, pp. 379-406.

**David R. Allee**

Professor
Ph.D., Stanford University
allee@asu.edu
480-965-6470

research expertise:

ultra-small device fabrication
mixed-signal circuit design for
analog-to-digital conversion and
telemetry

biosketch: David R. Allee holds a B.S. in electrical engineering from the University of Cincinnati and M.S. and Ph.D. degrees in electrical engineering from Stanford University. While at Stanford University, and as a research associate at Cambridge University, he fabricated field-effect transistors with ultra-short gate lengths using custom e-beam lithography and invented several ultra-high resolution lithography techniques. Since joining Arizona State University, his focus has been on mixed-signal integrated circuit design. Allee is currently Director of Research for Backplane Electronics for the Flexible Display Center (flexdisplay.asu.edu) funded by the Army, and he is investigating a variety of flexible electronics applications. He has been a regular consultant with several semiconductor industries on low-voltage and low-power mixed signal CMOS circuit design. He has co-authored over 100 archival scientific publications and patents.

selected publications:

Ed Lee, George Kunnen, Alfonso Dominguez, David R. Allee, "A low noise dual stage a-Si:H active pixel sensor," *IEEE Transactions on Electron Devices*, vol. 59, no. 6, pp. 1679-1685, June 2012.

Aritra Dey, Sameer Venugopal, David R. Allee and Lawrence T. Clark, "Impact of Drain Bias Stress on Forward/Reverse Mode Operation of a-ZIO TFTs," *Solid State Electronics*, vol. 62, pp. 19-24, 2011.

Edward H. Lee, Anil Indluru, David R. Allee, Lawrence T. Clark, Keith E. Holbert, and Terry L. Alford, "Effects of Gamma Irradiation and Electrical Stress on a-Si:H Thin-Film Transistors for Flexible Electronics and Displays," *IEEE Journal of Display Technology*, vol. 7, no. 6, pp. 325-329, 2011.

Aritra Dey, Adrian Avendanno, Sameer Venugopal, David R. Allee, Manuel Quevedo, and Bruce Gnade, "CMOS TFT Op-Amps: Performance and Limitations," *IEEE Electron Device Letters*, vol. 32, no. 5, pp. 650-652, 2011.

Korhan Kaftanoglu, Sameer M. Venugopal, Michael Marrs, Aritra Dey, James R. Wilson, Edward Bawolek, David R. Allee, and Doug Loy, "Stability of IZO and a-Si:H TFTs Processed at Low Temperature (200C)" *IEEE Journal of Display Technology*, vol. 7, no. 6, pp. 339-343, 2011.

**Raja Ayyanar**

Associate Professor
Ph.D., University of Minnesota
rayyanar@asu.edu
480-727-7307

research expertise:

power electronics, DC-DC converters
and power management, power
conversion and control for
renewable energy interface,
especially PV and wind, smart
grid technologies, plug-in electric

vehicles, motor drives

biosketch: Rajapandian Ayyanar joined Arizona State University as an assistant professor in 2000. He received a B.E. in electrical engineering from P.S.G. College of Technology, India in 1989, an M.S. in power electronics from the Indian Institute of Science in 1995, and a Ph.D. in power electronics from the University of Minnesota in 2000. He has published over 70 journal and conference papers in the area of power electronics and renewable energy integration, and he holds two U.S. patents. Ayyanar was awarded the ONR Young Investigator Award in 2005.

selected publications:

G.T. Heydt, R. Ayyanar, K.W. Hedman, V. Vittal, "Electric Power and Energy Engineering: The First Century," *Proceedings of the IEEE*, vol. 100, Special Centennial Issue, pp. 1315-1328, 2012.

D. Gautam, L. Goel, R. Ayyanar, V. Vittal, and T. Harbour, "Control strategy to mitigate the impact of reduced inertia due to doubly fed induction generators on large power systems," *IEEE Transactions on Power Systems*, vol. 26, pp. 214-224, Feb. 2011.

A. K. Jain, R. Ayyanar, "PWM control of dual active bridge: Comprehensive analysis and experimental verification," *IEEE Transactions on Power Electronics*, vol. 26, pp. 1215-1227, April 2011.

D. Zhao, V. S. S. Pavan Kumar Hari, G. Narayanan, and R. Ayyanar, "Space-vector-based hybrid pulsewidth modulation techniques for reduced harmonic distortion and switching loss," *IEEE Transactions on Power Electronics*, vol. 25, pp. 760-774, March 2010.

R. Ayyanar, H. K. Krishnamurthy, and X. Mao, "Optimal variable switching frequency scheme for reducing switching loss in single-phase inverters based on time-domain ripple analysis," *IEEE Transactions on Power Electronics*, vol. 24, pp. 991-1001, April 2009.

R. Ayyanar and N. Mohan, "Zero Voltage Switching DC-DC Converter," U.S. Patents 6,611,444 and 6,310,785.

**Bertan Bakkaloglu**

Associate Professor
Ph.D., Oregon State University
bertan.bakkaloglu@asu.edu
480-727-0293

research expertise:

RF and mixed-signal IC design, integrated power management circuits for high reliability applications, low-noise biomedical and chemical instrumentation ICs

biosketch: Bertan Bakkaloglu joined Arizona State University in 2004. He received a Ph.D. in electrical and computer engineering in 1995 from Oregon State University. Prior to ASU, Bakkaloglu was with Texas Instruments where he was responsible for analog, mixed signal, and RF system-on-chip development for wireless and wireline communication transceivers. He is a steering committee member for IEEE Radio Frequency Integrated Circuits Conference, IEEE Circuits and Systems for Medical and Environmental Applications Workshop, and founding chair of the IEEE Solid State Circuits Society Phoenix Chapter. He is an associate editor of IEEE Transactions on Microwave Theory and Techniques.

selected publications:

K. Chandrashekar, B. Bakkaloglu, "A 10 b 50 MS/s Opamp-Sharing Pipeline A/D With Current-Reuse OTAs," IEEE Transactions on Very Large Scale Integration (VLSI) Systems, vol.19, no. 9, pp. 1610-1616, Sept. 2011.

Ilker Deligoz, S. R. Naqvi, T. Copani, S. Kiaei, B. Bakkaloglu, Sang-Soo Je, J. Chae, "A MEMS-Based Power-Scalable Hearing Aid Analog Front End," IEEE Transactions on Biomedical Circuits and Systems, vol. 5, no. 3, pp. 201-213, June 2011.

W. Khalil, S. Shashidharan, T. Copani, S. Chakraborty, S. Kiaei, and B. Bakkaloglu, "A 405-MHz all-digital fractional-frequency-locked loop for ISM band applications," IEEE Transactions on Microwave Theory and Techniques, vol. 59, no. 5, pp. 1319-1326, May 2011.

T. Copani, S. Min, S. Shashidharan, S. Chakraborty, M. Stevens, S. Kiaei, and B. Bakkaloglu, "A CMOS low-power transceiver with reconfigurable antenna interface for medical implant applications," IEEE Transactions on Microwave Theory and Techniques, vol. 59, no. 5, pp. 1369-1378, May 2011.

T. Liu, H. Yeom, B. Vermeire, P. Adell, B. Bakkaloglu, "A digitally controlled DC-DC buck converter with lossless load-current sensing and BIST functionality," IEEE International Solid-State Circuits Conference Digest of Technical Papers (ISSCC), 2011, pp. 388-390, Feb. 2011.

**Constantine A. Balanis**

Regents' Professor
Ph.D., The Ohio State University
balanis@asu.edu
480-965-3909

research expertise:

computational electromagnetic methods (FDTD, FEM, MoM, GO/GTD/UTD, PO/PTD) for antennas, scattering and high-intensity radiated fields (HIRF), flexible and conformal antennas,

ferrite-loaded non-uniformly biased CBS antennas, smart/adaptive antennas for wireless communications

biosketch: Constantine A. Balanis joined the electrical engineering faculty in 1983 and is now an ASU Regents' Professor. He has published over 135 journal papers, 235 conference papers, 12 book chapters, 9 magazine/newsletter papers and numerous scientific reports. He has also published four books: Antenna Theory: Analysis and Design; Advanced Engineering Electromagnetics; Introduction to Smart Antennas; and Modern Antenna Handbook.

honors and distinctions: ASU Regents' Professor; Honorary Doctorate-University of Thessaloniki (Greece); IEEE Life Fellow; IEEE Third Millennium Medal; IEEE AP Society Distinguished Achievement Award; IEEE AP Society Chen-To Tai Distinguished Educator Award; ASU Outstanding Graduate Mentor Award; ASU Schools of Engineering Graduate Teaching Excellence Award; ASU College of Engineering Distinguished Achievement Award; IEEE Region 6 Individual Achievement Award; IEEE Phoenix Section Professionalism Award.

selected publications:

C. A. Balanis, Advanced Engineering Electromagnetics (2nd edition), John Wiley & Sons, 2012.

V. G. Kononov, C. A. Balanis, and Craig R. Birtcher, "Analysis, Simulation and Measurements of CBS Antennas Loaded with Non-Uniformly Biased Ferrite Material," IEEE Trans. Antennas Propagat., vol. 60, no. 4, pp. 1717-1726, April 2012.

A. C. Durgun, C. A. Balanis, C. R. Birtcher and D. R. Allee, "Design, Simulation, Fabrication and Testing of Flexible Bow-Tie Antennas," IEEE Trans. Antennas Propagat., vol. 59, no. 12, pp. 4425-4435, Dec. 2011.

D. Arceo and C. A. Balanis, "A Compact Yagi-Uda Antenna with Enhanced Bandwidth," IEEE Antennas and Wireless Letters, vol. 10, pp. 442-445, 2011.

M. S. Reese, C. A. Balanis, C. R. Birtcher, and G. C. Barber, "Modeling and Simulation of a Helicopter-Mounted SATCOM Antenna Array," IEEE Antennas and Propagation Magazine, vol. 53, no. 2, pp. 51-60, April 2011.

V. Kononov and C. A. Balanis, "Analysis and simulation of the propagation channel complexity on signal fading," IEEE Antennas and Wireless Letters, vol. 9, pp. 895-898, 2010.

V. Kononov, C. A. Balanis, C. R. Birtcher, and C. Polycarpou, "Non-uniform field modeling of ferrite-loaded cavity-backed slot antennas," IEEE Trans. Antennas Propagat., vol. 57, no. 10, pp. 3402-3405, 2009.

P. Bevelacqua and C. A. Balanis, "Geometry and weight optimization for minimizing sidelobes in wideband planar arrays," IEEE Trans. Antennas Propagat., vol. 57, no. 4, pp. 1285-1289, Apr. 2009.

C. A. Balanis, D. DeCarlo, and J. Lambert, "Spherical cap adaptive antennas for GPS," IEEE Trans. Antennas Propagat., vol. 57, no. 2, pp. 406-413, Feb. 2009.

**Hugh Barnaby**

Associate Professor
Ph.D., Vanderbilt University
hbarnaby@asu.edu
480-727-0289

research expertise:

semiconductors for hostile environments, device physics and modeling, microelectronic device and sensor design and manufacturing, analog/RF/mixed signal circuit design and test

biosketch: Hugh Barnaby joined ASU in 2004. Previously, he was an assistant professor at the University of Arizona. His primary research focuses on the analysis, modeling and experimental characterization of extreme environment effects in semiconductor materials, devices and integrated circuits. As part of this research, he also develops design and processing techniques that enable the reliable operation of electronics in these environments. In addition, Barnaby has ongoing research activities in wireless (RF and optical) IC and data converter design, radiation and reliability-enabled compact modeling, and memristor technologies and applications. He has been an active researcher in the microelectronics field for 19 years in both industry and academics, presenting and publishing more than 100 papers during this time.

honors and distinctions: ONR Faculty Research Fellow; IEEE Senior Member; IEEE Nuclear and Space Radiation Effects Conference Committee, Associate Editor for IEEE Transactions on Nuclear Science; IEEE Solid State Circuits Society Section Chairman.

selected publications:

H. J. Barnaby, S. Malley, M. Land, S. Charnicki, A. Kathuria, B. Wilkens, E. Delonno, W. Tong, "Impact of Alpha Particles on the Electrical Characteristics of TiO₂ Memristors," IEEE Transactions on Nuclear Science, vol. 58, no. 6, pp. 2838-2844, 2011.

I.S. Esqueda, H. J. Barnaby, K. E. Holbert, F. El-Mamouni, R. D. Schrimpf, "Modeling of Ionizing Radiation-Induced Degradation in Multiple Gate Field-Effect Transistors," IEEE Transactions on Nuclear Science, vol. 58, no. 2, pp. 499-505, 2011.

I. S. Esqueda, H. J. Barnaby, M. L. McClain, P. C. Adell, F. E. Mamouni, S. K. Dixit, R. D. Schrimpf, and W. Xiong, "Modeling the radiation response of fully depleted SOI n-channel MOSFETs," IEEE Transactions on Nuclear Science, vol. 56, no. 4, pp. 2247-2250, 2009.

X. J. Chen, H. J. Barnaby, P. Adell, R. L. Pease, B. Vermeire, and K. E. Holbert, "Modeling the dose rate response and the effects of hydrogen in bipolar technologies," IEEE Transactions on Nuclear Science, vol. 56, no. 6, pp. 3196-3202, 2009.

**Jennifer Blain Christen**

Assistant Professor
Ph.D., Johns Hopkins University
jennifer.blainchristen@asu.edu
480-965-9859

research expertise:

bio-compatible integration techniques for CMOS electronics, microfluidics and soft lithography, MEMS devices with emphasis on bio-MEMS, analog and mixed-mode VLSI for biomedical/

analytical instrumentation including SOS/SOI technologies

biosketch: Jennifer Blain Christen joined ASU in 2008. She received her Ph.D. in 2006 and M.S. in electrical engineering in 2001 from Johns Hopkins University. She conducted her post-doctoral research at the Immunogenetics Department of the Johns Hopkins Medical School. Her research focuses on engineering systems that directly interface biology; this interface usually includes low-power analog circuits and microfluidics.

honors and distinctions: Transactions on Biomedical Circuits and Systems Best Paper Award (2007-2010); Science Foundation Arizona Grand Challenges Conference Poster Contest 1st Place, 2010; STIMESI MultiMEMS Design Contest, Advanced Category 1st Place, 2008; National Science Foundation Graduate Teaching Fellows in K-12 Education, 2005-2006; National Science Foundation Graduate Research Fellowship, 2001-2004; Grant recipient for the Undergraduate Engineering Research Opportunities Program, sponsored by General Electric Faculty for the Future, 1998; Maryland Scholars Award, 1997.

selected publications:

A. G. Andreou, Z. Zhang, R. Ozgun, E. Choi, Z. Kalayjian, M. Marwick, J. Blain Christen, and L. Tung, "Contactless fluorescence imaging with a CMOS image sensor," IEEE International Symposium on Circuits and Systems, May 2011.

D. Welch and J. Blain Christen, "A multiparametric biosensor array for on-chip cell culture with feedback controlled microfluidics," IEEE International Symposium on Circuits and Systems, May 2011.

J. Song, D. Welch, and J. Blain Christen, "A fully adjustable dynamic range capacitance sensing circuit in a 0.15 um 3D SOI process," IEEE International Symposium on Circuits and Systems, May 2011.

D. Welch and J. Blain Christen, "On-chip biosensing with microfluidic feedback control," IEEE/NIH 5th Life Science Systems and Applications Workshop (LiSSA 2011), April, 2011.

W. Chen, T. Copani, H. J. Barnaby, and S. Kiaei, "A 14-GHz CMOS receiver with local oscillator and IF bandpass filter for satellite applications," IEEE Radio Frequency Integrated Circuits Symposium, pp. 123-126, June 2009.

M. L. McLain, H. J. Barnaby, I. S. Esqueda, J. Oder, and B. Vermeire, "Reliability of high-performance standard two-edge and radiation hardened by design enclosed geometry transistors," IEEE International Reliability Physics Symposium Proceedings, pp. 174-179, April 2009.

**Yu (Kevin) Cao**

Associate Professor
Ph.D., University of California, Berkeley
ycao@asu.edu
480-965-1472

research expertise:

physical modeling of nanoscale technologies, design solutions for variability and reliability, reliable integration of post-silicon technologies

biosketch: Kevin Cao joined Arizona State University in 2004. He received a Ph.D. in electrical engineering in 2002 and an M.A. in biophysics in 1999 from the University of California, Berkeley, and conducted his post-doctoral research at the Berkeley Wireless Research Center. He has published more than 150 articles and has co-authored one book on nano-CMOS physical and circuit design. He has served on the technical program committee of many conferences and is a member of the IEEE EDS Compact Modeling Technical Committee.

honors and distinctions: Teaching Excellence Award, Ira. A. Fulton Schools of Engineering, ASU, 2010; Promotion and Tenure Faculty Exemplar, ASU, 2009; Distinguished Lecturer of the IEEE Circuits and Systems Society, 2009; Chunhui Award for Outstanding Oversea Chinese Scholars, China, 2008; Best Paper Award at the International Symposium on Low-Power Electronics and Design, 2007; IBM Faculty Award, 2007 and 2006; NSF Faculty Early Career Development (CAREER) Award, 2006; Best Paper Award at the International Symposium on Quality Electronic Design, 2004; Beatrice Winner Award, International Solid-State Circuits Conference, 2000; Biophysics Graduate Program Fellowship at the University of California, Berkeley, 1997-98; UC Regents Fellowship at University of California, Santa Cruz, 1996-97.

selected publications:

W. Wang, S. Yang, S. Bhardwaj, R. Vattikonda, S. Vrudhula, F. Liu, and Y. Cao, "The impact of NBTI effect on combinational circuit: modeling, simulation, and analysis," IEEE Transactions on VLSI Systems, vol. 18, no. 2, pp. 173-183, 2010.

T. Austin, V. Bertacco, Y. Cao, and S. Mahlke, "Reliable systems on unreliable fabrics," IEEE Design and Test of Computers, vol. 25, no. 4, pp. 322-332, July-Aug., 2008.

B. H. Calhoun, Y. Cao, X. Li, K. Mai, L. T. Pileggi, R. A. Rutenbar, and K. L. Shepard, "Digital circuit design challenges and opportunities in the era of nanoscale CMOS," Proceedings of the IEEE, vol. 96, no. 2, pp. 343-365, Feb. 2008.

**Junseok Chae**

Associate Professor
Ph.D., University of Michigan, Ann Arbor
junseok.chae@asu.edu
480-965-2082

research expertise:

microdevices for bioenergy applications, implantable microdevices, electronic circuit integration with microdevices

biosketch: Junseok Chae received a B.S. degree in metallurgical engineering from Korea University, Seoul, Korea, in 1998, and M.S. and Ph.D. degrees in electrical engineering and computer science from University of Michigan, Ann Arbor, in 2000 and 2003, respectively. He joined Arizona State University in 2005 as an assistant professor, and is now an associate professor of electrical engineering. He has published over 100 journal and conference articles, two book chapters, one book and holds two U.S. patents. His areas of interests are MEMS (microelectromechanical systems) sensors/actuators, integrating MEMS with readout/control electronics, and microdevices for bioenergy/biomedical applications.

honors and distinctions: NSF CAREER Award, 2009; Best Poster Award in IEEE International Conference on Sensors, 2007; First Place Prize and the Best Paper, DAC (Design Automation Conference) Student Design Contest, 2001.

selected publications:

H. Ren, H. Lee, and J. Chae, "Miniaturizing Microbial Fuel Cells for Potential Portable Power Sources: Promises and Challenges," Microfluidics and Nanofluidics (invited review article), 2012.

