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

IRA A. FULTON SCHOOLS OF engineering
ARIZONA STATE UNIVERSITY

Annual Report 2012-2013

the fulton schools of engineering

school of biological and health systems engineering

Marco Santello, School Director
enrollment 930
undergraduate 771
graduate 159

DEGREE PROGRAM
biomedical engineering
(Harrington Bioengineering program)

school of computing, informatics, and decision systems engineering

Ronald G. Askin, School Director
enrollment 2,872
undergraduate 1,908
graduate 964

DEGREE PROGRAMS
computer engineering
computer science
computer systems engineering
engineering management
industrial engineering
informatics

school of electrical, computer and energy engineering

Stephen M. Phillips, School Director
enrollment 2,003
undergraduate 906
graduate 1,097

DEGREE PROGRAMS
computer engineering
electrical engineering

school for engineering of matter, transport and energy

Kyle Squires, School Director
enrollment 2,983
undergraduate 2,402
graduate 581

DEGREE PROGRAMS
aerospace engineering
chemical engineering
materials science and engineering
mechanical engineering
solar energy engineering and commercialization

school of sustainable engineering and the built environment

G. Edward Gibson, Jr., School Director
enrollment 1,201
undergraduate 938
graduate 263

DEGREE PROGRAMS
civil, environmental and sustainable engineering
construction engineering
construction management
(Del E. Webb School of Construction program)

10,253
fall 2013 enrollment

$79.7M
research expenditures
FY2013 estimated

Christi Mendoza, education and outreach coordinator for Quantum Energy and Sustainable Solar Technologies (QESST), works with students building solar cars in Fulton Engineering's BEST program.

IRA A. FULTON SCHOOLS OF engineering
ARIZONA STATE UNIVERSITY

IRA A. FULTON SCHOOLS OF ENGINEERING
School of Electrical, Computer and Energy Engineering
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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 2012-2013
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.

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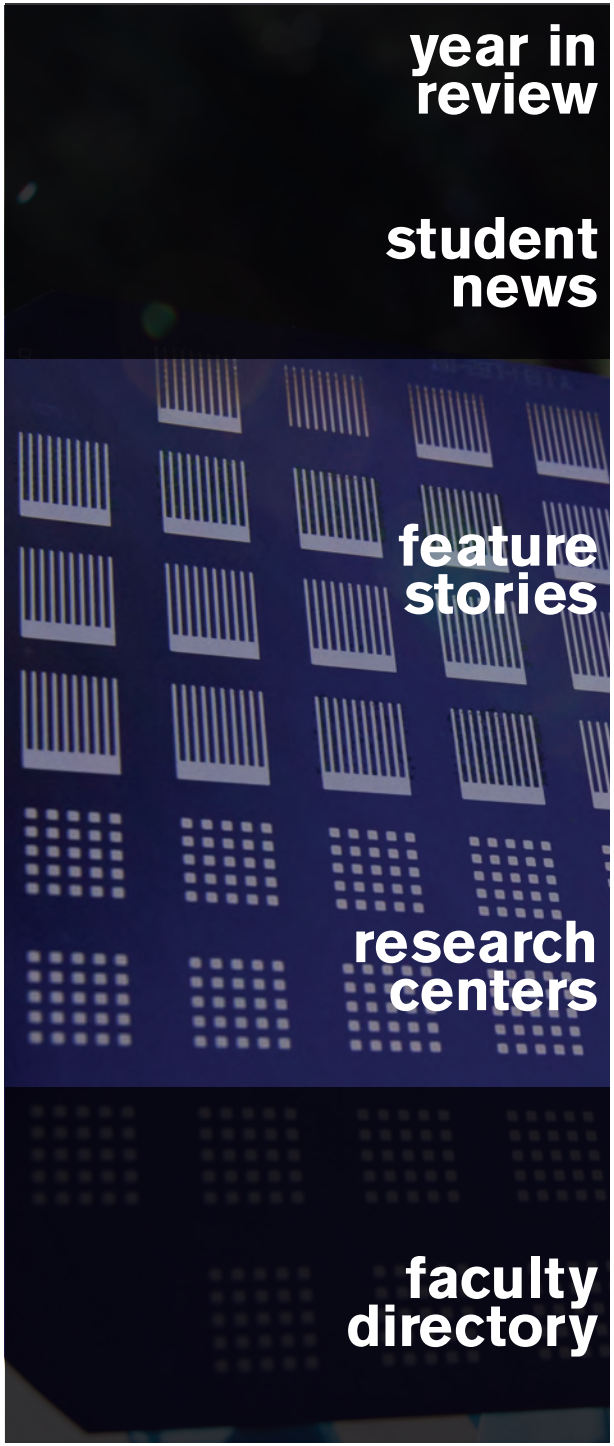

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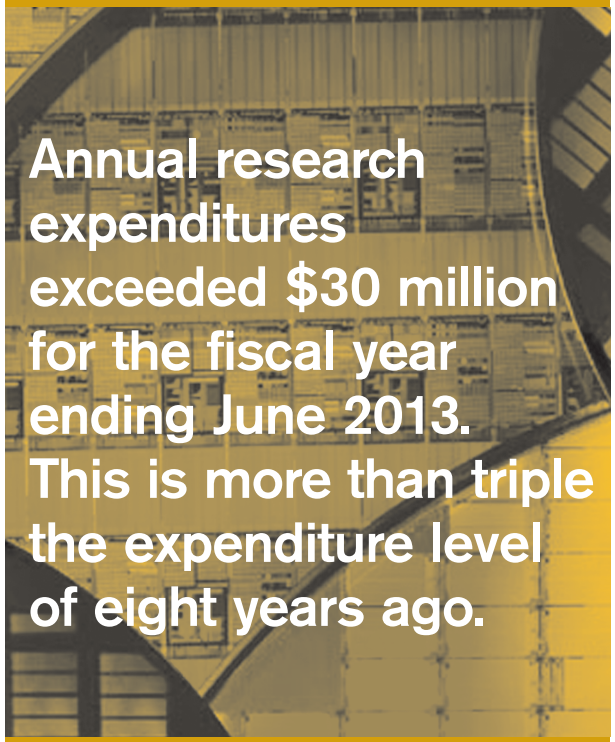
continued strength

Our faculty, students and staff continued their collaborate efforts to strengthen and grow our programs in the ECEE School and its programs this past year. These efforts have provided continued strength in research performance, growth in student enrollment at all levels and the rollout of innovative new academic programs.

Stephen M. Phillips

Annual research expenditures continue to grow, although only modestly over last year's level due in part to the effects of the federal sequester. Our expenditures of just over $30 million for the fiscal year ending June 2013 is more than triple the expenditure level of eight years ago when the expenditures had not exceeded $10 million. The $30 million total represents about $500,000 in expenditures per tenured or tenure-track faculty member. This expenditure level is also the highest of any school, department or academic unit at the university. Key to achieving these results are the contributions of several large research centers described later in this report.

Our primary focus is the education of students and they play prominent roles in our research. The majority of our research expenditures includes funding for students in our research program. In addition to graduate students working on sponsored project research, we engage undergraduates and even some high school students in our research labs. In addition to external sponsored projects, we have a variety of fellowships, scholarships and research stipends for all levels of students provided by gifts from generous alumni, corporations and friends.