S. Kim, X. Zhang, R. Daugherty, E. Lee, G. Kunnen, D. Allee, E. Forsythe, and J. Chae, "MEMS (Microelectromechanical Systems)-based Ultrasonic Electrostatic Actuators on a Flexible Substrate," IEEE Electron Device Letters, 2012.

H. Schwerdt, F. Miranda, and J. Chae, "A Fully Passive Wireless Backscattering Neuro-Recording Microsystem Embedded in Dispersive Human Head Phantom Medium," IEEE Electron Device Letters, 2012.

W. Xu, J. Appel, and J. Chae, "Real-Time Monitoring of Whole Blood Coagulation Using a Microfabricated Contour-Mode Film Bulk Acoustic Resonator," IEEE Journal of Microelectromechanical Systems, vol. 21, no. 2, pp. 302-307, 2012.

S. Choi and J. Chae, "An array of microliter-sized microbial fuel cells generating 100 μW of power," Sensors and Actuators A, vol. 177, pp. 10-15, 2012.

**Chaitali Chakrabarti**

Professor
Ph.D., University of Maryland
chaitali@asu.edu
480-965-9516

research expertise: VLSI architectures and algorithms for media processing and wireless communications, low-power embedded system design, algorithm-architecture co-design of signal processing systems

biosketch: Chaitali Chakrabarti received a B.Tech in electronics and electrical communication engineering from the Indian Institute of Technology, Kharagpur, India, and M.S. and Ph.D. degrees in electrical engineering from the University of Maryland, College Park. She is an associate editor of the IEEE Transactions on VLSI Systems and the Journal of VLSI Signal Processing Systems.

honors and distinctions: Top 5 percent faculty, Ira A. Fulton Schools of Engineering, 2012; Best Paper Awards in SAMOS'07, MICRO'08, and SiPS'10; MICRO Top Picks in 2007 and 2010; Outstanding Educator Award, IEEE Phoenix section, 2001; IEEE Fellow.

selected publications:

C. Yang, Y. Emre and C. Chakrabarti, "Product Code Schemes for Error Correction in MLC NAND Flash Memories," IEEE Transactions on VLSI Systems, 2012.

M. Debole, A. al Maashri, C.-L. Yu, C. Chakrabarti and V. Narayanan, "A Framework for Accelerating Neuromorphic Vision Algorithms on FPGA," IEEE/ACM International Conference on Computer-Aided Design, pp. 810-813, 2011.

M. Woh, S. Seo, S. Mahlke, T. Mudge, and C. Chakrabarti, "AnySP: Anytime anywhere anyway signal processing," IEEE MICRO Top Picks, pp. 81-91, Jan./Feb. 2010.

L. Miao, J. J. Zhang, C. Chakrabarti, and A. Papandreou-Suppappola, "A new parallel implementation for particle filters and its application to adaptive waveform design," IEEE Workshop on Signal Processing Systems (SiPS), pp. 19-24, Oct. 2010, (Bob Owens Memorial Best Paper Award).

J. S. Kim, L. Deng, P. Mangalagiri, K. Irick, K. Sobti, M. Kandemir, V. Narayanan, C. Chakrabarti, N. Pitsianis, and X. Sun, "An automated framework for accelerating numerical algorithms on reconfigurable platforms using algorithmic/architectural optimizations," IEEE Transactions on Computers, pp. 1654-1667, Dec. 2009.

M. Woh, Y. Lin, S. Mahlke, T. Mudge, C. Chakrabarti, R. Bruce, D. Kershaw, and K. Flautner, "From SODA to scotch: The evolution of a wireless baseband processor," Proceedings of the IEEE/ACM Symposium on Microarchitecture (MICRO), Nov. 2008, (Best Paper Award).

**Lawrence T. Clark**

Associate Professor
Ph.D., Arizona State University
lawrence.clark@asu.edu
480-727-0295

research expertise: circuits and architectures for low-power and high-performance VLSI, radiation-hardened circuit design and CAD for VLSI

biosketch: Lawrence T. Clark worked at Intel Corporation after receiving his B.S. in computer science in 1983. While completing his Ph.D. he worked at VLSI Technology Inc., designing PC chipsets. He received his Ph.D. in 1992 after receiving his M.S. in 1987, both in electrical engineering, from Arizona State University. He rejoined Intel in 1992, then moved to ASU in 2004. Clark has been awarded over 70 patents, with approximately 20 pending. He has published over 100 peer-reviewed technical papers. He has approximately 15 years of industry experience in various aspects of chipset, CMOS imager, microprocessor design, test engineering and TCAD. Clark contributed to the Pentium, Itanium and XScale microprocessor designs. Most recently, he was a principal engineer and circuit design manager for the Intel XScale microprocessor designs. Clark has been with SuVolta Inc. in various capacities since 2009.

honors and distinctions: IEEE Senior Member; previous associate editor, IEEE Transactions on Circuits and Systems II; previous guest editor, IEEE Journal of Solid State Circuits; recipient of the Intel Achievement Award and multiple Intel divisional recognition awards; technical committee member for IEEE Custom Integrated Circuits Conference, IEEE Nuclear and Space Radiation Effects Conference, and for the International Symposium on Low-Power Electronics and Design.

selected publications:

S. K. Maurya and L. Clark, "A dynamic longest prefix matching content addressable memory for IP routing," IEEE Transactions on VLSI Systems, vol. 19, no. 6, pp. 963-972, June 2011.

L. Clark, D. Patterson, N. Hindman, K. Holbert, S. Maurya, and S. Guertin, "A Dual-Mode Redundant Approach for Microprocessor Soft Error Hardness," IEEE Transactions on Nuclear Science, vol. 58, no. 6, pp. 3018-3025, Dec. 2011.

G. Sampson and L. Clark, "Low-power race-free programmable logic arrays," IEEE Journal of Solid State Circuits, vol. 44, no. 3, pp. 935-946, March 2009.

D. Allee, E. Bawolek, L. Clark, J. Fernando, Z. Li, K. Kaftanoglu, S. O'Rourke, H. Shivalingaiah, R. Shringarpure, S. Uppili, S. Venugopal, and B. Vogt, "Degradation effects in a-Si:H thin-film transistors and their impact on circuit performance," IEEE Transactions on Electron Devices, vol. 56, no. 6, pp. 1166-1176, June 2009.

G. Samson, N. Ananthapadmanabhan, S. Badrudduza, and L. Clark, "Low-Power Dynamic Memory Word Line Decoding for Static Random Access Memories," IEEE Journal of Solid State Circuits, vol. 43, no. 11, pp. 935-946, March 2008.

**Douglas Cochran**

Associate Professor
Ph.D., Harvard University
cochran@asu.edu
480-965-7409

research expertise: sensor signal processing, applied harmonic analysis, detection theory

biosketch: Douglas Cochran joined ASU in 1989. Between 2000 and 2005 and again from 2008 through 2010, he was on assignment to program management positions in federal agencies, first at the U.S. Defense Advanced Research Projects Agency and subsequently at the U.S. Air Force Office of Scientific Research. He served as assistant dean for research in the Ira A. Fulton Schools of Engineering between 2005 and 2008. Before coming to ASU, he was a senior scientist at BBN Laboratories. Cochran has served as a visiting scientist at the Australian Defense Science and Technology Organisation, as associate editor of the IEEE Transactions on Signal Processing, and as general co-chair for the 1999 IEEE International Conference on Acoustics, Speech, and Signal Processing and the 1997 U.S.-Australia Workshop on Defense Signal Processing. He holds Ph.D. and S.M. degrees in applied mathematics from Harvard University and degrees in mathematics from UCSD and MIT.

honors and distinctions: Top 5 percent faculty, Ira A. Fulton Schools of Engineering, 2007; U.S. Secretary of Defense Medal for Exceptional Public Service, 2005; Engineering Teaching Excellence Award, 1996-1997.

selected publications:

D. Cochran, S.D. Howard, and B. Moran, "Operator-Theoretic Modeling and Waveform Design for Radar in the Presence of Doppler," Proceedings of IEEE RadarCon, pp. 774-777, May 2012.

B. Moran, S. D. Howard, and D. Cochran, "An information-geometric approach to sensor scheduling" (invited paper), Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing, pp. 5261-5264, April 2012.

S. Sirianunpiboon, S. D. Howard and D. Cochran, "A Bayesian Derivation of the Generalized Coherence Detectors," Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing, pp. 3253-3256, April 2012.

D. Cochran, A. Gelb, and Y. Wang, "Edge Detection from Truncated Fourier Data Using Spectral Mollifiers," Advances in Computational Mathematics, vol. 36, no. 3, March 2012.

A.O. Hero III and D. Cochran, "Sensor Management: Past, Present, and Future" (invited paper), IEEE Sensors Journal, vol. 11, no. 12, pp. 3064-3075, Dec. 2011.

A. Viswanathan, A. Gelb, and D. Cochran, "Iterative Design of Concentration Factors for Jump Detection," Journal of Scientific Computing, 2011.

K. Ni, S. Datta, P. Mahanti, S. Roudenko, and D. Cochran, "Efficient Deterministic Compressed Sensing for Images with Chirps and Reed-Muller Sequences," SIAM Journal on Imaging Sciences, vol. 4, no. 3, pp. 931-953, Sept. 2011.

**Rodolfo Diaz**

Associate Professor
Ph.D., University of California,
Los Angeles
rudydiaz@asu.edu
480-965-4281

research expertise: optical scattering of sub-wavelength objects in complex environments and nanophotonics, analytic theory of natural and artificial media, measurement of electromagnetic properties of materials, combined

computational mechanics and electromagnetics

biosketch: During his 20 years in the aerospace industry, Diaz has worked on many aspects of the interaction between electromagnetic waves and materials, from lightning protection on the space shuttle through the design of microwave lenses and high-temperature broadband radomes for radar missiles to the design and manufacture of radar-absorbing structures for stealth applications. He joined ASU in 1998. Diaz is the former associate director of the Consortium for Metrology of Semiconductor Nanodefects and interim director of the Consortium for Engineered Materials. He holds 21 patents ranging from the design of broadband radomes to the amplification of magnetic fields.

honors and distinctions: 1994 Association of Interamerican Businessmen Award to Distinguished Young Executives in the Professional Category for Excellence in Engineering, San Juan, Puerto Rico.

selected publications:

Sang-Soo Je, F. Rivas, R. E. Diaz, J. Kwon, J. Kim, B. Bakkaloglu, S. Kiaei, and J. Chae, "A compact and low-cost MEMS loudspeaker for digital hearing aids," *IEEE Transactions on Biomedical Circuits and Systems*, vol. 3, no. 5, pp. 348-358, Oct. 2009.

A. H. Panaretos, and R.E. Diaz, "A simple and accurate methodology to optimize parameter-dependent finite-difference time-domain schemes," *IEEE Transactions on Microwave Theory and Techniques*, vol. 56, no. 5, pp. 1125-1136, May 2008.

A. H. Panaretos, J. T. Aberle, and R. E. Diaz, "The effect of the 2-D Laplacian operator approximation on the performance of finite-difference time-domain schemes for Maxwell's equations," *Journal of Computational Physics*, vol. 227, issue 1, pp. 513-536, Nov. 2007.

A. H. Panaretos, J. T. Aberle, and R. E. Diaz, "A three-dimensional FDTD scheme based on a transversely extended curl operator," *IEEE Transactions on Microwave Theory and Techniques* 54, no. 12, pp. 4237-4246, Dec. 2006.

**Tolga M. Duman**

Professor
Ph.D., Northeastern University
duman@asu.edu
480-965-7888

research expertise: digital communications, wireless and mobile communications, channel coding, coded modulation, multi-user communications, information theory, underwater acoustic communications

biosketch: Tolga M. Duman received a B.S. from Bilkent University, Turkey, in 1993 and M.S. and Ph.D. degrees from Northeastern University in 1995 and 1998, respectively, all in electrical engineering. He has been with ASU since 1998.

honors and distinctions: IEEE Fellow, 2010; IEEE Third Millennium Medal; Editor for *IEEE Transactions on Wireless Communications* (2003-2008) and *IEEE Transactions on Communications* (2007-present); NSF CAREER Award, 2000.

selected publications:

Dario Fertonani, Tolga M. Duman, and M. Fatih Erden, "Bounds on the capacity of channels with insertions, deletions and substitutions," *IEEE Transactions on Communications*, vol. 59, no. 1, pp. 2-6, Jan. 2011.

Dario Fertonani and Tolga M. Duman, "Novel bounds on the capacity of binary deletion channel," *IEEE Transactions on Information Theory*, vol. 56, no. 6, pp. 2753-2765, June 2010.

Jun Hu, Tolga M. Duman, M. Fatih Erden, and Aleksandar Kavcic, "Achievable information rates for channels with insertions, deletions and intersymbol interference with i.i.d. inputs," *IEEE Transactions on Communications*, vol. 58, no. 4, pp. 1102-1111, April 2010.

Ahmet B. Keha and Tolga M. Duman, "Minimum distance computation of LDPC codes using branch and cut algorithm," *IEEE Transactions on Communications*, vol. 58, no. 4, pp. 1072-1079, April 2010.

Tolga M. Duman and Ali Ghayeb. *Coding for MIMO Communication Systems*. Wiley, 2007.

**David K. Ferry**

Regents' Professor
Ph.D., University of Texas
ferry@asu.edu
480-965-2570

research expertise: transport physics and modeling of quantum effects in sub-micron semiconductor devices, scanning gate microscopy of quantum properties of mesoscopic devices

biosketch: David Ferry joined ASU in 1983 following stints at Texas Tech University, the Office of Naval Research and Colorado State University. He has published more than 750 articles, books and chapters and has organized many conferences.

honors and distinctions: American Physical Society Fellow; IEEE Fellow; Institute of Physics Fellow; ASU Graduate Mentor Award, 2000; Regents' Professor; IEEE Cleo Brunetti Award, 1999; IEEE Engineer of the Year, 1990; Phoenix Section; Outstanding research awards at Texas Tech University and Colorado State University.

selected publications:

N. Aoki, R. Brunner, A. M. Burke, R. Akis, R. Meisels, D. K. Ferry, and Y. Ochiai, "Direct imaging of electron states in open quantum dots," *Physical Review Letters* 108, 136804 (5 pages), 2012.

D. K. Ferry, A. M. Burke, R. Akis, R. Brunner, T. E. Day, R. Meisels, F. Kuchar, J. P. Bird, and B. R. Bennett, "Open quantum dots—probing the quantum to classical transition," *Semiconductor Science and Technology* 26, 043001 (14 pages), 2011.

D. K. Ferry, "Feynman on Quantum Simulation—Rush to Judgement," *Journal of Computational and Theoretical Nanoscience* 8, 953-962, 2011.

D. Guerra, M. Saraniti, D. K. Ferry, S. M. Goodnick, and F. A. Marino, "Carrier dynamics investigation on passivation dielectric constant and RF performance of millimeter-wave power GaN HEMTs," *IEEE Transactions on Electron Devices* 58, 3876-84, 2011.

**David H. Frakes**

Assistant Professor
Ph.D., Georgia Institute of
Technology
dfrakes@asu.edu
480-727-9284

research expertise:

image and video processing,
fluid dynamics, machine vision
(specifically, endovascular
treatment of cerebral aneurysms,
surgical planning for congenital
heart defects, suppression of

atmospheric distortion in video, control of flexible systems)

biosketch: David Frakes joined ASU in 2008. He received a B.S. in electrical engineering and M.S. degrees in electrical engineering and mechanical engineering from the Georgia Institute of Technology, where he also earned a Ph.D. in bioengineering and performed post-doctoral work.

honors and distinctions: National Science Foundation CAREER Award, 2012; Arizona State University Top 5 Percent Excellence in Instruction Award, 2011; IEEE Phoenix Section Outstanding Faculty Award, 2011; Rosann Donato Chair of Research – The Brain Aneurysm Foundation, 2010; Mimics Innovation Award, 2010; Phase I SBIR Award, 2010; Arizona State University Centennial Professor of the Year Award, 2009; Georgia Institute of Technology Council of Outstanding Young Alumni, 2007.

selected publications:

S. Beeman, M. Zhang, L. Gubhaju, T. Wu, J. Bertram, B. Cherry D. Frakes, and K. Bennett, "Measuring glomerular number and size in perfused kidneys using MRI," *American Journal of Physiology – Renal Physiology*, vol. 300, issue 6, pp. F1454-57, June 2011.

O. Dur, S. Coskun, K. Coskun, D. Frakes, L. Kara, and K. Pekkan, "Computer-aided patient-specific coronary artery graft design improvements using CFD-coupled shape optimizer," *Cardiovascular Engineering and Technology*, vol. 2, issue 1, pp. 35-47, Mar. 2011.

M. Patrick, C. Chen, D. Frakes, O. Dur, and K. Pekkan, "Cellular level near-wall unsteadiness of high-hematocrit erythrocyte flow," *Experiments in Fluids*, vol. 50, issue 4, pp. 887-904, July 2010.

K. Sundareswaran, D. Frakes, M. Fogel, D. Soerensen, J. Oshinski, and A. Yoganathan, "Optimum fuzzy filters for phase-contrast magnetic resonance imaging segmentation," *Journal of Magnetic Resonance Imaging*, vol. 29, no. 1, pp. 155-65, Jan. 2009.

**Gennady Gildenblat**

Motorola Chair Professor
Ph.D., Rensselaer Polytechnic
Institute
gildenblat@asu.edu
480-965-3749

research expertise: physics
and modeling of semiconductor
devices, semiconductor transport
physics, integrated circuit
technology

biosketch: Gennady Gildenblat received an MSEE (with honors) from the St. Petersburg Electrical Engineering Institute in 1975 and a Ph.D. in solid-state physics from the Rensselaer Polytechnic Institute in 1984. He works in the areas of semiconductor device physics and modeling, novel semiconductor devices and semiconductor transport. Gildenblat has over 150 publications in these areas including several books, invited articles and U.S. patents. In 1980, he joined the General Electric Corporate Research and Development Center in Schenectady, N.Y., where he was engaged in various aspects of semiconductor device physics and IC technology development. Between 1984 and 1986, he supervised the Cryogenic CMOS device engineering study at the Digital Equipment Corporation in Hudson, Mass. From 1986, Gildenblat was with The Pennsylvania State University, until in 2006, when he joined Arizona State University. He has developed an advanced surface-potential-based SP and PSP compact MOSFET model. The PSP model (joint development with NXP) was selected as an international industry standard by the Compact Model Council (PSPmodel.asu.edu) in 2006. In 2007, PSP-based compact varactor model (joint development with Jazz semiconductor) became another industry standard.

honors and distinctions: IEEE Fellow; Semiconductor Research Corporation Technical Excellence Award recipient, 2006.

selected publications:

W. Yao, G. Gildenblat, C. C. McAndrew, and A. Cassagnes, "SP-HV: A scalable surface-potential-based compact model for LDMOS transistors," *IEEE Transactions on Electron Devices*, vol. 59, pp. 542-550, March 2012.

W. Yao, G. Gildenblat, C. C. McAndrew, and A. Cassagnes, "Generalized Berglund relation in LDMOS transistors," *Electronic Letters*, vol. 47, no. 16, pp. 936-937, Aug. 2011.

Z. Zhu, A. Kathuria, S. G. Krishna, M. Mojarradi, B. Jalali-Farahani, H. Barnaby, W. Wu, and G. Gildenblat, "Design applications of compact MOSFET model for the extended temperature range (60-400K)," *Electronics Letters*, vol. 47, no. 2, pp. 141-142, 2011.

G. Gildenblat (Ed). *Compact Modeling – Principles, Techniques and Applications*. Springer, 2010.

X. Li, C. C. McAndrew, W. Wu, S. Chaudhry, J. Victory, and G. Gildenblat, "Statistical modeling with the PSP MOSFET model," *IEEE Transactions on Computer-aided Design of Integrated Circuits and Systems*, vol. 29, pp. 599-606, 2010.

G. Dessai and G. Gildenblat, "Solution space for the independent-gate asymmetric DGFET," *Solid-State Electronics*, vol. 54, pp. 382-384, 2010.

**Stephen Goodnick**

Professor
Ph.D., Colorado State University
stephen.goodnick@asu.edu
480-965-9572

research expertise: solid-
state device physics, transport in
nanostructures, nanoelectronic
devices and circuits,
computational electronics,
RF and microwave devices,
optoelectronic and energy

conversion devices

biosketch: Stephen Goodnick is deputy director of the ASU Lightworks initiative. He recently served as the associate vice president for research from 2006-2008, and prior to that as deputy dean of the Fulton Schools of Engineering. He came to ASU in fall 1996 as department chair. Prior to that, he was a professor of electrical and computer engineering at Oregon State University. He has also been a visiting scientist at the Solar Energy Research Institute and Sandia National Laboratories and a visiting faculty member at the Walter Schottky Institute, Munich, Germany, the University of Modena, Italy, the University of Notre Dame, and Osaka University, Japan. He is currently president of the board of governors of the IEEE Eta Kappa Nu engineering honor society and president of the IEEE Nanotechnology Council. He served as president (2003-2004) of the Electrical and Computer Engineering Department Heads Association (ECEDHA) and as program chair of the Ninth IEEE Conference on Nanotechnology in 2009. Goodnick has published over 200 refereed journal articles, books and book chapters.

honors and distinctions: Robert M. Janowiak Outstanding Leadership and Service Award, Electrical and Computer Engineering Department Heads Association, 2008; IEEE Fellow, 2004; IEEE Phoenix Section Society Award for Outstanding Service, 2002; Colorado State University College of Engineering Achievement in Academia Award, 1998; College of Engineering Research Award, Oregon State University, 1996; Alexander von Humboldt Research Fellow, Germany, 1986.

selected publications:

D. Guerra, M. Saraniti; D. K. Ferry; S. M. Goodnick, and F. A. Marino, "Carrier dynamics investigation on passivation dielectric constant and RF performance of millimeter-wave power GaN HEMTs," *IEEE Transactions on Electron Devices*, vol. 58, issue 11, pp. 3876-3884, 2011.

F. A. Marino, N. Faralli, T. Palacios, D. K. Ferry, S. M. Goodnick, and M. Saraniti, "Effects of threading dislocations on AlGaIn/GaN high-electron mobility transistors," *IEEE Transactions on Electron Devices*, vol. 57, issue 1, pp. 353-360, 2010.

D. Vasileska, S. M. Goodnick, and G. Klimeck. *Computational Electronics: Semi-Classical and Quantum Device Modeling and Simulation*. UK: Taylor and Francis (600 pages), 2010.

D. K. Ferry, S. M. Goodnick, and J. Bird, *Transport in Nanostructures*, 2nd Ed., UK: Cambridge University Press (650 pages), 2009.



Ravi Gorur
Professor
Ph.D., University of Windsor,
Canada
ravi.gorur@asu.edu
480-965-4894

research expertise: dielectrics and electrical insulating materials for outdoor power delivery, nanodielectrics, electric field calculations, HV testing techniques and computer-aided design

biosketch: Ravi Gorur joined ASU in 1987 as an assistant professor after graduating with a Ph.D. from the University of Windsor, Canada, in 1986. Since 1995, he has held the position of professor, and presently he is the undergraduate program chair. He has authored a textbook on outdoor insulators and more than 150 papers in IEEE journals and conferences on the subject of outdoor insulators for electric power transmission and distribution. He works in other related areas such as liquid dielectrics, dielectrics for aircraft and communications systems. He teaches a short course on the subject of insulators that is offered to the industry annually.

honors and distinctions: Claude de Tourreil Memorial Award for Lifetime Achievement in the field of electrical insulators, 2011; Outstanding technical contributor, IEEE Conference on Electrical Insulation and Dielectric Phenomena, 2011; IEEE Fellow, 1999; U.S. representative to CIGRE Study Committee D1 (materials for advanced technologies).

selected publications:

G. Iyer, R. S. Gorur and A. Krivda, "Corona resistance of epoxy nanocomposites: experimental results and modeling," IEEE Transactions on Dielectrics and Electrical Insulation, vol. 19, no. 1, pp. 118-125, 2012.

A. Krivda, R. S. Gorur, et al, "Characterization of epoxy microcomposite and nanocomposite materials for power engineering applications," IEEE Electrical Insulation Magazine, vol. 28, no. 2, pp.38-51, 2012.

T. Doshi, R. S. Gorur and J. Hunt, "Electrical field calculations of composite insulators up to 1200 kV ac," IEEE Transactions on Dielectrics and Electrical Insulation, vol. 18, pp. 861-867, 2011.

G. Iyer, R. S. Gorur, R. Rickert and A. Krivda, "Performance of epoxy nanocomposites for HV insulation," IEEE Transactions on Dielectrics and Electrical Insulation, vol. 18, pp. 659-666, 2011.

D. Rodriguez, R. S. Gorur and P. Hansen, "Prediction of breakdown of air for VLF/LF," European Journal of Electric Power, paper no. 117, 2011.



Michael Goryll
Assistant Professor
Ph.D., RWTH Aachen University,
Germany
michael.goryll@asu.edu
480-965-9517

research expertise: surface and interface physics, new materials in CMOS processing, fabrication of nanoscale semiconductor devices, transport phenomena in nanopores, integration of biomineralized

structures with silicon MEMS, electrophysiological properties of cell membrane ion channels, low-noise analog amplifier design, electronic instrumentation for biophysical measurements

biosketch: Michael Goryll joined ASU in 2007. He received a Ph.D. in physics in 2000 and a Diplom in physics in 1997, both from the RWTH Aachen University, Germany. He performed his post-doctoral research on biosensors at ASU from 2003-2005. Before joining ASU, Goryll spent several years at the Research Centre Juelich, the largest national research lab in Germany, focusing on SiGe chemical vapor deposition and biosensor development.

honors and distinctions: NSF CAREER Award, 2012; Top 5 percent faculty Teaching Award in Engineering at ASU, 2010; Helmholtz Research Fellowship for Outstanding Young Investigators granted by the Research Centre Juelich, Germany 2001-2005; Post-Graduate Scholarship granted by the RWTH Aachen University, Germany, 1997-2000.

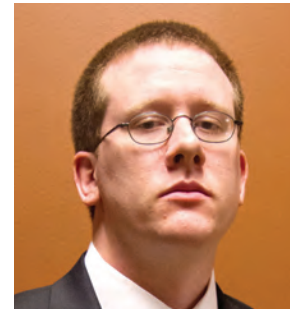
selected publications:

S. Choi, M. Goryll, L. Y. M. Sin, P. K. Wong, and J. Chae, "Microfluidic-based biosensors toward point-of-care detection of nucleic acids and proteins," Microfluidics and Nanofluidics, vol. 10, pp. 231-247, 2011.

P. Joshi, A. Smolyanitsky, L. Petrossian, M. Goryll, M. Saraniti, and T. J. Thornton, "Field-effect modulation of ionic conductance of cylindrical silicon-on-insulator nanopore array," Journal of Applied Physics, vol. 107, 054701-1-6, 2010.

F. Lanzerath, D. Buca, H. Trinkaus, M. Goryll, S. Mantl, J. Knoch, U. Breuer, W. Skorupa, and B. Ghyselen, "Boron activation and diffusion in silicon and strained silicon-on-insulator by rapid thermal and flash lamp annealings," Journal of Applied Physics, vol. 104, issue 4, 044908-1-7, 2008.

S. J. Wilk, L. Petrossian, M. Goryll, T. J. Thornton, S. M. Goodnick, J. M. Tang, and R. S. Eisenberg, "Integrated electrodes on a silicon-based ion channel measurement platform," Biosensors and Bioelectronics, vol. 23, issue 2, pp. 183-190, 2007.



Kory W. Hedman
Assistant Professor
Ph.D., University of California,
Berkeley
khedman@asu.edu
480-965-1276

research expertise: power and energy systems, operations research, renewable energy, power system economics, operations and planning, transmission engineering, mathematical programming, stochastic optimization,

market design, financial engineering

biosketch: Kory W. Hedman received a B.S. in electrical engineering and B.S. in economics from the University of Washington, Seattle, in 2004, and M.S. degrees in economics and electrical engineering from Iowa State University, Ames, in 2006 and 2007, respectively. He received M.S. and Ph.D. degrees in industrial engineering and operations research from the University of California, Berkeley in 2007 and 2010, respectively. He has worked for the California ISO (CAISO) in Folsom, Calif., on transmission planning, as well as for the Federal Energy Regulatory Commission (FERC), Washington, DC, on transmission switching. Hedman joined ASU as an assistant professor in 2010. He is also graduate faculty in ASU's department of industrial engineering. Hedman's research at ASU includes integrating renewable resources into the power grid, smart grid technologies, pricing mechanisms and market design, stochastic unit commitment, topology control, modeling and operations of a microgrid, and creating a robust corrective switching model for improved system reliability. Hedman is a member of the Power System Engineering Research Center (PSERC).

selected publications:

K. W. Hedman, S. S. Oren, and R. P. O'Neill, "Optimal transmission switching: Economic efficiency and market implications," Journal of Regulatory Economics, accepted for publication.

K. W. Hedman, S. S. Oren, and R. P. O'Neill, "A review of transmission switching and network topology optimization," IEEE PES General Meeting 2011, Detroit, Mich., 2011.

K. W. Hedman, R. P. O'Neill, E. B. Fisher, and S. S. Oren, "Smart flexible just-in-time transmission and flowgate bidding," IEEE Transactions on Power Systems, vol. 26, no. 1, pp. 93-102, Feb. 2011.

R. P. O'Neill, K. W. Hedman, E. A. Krall, A. Papavasiliou, and S. S. Oren, "Economic analysis of the ISOs multi-period N-1 reliable unit commitment and transmission switching problem using duality concepts," Energy Systems Journal, vol. 1, no. 2, pp. 165-195, 2010.

**Gerald T. Heydt**

Regents' Professor
Ph.D., Purdue University
heydt@asu.edu
480-965-8307

research expertise: power engineering, electric power quality, distribution engineering, transmission engineering, computer applications in power engineering, power engineering education, power system sensors

and instrumentation.

biosketch: Gerald Thomas Heydt is from Las Vegas, Nev. He holds a BEEE degree from the Cooper Union in New York and MSEE and Ph.D. degrees from Purdue University. He spent approximately 25 years as a faculty member at Purdue, and in 1994, he took the position of site director of the NSF and industrially supported Power Systems Engineering Research Center at ASU. He has industrial experience with the Commonwealth Edison Company in Chicago, E.G. & G. in Mercury, Nev., and with the United Nations Development Program. In 1990, he served as the program manager of the National Science Foundation program in power systems engineering. He is the author of two books in the area of power engineering. Heydt is a Regents' Professor and professor of advanced technology at ASU. He is a member of the National Academy of Engineering, and a fellow of the IEEE.

honors and distinctions: IEEE Kaufmann Award, 2010; IEEE Power Engineering Society Power Engineering Educator of the Year, 1995; Edison Electric Institute Power Engineering Educator Award, 1989; IEEE Life Fellow; Member, National Academy of Engineering.

selected publications:

H. Zhang, V. Vittal, G. T. Heydt, J. Quintero, "A mixed integer linear programming approach for multi-stage security constrained transmission expansion planning," *IEEE Transactions on Power Systems*, vol. 27, no. 2, pp. 1125-1133, May 2012.

Alex Q. Huang, Mariesa L. Crow, Gerald Thomas Heydt, Jim P. Zheng, Steiner J. Dale, "The future renewable electric energy delivery and management (FREEDM) system: The energy Internet," *Proceedings of the IEEE*, vol. 99, no. 1, pp. 133-148, Jan. 2011.

G. Heydt, "The next generation of power distribution systems," *IEEE Transactions on Smart Grid*, vol. 1, no. 3, pp. 225-235, Dec. 2010.

K. Munukutla, V. Vittal, G. Heydt, D. Chipman, and B. Keel, "A practical evaluation of surge arrester placement for transmission line lightning protection," *IEEE Transactions on Power Delivery*, vol. 25, no. 3, pp. 1742-1748, July 2010.

**Keith Holbert**

Associate Professor
Ph.D., University of Tennessee
holbert@asu.edu
480-965-8594

research expertise: nuclear engineering, process monitoring and diagnostics, sensor fault detection, instrumentation development, and radiation effects on electronics.

biosketch: Keith Holbert is the director of the nuclear power generation program. He joined the ASU faculty in 1989. Holbert is a registered professional (nuclear) engineer and has published over 100 refereed journal and conference papers.

honors and distinctions: Top 5 percent faculty, 2012; Guest Scientist, Los Alamos National Laboratory, 2005-2012; IEEE Transactions on Education Best Paper award, 2010; Outstanding Faculty Award, IEEE Phoenix Section, 2007; Tau Beta Pi; Teaching Excellence Award from ASU College of Engineering, 1997; IEEE Senior Member.

selected publications:

W. Xin, K. E. Holbert, L. T. Clark, "Single event upset mitigation techniques for FPGAs utilized in nuclear power plant digital instrumentation and control," *Nuclear Engineering and Design*, vol. 241, no. 8, pp. 3317-3324, Aug. 2011.

K. Lin and K. E. Holbert, "Void diagnostics in liquid-filled pressure sensing lines," *Progress in Nuclear Energy*, vol. 52, no. 5, pp. 503-511, July 2010.

K. E. Holbert, G. G. Karady, S. G. Adhikari, and M. L. Dyer, "Magnetic fields produced by underground residential distribution system," *IEEE Transactions on Power Delivery*, vol. 24, no. 3, pp. 1616-1622, July 2009.

K. Lin and K. E. Holbert, "Applying the equivalent pi circuit to the modeling of hydraulic pressurized lines," *Mathematics and Computers in Simulation*, vol. 79, no. 7, pp. 2064-2075, Mar. 2009.

K. E. Holbert and G. G. Karady, "Strategies, challenges and prospects for active learning in the computer-based classroom," *IEEE Transactions on Education*, vol. 52, no. 1, pp. 31-38, Feb. 2009.

K. Lin and K. E. Holbert, "Blockage diagnostics for nuclear power plant pressure transmitter sensing lines," *Nuclear Engineering and Design*, vol. 239, no. 2, pp. 365-372, Feb. 2009.

K. E. Holbert, A. S. Heger, D. M. Geschke, R. M. Stewart, "Prediction of Corning InfiniCor 300 optical fiber attenuation at low gamma dose rates," *IEEE Transactions on Nuclear Science*, vol. 55, no. 6, pp. 3515-3522, Dec. 2008.

**Christiana Honsberg**

Professor
Director, Quantum Energy and Sustainable Solar Technologies Engineering Research Center
Ph.D., University of Delaware
christiana.honsberg@asu.edu
480-965-2831

research expertise: ultra-high efficiency solar cells, and silicon solar cells

biosketch: Christiana Honsberg joined the electrical engineering faculty in 2008 and is currently a professor. Honsberg also leads the Quantum Energy and Sustainable Solar Technologies Engineering Research Center established in 2011 with funding from the National Science Foundation and Department of Energy. Before joining the ASU faculty, Honsberg was an associate professor and director for the high performance solar power program at the University of Delaware. She currently holds one patent in the U.S., Japan, and Europe; three patents are pending. She received her B.S., M.S. and Ph.D. from University of Delaware in 1986, 1989 and 1992, respectively, all in electrical engineering.

selected publications:

Jampana, B.R., Weiland, C.R., Opila, R.L., Ferguson, I.T., Honsberg, C.B., "Optical absorption dependence on composition and thickness of $\text{In}_x\text{Ga}_{1-x}\text{N}$ ($0.05 < x < 0.22$) grown on GaN/sapphire," *Thin Solid Films*, vol. 520, issue 22, Sept. 2012, pp. 6807-6812.

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Honsberg, C.B., Goodnick, S.M., "Realizing terawatt-scale solar electricity: Nanotechnology-enabled physical mechanisms and material properties," *IEEE Nanotechnology Magazine*, vol. 6, issue 2, pp. 6-14.

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Mutitu, J.G., Shi, S., Chen, C., Creazzo, T., Barnett, A., Honsberg, C., Prather, D.W., "Thin film silicon solar cell design based on photonic crystal and diffractive grating structures," *Optics Express*, vol. 16, issue 19, Sept. 2008, pp. 15238-15248.

Jani, O., Ferguson, I., Honsberg, C., Kurtz, S., "Design and characterization of FaInGaIn solar cells," *Applied Physics Letters*, vol. 91, issue 13, 2007, 132117.

**Joseph Hui**

ISS Chair Professor
Ph.D., Massachusetts Institute of Technology
jhui@asu.edu
480-965-5188

research expertise:

wireless networks, broadband switching and routing, teletraffic analysis, coding and information theory, virtualization and cloud computing, renewable energy

biosketch: Joseph Y. Hui joined ASU as ISS Chair Professor in 1999. He received his B.S., M.S. and Ph.D. degrees from Massachusetts Institute of Technology. He held research and teaching positions at Bellcore, Rutgers University, Columbia University, and the Chinese University of Hong Kong before joining ASU. He founded and holds presidency for Nuon Labs and its subsidiaries Pcion, Virtuon and Etherion.

honors and distinctions: ISS Chair Professor, IEEE Fellow, 1996; HKIE Fellow, 1998; NSF Presidential Young Investigator, 1990; IEEE William Bennett Prize Paper Award, 1984; Henry Rutgers Research Fellow, 1989.

selected publications:

Joseph Y. Hui and David A. Daniel, "Terabit Ethernet: Access and core switching using time-space carrier sensing," IEEE Systems Journal, vol. 4 issue 4, pp. 458-466, Dec. 2010.