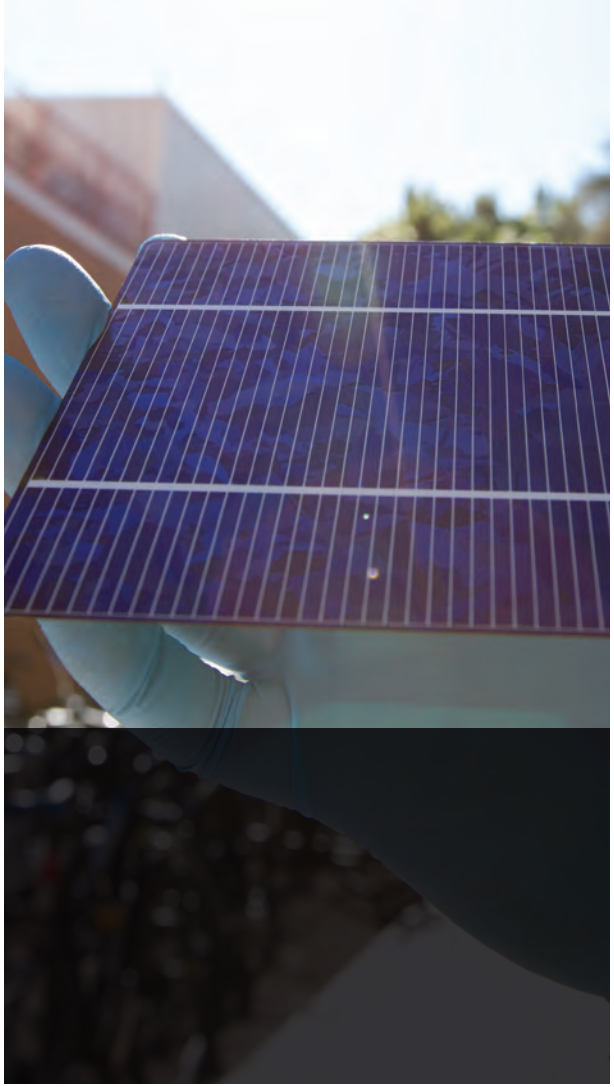
Enrollment in our academic programs has grown significantly over the past few years from about 1,200 seven years ago to more than 2,000 in fall 2012. This includes an all-time high enrollment of more than 300 Ph.D. students. This enrollment level is an average of more than five Ph.D. students per tenured 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. Our graduate programs remain highly recognized with our EE graduate program ranked 31 by US News and World Report and ranked in the top 20 by the National Research Council.

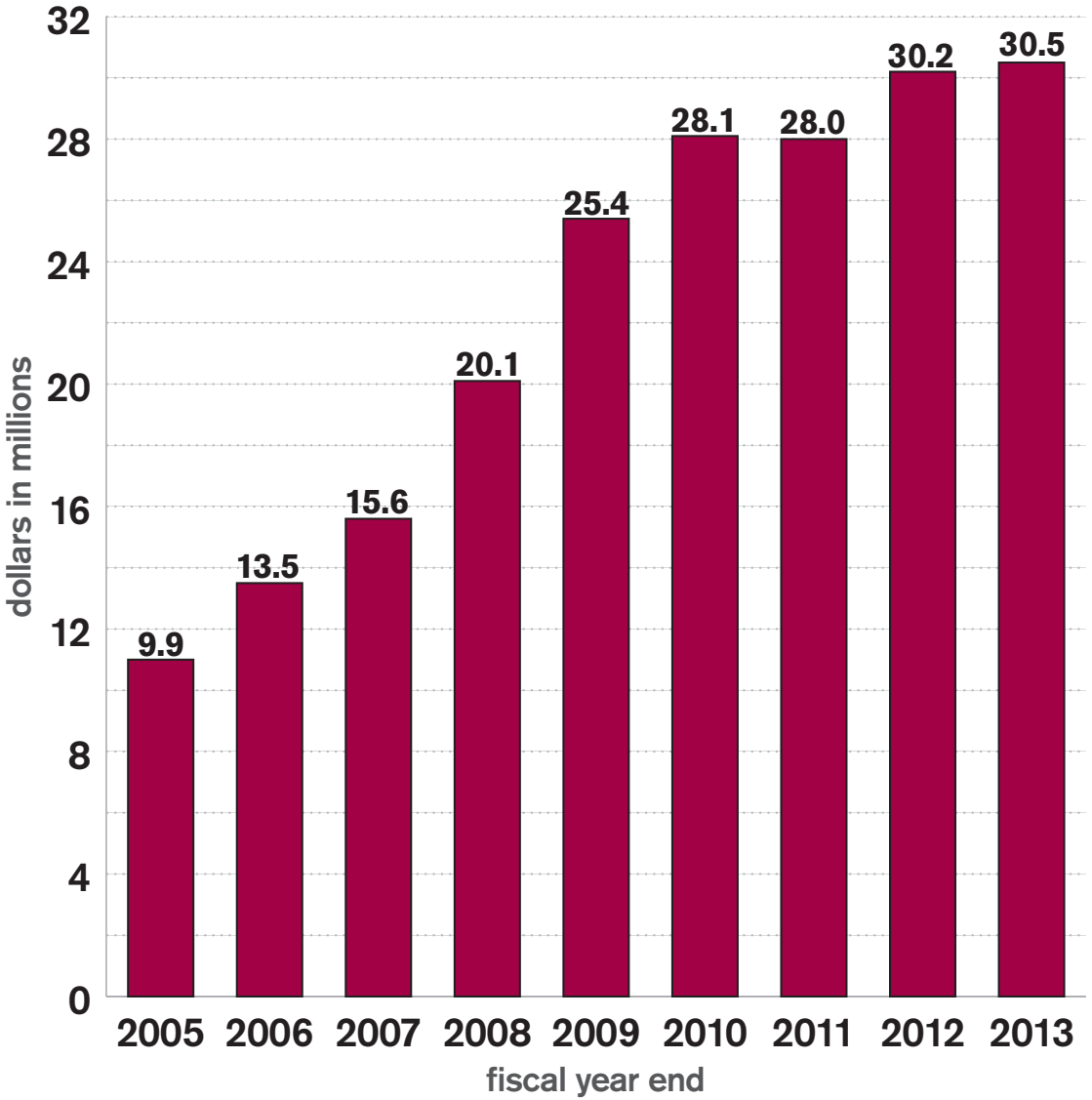
This fall we launched the online delivery of our B.S.E. program. This new delivery mechanism for our existing program is the first bachelor's level engineering program available in a 100 percent online format that is listed as accredited by ABET. This increased access has helped grow our bachelor's program enrollment to more than 900. We are looking forward to leveraging online tools to provide an improved experience for all of our students.

We continue to accelerate our progress through aggressive faculty hiring. The extraordinary efforts of our dedicated faculty, staff and students continue to drive the success of our school.

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	2
IEEE Fellows	21
NSF CAREER	12
DoD/ONR – YIP	5

Three named IEEE Fellows

Professors Lina Karam, Cun-Zheng Ning and Antonia Papandreou-Suppappola have been elected Fellows of the Institute of Electrial and Electronics Engineers (IEEE).

Karam is recognized for contributions to human perception-based visual processing, image and video communications and digital filtering.

Ning is recognized for contributions to nanophotonics and nanowire lasers.

Papandreou-Suppappola is recognized for contributions to applications of time-frequency signal processing.

Ning, Zhang named OSA Fellows

Professors Cun-Zheng Ning and Yong-Hang Zhang are among new Fellows of the Optical Society of America (OSA). The OSA recognized Ning's wide range of contributions to nanophotonics, optoelectronics and laser physics. Zhang was elected in recognition of his contributions to semiconductor electronics.

Top 5 percent teachers honorees

David Allee
Yu (Kevin) Cao
Michael Goryll
Kory Hedman
Armando Rodriguez
Marco Saraniti
Dieter Schroder

Engineering leadership earns Vittal prestigious honor

Vijay Vittal

Vijay Vittal, the Ira A. Fulton Chair Professor, was selected to receive the Herman Halperin Electric Transmission and Distribution Award from the Institute of Electrical and Electronics Engineers (IEEE).

The award recognizes his contribution to "development of power system stability assessment methods leading to the maximum utilization and increased reliability of transmission lines."

The IEEE technical field honors are awarded for contributions or leadership in specific areas of interest to the institute.

The Herman Halperin award is named for a pioneer in the design and operation of electric plant facilities and power-distribution systems.

Chaitali Chakrabarti

Chakrabarti leading advance in portable 3-D ultrasound technology

Professor Chaitali Chakrabarti and students Ming Yang and Siyuan Wei shared the Best Paper Award at the 2013 International Symposium on High-Performance Computer Architecture in Shenzhen, China, with colleagues Richard Sampson and Thomas Wenisch of the University of Michigan.

Their paper, "Sonic Millip3De: Massively Parallel 3D-Stacked Accelerator for 3D Ultrasound," focuses on the team's work on development of a portable ultrasound device that in three to four years will be capable of operating at a five-watt power budget while still producing high-quality images.

Of note: Chakrabarti was selected as one of four alumni to receive the Distinguished ECE Alumni Award from the Electrical and Computer Engineering Department at the University of Maryland.

Hui recognized by Arizona Manufacturers Council

Joseph Hui won an Excellence in Innovation award from the Arizona Manufacturers Council for his solar technology development venture, Monarch Power. His company is developing the Lotus, a solar "flower" that tracks the sun and folds up at night.

Joseph Hui's Lotus solar "flower"

David Frakes

Frakes honored for pioneering health care innovation

David Frakes' work in personalized management of cerebral aneurysms earned him ASU's 2013 Faculty Excellence Award, Defining Edge Research and Creative Work—Innovation.