Joseph Y. Hui and Lingie Li, "First-fit scheduling for multi-stage packet switching networks," Journal of Communications, Academic Publishers, vol. 5, no. 3, pp. 205-210, Mar. 2010.

J. Hui, and D. Daniel, "Terabit Ethernet: A time-space carrier sense multiple access method," Proceedings of the 2008 IEEE Globecom, 1-6, 2008.

J. Hui, and L. Li, "First-fit scheduling for multistage packet switching networks," in Proceedings of 2008 High Performance Switching and Routing Symposium, 197-202, (also published as journal paper in 2008).

J. Hui, and D. Daniel, "Virtualization of local computer bus architectures over the Internet," IEEE Globecom 2007 Internet Protocol Symposium, Nov. 2007.

J. Hui and P. C. Gurumohan, "Selfish vs. social routing with competitive traffic pricing," in Proceeding of 43rd Annual Allerton Conference on Communication, Control, and Computing, 341-345, Sept. 2005.

J. Hui, S. B. Narasimhamurthy, P. C. Gurumohan, and S. Sreenivasamurthy, "Quanta data storage: An information processing and transportation architecture for storage area networks," IEEE Journal on Selected Areas in Communications, vol. 23, issue 10, pp. 2032-2040, Oct. 2005.

**Bahar Jalali-Farahani**

Assistant Professor
Ph.D., Ohio State University
bahar.jalali@asu.edu
480-727-7191

research expertise:

analog integrated circuits especially low-power, high-performance designs, reliability issues in deep submicron technology, calibration techniques for analog to digital converters, circuit

design for extreme environments, and analog design for wireless communication systems

biosketch: Bahar Jalali-Farahani joined ASU in 2006 as an assistant professor. She received her Ph.D. in electrical engineering from The Ohio State University in 2005, and B.S. and M.S. degrees in electrical engineering from the University of Tehran, Tehran, Iran, in 1996 and 1999, respectively.

selected publications:

B. Jalali Farahani and A. Meruva, "A 14-b 32MS/s pipelined ADC with fast convergence comprehensive background calibration," Journal of Analog Integrated Circuits and Signal Processing, vol. 61, no. 1, pp. 65-74, Oct. 2009.

A. Meruva and B. Jalali-Farahani, "A 14-b 32MS/s pipelined ADC with fast convergence comprehensive background calibration," International Symposium on Circuits and Systems, Sept. 2009.

J. Wang and B. Jalali-Farahani, "A CT MASH $\Sigma\Delta$ Modulator with Adaptive Digital Tuning for Analog Circuit Imperfections," Midwest Symposium on Circuits and Systems, 646-649, August 2008.

S. Thirunakkarasu A.I. Hossain and B.J. Farahani, "Sigma Delta Modulators with Modified Hybrid Integrators," Midwest Symposium on Circuits and Systems, 642-645, August 2008. F. Ge and B. Jalali-Farahani, "A Versatile Chopper-Stabilized Rail-to-Rail Operational Amplifier," Midwest Symposium on Circuits and Systems, 113-116, August 2008.

B. Jalali Farahani and A. Meruva, "Low Power High Performance Digitally Assisted Pipelined ADC," IEEE Annual Symposium on VLSI, ISVLSI08, 111-116, April 2008.

B. Jalali-Farahani and M. Ismail, "Adaptive Noise Cancellation Techniques in Sigma-Delta Analog-to-Digital Converters," IEEE Transactions on Circuits and Systems I, vol. 54, issue 9, 1891-1899, September 2007.

**George G. Karady**

Power System Chair Professor
Ph.D., University of Technical Sciences, Budapest
karady@asu.edu
480-965-6569

research expertise:

power electronics, high-voltage engineering and power systems

biosketch: George G. Karady received his M.S. and Ph.D. degrees in electrical engineering from the Technical University of Budapest. He joined ASU in 1986 and currently is Power System Chair Professor. Previously, he was with EBASCO Services where he served as chief consulting electrical engineer, manager of electrical systems and chief engineer of computer technology. He was an electrical task supervisor for the Tokamak Fusion Test Reactor project in Princeton. Karady has graduated 21 doctoral and 47 master's students. He has published a book, several book chapters, and more than 120 journal and 200 conference papers.

honors and distinctions: IEEE Fellow; 2010 Best Transaction Paper Award (with K. Holbert); Chair, Awards Committee, IEEE PES Chapter and membership division, 2000-2005; President, IEEE Phoenix Section, 2004; Honorary doctorate, Technical University of Budapest, 1999; IEEE Third Millennium Medal; IEEE PES Working Group (WG) Recognition Award, 2002; Chair, WG that prepared IEEE Standard 1313-2.

selected publications:

[Xianjun Zhang1, George G. Karady and Yonggang Guan, "Design methods investigations for residential microgrid infrastructure"; European Transaction on Electrical Power; Vol. 21, Issue 8, pp. 21520-2141 online publication Nov. 24, 2011.

George G. Karady, Kumaraguru Prabakar, "Design of all-dielectric self-supporting cable system," Journal on high voltage engineering, China, vol. 37, No. 11, Nov. 30, 2011, pp. 11503 – 11508.

S. Kucuksari, G. G. Karady, "Experimental Comparison of Conventional and Optical VTs and Circuit Model for Optical VT," IEEE Trans. on Power Delivery, Vol. 26, No. 3, pp:1571-1579; July 2011.

Sadik Kucuksari and George. G. Karady: "Experimental Comparison of Conventional and Optical Current Transformers"; IEEE Transaction on. Power Delivery; Vol. 25, No 4, pp 2455-2463, Oct. 2010.

E. A. Al-Ammar, G.G Karady, and H. J. Sim: "Novel Technique to Improve the Fault Detection Sensitivity in Transformer Maintenance Test" European Transaction on Electrical Power; On line May 2009, paper: Vol. 20,No: 4, pp: 438-449, May 2010.

B. L. Kokanos and G. G. Karady: "Associate Hermite Expansion Small Signal Mode Estimation". Transaction on Power Systems; Vol. 25, No 2, pp 999-1007, May 2010.

**Lina Karam**

Professor
Ph.D., Georgia Institute of
Technology
karam@asu.edu
480-965-3694

research expertise:

image and video processing,
compression, and transmission,
visual quality assessment,
human visual perception,
multidimensional signal
processing, digital filtering,

source coding, and biomedical imaging

biosketch: Lina J. Karam received a B.A. in engineering from the American University of Beirut in 1989, and M.S. and Ph.D. degrees in electrical engineering from the Georgia Institute of Technology in 1992 and 1995, respectively. She is director of the Image, Video, and Usability Lab and the Real-Time Embedded Signal Processing Lab at ASU. She is serving as the general chair of the IEEE International Conference on Image Processing (ICIP 2016) and as the chief editor, Proceedings of the IEEE journal, Special issue of Perception-Based Media Processing. She is on the editorial board of the IEEE Signal Processing Magazine, and is a member of the IEEE Signal Processing Society's (SPS) Nominations and Awards Committee (2011-present). She is an elected member of the IEEE Circuits and Systems Society's DSP Technical Committee (1996-present), of the IEEE Signal Processing Society's IVMSPTechnical Committee (2005-2011), the IEEE SPS Multimedia Technical Committee (2011-present), and the IEEE SPS Education Technical Committee (2010-present). She is a member of the Fulton Engineering Dean's Faculty Advisory Committee.

honors and distinctions: Intel Outstanding Researcher Award, 2012; IEEE Phoenix Section Outstanding Faculty Award, 2012; AUB Distinguished Alumnus Award, 2011; NASA Technical Innovation Award, 2006; ASU Last Lecture Series Nomination, 2005; IEEE Phoenix Section Outstanding Technical Contributions Award, 2005; IEEE Senior Member, 2003; Associate Editor Service Recognition, 2002; Professional Leadership and Service Recognition from the IEEE Signal Processing and the IEEE Communications societies, 1999; NSF CAREER Award, 1998; Society of Women Engineers Outstanding Graduate Student Award, 1994.

selected publications:

Gaurav Sharma, Lina Karam, and Patrick Wolfe, "Select Trends in Image, Video, and Multidimensional Signal Processing," IEEE Signal Processing Magazine, pp. 5-8, Jan. 2012.

Lina J. Karam, Nabil G. Sadaka, Rony Ferzli and Zoran A. Ivanovski, "An Efficient Selective Perceptual-Based Super-Resolution Estimator," IEEE Transactions on Image Processing, vol. 20, no. 12, pp. 3470-3482, Dec. 2011.

Niranjan D. Narvekar and Lina J. Karam, "A No-Reference Image Blur Metric Based on the Cumulative Probability of Blur Detection (CPBD)," IEEE Transactions on Image Processing, vol. 20, no. 9, pp. 2678-2682, Sept. 2011.

Asaad F. Said, Bonnie L. Bennett, Lina J. Karam, and Jeff Pettinato, "Automated Detection and Classification of Non-Wet Solder Joints," IEEE Transactions on Automation Science and Engineering, vol. 8, no. 1, pp. 67-80, Jan. 2011.

**Sayfe Kiaei**

Motorola Chair Professor
Director, Connection One: NSF
Industry/University Cooperative
Research Center
Ph.D., Washington State University
sayfe@asu.edu
480-727-7761

research expertise:

wireless transceiver design, RF
and mixed-signal ICs

biosketch: Sayfe Kiaei has been with ASU since 2001. From 2008-2012, he was associate dean of research for the Ira A. Fulton Schools of Engineering. Prior to joining ASU, he was a senior member of the technical staff with the Wireless Technology Center and Broadband Operations at Motorola where he was responsible for the development of RF and transceiver integrated circuits, GPS RF IC, and digital subscriber lines (DSL) transceivers. From 1987 to 1993, Kiaei was a professor at Oregon State University. Kiaei has established two Industry-University Cooperative Research Centers: Center for the Design of Analog/Digital ICs (CDADIC) where he was a co-director from 1987 to 1993, and the Connection One center at ASU. He has published over 200 journal and conference papers and holds several patents. His research projects are funded by DARPA, NSF, DOE, ARL, AFRL and a large number of industrial sponsors. Kiaei is a member of IEEE Circuits and Systems Society, IEEE Solid State Circuits Society and IEEE Communication Society. Kiaei was the founding member and chair RFIC symposium, and has been a chair/technical program chair and committee member for many conferences, including: RFIC, MTT, ISCAS and other international conferences.

honors and distinctions: IEEE Fellow; IEEE Microwave Techniques and Society (MTT) Fellow; Carter Best Teacher Award; IEEE Darlington Award; Global Standards Award (ITU Standards); IEEE Circuits and Systems Society Best Paper Award; Motorola 10X Design Award; IEEE Fellow Selection Committee Chair; IEEE Fellow Committee Award.

selected publications:

I. Deligoz, S. Naqvi, T. Copani, S. Kiaei, B. Bakkaloglu, S.-S. Je, J. Chae, "A MEMS-Based Power-Scalable Hearing Aid Analog Front End," IEEE Transactions on Biomedical Circuits and Systems, vol. 5, no. 3, pp. 201-213, June 2011.

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W. Khalil, S. Shashidharan, T. Copani, S. Chakraborty, S. Kiaei, B. Bakkaloglu, "A 700-u A 405-MHz all-digital fractional-N frequency-locked loop for ISM band applications," IEEE Transactions on Microwave Theory and Techniques, vol. 59, no. 5, pp.1319-1326, May 2011.

S. Min, S. Shashidharan, M. Stevens, T. Copani, S. Kiaei, B. Bakkaloglu, S. Chakraborty, "A 2mW CMOS MICS-band BFSK transceiver with reconfigurable antenna interface," Radio Frequency Integrated Circuits Symposium (RFIC), 2010 IEEE, pp.289-292, May 2010.

**Michael N. Kozicki**

Professor
Director, Center for Applied
Nanionics
Ph.D., University of Edinburgh
michael.kozicki@asu.edu
480-965-2572

research expertise:

integrated/solid-state nanionics,
low-energy non-volatile memory,
self-healing electrodes and
interconnect, and nano-
electromechanical systems (NEMS)

biosketch: Michael Kozicki joined ASU in 1985 from Hughes Microelectronics. He has served as interim and founding director of entrepreneurial programs and director of the Center for Solid State Electronics Research in the Ira A. Fulton Schools of Engineering at ASU. He develops new materials, processes, and device structures for next-generation integrated circuits and systems. Kozicki holds several dozen key patents in programmable metallization cell technology, in which solid electrolytes are used for storage and control of information and for the manipulation of mass at the nanoscale. He has published extensively, developed undergraduate and graduate courses in solid-state electronics and is a frequent invited speaker at international meetings. He is a founder of Axon Technologies, an ASU spin-off company involved in the development and licensing of solid-state ionic technologies. He also serves as chief scientist for Silicon Valley company, Adesto Technologies, and as visiting professor at the University of Edinburgh in the United Kingdom.

honors and distinctions: Founding Member, Globalscot Network; Chartered Engineer (UK/EC Professional Engineer); Charter member of the ASU Academic Council; ASU Faculty Achievement Award (Most Significant Invention), 2007; Best Paper Awards, Non-Volatile Memory Technology Symposium, 2005, and European Symposium on Phase Change and Ovonic Science, 2006; IEEE Phoenix Section Outstanding Educator, Research Award, 2001.

selected publications:

I. Valov, R. Waser, J.R. Jameson and M.N. Kozicki, "Electrochemical metallization memories—fundamentals, applications, prospects," Nanotechnology, vol. 22, doi:10.1088/0957-4484/22/25/254003, 2011.

N. Derhacopian, S. C.Hollmer, N. Gilbert, and M. N. Kozicki, "Power and energy perspectives of nonvolatile memory technologies," Proceedings of the IEEE, vol. 98, pp. 283-298, 2010.



Ying-Cheng Lai
Professor
Ph.D., University of Maryland at
College Park
ying-cheng.lai@asu.edu
480-965-6668

research expertise:
nonlinear dynamics, complex
networks, quantum transport
in nanostructures, graphene
physics, signal processing and
biological physics

biosketch: Ying-Cheng Lai joined ASU in 1999. Prior to that, he was an associate professor of physics and mathematics at the University of Kansas. He has authored or co-authored over 340 papers, including over 310 published in refereed journals. In the past five years, he has given about 50 invited talks worldwide.

honors and distinctions: Outstanding Referee Award, American Physical Society, 2008; NSF ITR Award, 2003; American Physical Society Fellow, 1999; AFOSR/White House Presidential Early Career Award for Scientists and Engineers, 1997; NSF Faculty Early Career Award, 1997; Undergraduate Teaching Award in Physics, University of Kansas, 1998; Institute for Plasma Research Fellowship, University of Maryland at College Park, 1992; Ralph D. Myers Award for Outstanding Academic Achievement, University of Maryland at College Park, 1988.

selected publications:

W.-X. Wang, X. Ni, Y.-C. Lai, and C. Grebogi, "Optimizing controllability of complex networks by small structural perturbations," *Physical Review E (Rapid Communications)* 85, 026115, 1-5 (2012).

R. Yang, L. Huang, Y.-C. Lai, and L. M. Pecora, "Modulating quantum transport by transient chaos," *Applied Physics Letters* 100, 093105, 1-4 (2012).

Y.-C. Lai and T. Tel, *Transient Chaos (Research Monograph, 500 pages, Springer, 2011)*.

W.-X. Wang, Y.-C. Lai, C. Grebogi, and J.-P. Ye, "Network reconstruction based on evolutionary-game data via compressive sensing," *Physical Review X* 1, 021021, 1-7 (2011).

X. Ni and Y.-C. Lai, "Transient chaos in optical metamaterials," *Chaos* 21, 033116, 1-7 (2011).



Deirdre R. Meldrum
ASU Senior Scientist and
Director, Center for Biosignatures
Discovery Automation,
ASU Biodesign Institute
Professor
Ph.D., Stanford University
deirdre.meldrum@asu.edu
480-727-9397

research expertise:
automation in life sciences,
micro- and nano-technologies,
microscale systems, lab-on-a-
chip, sensors, live single-cell,
genomics, ecogenomics, robotics, control systems

biosketch: Deirdre Meldrum joined the ASU faculty in 2007, as dean of engineering, director of the Center for Ecogenomics in the Biodesign Institute and professor of electrical engineering. In her role as dean, Meldrum transformed the engineering school into an organization fully aligned with the emerging U.S. Grand Challenges. She has been engaged nationally in research and education forums with the National Academy of Engineering. Currently, she is ASU Senior Scientist and director of the Center for Biosignatures Discovery Automation in the Biodesign Institute. Prior to ASU, she was a professor of electrical engineering at the University of Washington where she founded and directed the Genomation Laboratory. Meldrum is PI and director of the NIH Center of Excellence in Genomic Sciences, Microscale Life Sciences Center funded for \$36 million, August 2001-July 2012. She was a founding senior editor and is now chair of the Advisory Board for the IEEE Transactions on Automation Science and Engineering, and was general chair for IEEE's Conference on Automation Science and Engineering 2007, IEEE BioRobotics Conference in 2008, and National Academy of Engineering (NAE) Grand Challenges Summit in Phoenix in 2010.

honors and distinctions: Member of the National Advisory Council for Human Genome Research for the U.S. Department of Health and Human Services, 2006-2008 and 2011-present; member of the advisory board for external research for Microsoft Research Connections, 2007-present; Distinguished Lecturer IEEE Robotics and Automation Society, 2006-2012; Dive in the Alvin submersible off R/V Atlantis to 2200m below sea level at Endeavor Ridge in NE Pacific Ocean, Aug. 2007; IEEE Fellow, 2004; American Association for the Advancement of Science Fellow, 2003; Presidential Early Career Award for Scientists and Engineers, 1996-2001; NIH Special Emphasis Research Career Award, 1993-1998.

selected publications:

V. Nandakumar, L. Kelbauskas, K. Hernandez, K. Lintecum, P. Senechal, K. Bussey, P. Davies, R. H. Johnson, D. R. Meldrum, "Isotropic 3D nuclear morphometry of normal, fibrocystic and malignant breast epithelial cells reveals new structural alterations," *PLoS One*, vol. 7, issue 1, Jan. 2012.

Wandaliz Torres-Garcia, Shashanka Ashili, Laimonas Kelbauskas, Roger H. Johnson, Weiwen Zhang, George C. Runger, Deirdre R. Meldrum, "Statistical framework for multiparameter analysis at the single-cell level," *Molecular BioSystems*, 2011.