He has developed a software platform, the EndoVascular Interventional Suite, which introduces a new endovascular treatment paradigm where quantitative engineering interacts seamlessly with personalized treatment design. The assistant professor holds a joint appointment in the School of Biological and Health Systems Engineering and Electrical, Computer and Energy Engineering.

honors and recognition

Bisgrove Scholar working with Zhang to advance photovoltaics

Alexander Kirk, postdoctoral scholar, began work at ASU in fall 2013 through a Bisgrove Scholar award from Science Foundation Arizona.

Kirk will conduct research that involves the design, modeling and development of ultra-thin multi-junction solar photovoltaic cells. He will work with professor Yong-Hang Zhang. Kirk holds a Ph.D. in materials science and engineering from the University of Texas.

recent books by faculty

Daniel W. Bliss, Adaptive Wireless Communications: MIMO Channels and Networks, Cambridge University Press, 2013.

George G. Karady and Keith E. Holbert, Electrical Energy Conversion and Transport: An Interactive Computer-Based Approach (second edition), Wiley-IEEE Press, 2013.

Vijay Vittal, Raja Ayyanar, Grid Integration and Dynamic Impact of Wind Energy, Springer, New York, 2013.

Henry Braun, Santoshi T. Buddha, Venkatachalam Krishnan, **Cihan Tepedelenlioglu, Andreas Spanias,** Toru Takehara, Ted Yeider, **Mahesh Banavar,** Shinichi Takada, Signal Processing for Solar Array Monitoring, Fault Detection, and Optimization, Morgan & Claypool, 2012.

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, Australia
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 Research Professor
Ph.D., University 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, Ukraine
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.

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, Canada; 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, nliten Energy

Larry Cooper, Ret., Office of Naval Research

Jeffrey Cotter, SunPower Corp.

Josef Debbins, Barrows Neurological Institute

Ding Ding, Soitec Phoenix Labs

Frank Hoppensteadt, New York University

Stephen D. Howard, Defence Science and Technology Organization

Frank Jahnke, Sonata Biosciences, Inc.

Bahar Jalali-Farahani, Arizona State University

Elias Kyriakides, University of Cypress

William Lepkowski, SJT Micropower

Michael McGarry, University of Texas at El Paso

William Moran, The University of Melbourne

Katerina Raleva, SS Cyril and Methodius University

Raymond Tsui, Raydis LLC

Seth Wilk, SJT Micropower

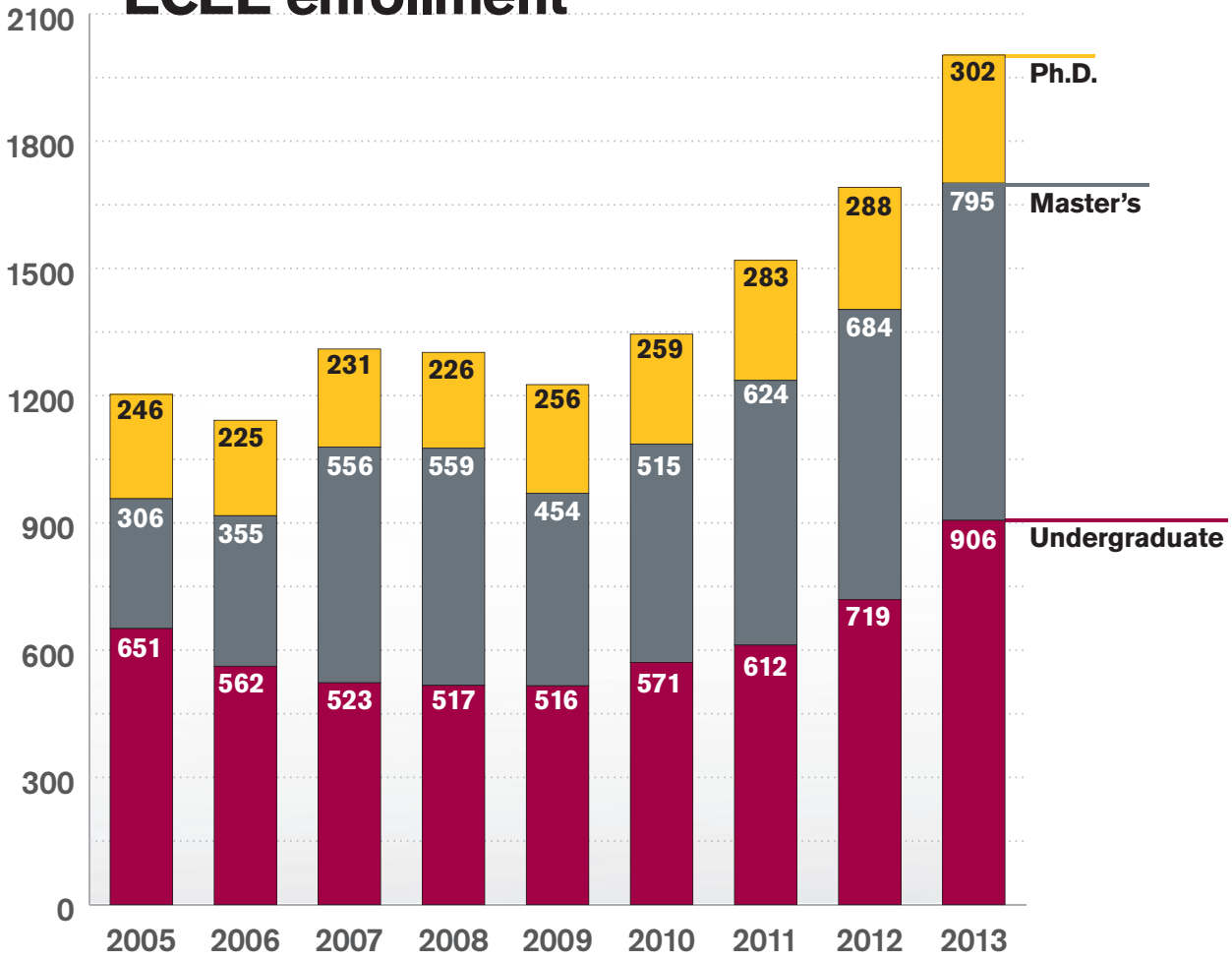
undergraduate scholarships and honors

Total undergraduates	**906**
Total students in Barrett, The Honors College	126
New freshmen in Barrett, The Honors College	43
Merit Scholars	21
Flinn Scholars*	2
National Hispanic Scholars	6
National Merit Scholars*	14

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

Abhishek Dharan

ECEE enrollment



students

Undergraduate gains valuable experience through WISE internship

Abhishek Dharan was one of three IEEE student members to present their public policy research findings on Capitol Hill through the Washington Internships for Students of Engineering (WISE) program, a prestigious internship that brings outstanding engineering students to Washington, D.C., to learn how technical professionals can influence public policy on complex technological issues.

During the nine-week summer internship, students interact with government leaders, industry and nongovernmental organizations. Participants research an engineering-related topic of importance to the sponsoring society, then write and present a paper.

Dharan's project was "Telemedicine: A broadband application improving healthcare access and efficiency."

Fourteen students were selected for the 2012 summer program. Dharan is the third participant from ASU.

Mongrain wins NIST fellowship

R. Scott Mongrain was one of 11 students nationwide selected for the Boulder, Colo., Laboratories' National Institute of Standards and Technology (NIST) 2013 Summer Undergraduate Research Fellowship (SURF) program.

Schwerdt receives ABOR doctoral research grant

Helen Schwerdt will further research supported by a grant from the Arizona Board of Regents (ABOR). Her project, "Fully Passive Wireless Microsystem for Recording of Neuropotentials using Backscattering Effects," received funding of $5,000. ABOR provided one-time funds to support approximately 18 competitive doctoral dissertation research improvement grants through the Technology Research Initiative Fund.

NSF Graduate Research Fellowships

Two electrical engineering students received National Science Foundation Graduate Research Fellowships to support doctoral studies.

Justin Echols was awarded his bachelor's degree in spring 2013 and will continue his studies at ASU with graduate advisor Armando Rodriguez. Echols will focus his research on control systems—flight control in general and specifically control of hypersonic vehicles.