Xianfeng Zhou, Fengyu Su, Weimin Gao, Yanqing Tian, Cody Youngbull, Roger H. Johnson, Deirdre R. Meldrum. "Triazacryptand-based fluorescent sensors for extracellular and intracellular K⁺ sensing," *Biomaterials*, vol. 32, issue 33, pp. 8574-8583. Sept. 2011 (online), Nov. 2011 (print).



Cun-Zheng Ning
Professor
Ph.D., University of Stuttgart
cning@asu.edu
480-956-7421

research expertise:
nanophotonics, nanowires,
surface plasmons and
nanolasers, nanomaterials
detectors and solar cells,
modeling and simulation of
optoelectronic devices,

quantum optics and two-photon lasers, geometric phases, stochastic resonances

biosketch: Cun-Zheng Ning joined ASU in 2006 from the NASA Center of Nanotechnology at NASA Ames Research Center, and University Affiliated Research Center (UARC) of University of California, where he was a senior scientist, group leader in nanophotonics and task manager in nanotechnology. He was an ISSP visiting professor at University of Tokyo in 2006 and a research assistant professor at University of Arizona. Ning has published 140 papers and given over 110 invited, plenary or colloquium talks. He holds three U.S. patents with two pending. He was an associate editor of IEEE Journal of Quantum Electronics from 2001 to 2003, and a guest editor of several special issues of IEEE and OSA journals. He has served as chair or a committee member of several IEEE and OSA conferences.

honors and distinctions: IEEE/LEOS Distinguished Lecturer Award, 2007-2009; NASA Space Act Patent Award, 2005, 2007; CSC Technical Excellence Award 2003; CSC Civil Group Presidential Award 2001; MRJ Award for Technical Achievement 2000; NASA Group Achievement Award 1999.

selected publications:

Debin Li and C. Z. Ning, "All-semiconductor active plasmonic system in mid-infrared wavelengths," *Optics Express*, vol. 19, no. 15, pp. 14594-14603, 2011.

Kang Ding, Zhicheng Liu, Leijun Yin, Hua Wang, Ruibin Liu, Martin T. Hill, Milan J. H. Marell, Peter J. van Veldhoven, Richard Nötzel, and C. Z. Ning, "Electrical injection, continuous wave operation of subwavelength-metallic cavity lasers at 260 K," *Applied Physics Letters*, 98, 231108, 2011.

D. A. Caselli and C. Z. Ning, "High-performance laterally arranged multiple-bandgap solar cells using spatially composition-graded Cd_xPb_{1-x}S nanowires on a single substrate: A design study," *Optics Express*, vol. 19, no. S4, pp. A686-A694, 2011.

Hua Wang, Minghua Sun, Kang Ding, Martin T. Hill, and Cun-Zheng Ning, "A top-down approach to fabrication of high-quality vertical heterostructure nanowire arrays," *Nano Letters*, vol. 11, pp. 1646-1650, 2011.

**Sule Ozev**

Associate Professor
Ph.D., University of California,
San Diego
sule.ozev@asu.edu
480-660-5273

research expertise: self-test and self-calibration for wireless transceivers, analysis and mitigation of process variations for mixed signal and digital circuits, fault-tolerant and reconfigurable heterogeneous

systems, mixed signal circuit testing

biosketch: Sule Ozev received her B.S. degree in electrical engineering from Bogazici University, Turkey, and her M.S. and Ph.D. degrees in computer science and engineering from University of California, San Diego in 1995, 1998 and 2002, respectively. Ozev joined the electrical engineering faculty in 2008. She is an associate editor for IEEE Transactions on VLSI systems and serves on various program committees, including IEEE VLSI Test Symposium (2008-2010), IEEE/ACM Design Automation Conference (2007-2009), IEEE Test Conference (2007-2010), IEEE International Conference on Computer Design (2004-2010), and IEEE European Test Symposium (2006-2010). She was the general chair for IEEE International Mixed-Signals, Sensors, and Systems 2009. She has published over 70 conference and journal papers and holds one U.S. patent.

honors and distinctions: Best Paper Award, European Test Symposium, 2009; IBM Faculty Award, 2007; NSF CAREER Award, 2006; Best Paper Award, ICCD, 2005; Best Dissertation Award, University of California, San Diego, 2003; VLSI Test Symposium TTTC Naveena Nagi Award, 2002; IBM Corporation Co-operative Fellowship Award, 2000-2002; UCSD Flaviu Cristian Research Award, 1999-2001.

selected publications:

- E. Acar and S. Ozev, "Low-cost MIMO testing for RF integrated circuits," IEEE Transactions on VLSI Systems, vol. 18, issue 9, pp. 1348-1356, Sept. 2010.
- E. S. Erdogan and S. Ozev, "Detailed characterization of transceiver parameters through loop-back-based BiST," IEEE Transactions on VLSI Systems, vol. 18, issue 6, pp. 901-911, June 2010.
- E. Yilmaz and S. Ozev, "Accurate multi-specification DPPM estimation using layered sampling based simulation," IEEE International Symposium on Quality Electronic Design, 2010.
- E. Acar, S. Ozev, "Low-cost characterization and calibration of RF integrated circuits through I-Q data analysis," IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, vol. 28, issue 7, pp. 993-1005, July 2009.

**Joseph Palais**

Professor
Ph.D., University of Michigan
joseph.palais@asu.edu
480-965-3757

research expertise: fiber optic communications, holography, distance education

biosketch: Joseph Palais joined ASU in 1964 and is the electrical engineering graduate program chair. He is also the academic director for the online and professional programs for Global Outreach and Extended Education of the Ira A. Fulton Schools of Engineering. He has published a textbook on fiber optics. The book (in English and in translation) has been used in classes worldwide. He has contributed chapters to numerous books, written over 40 research articles in refereed journals, and presented more than 35 papers at scientific meetings. He has presented over 150 short courses on fiber optics.

honors and distinctions: Daniel Jankowski Legacy Award; IEEE Life Fellow; IEEE Educational Activities Board Meritorious Achievement Award; IEEE Phoenix Achievement Award; University Continuing Education Association Conferences and Professional Programs Faculty Service Award.

selected publications:

- J. Palais, "Micro-optics-based components for networking," (Chapter 18) in Optical Society of America Handbook of Optics, 3rd ed., vol. 5, M. Bass, Ed., New York: McGraw-Hill, 2010.
- J. Palais, "Fiber Optic Communications," 5th ed., Upper Saddle River: Prentice-Hall, 2005. Translations: Korean, Chinese, Persian, Japanese and Syrian.

**George Pan**

Professor
Ph.D., University of Kansas
george.pan@asu.edu
480-965-1732

research expertise: computational electromagnetics, high-speed electronics packaging, magnetic resonant imaging RF coil design and analysis, inverse scattering, rough surface scattering,

millimeter-wave antenna systems

biosketch: George Pan joined ASU in 1995 as a professor and the director of the Electronic Packaging Laboratory. He has written three book chapters, published 68 research articles in refereed journals and presented 108 papers at national/international conferences. He has offered short courses on wavelets in electromagnetics at Moscow State University, Russia, the University of Canterbury, New Zealand, CSIRO in Sydney, Australia, IEEE Microwave Symposium, Peking University, the Chinese Aerospace Institute, the Electric Performance of Electronic Packaging (EPEP), Beijing University of Aeronautics and Astronautics, and National Central University of ROC. His book Wavelets in Electromagnetics and Device Modeling, published in 2003, was among John Wiley's best-selling titles. He is an associate editor of the IEEE Transactions on Antennas and Propagation, and associate editor of the International Journal of Computational Electronics.

honors and distinctions: IET Fellow; IEEE Senior Member; Outstanding Paper Award, Government Microcircuit Applications Conference, Nov. 1990.

selected publications:

- J. Griffith and G. Pan, "Time Harmonic Fields Produced by Circular Current Loops," IEEE Transactions on Magnetics, vol. 47, no. 8, pp. 2029-2033, Aug. 2011.
- Z. Guo, G. Pan and H. Pan, "Unified Formulation for Multiple Vias with or without Circular Pads in High Speed Interconnects," IEEE Transactions on Advanced Packaging, vol. 1, no. 8, pp. 1226-1233, Aug. 2011.
- Z. Huang, G. Pan and H. Pan, "Perfect plane injection for Crank-Nicholson time-domain method," IET Microwave Antennas Propagation, vol. 4, issue 11, pp. 1855-1862, Nov. 2010.
- Z. Guo and G. Pan, "On simplified fast modal analysis for through silicon vias in layered media based upon full-wave solutions," IEEE Transactions on Advanced Packaging, vol. 33, no. 2, pp. 517-523, May 2010.

**Antonia Papandreou-Suppappola**

Professor
Ph.D., University of Rhode Island
papandreou@asu.edu
480-965-7881

research expertise:

adaptive sensing, time-frequency signal processing, stochastic processing, radar processing, biological and biomedical signal processing

biosketch: Antonia Papandreou-Suppappola joined ASU as an assistant professor in 1999 and was promoted to associate professor in 2004 and professor in 2008. She is currently a member-at-large of the IEEE Signal Processing Society Board of Governors (2010-2012). She was the technical area chair for array processing and statistical signal processing of the 2010 Asilomar Conference on Signals, Systems, and Computers; special sessions chair of the 2010 IEEE International Conference of Acoustics, Speech and Signal Processing; general chair of the 2008 Sensor Signal and Information Processing Workshop; guest editor for the January 2009 Special issue on Waveform-Agile Sensing and Processing for the IEEE Signal Processing Magazine; associate editor for the IEEE Transactions on Signal Processing (2005-2009); technical committee member of the IEEE Signal Processing Society on Signal Processing Theory and Methods (2003-2008); and treasurer of the IEEE Signal Processing Society Conference Board (2004-2006).

honors and distinctions: Bob Owens Memorial Best Paper Award in IEEE Workshop on Signal Processing Systems, 2010; Top 5 percent faculty, Fulton Schools of Engineering, 2009; IEEE Phoenix Section Society SenSIP Center Research Award, 2008; Fulton School of Engineering Teaching Excellence Award, 2005; IEEE Phoenix Section Outstanding Faculty for Research Award, 2003.

selected publications:

- A. Papandreou-Suppappola, J. Zhang, B. Chakraborty, Y. Li, D. Morrell, S. P. Sira, "Adaptive waveform design for tracking," Chapter 16, *Waveform Design and Diversity for Advanced Radar Systems*, (F. Gini, A. De Maio, and L. Patton, Eds.), IET Peter Peregrinus, pp. 407-444, 2012.
- A. Papandreou-Suppappola, C. Ioana and J. Zhang, "Time-varying wideband channel modeling and applications," Chapter 9 in *Wireless Communications over Rapidly Time-Varying Channels*, (Franz Hlawatsch and Gerald Matz, Eds.), Academic Press, pp. 375-411, 2011.
- L. Miao, J. J. Zhang, C. Chakrabarti, A. Papandreou-Suppappola, "Algorithm and parallel implementation of particle filtering and its use in waveform-agile sensing," *Journal of Signal Processing Systems*, vol. 65, pp. 1-17, Nov. 2011.
- L. Ravichandran, A. Papandreou-Suppappola, Z. Lacroix, A. Spanias, and C. Legendre, "Waveform mapping and time-frequency processing of DNA and protein sequences," *IEEE Transactions on Signal Processing*, vol. 59, no. 9, pp. 4210-4224, Sept. 2011.
- I. Kyriakides, D. Morrell, and A. Papandreou-Suppappola, *Adaptive High-Resolution Sensor Waveform Design for Tracking*, Synthesis Lectures on Algorithms and Software in Engineering, Morgan & Claypool Publishers (109 pages), 2010.

**Stephen M. Phillips**

Professor and Director of the School
Ph.D., Stanford University
stephen.phillips@asu.edu
480-965-6410

research expertise:

applications and integration of microsystems including microelectromechanical systems (MEMS), microactuators, neural recording and neural stimulation; applications of systems and

control including adaptive control, prosthetics, feedback control over nondeterministic networks, instrumentation and control of gas-turbine engines

biosketch: Stephen M. Phillips received a B.S. degree in electrical engineering from Cornell University in 1984 and M.S. and Ph.D. degrees in electrical engineering from Stanford University in 1985 and 1988, respectively. From 1988 to 2002, he served on the faculty of Case Western Reserve University. From 1995 to 2002, he also served as director of the Center for Automation and Intelligent System Research, an industry-university-government collaborative at Case. In 2002, he joined ASU as professor of electrical engineering. He was appointed electrical engineering department chair in 2005 and director of the School of Electrical, Computer and Energy Engineering in 2009. He has held visiting positions at the NASA Glenn Research Center and the University of Washington. He has served as a program evaluator and is a professional engineer registered in the state of Ohio.

selected publications:

- Stephen M. Phillips, David R. Allee, Narendra Lakamraju, *Passive Flexible-Substrate Blast Sensor Array*, International Microelectronics and Packaging Society (IMAPS) Device Packaging Conference, Scottsdale, Ariz., 2012.
- Karthikeyan Ramamurthy, Jayaraman Thiagarajan, Prasanna Sattigeri, Michael Goryll, Andreas Spanias, Trevor Thornton, and Stephen Phillips, "Transform domain features for ion-channel signal classification," *Journal of Biomedical Signal Processing and Control*, vol. 6, no. 3, pp. 219-224, 2011.
- Narendra V. Lakamraju, Sameer M. Venugopal, David R. Allee, Stephen M. Phillips, and Barry P. O'Brien, "Flexible shock sensor tag with integrated display," *Army Science Conference*, Orlando, Fla., Dec. 2010.
- Narendra V. Lakamraju, Sameer M. Venugopal, David R. Allee, Stephen M. Phillips, "Shock wave pressure sensor on PEN substrate," *IEEE Sensors Conference*, Hawaii, Nov. 2010.
- B. Mi, H. Kahn, F. Merat, A. H. Heuer, D. A. Smith, and S. M. Phillips, "Static and electrically actuated shaped MEMS mirrors," *Journal of Microelectromechanical Systems*, vol. 14, no. 1, pp. 29-36, 2005.

**Martin Reisslein**

Professor
Ph.D., University of Pennsylvania
reisslein@asu.edu
480-965-8593

research expertise:

multimedia streaming, multimedia traffic characteristics, metro and access fiber/wireless networks, and engineering education

biosketch: Martin Reisslein joined ASU in 2000. He received a Dipl.-Ing. in electrical engineering from Fachhochschule Dieburg, Germany, in 1994, an M.S.E. in electrical engineering from the University of Pennsylvania in 1996, and a Ph.D. in systems engineering from the University of Pennsylvania in 1998. He has published over 95 journal articles. He has a Google Scholar h-index of 31 and a Web of Science h-index of 17. He serves as Associate Editor for the IEEE/ACM Transactions on Networking and the Computer Networks Journal.

honors and distinctions: NSF CAREER Award, 2002; Editor-in-chief, IEEE Communications Surveys and Tutorials, 2002-2007; ACM Senior Member, ASEE Member, IEEE Senior Member; IEEE Communication Society 2009 Best Tutorial Paper Award.

selected publications:

- P. Seeling and M. Reisslein, "Video Transport Evaluation with H.264 Video Traces," *IEEE Communications Surveys and Tutorials*, in print, 2012.
- R. Gupta, A. Pulipaka, P. Seeling, L. J. Karam, and M. Reisslein, "H.264 Coarse Grain Scalable (CGS) and Medium Grain Scalable (MGS) Encoded Video: A Trace-Based Traffic and Quality Evaluation," *IEEE Transactions on Broadcasting*, in print, 2012.
- N. Ghazisaidi, M. Maier, and M. Reisslein, "VMP: A MAC Protocol for EPON-Based Video-Dominated FiWi Access Networks," *IEEE Transactions on Broadcasting*, vol. 58, no. 3, Sept. 2012.
- G. Ozogul, A.M. Johnson, R. Moreno, and M. Reisslein, "Technological Literacy Learning With Cumulative and Stepwise Integration of Equations Into Electrical Circuit Diagrams," *IEEE Transactions on Education*, vol. 55, no. 4, Aug. 2012.
- M. McGarry and M. Reisslein, "Investigation of the DBA Algorithm Design Space for EPONs," *IEEE/OSA Journal of Lightwave Technology*, vol. 30, no. 14, July 2012.

**Armando A. Rodriguez**

Professor
Ph.D., Massachusetts Institute of Technology
aar@asu.edu
480-965-3712

research expertise:

control of nonlinear distributed parameter systems, approximation theory, sampled data and multi-rate control, embedded systems, rapid prototyping, modeling, simulation,

animation, and real-time control (MoSART) of Flexible Autonomous Machines operating in an uncertain Environment (FAME), integrated real-time health monitoring, modeling, and reconfigurable fault-tolerant controls; control of bio-economic systems, renewable resources, and sustainable development; control of semiconductor, (hypersonic) aerospace, robotic, and low-power electronic systems

biosketch: Prior to joining ASU in 1990, Armando A. Rodriguez worked at MIT, IBM, AT&T Bell Laboratories and Raytheon Missile Systems. He has also consulted for Eglin Air Force Base, Boeing Defense and Space Systems, Honeywell, and NASA. He has published over 195 technical papers in refereed journals and conference proceedings. He has authored three engineering textbooks. Rodriguez has given over 70 invited presentations—13 plenary—at international and national forums, conferences and corporations. Since 1994, he has directed an extensive engineering mentoring research program that has served over 300 students. He has served as the co-director of an NSF-WAESO funded Bridge to the Doctorate Program involving 12 NSF fellows. He is currently serving on the following National Academies panels: Survivability and Lethality Analysis, Army Research Laboratory (ARL) Autonomous Systems.

honors and distinctions: AT&T Bell Laboratories Fellowship; Boeing A.D. Welliver Fellowship; CEAS Teaching Excellence Award; IEEE International Outstanding Advisor Award; White House Presidential Excellence Award for Science, Mathematics, and Engineering; ASU Faculty Fellow; ASU Professor of the Year Finalist; Ralf Yorke Memorial Prize.

selected publications:

J. Dickeson, A. A. Rodriguez, S. Sridharan, and A. Korad, "Elevator sizing, placement, and control-relevant tradeoffs for hypersonic vehicles," AIAA-2010-8339, AIAA Guidance, Navigation, and Control Conference, Toronto, Canada, Aug. 2010.

O. Cifdaloz, A. Regmi, J. Anderies, A. A. Rodriguez, "Robustness, vulnerability, and adaptive capacity in small-scale social-ecological systems: The Pampa Irrigation System in Nepal," *Journal of Ecology and Society*, vol. 15, no. 3, article 39 (online, 46 pages), 2010. (Ralf Yorke Memorial Prize).

J.M. Anderies, A.A. Rodriguez, M.A. Janssen, and O. Cifdaloz, "Panaceas, Uncertainty, and the Robust Control Framework in Sustainability Science," *Proceedings of the National Academy of Sciences (PNAS)*, Special issue, vol. 104, no. 39, pp. 15194-15199, 2007.

**Marco Saraniti**

Professor
Ph.D., Technische Universitaet Muenchen
marco.saraniti@asu.edu
480-965-2650

research expertise:

computational electronics and biophysics

biosketch: From 1996 to 1998, Marco Saraniti was a faculty research associate with the electrical engineering

department of Arizona State University. He joined the electrical and computer engineering department of the Illinois Institute of Technology, Chicago in 1998, where he was awarded the tenure in 2004, and was promoted to the rank of full professor in June 2007. He rejoined ASU in 2007. He is the author and coauthor of four book chapters, four technical reports, and more than 90 publications. His current research focuses mainly on computational electronics applied to the simulation of semiconductor devices and biological structures. His recent scientific work covers the following fields: the development of Monte Carlo and cellular automation techniques for 2D and 3D simulation of semiconductor devices, simulation and engineering of semiconductor devices, and the development of numerical methods for the modeling and simulation of membrane proteins.

selected publications:

D. Guerra, M. Saraniti, D. K. Ferry, S. M. Goodnick, and F.A. Marino, "Carrier Dynamics Investigation on Passivation Dielectric Constant and RF Performance of Millimeter-wave Power GaN HEMTs," *IEEE Transactions on Electron Devices*, vol. 58, no. 11, pp. 3876-3884, Nov. 2011.

D. Guerra, F. A. Marino, S. M. Goodnick, D. K. Ferry, and M. Saraniti, "Extraction of Gate Capacitance of High-Frequency and High-Power GaN HEMTs by Means of Cellular Monte Carlo Simulations," *International Journal of High Speed Electronics and Systems*, vol. 20, no. 3, pp. 423-430, Sept. 2011.

D. Guerra, R. Akis, F. A. Marino, D. K. Ferry, S. M. Goodnick, and M. Saraniti, "Aspect ratio impact on RF and DC performance of state-of-the-art short-channel GaN and InGaAs HEMTs," *IEEE Electron Device Letters*, vol. 31, no. 11, pp. 1217-1219, Nov. 2010.

A. Marino, D. K. Ferry, S. M. Goodnick, and M. Saraniti, "RF and DC characterization of state-of-the-art GaN HEMT devices through cellular Monte Carlo simulations," *Physics Status Solidi*, vol. 7, no. 10, pp. 2445-2449, July 2010.

F. A. Marino, D. Cullen, D. Smith, M. McCartney, and M. Saraniti, "Simulation of polarization charge on AlGaN/GaN high electron mobility transistors: Comparison to electron holography," *Journal of Applied Physics*, vol. 107, no. 5, article 054516, March 2010.

P. Joshi, A. Smolyanitsky, L. Petrossian, M. Goryll, M. Saraniti, T. J. Thornthorn, "Field-effect modulation of ionic conductance of cylindrical silicon-on-insulator nanopore array," *Journal of Applied Physics*, vol. 107, no. 5, article 054701, March 2010.

A. Smolyanitsky and M. Saraniti, "Silicon nanopores as bioelectronic devices: A simulation study," *Journal of Computational Electronics*, vol. 8, no. 2, pp. 90-97, 2009.

M. Saraniti, "Artificial cells: Designing biomimetic nanomachines," *Nature Nanotechnology*, no. 3, pp. 647-648, 2008.

**Dieter K. Schroder**

Regents' Professor
Ph.D., University of Illinois
schroder@asu.edu
480-965-6621

research expertise:

semiconductor devices, photovoltaics, defects in semiconductors, semiconductor material and device characterization, electrical/lifetime measurements, low-power electronics, device modeling, MOS devices

biosketch: Dieter Schroder joined ASU in 1981 after 13 years at the Westinghouse Research Labs. He has published two books, 186 journal articles, 10 book chapters and 174 conference presentations, edited 11 books, holds five patents, and has graduated 64 M.S. students and 42 Ph.D. students.

honors and distinctions: Outstanding Graduate Mentor, 2010; ASU Regents' Professor, 2009; ASU College of Engineering Teaching Excellence Award, 1989, 1998, 2001, 2006, 2008; IEEE Life Fellow; IEEE van der Ziel Award, 2007; Distinguished National Lecturer for the IEEE Electron Device Society, 1993-2007; National Technical University Outstanding Instructor, 1991-2003; IEEE Phoenix Section: Outstanding Faculty Member, 2000; ASU College of Extended Education Distance Learning Faculty Award, 1998; IEEE Meritorious Achievement Award in Continuing Education Activities, 1998; University Continuing Education Association Faculty Service Award, 1997.

selected publications:

P. Nayak, M. Seacrist and D.K. Schroder, "Unusual C-V Characteristics of High-Resistivity SOI Wafers," *IEEE Electron Device Letters*, vol. 32, pp. 1659-1661, Dec. 2011.

N. Chandra, V. Sharma, G.Y. Chung and D.K. Schroder, "Four-point Probe Characterization of 4H Silicon Carbide," *Solid-State Electronics*, vol. 64, 73-77, Oct. 2011.

S. C. Puthentheradam, D. K. Schroder, and M. N. Kozicki, "Inherent diode isolation in programmable metallization cell resistive memory elements," *Applied Physics A*, vol.102, pp. 817-826, March 2011.

M. J. Marinella, D. K. Schroder, G. Chung, M. J. Loboda, T. Isaacs-Smith, and J. R. Williams, "Carrier generation lifetimes in 4H-SiC MOS capacitors," *IEEE Transactions on Electron Devices*, vol. 57, pp. 1910-1923, Aug. 2010.

S. Bowden, C. Honsberg, and D. Schroder, "Moore's law of photovoltaics," *Future Photovoltaics*, vol. 1, pp. 1-7, May 2010.

K. Park, P. Nayak, and D. K. Schroder, "Role of the substrate during pseudo-MOSFET drain current transients," *Solid-State Electronics*, vol. 54, pp. 316-322, March 2010.

I. Rapoport, P. Taylor, J. Kearns, and D. K. Schroder, "Two-side surface photovoltage studies for implanted iron diffusion in silicon during rapid thermal anneal," *Journal of Applied Physics* 107, 013518 1-6, Jan. 2010.

G. Ng, D. Vasileska, and D. K. Schroder, "Calculation of the electron Hall mobility and Hall scattering factor in 6H-SiC," *Journal of Applied Physics*, vol. 106, article 053719 1-6, Sept. 2009.



Jennie Si
Professor
Ph.D., University of Notre Dame
si@asu.edu
480-965-6133

research expertise:

experimental and computational studies of cortical neural control, dynamic optimization (approximate/adaptive dynamic programming), target tracking

biosketch: Jennie Si received her B.S. and M.S. degrees from Tsinghua University, Beijing, China, and her Ph.D. from the University of Notre Dame, all in electrical engineering. She joined ASU in 1991.

honors and distinctions: General Co-Chair of the 2014 World Congress on Computational Intelligence; IEEE Fellow, 2008; General Chair of the 2007 International Joint Conference on Neural Networks; NSF Research Institution Award, 1993; Action Editor of Neural Networks; Listed in several Marquis Who's Who publications since late 1990s; NSF/White House Presidential Faculty Fellow, 1995; Motorola Excellence Award, 1995; Past associate editor of IEEE Transactions on Automatic Control, IEEE Transactions on Semiconductor Manufacturing, and IEEE Transactions on Neural Networks.

selected publications:

42 Feng Liu, Jian Sun, Jennie Si, and Shengwei Mei, "A Boundedness Result for the Direct Heuristic Dynamic Programming," Neural Networks, vol. 32, pp. 229-235, 2012.

Chenhui Yang, Byron Olson, and Jennie Si, "A multiscale correlation of wavelet coefficients approach to spike detection," Neural Computation, vol. 23, no. 1, pp. 215-250, 2011.

Baohua Li and Jennie Si, "Approximate robust policy iteration using multilayer perceptron neural networks for discounted infinite-horizon Markov decision processes with uncertain stationary transition matrices," IEEE Transactions on Neural Networks, vol. 21, no. 28, pp. 1270-1280, 2010.

L. Yang, J. Si, K. Tsakallis, and A. Rodriguez, "Direct heuristic dynamic programming for nonlinear tracking control with filtered tracking error," IEEE Transactions on Systems, Man, and Cybernetics, Part B, 2009.

James Dankert, Byron Olson, and Jennie Si, "Asynchronous decision-making in a memorized paddle pressing task," Journal of Neural Engineering, vol. 5, pp. 363-373, Sept. 2008.

Baohua Li and Jennie Si, "Robust optimality for discounted infinite-horizon Markov decision processes with uncertain transition matrices," IEEE Transactions on Automatic Control, vol. 53, no. 9, pp. 2112-2116, Oct. 2008.

Chao Lu, Jennie Si, and Xiaorong Xie, "Direct heuristic dynamic programming method for power system stability enhancement," IEEE Transactions on Systems, Man, and Cybernetics, Part B, vol. 38, no. 4, pp. 1008-1013, Aug. 2008.



Brian Skromme
Professor
Ph.D., University of Illinois
skromme@asu.edu
480-965-8592

research expertise:

compound semiconductor materials and devices, especially wide bandgap materials for optoelectronic, high-frequency, high-power, and high-temperature applications; optical

characterization of semiconductor materials, development of GaN and SiC-based materials and devices

biosketch: Brian Skromme joined ASU in 1989, where he is presently a professor in solid-state electronics. From 1985 to 1989, he was a member of the technical staff at Bellcore. He has written over 120 refereed publications in solid-state electronics.

honors and distinctions: Eta Kappa Nu, Young Faculty Teaching Award, 1990-1991; Golden Key National Honor Society Outstanding Professor Award, 1991; Listed in Marquis's Who's Who in America.

selected publications:

B. J. Skromme, A. Sasikumar, B. M. Green, O. L. Hartin, C. E. Weitzel, and M. G. Miller, "Reduction of low-temperature nonlinearities in pseudomorphic AlGaAs/InGaAs HEMTs due to Si-related DX centers," IEEE Transactions on Electron Devices, vol. 57, no. 4, pp. 749-754, 2010.

Y. Wang, P. A. Losee, S. Balachandran, I. B. Bhat, T. P. Chow, Y. Wang, B. J. Skromme, J. K. Kim, and E. F. Schubert, "Achieving low sheet resistance from implanted p-type layers in 4H-SiC using high-temperature graphite capped annealing," Mater. Sci. Forum, vol. 556-557, pp. 567-571, 2007.

Y. Wang, M. K. Mikhov, and B. J. Skromme, "Formation and properties of Schottky diodes on 4H-SiC after high temperature annealing with graphite encapsulation," Materials Science Forum, vol. 527-529, pp. 915-918, 2006.

A. Mahajan and B. J. Skromme, "Design and optimization of junction termination extension (JTE) for 4H-SiC high-voltage Schottky diodes," Solid-State Electronics, vol. 49, pp. 945-955, 2005.

L. Chen, B. J. Skromme, R. F. Dalmau, R. Schlessler, Z. Sitar, C. Chen, W. Sun, J. Yang, M. A. Khan, M. L. Nakarmi, J. Y. Lin, and H.-X. Jiang, "Band-edge exciton states in AlN Single crystals and epitaxial layers," Applied Physics Letters, vol. 85, pp. 4334-4336, 2004.



Andreas Spanias
Professor
Director, SenSIP Industry/
University Cooperative Research
Center
Ph.D., West Virginia University
spanias@asu.edu
480-965-1837

research expertise: digital signal processing, sensor data analysis, speech and audio coding, adaptive filters, real-time DSP

biosketch: Andreas Spanias joined ASU in 1988. He published more than 65 journal and 200 conference papers and contributed several book chapters. He authored/co-authored two textbooks in DSP (LL Press) and Audio Coding (Wiley) and three Morgan-Claypool Lecture Series books. He and his student team developed the award-winning Java-DSP software and its iPhone/Android extensions. He served as associate editor of IEEE Transactions on Signal Processing, general co-chair of IEEE ICASSP-99, and as vice president, conferences of the IEEE Signal Processing Society (SPS). He received the 2005 IEEE SPS Meritorious Service Award. He is director of the SenSIP Center, an NSF I/UCRC, and director of a major Phase 3 multi-university NSF program. He served as founding associate director of the School of Arts, Media and Engineering (AME), and co-PI on the NSF AME IGERT. He is a book series editor for Morgan-Claypool Lecture Series.

honors and distinctions: IEEE Distinguished Lecturer, 2004; IEEE Field Series Award; IEEE Fellow, 2003; J-DSP software (jdsp.asu.edu) ranked in Top 3 Educational Resources by 2003 UC-Berkeley NEEDS panel; Donald G. Fink Prize for paper "Perceptual Coding of Digital Audio," 2002; Intel Advanced Personal Communications Award, 1997; Intel Research Council Award, 1996; Intel Award for Leadership & Contributions to the 60172 Architecture, 1993.

selected publications:

M. Shirsat, T. Sarkar, J. Kakoullis, Jr., N. Myung, B. Konnanath, A. Spanias, and A. Mulchandani, "Porphyrin-Functionalized Single-Walled Carbon Nanotube Chemiresistive Sensor Arrays for VOCs," Journal of Physical Chemistry C, vol. 116, no. 5, pp. 3845-3850, Jan. 2012.

Tepedelenioglu, C., Banavar, M.K., Spanias, A., "On the Asymptotic Efficiency of Distributed Estimation Systems With Constant Modulus Signals Over Multiple-Access Channels," IEEE Transactions on Information Theory, vol. 57, issue 10, pp. 7125-7130, 2011.

K. N. Ramamurthy, J. J. Thiagarajan, P. Sattigeri, M. Goryll, A. Spanias, T. Thornton, S. M. Phillips, "Transform domain features for ion-channel signal classification," Biomedical Signal Processing and Control, vol. 6, no. 3, pp. 219-224, 2011.

Wichern, G., Xuejiachen, H. Thornburg, B. Mechtley, and A. Spanias, "Segmentation, indexing, and retrieval for environmental and natural sounds," IEEE Transactions on Audio, Speech, and Language Processing, vol. 18, issue 3, pp. 688-707, 2010.

M. Banavar, C. Tepedelenioglu, A. Spanias, "Estimation over fading channels with limited feedback using distributed sensing," IEEE Transactions on Signal Processing, vol. 58, issue 1, pp. 414-425, 2010.

H. Krishnamoorthi, A. Spanias, and V. Berisha, "A frequency/detector pruning approach for loudness estimation," IEEE Signal Processing Letters, vol. 16, no. 11, pp. 997-1000, Dec. 2009.

**Meng Tao**

Professor
Ph.D., University of Illinois at
Urbana-Champaign
meng.tao@asu.edu
480-965-9845

research expertise:

semiconductor surfaces,
interfaces and thin films;
terawatt-scale photovoltaics
for solar energy conversion;
chemical vapor deposition and its
derivatives; electrochemistry for

solar-grade silicon; and high-temperature silicon electronics

biosketch: Meng Tao's current research covers a wide range of topics in photovoltaics, such as 1) Earth-abundant chalcogenides as active layer and transparent electrode in next-generation photovoltaics; 2) terawatt-scale silicon photovoltaics, including electrorefining for solar-grade silicon and substitution of silver electrode with aluminum; and 3) high-temperature silicon electronics for power management in renewable energy systems. He joined ASU in 2011, and is establishing a new Laboratory for Terawatt Photovoltaics.

honors and distinctions: University Outstanding Research Award, 2011; College of Engineering Outstanding Young Faculty Award, 2004; South Central Bell Professorship, 2001; Tao also played a critical role in the establishment of the U.S. Photovoltaic Manufacturing Consortium under SEMATECH.

selected publications:

C.S. Tao, J. Jiang, and M. Tao, "Natural Resource Limitations to Terawatt-Scale Solar Cells," *Solar Energy Materials and Solar Cells*, vol. 95, pp. 3176-80, 2011.

X. Han, K. Han, and M. Tao, "Low-Resistivity Y-Doped ZnO by Electrochemical Deposition," *Journal of the Electrochemical Society*, vol. 157, pp. H593-597, 2010.

G. Song, M.Y. Ali, and M. Tao, "A High Schottky Barrier of 1.1 eV between Al and S-Passivated p-Type Si(100) Surface," *IEEE Electron Device Letters*, vol. 28, pp. 71-73, 2007.

M. Tao, D. Udeshi, N. Basit, E. Maldonado, and W.P. Kirk, "Removal of Dangling Bonds and Surface States on Si(001) Surface by a Monolayer of Se," *Applied Physics Letters*, vol. 82, pp. 1559-1561, 2003.

M. Tao, "A Kinetic Model for Metalorganic Chemical Vapor Deposition from Ga(CH₃)₃ and AsH₃," *Journal of Applied Physics*, vol. 87, pp. 3554-3562, 2000.

**Nongjian (NJ) Tao**

Professor
Director, The Biodesign Institute,
Bioelectronics and Biosensors
Ph.D., Arizona State University
njtao@asu.edu
480-965-4456

research expertise:

chemical and biological sensors,
molecular and nano electronics,
mobile health devices,
wireless sensors

biosketch: NJ Tao joined ASU as a professor of electrical engineering and an affiliated professor of chemistry and biochemistry in 2001. Previously, he worked as an assistant and associate professor at Florida International University. He has 10 patents, and published over 200 refereed journal articles and book chapters, which have been cited approximately 8,500 times. He has given over 200 invited and keynote talks worldwide.

honors and distinctions: AAAS Fellow; America Physical Society Fellow; Alexander von Humboldt Senior Research Award; Hellmuth Fisher Medal; NSF two-year extension for Special Creativity; Excellence in Research Award, Florida International University; AzTE Innovator of the Year; Molecular Imaging Young Microscopist.

selected publications:

I. Diez-Perez, J. Hihath, T. Hines, Z. S. Wang, G. Zhou, K. Müllen, and N. J. Tao, "Controlling single molecule conductance through lateral coupling of π -orbitals," *Nature Nanotechnology*, vol. 6, pp. 226-231, 2011.

W. Wang, K. Foley, X. N. Shan, S. P. Wang, S. Eaton, V. J. Nagaraj, P. Wiktor, U. Patel, and N. J. Tao, "Electrochemical impedance microscopy based on plasmonics: A study of single cells and intracellular processes," *Nature Chemistry*, vol. 3, no. 6, pp. 226-231, 2011.

Diez-Perez, Z. H. Li, J. Hihath, J. H. Li, C. Y. Zhang, X. M. Yang, L. Zang, Y. J. Dai, X. L. Feng, K. Muellen, and N. J. Tao, "Gate-controlled electron transport in coronenes: Bottom-up approach towards graphene transistors," *Nature Communication*, vol. 1, no. 31, 2010.

X. Shan, U. Patel, S. Wang, R. Iglesias, and N. J. Tao, "Imaging local electrochemical current via surface plasmon resonance," *Science*, vol. 327, pp. 1363-1366, 2010.

S. P. Wang, X. N. Shan, U. Patel, X. P. Huang, J. Lu, J. H. and Li, and N. J. Tao, "Label-free imaging, detection and mass measurement of single viruses by surface plasmon resonance," *Proceedings of the National Academy of Sciences*, vol. 107, pp. 16028-16032, 2010.