Jennie Appel earned a bachelor's degree in electrical engineering from Auburn University in 2012, the same year she came to ASU as a research associate. Appel will work with advisor Junseok Chae on microelectromechanical systems, using them to design and build sensors for devices that can detect signs of diseases or other health problems or improve detection of environmental hazards.

students

Graduate student awards

ABOR Doctoral Research Grant
Helen Schwerdt

Achievement Rewards for College Scientists
Derek Caselli, Helen Schwerdt

Barrett Electronic Materials Fellowship
Jacob Becker

Peter E. Crouch Excellence Award
Jay Prigmore

Dean's Award
Jennie Appel, Mark Bailly, Jacob Becker, Alfonso Dominguez, David Ganger, Mariam Hoseini, Steven Limpert, Alexander Maurer, Ky Merrill, Brian O'Donnell, Tim Reblitz, Preston Webster

Ford Graduate Engineering Fellowship
Shi Liu, Rui Zhang

Fulton Fellowship
Steven Limpert, Alexander Maurer, Ky Merrill, Tim Reblitz

Grand Challenges Summer Fellowship
Helen Schwerdt

IGERT: Solar Utilization Network (SUN)
James LeBeau

ISS: International Switching Symposium
Brian Proulx, Tong Zhu

University Graduate Fellowship
Craig Bush, Zhen Chen, Ahmet Durgan, Karl Dutson, Miao He, Xiaocong Jin, Jongwon Lee, Weichao Ma, Muhlis Kenan Ozel, Jay Prigmore, Alix Rivera-Albino, Steven Sandoval, Garrett Schlenvogt, Helen Schwerdt, Vivek Sharma, Mohammad Suga, Rui Zhang, Yuja Zhu

Summer 2012

Ganpathy Iyer—Evaluation of Epoxy Nanocomposites for High Voltage Insulation. Chair: Ravi Gorur

Korhan Kaftanoglu—Design of NMOS and CMOS Thin-Film Transistors and Application to Electronic Textiles. Chair: David Allee

Hyunjun Kim—Performance Analysis of MIMO Relay Networks with Beamforming. Chair: Cihan Tepedelenlioglu

JingJing Li—Novel Materials, Grid Design Rule, and Characterization Methods for Multi-Junction Solar Cells. Chair: Yong-Hang Zhang

Xuan Ni—Effect of Chaos and Complex Wave Pattern Formation in Multiple Physical Systems: Relativistic Quantum Tunneling, Optical Meta-materials and Co-evolutionary Game Theory. Chair: Ying-Cheng Lai

Bharadwaj R. Sathyanarayana—Sensitivity-based Pricing and Multiobjective Control for Energy Management in Power Distribution Systems. Chair: Gerald Heydt

Feng Wang—Channel Coding for Insertion/Deletion Channels. Chair: Tolga M. Duman

Shanshan Wang—Cognitive Communications in White Space: Opportunistic Scheduling, Spectrum Shaping, and Delay Analysis. Chair: Junshan Zhang

Wei Yao—Scalable Surface-Potential-Based Compact Model of High-Voltage LDMOS Transistors. Chair: Gennady Gildenblat

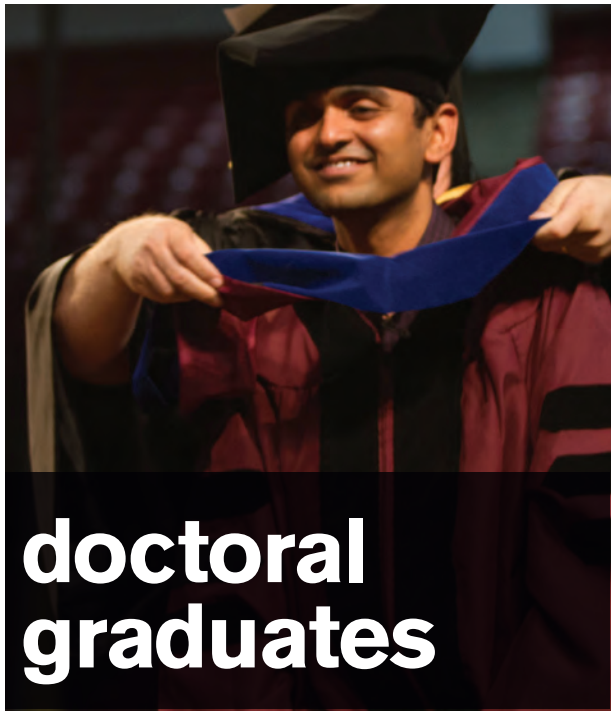
Xu Zhang—Power management interface circuit for MEMS (Micro-Electro-Mechanical-Systems) bio-sensing and chemical sensing applications. Chair: Junseok Chae

Fall 2012

Diana Arceo—Design Methodology for Multiport Antennas. Chair: Constantine Balanis

Sai Buddi—Statistical Signal Processing of ESI-TOF-MS for Biomarker Discovery. Co-chairs: Thomas Taylor and Douglas Cochran

Gajanan Dessai—Compact Modeling of Multi-Gate Transistors. Chair: Gennady Gildenblat



doctoral graduates

Shwetha Reddy Edla—Adaptive Parameter Estimation, Modeling and Patient-Specific Classification of Electrocardiogram Signals. Chair: Antonia Papandreou-Suppappola

Yunus Erme—Energy and Quality-Aware Multimedia Signal Processing. Chair: Chaitali Chakrabarti

Sara Eftekharnejad—The Impact of Increased Penetration of Photovoltaic Generation on Smart Grids. Co-chairs: Gerald Heydt and Vijay Vittal

Miao Fan—Probabilistic Power Flow Studies to Examine the Influence of Photovoltaic Generation on Transmission System Reliability. Chair: Vijay Vittal

Daniel Andrew Haughton—State Estimation for Enhanced Monitoring, Reliability, Restoration and Control of Smart Distribution Systems. Chair: Gerald Heydt

Nathan Hindman—Fully Automated Radiation Hardened by Design Circuit Construction. Chair: Lawrence Clark

Chu-Yu Lee—Diffusion-Weighted MR Imaging: Behaviors of Phenomenological Models and Enhanced PROPELLER Data Acquisition. Co-chairs: Joseph Debbins and Kevin Bennett

Pinakpani Nayak—Characterization of High-Resistivity Silicon-Bulk and SOI Wafers. Chair: Dieter Schroder

Venkata Sai Akshay Pulipaka—Traffic Characterization and Modeling of H.264 Scalable & Multi-View Encoded Video. Chair: Martin Reisslein

Dajun Qian—Network interdependence and information dynamics in cyber-physical systems. Chair: Junshan Zhang

Di Shi—Power Systems Network Reduction for Engineering and Economic Analysis. Chair: Daniel Tylavsky

Balasubramanian Sivakumar—Triple Sampling, an Application to a 14b 10MS/S Cyclic ADC. Chair: Bahar Jalali Farahani

Anupama Subramaniam—Circuit Analysis under Variation. Chair: Yu Cao

Jyothi Bhaskarr Velamala—Compact Modeling and Simulation for Digital Circuit Aging. Chair: Yu Cao

Le Wang—Asymptotic and Numerical Algorithms in Applied Electromagnet. Chair: George Pan

Lei Yang—Stochistic Optimization and Real-Time Scheduling in Cyber-Physical Systems. Chair: Junshan Zhang

Ender Yilmaz—Efficient Test Strategies for Analog/RF Circuits. Chair: Sule Ozev

Qing Zhang—Analysis of Sychronization and Accuracy of Synchrophasor Measurements. Co-chairs: Gerald Heydt and Vijay Vittal

students

Spring 2013

Mikal Askarian Amiri—Gain and Bandwidth Enhancement of Ferrite-Loaded CBS Antenna Using Material Shaping and Positioning. Chair: Constantine A. Balanis

Alex Fink—Re-Sonification of Objects, Events, and Environments. Chair: Andreas Spanias

Bakaji Padmanabhan—Modeling Reliability of Gallium Nitride High Electron Mobility Transistors. Chair: Dragica Vasileska

Jay Prigmore—A Neodymium Hybrid Fault Current Limiter. Chair: George Karady

Mojtaba Rahmati—On Asynchronous Communication Systems: Capacity Bounds and Relaying Schemes. Chair: Tolga Duman

Karthikeyan Natesan Ramamurthy—New Directions in Sparse Models for Image Analysis. Chair: Andreas Spanias

Jayaraman J. Thiagarajan—Sparse Methods in Image Understanding and Computer Vision. Chair: Andreas Spanias

Xianjun Zhang—Network Capacity Assessment of the CHP-based Distributed Generation on Urban Energy Distribution Networks. Chair: George Karady

Yuan Zhang—Performance Characterization of Communication Channels through Asymptotic and Partial Ordering Analysis. Chair: Cihan Tepedelenlioglu

ECEE Director Stephen Phillips presents the Palais Doctoral Award to Xuan Ni.