J. L. Xia, F. Chen, J. H. Li, and N. J. Tao, "Measurement of quantum capacitance of graphene," *Nature Nanotechnology*, vol. 4, pp. 505-509, 2009.

**Cihan Tepedelenlioglu**

Associate Professor
Ph.D., University of Minnesota
cihan@asu.edu
480-965-6623

research expertise:

wireless communications,
statistical signal processing,
data mining for PV systems

biosketch: Cihan Tepedelenlioglu joined ASU as an assistant professor in July 2001. He received a B.S. from the Florida Institute of Technology in 1995, an M.S. from the University of Virginia in 1998 and a Ph.D. from the University of Minnesota in 2001, all in electrical engineering.

honors and distinctions: NSF CAREER Award, 2001; Member, Tau Beta Pi.

selected publications:

K. Bai, and C. Tepedelenlioglu, "Distributed detection in UWB wireless sensor networks," *IEEE Transactions on Signal Processing*, vol. 58, no. 2, pp. 804- 813, Feb. 2010.

N. He and C. Tepedelenlioglu, "Fast and low-complexity synchronization for non-coherent UWB receivers," *IEEE Transactions on Wireless Communications*, vol. 6, no. 3, pp. 1014-1023, March 2007.

C. Tepedelenlioglu, "Maximum multipath diversity with linear equalization in precoded OFDM systems," *IEEE Transactions on Information Theory*, vol. 50, no. 1, pp. 232-235, Jan. 2004.

C. Tepedelenlioglu and R. Challagulla, "Low complexity multipath diversity through fractional sampling in OFDM," *IEEE Transactions on Signal Processing*, vol. 52, no. 11, pp. 3104-3116, Nov. 2004.

G. B. Giannakis and C. Tepedelenlioglu, "Basis expansion models and diversity techniques for blind equalization of time-varying channels," *Proceedings of the IEEE*, vol. 86, pp. 1969-1986, Oct. 1998.

**Trevor Thornton**

Professor
Ph.D., Cambridge University, UK
t.thornton@asu.edu
480-965-3808

research expertise:

nanostructures, molecular electronics and sensors, microelectro-mechanical systems (MEMS), silicon-on-insulator MESFETs

biosketch: Trevor Thornton joined ASU in 1998 after having spent eight years at Imperial College in London and two years as a member of the technical staff at Bell Communications Research, N.J. He is currently director of the Center for Solid State Electronics Research, which manages the ASU NanoFab, the Southwest regional node of the NSF-supported National Nanofabrication Infrastructure Network (www.nnin.org). Thornton has published more than 150 journal and conference papers and has seven issued patents related to the commercial development of CMOS compatible MESFETs.

honors and distinctions: Recipient of ASU Co-Curricular Programs Last Lecture Award, 2001.

selected publications:

W. Lepkowski, M. R. Ghajar, S. J. Wilk, N. Summers, and T. J. Thornton "Scaling SOI MESFETs to 150-nm CMOS technologies," IEEE Transactions on Electron Devices, vol. 58, issue 6, pp. 1628-1634, June 2011.

S. Wilk, A. Balijepalli, J. Ervin, W. Lepkowski, and T. J. Thornton, "Silicon on insulator MESFETs for RF amplifiers," Solid-State Electronics, vol. 54, pp. 336-342, 2010.

P. Joshi, A. Smolyanitsky, L. Petrossian, M. Goryll, M. Saraniti, and T. J. Thornton, "Field-effect modulation of ionic conductance of cylindrical silicon-on-insulator nanopore array," Journal of Applied Physics, vol. 107, pp. 054701-054706, 2010.

W. Lepkowski, J. Ervin, S. J. Wilk, and T. J. Thornton, "SOI MESFETs fabricated using fully depleted CMOS technologies," IEEE Electron Device Letters, vol. 30, pp. 678-680, 2009.

B. R. Takulapalli, G. M. Laws, P. A. Liddell, J. Andreasson, Z. Erno, D. Gust, and T. J. Thornton, "Electrical detection of amine ligation to a metalloporphyrin via a hybrid SOIMOSFET," Journal of the American Chemical Society, vol. 130, pp. 2226-2233, 2008.

**Konstantinos Tsakalis**

Professor
Ph.D., University of Southern California
tsakalis@asu.edu
480-965-1467

research expertise:

applications of control, optimization, and system identification theory to semiconductor manufacturing, chemical process control, and prediction and control of epileptic seizures

biosketch: Konstantinos Tsakalis joined ASU in 1988. He received an M.S. in chemical engineering in 1984, an M.S. in electrical engineering in 1985, and a Ph.D. in electrical engineering in 1988, all from the University of Southern California. He holds nine patents and has published one book, 50 journal and 103 conference papers.

honors and distinctions: Licensed chemical engineer, Technical Chamber of Greece; Member IEEE, Sigma Xi.

selected publications:

K. Tsakalis, N. Vlassopoulos, G. Lentaris, and D. Reisis, "A control-theoretic approach for efficient design of filters in DAC and digital audio amplifiers," Circuits, Systems and Signal Processing, vol. 30, issue 2, pp. 421-438, April 2011.

L. B. Good, S. Sabesan, S. T. Marsh, K. Tsakalis, D. M. Treiman, and L. D. Iasemidis, "Nonlinear dynamics of seizure prediction in a rodent model of epilepsy," Nonlinear Dynamics, Psychology and Life Sciences, vol. 14, no. 5, pp. 411-434, 2010.

L. Yang, J. Si, K. S. Tsakalis, and A. A. Rodriguez, "Performance evaluation of direct heuristic dynamic programming using control-theoretic measures," Journal of Intelligent and Robotic Systems, vol. 55, pp. 177-201, 2009.

S. Sabesan, L. B. Good, K. S. Tsakalis, A. Spanias, D. M. Treiman, and L. D. Iasemidis, "Information flow and application to epileptogenic focus localization from intracranial EEG," IEEE Transactions on Neural Systems and Rehabilitation Engineering, vol. 17, issue 3, pp. 244-253, June 2009.

L. B. Good, S. Sabesan, S. T. Marsh, K. Tsakalis, D. M. Treiman, and L. D. Iasemidis, "Control of synchronization of brain dynamics leads to control of epileptic seizures in rodents," International Journal of Neural Systems (IJNS), vol. 19, issue 3, pp. 173-196, 2009.

N. Chakravarthy, K. Tsakalis, S. Sabesan, and L. Iasemidis, "Homeostasis of brain dynamics in epilepsy: A feedback control systems perspective of seizures," Annals of Biomedical Engineering, vol. 37, no. 3, pp. 565-585, 2009.

**Pavan K. Turaga**

Assistant Professor
Ph.D., University of Maryland, College Park
pturaga@asu.edu
480-965-3704

research expertise:

computer vision, multimedia, human activity analysis, machine learning, healthcare applications

biosketch: Pavan Turaga joined ASU in 2011 as an assistant professor jointly between the School of Arts, Media, and Engineering and School of Electrical, Energy and Computer Engineering. He obtained his Ph.D. in 2009 from the ECE Department at the University of Maryland, College Park under the guidance of Professor Rama Chellappa. He then spent two years as a research associate at the Center for Automation Research, UMD. His research interests are in statistics and machine learning with applications to computer vision, human activity analysis, video summarization, dynamic scene analysis, statistical inference on manifolds, and interdisciplinary applications in preventive healthcare.

honors and distinctions: UMD Distinguished Dissertation award, 2009; IBM Emerging Leader in Multimedia, 2008.

selected publications:

J. Ni, P. Turaga, V. M. Patel, R. Chellappa, "Example-driven Manifold priors for Image Deconvolution," accepted at IEEE Transactions on Image Processing 2011.

N. Shroff, P. Turaga, R. Chellappa, "Manifold Precise: An annealing method for selecting the best citizens on manifolds," accepted at Neural Information Processing Systems (NIPS) 2011.

P. Turaga, A. Veeraraghavan, A. Srivastava, and R. Chellappa, "Statistical Computations on Grassmann and Stiefel Manifolds for Image and Video based Recognition," IEEE Transactions on Pattern Analysis and Machine Intelligence, 2010.

N. Shroff, P. Turaga, and R. Chellappa, "Video Precise: Highlighting Diverse Aspects of Videos," at IEEE Transactions on Multimedia, Dec. 2010.

P. Turaga and Y. Ivanov, "Diamond Sentry: Integrating Cameras and Sensors for Real-Time Monitoring of Indoor Spaces," accepted at IEEE Sensors Journal, Special issue on Cognitive Sensor Networks, 2010.

**Daniel Tylavsky**

Associate Professor
Ph.D., Pennsylvania State
University
tylavsky@asu.edu
480-965-3460

research expertise:

electric power systems, numerical methods applied to large-scale system problems, parallel numerical algorithms, new educational methods and technologies, applying

social optimization to power system markets, and transformer thermal modeling

biosketch: Daniel Tylavsky is internationally known for applying computation technology to the analysis and simulation of large-scale power system generation/transmission problems. He also is an avid educator who uses team/cooperative learning methods in graduate and undergraduate education and is a pioneer in the use of mediated classrooms. He has been responsible for more than \$3.5 million in research funding for both technical and educational research projects. He is a member of several honor societies and has received numerous awards for his technical work, as well as for work with student research.

honors and distinctions: IEEE Senior Member; IEEE-PES Certificate for Outstanding Student Research Supervision (three times); six awards for outstanding research from the IEEE IAS Mining Engineering Committee; various awards for outstanding teaching.

selected publications:

L. M. Beard, J. B. Cardell, I. Dobson, F. Galvan, D. Hawkins, W. Jewell, M. Kezunovic, T. J. Overbye, P. K. Sen, and D. J. Tylavsky, "Key technical challenges for the electric power industry and climate change," *IEEE Transactions on Energy Conversion*, vol. 25, no. 2, pp. 465-473, June 2010.

D. Shi, D. J. Tylavsky, K. M. Koellner, N. Logic, and D. E. Wheeler, "Transmission line parameter identification using PMU measurements," *European Transactions on Electrical Power*, vol. 20, pp. 1-15, 2010.

D. Toomey, W. D. Schulze, R. Thomas, J. Thorp, D. J. Tylavsky, and R. E. Schuler, "Efficient market design and public goods: Pt I economic models," *International Journal of Emerging Electric Power Systems*, vol. 11, issue 1, pp. 1-15, article 4, (DOI 10.2202/1553-799X.2299), 2010.

D. Toomey, W. D. Schulze, R. Thomas, J. Thorp, D. J. Tylavsky, and R. E. Schuler, "Efficient market design and public goods: Pt. II theoretical results," *International Journal of Emerging Electric Power Systems* vol. 11, issue 1, pp. 1-16, article 5, (DOI 10.2202/1553-799X.2300), 2010.

**Dragica Vasileska**

Professor
Ph.D., Arizona State University
vasileska@asu.edu
480-965-6651

research expertise:

semiconductor device physics, semiconductor transport, 1-D to 3-D device modeling, quantum field theory and its application to real device structures, spin transport, heating

effects in nano-scale devices, current collapse in GaN HEMTs, modeling of solar cells

biosketch: Dragica Vasileska joined ASU in 1997. She has published over 160 journal articles in prestigious refereed journals, 20 book chapters and more than 80 articles in conference proceedings in the areas of solid-state electronics, transport in semiconductors, and semiconductor device modeling. She has co-authored three books: D. Vasileska and S. M. Goodnick, *Computational Electronics*, Morgan and Claypool, 2006; D. Vasileska, S. M. Goodnick and G. Klimeck, *Computational Electronics: Semiclassical and Quantum Transport Modeling*, Taylor & Francis, 2010; D. Vasileska and S. M. Goodnick (Eds.), *Nanoelectronic Devices: Semiclassical and Quantum Transport*, Springer, 2011. She has given numerous invited talks. She is a senior member of IEEE and member of Phi Kappa Phi.

honors and distinctions: ISDRS 2011 Conference: Best Student Oral Presentation Award, Devices: Balaji Padmanabhan, Dragica Vasileska and Stephen Goodnick, "Modeling Reliability of GaN/AlGaIn/AlN/GaN HEMT"; LDS Conference Best Poster and Best Paper, 2004; NSF Early CAREER Award, 1999; University Cyril and Methodius, Skopje, Republic of Macedonia, College of Engineering Award for Best Achievement in One Year, 1981-1985; University Cyril and Methodius, Skopje, Republic of Macedonia, Award for Best Student from the College of Engineering in 1985 and 1990.

selected publications:

N. Ashraf, D. Vasileska, G. Wirth and P. Srinivasan, Accurate Model for the Threshold Voltage Fluctuations Estimation in 45 nm Channel Length MOSFET Devices in the Presence of Random Traps and Random Dopants, *IEEE Electron Device Letters*, vol. 32, pp. 1044-1046, 2011.

K. Raleva, D. Vasileska, S. M. Goodnick and M. Nedjalkov, Modeling Thermal Effects in Nanodevices, *IEEE Transactions on Electron Devices*, vol. 55, issue 6, pp. 1306-1316, June 2008.

H. R. Khan, D. Mamaluy, and D. Vasileska, "Quantum Transport Simulation of Experimentally Fabricated Nano-FinFET," *IEEE Transactions on Electron Devices*, vol. 54, issue 4, pp. 784-796, 2007.

S. Krishnan, D. Vasileska, and M. Fischetti, "First Self-Consistent Full Band - 2D Monte Carlo - 2D Poisson Device Solver for Modeling SiGe p-Channel Devices," *Journal of Vacuum Science & Technology B*, vol. 24, issue 4, pp. 1997-2003, 2006.

D. Vasileska, C. Prasad, H. H. Wieder, and D. K. Ferry, "Green's Function Approach for Transport Calculation in a In_{0.53}Ga_{0.47}As/In_{0.52}Al_{0.48}As Modulation-Doped Heterostructure," *Journal of Applied Physics*, vol. 93, pp. 3359-3363, 2003.

W.J. Gross, D. Vasileska, and D.K. Ferry, "3-D simulations of Ultra-small MOSFETs: The Role of the Discrete Impurities on the Device Terminal Characteristics," *Journal of Applied Physics*, vol. 91, pp. 3737-3740, 2002.

**Vijay Vittal**

Professor
Director, Power Systems
Engineering Research Center
Ph.D., Iowa State University
vijayvittal@asu.edu
480-965-1879

research expertise: electric power, power system dynamics and controls, nonlinear systems, computer applications in power, sustainable energy, modeling and simulation of complex systems

biosketch: Vijay Vittal joined ASU in 2005. Previously, he was an Anston Marston Distinguished Professor at Iowa State University's Electrical and Computer Engineering Department. In addition, he was a Murray and Ruth Harpole Professor and director of the university's Electric Power Research Center and site director of the NSF/IUCRC Power Systems Engineering Research Center (PSERC). Currently, he is the director of PSERC, headquartered at ASU. From 1993 to 1994, he served as the program director of power systems for the NSF Division of Electrical and Communication Systems in Washington, DC. He was the editor-in-chief of the *IEEE Transactions on Power Systems* from 2005-2011. Vittal has published 122 articles in refereed journals, 105 refereed conference proceeding articles, nine books and book chapters, and 13 research and technical reports.

honors and distinctions: National Academy of Engineering, 2004; Ira A. Fulton Chaired Professor; Iowa State University College of Engineering Anson Marston Distinguished Professor, 2004; Foundation Award for Outstanding Achievement in Research, 2003; IEEE Fellow; IEEE Power Engineering Society Technical Council Committee of the Year Award, 2000-2001; Outstanding Power Engineering Educator Award, PES, IEEE, 2000; Warren B. Boast Undergraduate Teaching Award, 2000.

selected publications:

Zhang, H., V. Vittal, G.T. Heydt, J. Quintero, "A Mixed-Integer Linear Programming Approach for Multi-Stage Security-Constrained Transmission Expansion Planning," *IEEE Transactions on Power Systems*, vol. 27, no. 2, pp. 1125-1133, May 2012.

Hou, G., V. Vittal, "Cluster Computing Based Trajectory Sensitivity Analysis Application to the WECC System," *IEEE Transactions on Power Systems*, vol. 27, no.1, pp. 502-509, Feb. 2012.

Ma, F., V. Vittal, "Right-Sized Power System Dynamic Equivalents for Power System Operation," *IEEE Transactions on Power Systems*, vol. 26, no. 4, pp.1998-2005, Nov. 2011.

Zhang, Q., V. Vittal, G.T. Heydt, N. Logic, S. Sturgill, "The Integrated Calibration of Synchronized Phasor Measurement Data in Power Transmission Systems," *IEEE Transactions on Power Delivery*, vol. 26, no. 4, pp. 2573-2581, Oct. 2011.

Wang, C., V. Vittal, K. Sun, "OBDD-Based Sectionalizing Strategies for Parallel Power System Restoration," *IEEE Transactions on Power Systems*, vol. 26, no. 3, pp. 1426-1433, Aug. 2011.



Hongbin Yu
Assistant Professor
Ph.D., University of Texas at Austin
yuhb@asu.edu
480-965-4455

research expertise:

nanostructure and nanodevice fabrication and characterization, nanoelectronics, flexible and transparent electronics, transport in metallic and semiconducting nanostructures and molecules,

quantum size effect in metallic and semiconducting nanostructures, surface and interface physics and chemistry

biosketch: Hongbin Yu joined ASU in 2005. He received a Ph.D. in physics in 2001 from the University of Texas at Austin, and a M.S. in physics in 1996 from Peking University, P.R. China, and conducted his post-doctoral research at California Institute of Technology and University of California at Los Angeles.

honors and distinctions: Graduate Research Award, American Vacuum Society, 2001.

selected publications:

Kevin Chen, Ebraheem Azhar, Teng Ma, Hanqing Jiang, and Hongbin Yu, "Facile large-area photolithography of periodic sub-micron structures using a self-formed polymer mask," *Applied Physics Letters*, vol. 100, 233503, 2012.

Hongbin Yu, Ebraheem Ali Azhar, Tej Belagodu, Swee Lim, and Sandwip Dey, "ZnO Nanowire Based Visible-Transparent Ultraviolet Detectors on Polymer Substrates", *Journal of Applied Physics*, vol. 111, 102806, 2012.

Wei Xu, Alan Chin, Laura Ye, Cun-Zheng Ning and Hongbin Yu, "Space-Charge limited Charge Transport in GaSb Nanowires", *Journal of Applied Physics*, vol. 111, 104515, 2012.

Wei Xu, Saurabh Sinha, Tawab Dastagir, Hao Wu, Bertan Bakalloglu, Donald S. Gardner, Yu Cao, and Hongbin Yu, "Performance enhancement of on-chip inductors with permalloy magnetic rings," *IEEE Electron Device Letter*, vol. 32, issue 1, pp. 69-71, 2011.