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.

Xuan Ni is the recipient of the 2012-2013 Palais Outstanding Doctoral Student Award. His mentor was Ying-Cheng Lai. Having graduated in summer 2012 with a perfect GPA, Ni played a key role during his doctoral studies in publishing a dozen papers in high-impact refereed journals such as Physical Review E, Europhysics Letters and Chaos.

Breaking the final barrier: room-temperature electrically powered nanolasers

Electrically powered nanoscale lasers have been able to operate effectively only in cold temperatures. Professor Cun-Zheng Ning is leading a research team that has been striving to enable them to perform reliably at room temperature, a step that would pave the way for their use in a variety of practical applications. Ning has been among engineers and scientists across the world attempting to fabricate a workable nanolaser with a volume smaller than its wavelength cubed – an intermediate step toward further miniaturization of lasers.

Miniaturizing lasers is crucial to making electronics smaller and better, and enabling them to operate faster. Packing more lasers into smaller spaces is necessary for downsized devices to maintain high performance. Being able to integrate more lasers onto a small microchip would make the next generations of computers faster and smaller. The wavelength scale is the next milestone to be achieved in the overall effort to enable more miniaturization.

Refining the shrinking technique

Ning explains that extremely small and thin lasers have been developed, but they needed to be optically driven by a larger laser. In addition, current electrically driven nanolasers can operate only at low temperatures and emit light only in short bursts or pulses.

To enable them to be useful in practical applications – particularly for improvements of electronic and photonic technologies – the smaller laser needs to operate at room temperature without a refrigeration system, receive power from a simple battery instead of by another laser, and emit light continuously.

"That has been the ultimate goal in the nanolaser research community," Ning says.

Ning's team started looking for solutions almost seven years ago, before he joined ASU, with his then-postdoctoral assistant, Alex Maslov, who is currently a scientist with Canon USA Inc.

"It is extremely challenging to get everything correct at the nanometer scale. At such a small scale, any fabrication error becomes relatively large, and there are many fabrication steps, each of which is rather complex."

nanolaser research

While working for the National Aeronautics and Space Administration's Ames Research Center, they proposed a semiconductor wire coated with a silver shell. They showed that such a core-shell structure was able to shrink the nanolaser to an incredibly small scale.

About four years ago, working with Martin Hill, a former professor at Eindhoven University of Technology in the Netherlands, the team developed the thinnest nanolaser capable of operating at low temperatures. Two years ago, with the aid of Ning's student, Kang Ding, they were able to raise the operating temperature to 260 Kelvin (8.33 degrees Fahrenheit).

Significant impacts

More recently the team demonstrated a device that could operate at room temperature but overheating led to imperfect device operation, and a conclusive demonstration of lasing remained elusive.

The most recent results, however, demonstrated an eight-fold improvement over previous results from a year ago, finally providing an unambiguous demonstration of continuous electrically driven operation of a laser at room temperature, Ning says.

To explain the significance of such an advance, Ning says, "Imagine if computers had to be cooled down to minus 200 Celsius (minus 350 degrees Fahrenheit) for our current information technology to work. If that were the case, we would not have the widespread usage of computers and social media."

Nanolasers that can operate at room temperature and are powered by a simple battery can be used to make computers operate faster, significantly broaden Internet bandwidth, and provide light sources for many computer-chip-based sensing and detection technologies.

Show-stopping advance

But the benefits of achieving continuous room temperature operation go beyond the practical aspects.

"In terms of fundamental science, it shows for the first time that metal heating loss is not an insurmountable barrier for room-temperature operation of a metallic cavity nanolaser under electrical injection. For a long time, many doubted if such operation is even possible at all," Ning says.

"Unlike nanolasers driven by another laser, where the driving laser can be chosen so that the heat generation is minimized, electrical injection by a battery produces more heat. In addition, typical metals can be heated quickly by the operation of the nanolasers. Thus, such elevated heat generation has been perceived as a show-stopper for such nanolasers," Ning says.

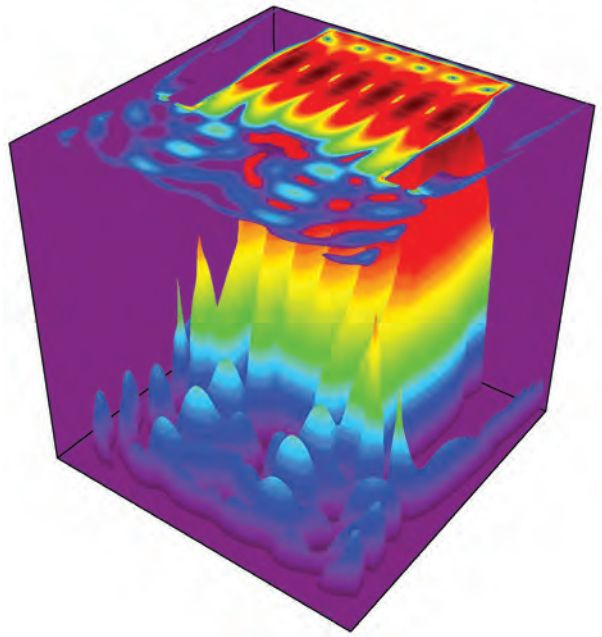
He adds, "More importantly, similar metal semiconductor structures used for nanolasers are also currently being explored for many other applications, such as being a building block for the formation of artificial materials that have remarkable properties. This demonstration is thus also important to the researchers working in those areas of materials science and engineering."

Crediting collaborators

The breakthrough by Ning's team required skillful nanofabrication and measurements. Credit for that contribution to the research goes to several of his students, primarily Kang Ding, Leijun Yin, and Zhicheng Liu. Yin is pursuing his doctorate in physics. Ding and Liu are pursuing doctoral degrees in electrical engineering.

"It is extremely challenging to get everything correct at the nanometer scale. At such a small scale, any fabrication error becomes relatively large, and there are many fabrication steps, each of which is rather complex," he says.

The team also benefited greatly from long-term collaboration with Martin Hill and his colleagues who provided technical support, especially Meint Smit, a professor of electrical engineering at Eindhoven University of Technology, who allowed the use of the university's advanced fabrication facility during the final phase of the research.



The research has been supported by the Defense Advanced Project Agency (an agency of the U.S. Department of Defense), and by the Air Force Office of Scientific Research.

Ning points to several managers at the agencies – including Henryk Temkin, Michael Haney, Scott Rodgers, Michael Gerhold, and Gernot Pomrenke – who were willing to support the project despite skepticism.

nanolaser research

Remaining challenges

"Many experts questioned the feasibility of such a project and doubted if we would ever be able to make such a small laser, let alone one that worked at room temperature," he says. "But we were convinced of the novelty and significance of such a project. With the support and trust of these agencies, we were eventually able to achieve or exceed many of our initial goals," says Ning.

Many challenges remain in efforts to integrate nanolasers into a photonic system on-chip platform, prolong the duration of laser operation, and further develop the capabilities of such devices. In addition, the physical mechanisms involved in the interaction of photons with metallic structures on small scale are not yet fully understood, so there is still much research to be done in this area.

"But thanks to the realization of room-temperature operation of nanolasers, all these goals can start to be more effectively explored," Ning says.

New mobile app enables research, education endeavors

Researchers in the Sensor, Signal and Information Processing Center (SenSIP) are entering the mobile phone/tablet application space with an award-winning app designed for a wide range of education and research applications.

iJDSP is a mobile extension of the JAVA Digital Signal Processing (J-DSP) editor, a signal processing laboratory developed by SenSIP. It is a tool for DSP simulations, computer laboratories and for research in sensor networks and health monitoring.

Within a week of submitting the iJDSP app to the iTunes app store, it was approved and made freely available on the Apple App store.

"It went through technical certification quickly, which is not a trivial process," says Andreas Spanias, professor and director of SenSIP.

The app enables simulations of digital signal processing concepts on iOS devices such as iPhone, iPad and iPod Touch.

Along with these advanced tools, the app is equipped with simple functions and can act as a learning and outreach tool for middle school and high school students to be introduced to the basic concepts of signal processing and its applications.

"It is a nice product that packages a lot of the things we do in signal processing," Spanias says.