Baoquan Ding, Hao Wu, Wei Xu, Hongbin Yu, and Hao Yan, "Interconnecting gold islands with DNA origami nanotubes," *Nano Letters*, vol. 10, pp. 5065-5069, 2010.

Wei Xu, Saurabh Sinha, Feng Pan, Tawab Dastagir, Yu Cao, and Hongbin Yu, "Improved frequency response of on-chip inductors with patterned magnetic dots," *IEEE Electron Device Letters*, vol. 31, issue 3, pp. 207-209, 2010.

Cunjiang Yu, Kevin O'Brien, Yong-Hang Zhang, Hongbin Yu, and Hanqing Jiang, "Tunable optical gratings based on buckled nanoscale thin films on transparent elastomeric substrates," *Applied Physics Letters*, vol. 96, 041111, 2010.



Hongyu Yu
Assistant Professor, Ph.D.,
University of Southern California
hongyuyu@asu.edu;
(480) 747-7454

research expertise:

wireless environmental sensing and communication, microfluidic analysis systems, acoustic transducers, micro seismometer, accelerometer, and mass spectrometer

biosketch: Hongyu Yu joined ASU in 2008 holding a joint position at the School of Earth and Space Exploration and the School of Electrical, Computer and Energy Engineering. He received his B.S. and M.S. degrees in electronics engineering from Tsinghua University, Beijing, China, in 1997 and 2000, respectively, and a Ph.D. degree in electrical engineering from the University of Southern California in 2005. His research area is focused on microelectromechanical systems (MEMS) for earth and space exploration. His goal is to provide miniaturized portable platforms and instruments for scientists to explore a variety of earth environments and space science, such as seismology, biogeochemistry, volcanology and astrobiology. His current projects include: miniature seismometers for earth and moon exploration, flexible and stretchable shear stress sensor for river and hot spring monitoring, wireless radiation, UV and IR sensing, 3D MEMS/NEMS manufacturing, wireless circuit component development and micro batteries.

selected publications:

X. Qiu, R. Tang, R. Liu, H. Huang, S. Guo and H. Yu, "A Micro Initiator Realizes by Reactive Ni/Al Nanolaminates," *Journal of Materials Science: Materials in Electronics*, April 2012.

Z. Wang, X. Qiu, J. Shi and H. Yu, "Room Temperature Ozone Detection Using ZnO-based Film Bulk Acoustic Resonator (FBAR)," *Journal of the Electrochemical Society*, vol. 159, issue 1, pp. J13-J16, 2012.

Xiaotun Qiu, Rui Tang, Shih Jui Chen, Hao Zhang, Wei Pang, Hongyu Yu, "PH measurements with ZnO-based surface acoustic wave resonator," *Electrochemistry Communications*, vol. 13, issue 5, pp. 488-490, 2011.

J. Zhu, C. Lee, E.S. Kim, D. Wu, C. Hu, Q. Zhou, K.K. Shung, and H. Yu, "High-overtone self-focusing acoustic transducers for high frequency ultrasonic Doppler," *Ultrasonics*, vol. 50, issue 6, pp. 544-547, May 2010.

X. Qiu, J. Zhu, J. Oiler, C. Yu, Z. Wang, and H. Yu, "Film bulk acoustic-wave resonator based ultraviolet sensor," *Applied Physics Letters*, vol. 94, issue 15, April 2009.

C. Yu, Z. Wang, H. Yu, and H. Jiang, "A stretchable temperature sensor based on elastically buckled thin-film devices on elastomeric substrates," *Applied Physics Letters*, vol. 95, issue 14, Oct. 2009.

H. Yu, L. S. Ai, M. Rouhanizadeh, D. Patel, E. S. Kim, and T. K. Hsiai, "Flexible polymer sensors for in vivo intravascular shear stress analysis," *Journal of Microelectromechanical Systems*, vol. 17, issue 5, pp. 1178-1186, 2008.



Junshan Zhang
Professor
Ph.D., Purdue University
junshan.zhang@asu.edu
480-727-7389

research expertise:

network optimization and management, cyberphysical systems with applications to smart grid, wireless communications, complex network dynamics, information theory, and stochastic modeling and analysis

biosketch: Junshan Zhang joined the ASU faculty as an assistant professor in August 2000. He received a B.S. degree in electrical engineering from HUST, China, in 1993, an M.S. degree in statistics from the University of Georgia in 1996, and a Ph.D. degree in electrical and computer engineering from Purdue University in 2000. He was general chair for IEEE Communication Theory Workshop in 2007. He will be TPC co-chair for INFOCOM 2012. He is currently serving as an editor for *Computer Networks Journal* and *IEEE Wireless Communication Magazine*.

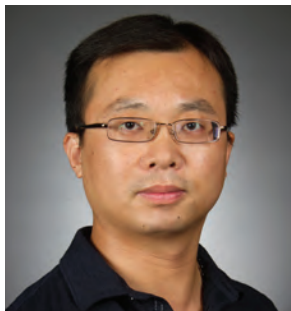
honors and distinctions: IEEE INFOCOM 2009 Best Paper Award runner-up; IEEE ICC 2008 Best Paper Award; ONR YIP Award, 2005; IEEE Fellow; NSF CAREER Award, 2003.

selected publications:

P. S. C. Thejaswi, J. Zhang, S. Pun, V. H. Poor, and D. Zheng, "Distributed opportunistic scheduling with two-level channel probing," *IEEE/ACM Transactions on Networking*, 2010.

D. Zheng, W. Ge, and J. Zhang, "Distributed opportunistic scheduling for ad-hoc networks with random access: An optimal stopping approach," *IEEE Transactions on Information Theory*, vol. 55, issue 1, pp. 205-222, Jan. 2009.

J. Zhang, D. Zheng, and M. Chiang, "The impact of stochastic noisy feedback on distributed network utility maximization," *IEEE Transactions on Information Theory*, vol. 54, issue 2, pp. 645-665, Feb. 2008.

**Yanchao Zhang**

Associate Professor
Ph.D., University of Florida
yczhang@asu.edu
480-727-0039

research expertise: network and distributed system security, wireless networking, and mobile computing

biosketch: Yanchao Zhang joined ASU in 2010. Previously, he was an assistant professor of electrical and computer engineering at New Jersey Institute of Technology from 2006 to 2010. He is an associate editor of IEEE Transactions on Vehicular Technology and a technical editor of IEEE Wireless Communications. He was a guest editor of IEEE Wireless Communications Special issue on security and privacy in emerging wireless networks in 2010 and a symposium TPC co-chair of IEEE GLOBECOM 2010. He also routinely serves as a TPC member for major international conferences such as INFOCOM, ICDCS, ICNP, MobiHoc, PerCom, NDSS, WiSec and SECON.

honors and distinctions: NSF CAREER Award, 2009.

selected publications:

Rui Zhang, Yanchao Zhang, and Kui Ren, "Distributed privacy-preserving access control in sensor networks," IEEE Transactions on Parallel and Distributed Systems, Aug. 2012.

Rui Zhang, Jing Shi, Yanchao Zhang, and Jinyuan Sun, "Secure cooperative data storage and query processing in unattended tiered sensor networks," IEEE Journal on Selected Areas in Communications, vol. 30, no. 2, pp. 433-441, Feb. 2012.

Rui Zhang, Yanchao Zhang, and Chi Zhang, "Secure top-k query processing via untrusted location-based service providers," IEEE International Conference on Computer Communication (INFOCOM'12), Orlando, Fla., March 2012 (complete version).

Rui Zhang, Yanchao Zhang, Jinyuan Sun, and Guanhua Yan, "Fine-grained private matching for proximity-based mobile social networking," IEEE International Conference on Computer Communication (INFOCOM'12), Orlando, Fla., March 2012.

Rui Zhang, Yanchao Zhang, and Yuguang Fang, "AOS: An anonymous overlay system for mobile ad hoc networks," ACM Wireless Networks, vol. 17, no. 4, pp. 843-859, May 2011.

**Yong-Hang Zhang**

Professor
Director, Center for Photonics Innovation
Ph.D., Max-Planck-Institute for Solid States and University Stuttgart, Germany
yhzhang@asu.edu
480-965-2562

research expertise: optoelectronic materials and devices such as solar cells, laser diodes and photodetectors

biosketch: Yong-Hang Zhang joined ASU in 1996 from Hughes Research Laboratories. He has edited three books/proceedings, authored or coauthored five issued U.S. patents, one book chapter and 214 refereed journal or proceeding papers, and given 53 invited talks and 226 contributed conference presentations.

honors and distinctions: IEEE Senior Member; Innovation and Excellence in Laser Technology and Applications Award from Hughes Research Labs; chair and co-chair of numerous international conferences and workshops.

selected publications:

J.-J. Li, X. Liu, S. Liu, S. Wang, D. J. Smith, D. Ding, S. R. Johnson, J. K. Furdyna and Y.-H. Zhang, "CdSe/CdTe type-II superlattices grown on GaSb (001) substrates by molecular beam epitaxy," Applied Physics Letters, vol. 100, 121908, 2012.

J. Fan, L. Ouyang, X. Liu, D. Ding, J. K. Furdyna, D. J. Smith, and Y.-H. Zhang, "Influence of temperature ramp on the materials properties of GaSb grown on ZnTe using molecular beam epitaxy," Journal of Vacuum Science and Technology B, vol. 30, 02B122, 2012.

D. Ding, S. R. Johnson, S.-Q. Yu, S.-N. Wu, and Y.-H. Zhang, "A Semi-Analytical Model for Semiconductor Solar Cells," Journal of Applied Physics, vol. 110, 123104, 2011.

E. H. Steenbergen, B. C. Connelly, G. D. Metcalfe, H. Shen, M. Wraback, D. Lubyshev, Y. Qiu, J. M. Fastenau, A. W. K. Liu, S. Elhamri, O. O. Cellek, and Y.-H. Zhang, "Significantly improved minority carrier lifetime observed in a long-wavelength infrared III-V type-II superlattice comprised of InAs/InAsSb," Applied Physics Letters, vol. 99, 251110, 2011.

J.-J. Li, S. H. Lim, C. R. Allen, D. Ding and Y.-H. Zhang, "Combined effects of shunt and luminescence coupling on external quantum efficiency measurements of multi-junction solar cells," IEEE Journal of Photovoltaics, vol. 1, pp. 225-230, 2011.

K. Hild, I.P. Marko, S. J. Sweeney, S. R. Johnson, S.-Q. Yu, Y.-H. Zhang, "Influence of de-tuning and non-radiative recombination on the temperature dependence of 1.3 μ m GaAsSb/GaAs vertical cavity surface emitting lasers," Applied Physics Letters, vol. 99, 071110-0711102, 2011.

S.-N. Wu, D. Ding, S. R. Johnson, S.-Q. Yu, and Y.-H. Zhang, "Four-junction solar cells using monolithically integrated II-VI and III-V semiconductors," Progress in Photovoltaics: Research and Applications, vol. 18, pp. 328-333, 2010.

S. Wang, D. Ding, X. Liu, X.-B. Zhang, D. J. Smith, J. K. Furdyna, and Y.-H. Zhang, "MBE growth of II/VI materials on GaSb substrates for photovoltaic applications," Journal of Crystal Growth, vol. 311, pp. 2116-2119, 2009.

**in memorium****Richard Farmer**

Research Professor
M.S., Arizona State University

Professor Richard Farmer, who taught electrical engineering at Arizona State University for most of the past 45 years passed away at his home in Phoenix in the spring.

"Professor Farmer was a tireless contributor to our electrical engineering programs and the electric power industry for more than four decades. During his service at ASU, he made a positive impact on thousands of our students," said Stephen Phillips, a professor and director of the School of Electrical, Computer and Energy Engineering.

Farmer earned his master's degree in engineering from ASU in 1964. The next year he began work at Arizona Public Service Co. (APS), where he would eventually become principal engineer.

In 1966 he began teaching one course each semester at the university. After retirement from APS in 1994, having spent almost 30 years with the company, he began teaching additional courses and later attained full professorship.

He was elected to the National Academy in 2006. The honor is among the highest distinctions in engineering, as it recognizes outstanding contributions to engineering research and education, advancement of engineering fields and pioneering of new technology.

In 1986 Farmer was elected to the status of Fellow of the Institute of Electrical and Electronics Engineers (IEEE), the world's largest professional association for the advancement of technology.

In 2007 the IEEE's Power Engineering Society gave him the highly prestigious Charles Concordia Power Systems Engineering Award for "innovation in the development, analysis, measurement and mitigation techniques for subsynchronous resonance and leadership in the area of power system dynamic analysis."

In 2010, the IEEE Power Engineering Society awarded him its Outstanding Power Engineering Educator Award for "outstanding contributions and leadership" in power system engineering education.

He was a valued mentor to both students and younger colleagues.



Devarajan "Srin" Srinivasan, electrical engineering M.S. '97 and Ph.D. '02, Ira A. Fulton, and Rick Hudson, B.S., electrical engineering, '97, at E2 Camp.

Be a part of Electrical Engineering

We had a great start to the fall semester at E2 Camp. Thanks to everyone who helped out and volunteered. Ira A. Fulton joined the excitement and met some of the incoming class of 2016. Mark your calendars to help out next year!

Have you seen our new look at ecee.engineering.asu.edu? We have made some changes to better serve you and all of our web visitors. Like us on Facebook (School of Electrical, Computer and Energy Engineering at ASU) to connect with students and other alumni in ECEE.

Keep up to date on news about Fulton Engineering and ECEE at our news site, Full Circle (fullcircle.asu.edu). Do you have your own news to add to the ECEE section of Full Circle? We want you to remain a part of the ECEE family—share your stories with us about accomplishments, exciting news and plans! Contact Veronica Brauchli, veronica.brauchli@asu.edu, so we can celebrate with you.

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Faculty and staff recognition

IMPACT and Fulton Difference Award Recipients

Teamwork – Jared Broderick, Cynthia Moayedpardazi, Donna Rosenlof, Farah Kiaei, Ginger Rose

IMPACT and Fulton Difference Award Nominees

Performance – Lori Brichetto, Jenna Marturano

Achievement – Emily Fassett

Customer Service – Loriann Brichetto, Julie Castro, Theo Eckhardt, Nancy Osgood

Fulton Difference – Clayton Javurek

ASU Service Recognition

30 years – Dieter Schroder

25 years – Rebecca Davis

20 years – David Allee, Esther Korner, Jennie Si

15 years – Stephen Goodnick, Yong-Hang Zhang

10 years – Sabrina Beck, Lauren Levin, Cynthia Moayedpardazi, Nongjian Tao, Cihan Tepedelenlioglu

5 years – Jared Broderick, Emily Fassett, Gennady Gildenblat, Theresa Herr, Deirdre Meldrum, Cun-Zheng Ning, Nancy Osgood, Merri Platt, Donna Rosenlof, Evie Selberg

SUN Awards

Loriann Brichetto

Jenna Marturano

Brett Dellandre

Cynthia Moayedpardazi

Laura DiPaolo

Nancy Osgood

Theo Eckhardt

Ginger Rose

Emily Fassett

Donna Rosenlof

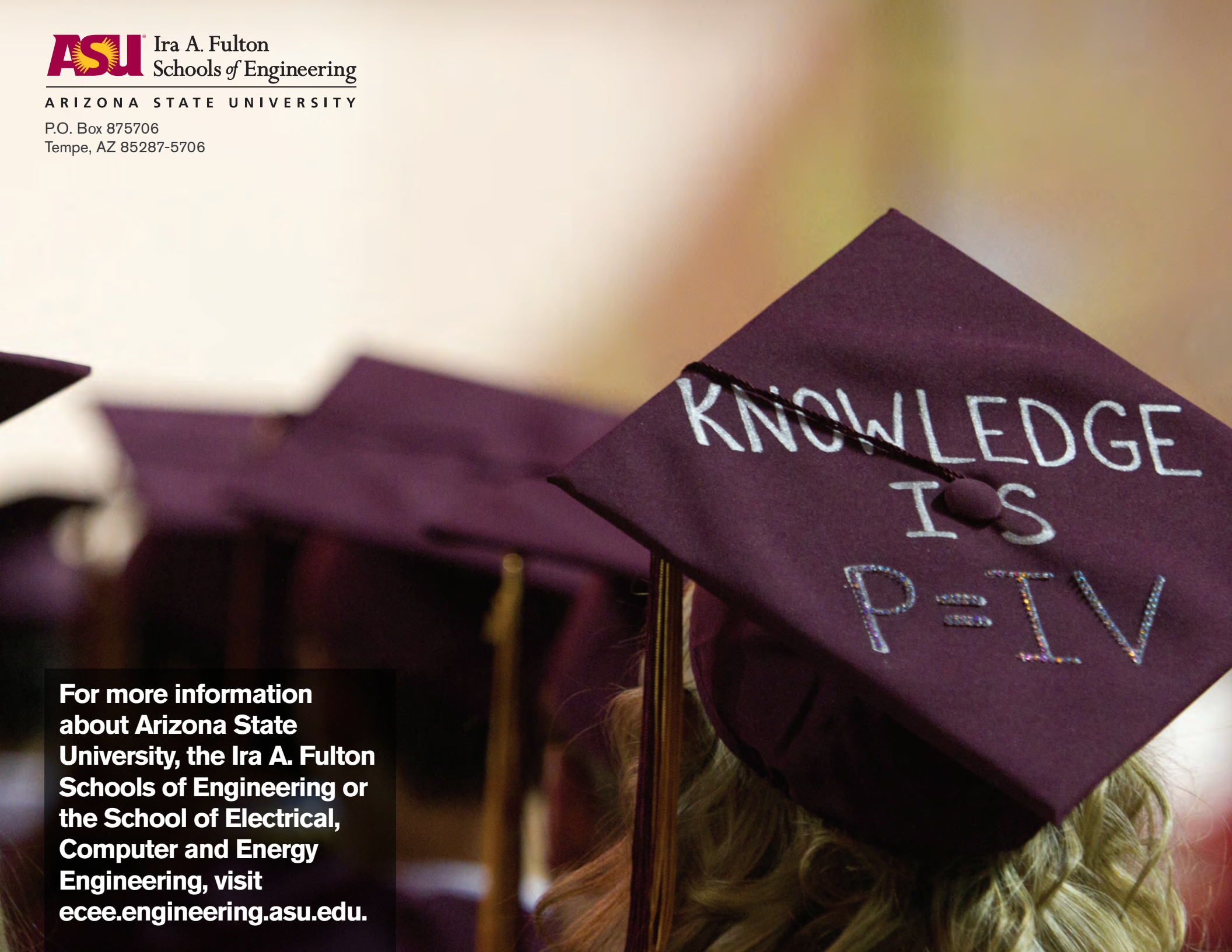
Clayton Javurek

Brian Skromme

Farah Kiaei

ECEE students present their senior capstone project, a comprehensive design experience for engineering students in the final year of their undergraduate studies preparing them for the transition from student to practicing engineer.





KNOWLEDGE
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Schools of Engineering or
the School of Electrical,
Computer and Energy
Engineering, visit
ecee.engineering.asu.edu.**