SenSIP's app has also been well received by the center's peer groups. The Massachusetts Institute of Technology is utilizing the desktop version of J-DSP for its online signal processing courses. The app was also used in a new online course launched by ECEE called Signal Processing for Digital Culture. This new course was offered by Spanias to non-ECEE students in Arts, Media and Engineering and the plan is to offer it across the curriculum

The iJDSP app was awarded the Premier Award of 2012 sponsored by the academic publishing company Microsoft Research, MathWorks, Wiley and the TechSmith computer software company. After the announcement of the award last September, Spanias was invited to present a plenary session on the iJDSP app in IEEE FIE 2012 with about 400 attendees. The Premier award was presented to Spanias and the iJDSP team at the end of the plenary session last October in Seattle.

The National Science Foundation (NSF) is supporting SenSIP's research on JDSP software apps through three grants totaling about $2 million. Development of the iJDSP app is part of the third phase of an NSF project led by ASU in collaboration with Rose-Hulman Institute of Technology, University of New Mexico and Johns Hopkins University.

iJDSP is the product of work by several collaborators who are continuing to contribute to its development.

SenSIP works with researchers at Johns Hopkins University to create simulations for earth systems monitoring and geology. The software implements advanced algorithms that are used by earth scientists to process and interpret Earth systems data for sustainability applications. For example ASU's J-DSP/ESE is being used to analyze concentrations of greenhouse gasses and their effect on global temperatures.

Other plans include using the iJDSP app to monitor the performance of photovoltaic panels in solar-energy systems in partnership with a company in Japan.

Several students assisted in researching and testing the iJDSP software. Among them were ASU engineering graduate students Jinru Liu, Girish Kalyanasundaram and Shuang Hu.

"Jinru's innovative software talents were very valuable in getting a beta version of the software running on an iPhone," Spanias says.

Shuang established filter design and sensor control functions for the iPhone/iPad. Girish produced several functions that expanded the capabilities of iJDSP to speech and sound processing applications. Another student, Deepta Rajan extended the sensor applications to Android platforms and produced dashboards for health monitoring.

iPhone software is currently available on the iTunes store and Health Monitoring Android applications will be soon available on Google Play.

Spanias is also working with colleagues in the arts and media technology to develop music signal synthesis functions for mobile platforms. An initial version of the software was used successfully in the new Signal Processing for Digital Culture course.

ASU, USAIAP work to advance solar energy solutions

Christiana Honsberg, professor and director of the Quantum Energy and Sustainable Solar Technologies Engineering Research Center, is the ASU lead on a $33-million collaboration among government, industry and academic partners to develop next-generation photovoltaic technologies with advanced performance and reduced costs.

The U.S. Australia Institute for Advanced Photovoltaics (USAIAP) partners include Australia National University, University of Melbourne, Monash University, University of Queensland, Australia's Commonwealth Scientific and Industrial Research Organization, Suntech R&D Australia, BT Imaging, BlueScope Steel and Trina Solar.

U.S. involvement includes the National Science Foundation's Department of Energy Quantum Energy and Sustainable Solar Technologies, National Renewable Energy Laboratory, Molecular Foundry, Arizona State University, Stanford University, Georgia Institute of Technology and the University of California.

Monarch Power aims to take solar mobile

ASU professor Joseph Hui is working to make portable solar devices affordable and accessible.

Hui has established Monarch Power at ASU's SkySong/The ASU Scottsdale Innovation Center to work on plans for production of solar-power devices and has set up a foundation to help make the technology affordable and available to people around the world.

"Nature is a continual source of inspiration for innovation," he says.

Hui has developed a retractable "solar flower" that could power an electric vehicle or be easily transported for generating power almost anywhere.

The Lotus is a 1.1-kilowatt solar dish that opens and closes with daylight and tracks the sun. The project has been in development for about two years.

Tracking the sun on two different axes, the Lotus can produce 30 percent more energy than rooftop solar. It is also less expensive due to significantly less structural support.

It's one of several ideas—either in design or prototype stages—he has for advances in portable energy technology. For example, a solar electric van that maximizes the vehicle surface to collect sunlight.

energy

Gift honors engineering professor's mentorship

Richard "Mike" McDaniel, an electrical engineering alumnus, created the Truet B. Thompson endowment at ASU in honor of the professor whose mentorship he said guided "many of his professional and business values and his success."

Thompson was on the electrical engineering faculty from 1959-1967 and served as chair from 1963-1967. He was an early leader in ASU's power engineering research.

McDaniel noted that math—an intensive part of the electrical engineering curriculum—was challenging for him. He credits professors like Thompson who made complex subjects more understandable. He would go on to earn his master's in electrical engineering.

After graduating from ASU, McDaniel spent 13 years at Lawrence Radiation Lab, where he was involved in the nuclear testing that took place in the Nevada desert during the Cold War.

Later in life, McDaniel moved to Yuma to take over management of farmland inherited from his grandfather. The land was at one time used for melon farming.

ASU spinoff takes on obesity challenge

Worldwide obesity has nearly doubled since 1980 and is a leading risk factor in diseases such as diabetes and cancer. Yet, obesity is preventable.

Arizona State University professors Nongjian (NJ) Tao and Erica Forzani have launched a startup aimed at providing an affordable, easy way to help people maintain a healthy weight.

Breezing is based on cutting-edge sensor technology that uses an individual's metabolism to provide diet and exercise recommendations. Metabolism tracking is traditionally available through labs and clinics.

The pocket-sized Breezing device offers a mobile, cost-effective way for individuals or professionals to track data anywhere, anytime.

The core technology was developed at ASU by Tao and Forzani along with Francis Tsow and Xiaojun Xian. The team has continued to perfect the device through the ASU spin-off.

Many devices on the market measure physical activity and caloric intake, but do not take into account how energy is expended.

Metabolism determines how the body uses energy and is affected by factors such as age, weight and body composition—which can change over time. Tracking metabolism provides information on how many calories are needed to maintain, lose or gain weight.

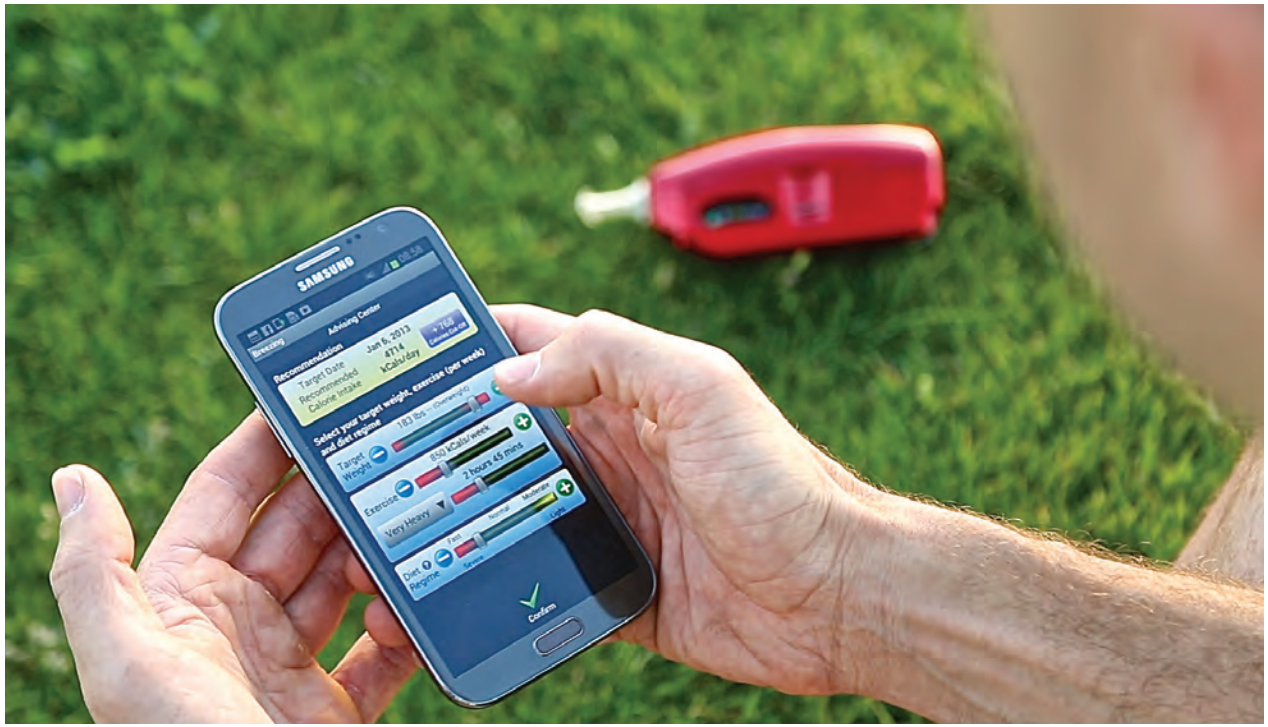
Breezing uses indirect calorimetry—recommended by the World Health Organization, American Dietetic Association and American College of Sports Medicine—which determines energy expenditure by measuring both consumed oxygen and produced carbon dioxide rates.

The user simply breathes into the device and data is wirelessly transmitted via Bluetooth to a smartphone or computer.

Breezing's app tracks both resting energy expenditure (REE) and total energy expenditure (TEE). REE is used to sustain vital functions such a breathing and cell growth. TEE includes an individual's physical activity level. For most people, energy is used most while at rest rather than exercising, making REE a better predictor of the number of calories needed per day.

Breezing also determines the respiratory quotient or the ratio of produced carbon dioxide to consumed oxygen to track the source of energy—carbohydrates, fats or a mix of both. An intelligent algorithm provides personalized recommendations on diet and exercise to maintain a healthy weight.

The researchers see further promise for the technology to help in the prevention and management of chronic diseases.



Expanding our capacity: new faculty

Umit Y. Ogras
assistant professor

expertise: digital VLSI design, embedded systems and electronic design automation with particular emphasis on multiprocessor systems-on-chip (MPSoC and multicore architectures

biosketch: Umit Y. Ogras joined ASU in 2013 as assistant professor. Previously, he was a research scientist at Intel Strategic CAD Labs.

Prior to joining Intel in 2008, Ogras was a postdoctoral research associate at Carnegie Mellon University.

His research interests are in low-power VLSI systems and embedded system design. In particular, his research focuses on design methodologies for application-specific MpSoCs and on-chip communication.

His doctoral thesis won the 2008 Outstanding Dissertation Award from the European Design Automation Association. He also received the Best Paper Award of IEEE Transactions on VLSI Systems in 2011, the Donald O. Pederson IEEE Transactions on CAD Best Paper Award in 2012 and Intel Strategic CAD Labs Research Award in 2012.

Ogras holds a Ph.D. in electrical and computer engineering from Carnegie Mellon University, an M.S. in electrical engineering from The Ohio State University and a B.S. in electrical engineering from Middle East Technical University in Turkey.

Umit Y. Ogras

Jae-Sun Seo

Jae-sun Seo
assistant professor

expertise: high-speed on-chip link design, high-performance and low-power VLSI design

biosketch: Jae-sun Seo will join the Ira A. Fulton Schools of Engineering as assistant professor in January 2014.

Seo is a research staff member with the IBM T.J. Watson Research Center. His research efforts include integrated voltage regulators for IBM's future high-performance processors and cognitive computing chip design for DARPA SyNAPSE project.

Seo conducted graduate research internships at Intel circuit research lab and Sun Microsystems VLSI research group, where he explored new circuit techniques for on-chip communication in microprocessors.

Among his accomplishments, Seo received the Samsung Scholarship from 2004 to 2009 and an IBM outstanding technical achievement award in 2012 for SyNAPSE Phase 1 chip design and demonstration. He served on the technical program committee for ISLPED 2013.

Seo holds a B.S. degree in electrical engineering from Seoul National University, Korea, and M.S. and Ph.D. degrees in electrical engineering from the University of Michigan, Ann Arbor.

Online electrical engineering degree program offers advanced education, ease of access

Beginning in fall 2013, ECEE began offering its renowned Bachelor of Science in Engineering (B.S.E.) degree program in electrical engineering in an online format.

"We are leveraging innovative learning technologies to enable students to gain the advanced skills needed in a fast-paced global economy," says Stephen Phillips, ECEE school director.

He notes that the program is designed to prepare students for the increasingly interdisciplinary nature of the electrical engineering industry.

"Our faculty members have expertise across a broad spectrum and we have strong ties to industry," Phillips says. "Students in the program gain valuable insight into leading-edge innovation, but also the practical applications in a wide range of sectors from healthcare to energy to security."

The 120-credit hour degree program includes core-engineering courses and a minimum of 45 upper division credit hours in specialty courses – including topics such as analog and digital circuits, electromagnetic fields, microprocessors, communications networks, solid-state electronics and electric power and energy systems.

The program's labs incorporate practical hardware with industry-standard computer-aided design and simulation tools to give students applied, hands-on experience. "Students will initially be working with circuit design and simulation tools that are easy to grasp, but will enable them to move on to more advanced tools, such as the Xilinx ISE environment, which is heavily used in industry for advanced digital logic design," says assistant professor Michael Goryll.

Marco Saraniti, electrical engineering professor, demonstrates how an interactive tablet enables faculty to communicate and share notes, giving online students an experience similar to meeting with instructors on campus during regular faculty office hours.

Sessions are offered in a seven-and-a-half week format and the degree program can be completed in as few as three calendar years, depending on the student's desired course load.

The online format enables corporate partners to provide workforce development opportunities, and gives their employees the opportunity to bring back insights gained from interaction with faculty who are leaders in their fields.

"It is an online class, but not a remote class," says electrical engineering professor Marco Saraniti. "Students will have significant real-time exposure to the instructor."

For example, Saraniti notes that office hours for both in-class and online students are implemented using an interactive display such as Skype, enabling the professor to share not only notes, but allowing the student to see exactly what the professor sees.

"Our hardware labs include kits for building circuits on breadboards and measuring the responses with computer-based instruments. Students can do the labs anywhere and at any time. Students have real-time access to teaching assistants and faculty during scheduled office hours. These labs are the same as those completed by our on-campus students," Goryll says.

The program leverages ASU's history of innovation in education and distance-learning programs. Thirty years ago, it offered programs to corporate sites through interactive TV networks and satellites. Since 2002, programs have expanded to include 60 undergraduate and graduate degree programs entirely online.

online education

ASU engineering alum helps Boeing's 'Little Bird' take on bigger tasks

Christine Cameron describes the helicopter she has helped the Boeing Company re-engineer as "a cute little aircraft." It is, in fact, called Little Bird.

The name can be misleading. It may be little by military aircraft standards, but it has big capabilities. Enough so that Boeing considers it one of its major recent aerospace technology successes.

Cameron, a 1997 ASU electrical engineering graduate, led the systems engineering team that turned Little Bird from a basic scout vehicle into a more versatile optionally unmanned aircraft.

The transformation provided it the increased flight power and advanced high-tech automation systems to handle delivering troops, deploying weapons, carrying battlefield cargo and embarking unmanned on missions into hazardous surroundings.

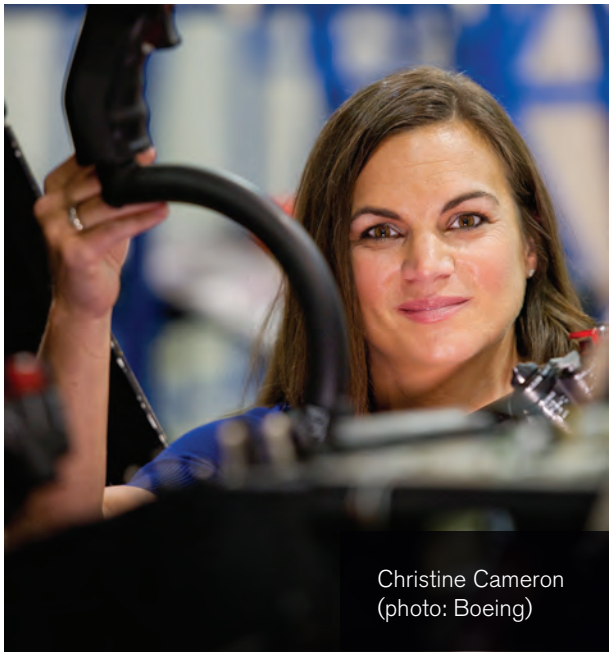
Part of Cameron's job is doing the "electrical integration" for aircraft at Boeing's facility in Mesa, Ariz. That involves ensuring all of the various systems built into helicopters will be reliably and adequately powered and will "talk to each other and interface effectively," she explains.

She says the Little Bird project has been among the most fulfilling of her assignments because it challenged her to employ what she has learned during her 15 years with Boeing and in the classroom at ASU.

It meant putting on the engineer's deep-thinking cap "to really dissect problems and think your way through to solutions," she says. And, just as important, it required "knowing how to work as a member of a team, and as a team leader."

Cameron's career path was kindled in high school in Pittsburgh, where she found science fascinating, particularly the aerospace field, prompting her to join the Air Force Junior Reserve Officers Training Corps.

She went on to earn a bachelor's degree in aerospace engineering technologies at Kent State University in Ohio. "That was more like technician training," she says, so she decided pursue more extensive education in engineering.



Christine Cameron (photo: Boeing)

She liked the tech industry opportunities Arizona might offer, and found ASU appealed to her not only for its variety of programs and courses but also because of the diversity and varied backgrounds of its students and faculty, and the competitive spirit fostered in the engineering programs.

"Those were all things that prepare you for the real world," she says.

Part of that preparation was in the focus on teamwork and communication. In today's industry environment, Cameron says, engineers "rarely accomplish anything working alone in a lab. So you are at a loss if you can't collaborate well with people. You can make the best product in the world, but if you can't communicate about it or write an effective report, you'll get nowhere."

She adds that she also worked her way through ASU as a waitress, "and I learned a lot about communicating from that job, too."

Chances of advancing in the food-service industry ended when she landed her engineering job with Boeing only a few months after earning a bachelor's degree at ASU.

alumni appointed to faculty positions

Miao He, Texas Tech University, September 2013
expertise: exploiting big data for smart grid design by leveraging a combination of tools in power systems, machine learning, stochastic modeling and optimization and data mining
mentors: Vijay Vittal and Junshan Zhang

Osman Yagan, Carnegie Mellon University, Silicon Valley, September 2013
expertise: emerging science for cyberphysical networks
mentor: Junshan Zhang

Rui Zhang, University of Hawaii, 2013
expertise: Security and privacy issues in wireless/mobile networks and systems, wireless/mobile health, smart grids, social networks, and cloud computing
mentor: Yanchao Zhang

alumni honors

Shaikh Ahmed ('05)
Associate Professor, Southern Illinois University at Carbondale
recent honors: College of Engineering Outstanding Faculty Award, 2013
mentor: Dragica Vasileska

Summer program engages high school students in research

Keith Holbert, an associate professor, directs research for high school students in the FREEDM Young Scholars pre-college program offered through the Future Renewable Electric Energy Delivery and Management Systems Center – called FREEDM.

The FREEDM Systems Engineering Research Center, based at North Carolina State University, is sponsored by the National Science Foundation and industry partners. ASU is a research partner in FREEDM.

Last summer, Holbert combined the FREEDM Young Scholars Program with Fulton Engineering's High School Engineering Research program, a move he says "changed the dynamic in a good way." Holbert explains that it allowed students the opportunity to see research being conducted by other students and to present their own work to other students.

Students got the chance to explore electricity generation, power transmission and distribution, and electricity distribution, as well as solar energy and hybrid cars.

They sought answers for such energy-related questions as: Which light bulb best conserves energy, incandescent, fluorescent or light-emitting diode bulbs? They figured out answers in a "myth buster"-like fashion, said Holbert, "using critical thinking to investigate the everyday energy-related questions in a hands-on way."

The learning activities included trips to the nearby Arizona Public Service Ocotillo Power Plant, ASU's Gammage Auditorium and the ASU Art Museum. The field trips are "not just about engineering, but also about getting out and having fun," Holbert said.

Keith Holbert with high school students

Broadcom MASTERS students

Connection One researchers host international middle school students

Twenty international middle school students—Broadcom MASTERS International delegates—spent a day on the ASU Tempe campus touring labs and getting hands-on engineering experience. Connection One researchers introduced the visitors to a range of experiences from experimenting with biochemistry to learning about an anechoic chamber.

Broadcom MASTERS International delegates come from countries where Broadcom has a presence and awards middle school students competing in SSP-affiliated fairs with the opportunity to represent his or her country as a Broadcom MASTERS delegate. In 2013, delegates were chosen from Australia, Canada, China, India, Israel, Japan, Mexico, Singapore, South Korea, Taiwan, the United Kingdom and the United States.

Broadcom MASTERS International delegates receive an all expenses paid trip to the United States where they are official observers at the Intel International Science and Engineering Fair (Intel ISEF) in which thousands of high school students compete each year. They gain invaluable experience and insight on how to use their STEM abilities to become innovators and leaders in their chosen fields. They return home inspired to continue math and science studies when they start high school in order to pursue STEM careers as scientists, engineers and innovators.

research centers

CANi:
Center for Applied Nanoionics

Director: Michael Kozicki

asu.edu/aine/cani/cani_main.html

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.

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

Connection One, a National Science

Foundation Industry/University Cooperative Center, was established at Arizona State University in 2002. The center is a multi-university cooperative research center with over 25 industrial and four university members.

Researchers in the center are at the forefront of development of next-generation of wireless, power management system integrated circuits, sensors electronics, bioelectronics and defense applications. The center's core research includes integrated nanoelectronic system-on-a-chip, radio frequency and analog integrated circuits, power management electronics on a chip, low-power integrated sensor electronics and interfaces, microelectrical/mechanical system (MEMS) on a chip, and advanced nanoelectronics.

The center has grown tremendously over the past ten years and has over 100 doctoral and master's graduate students and 30 faculty working on cutting-edge research. Every year, the center graduates over 75 doctoral and master's students with focus in the center's core areas.

As a result of the center's research, and focused hiring in the ECEE programs, ASU is among the top three schools in the country offering over 30 classes in RF, mixed-signal analog/digital VLSI, microwave, communication transceiver, power management IC, antennas and related areas.

The center has multiple new labs in RF IC design, mixed-signal analog/digital IC testing, VLSI design and system testing and MEMS system fabrication. Capabilities also include an electromagnetic anechoic chamber and RF screen room testing.

Connection One: Integrated nanoelectronics, MEMS and sensors on a chip

Director: Sayfe Kiaei

connectionone.org

research centers

Connection One's technical and scientific breakthroughs have included integrated radio on a chip, wireless RF stethoscope for wireless measurement of vital signs, bio-electronics sensors for disease diagnostics, nano-electronics for digital hearing aids, implantable neuron sensors, testing Analog/VLSI system, and ultra-wideband radar.

university partners

The Ohio State University
Rensselaer Polytechnic Institute
University of Hawaii

industry and government partners

Air Force Research Laboratory
Agilent
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Bridgestone Americas Tire
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Ridgetop Group Inc.
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Texas Instruments
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Traycer Diagnostic Systems, Inc.
U.S. Army Communications-Electronics Research Development and Engineering Center (CERDEC)
U.S. Army Research Laboratory
U.S. Central Intelligence Agency
U.S. Department of Energy
U.S. Office of Naval Research
Zomega Terahertz Corp.

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.

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.

PSERC: Power Systems Engineering Research Center

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

partners and donors

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American Electric Power
American Transmission Company
Arizona Public Service
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California Independent System Operator (CAISO)
CenterPoint Energy
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Exelon
FirstEnergy Corporation
GE Energy
Institut de Recherche d'Hydro-Québec (IREQ)
ISO New England
ITC Holdings
Lawrence Livermore National Lab
Midwest Independent System Operator (MISO)
Mitsubishi Electric Research Laboratories (MERL)
National Aeronautics and Space Administration (NASA)
National Renewal Energy Laboratory (NREL)
National Rural Electric Cooperative Association (NRECA)
New York Independent System Operator (NYISO)
New York Power Authority
Pacific Gas and Electric Company
PJM Interconnection
PowerWorld Corporation
RTE-France
Salt River Project
Southern California Edison
Southern Company
Southwest Power Pool
Tennessee Valley Authority
Tri-State Generation and Transmission
U.S. Department of Energy
Western Area Power Administration

QESST: Quantum Energy and Sustainable Solar Technologies

Director: Christiana Honsberg
Executive Director: Matthew Fraser
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 the Engineering Research Center on the ASU Tempe campus in newly renovated space that houses administrative and outreach offices, a graduate student synthesis workshop, laboratories and clean rooms. One of the central QESST research laboratories is the Solar Power Laboratory, housed in the MacroTechnology Works building at the ASU Research Park. Both venues are ideally suited for leading a collaborative network of industry-relevant research.

project highlights

QESST researchers have:

- demonstrated extremely high-hole concentrations in gallium nitride (GaN) and indium gallium nitride (InGaN), overcoming previously accepted limits for this material system, which allows for drastic improvement in many devices like transistors, and demonstrates the feasibility of GaN and InGaN for use in high-efficiency and multi-junction solar cells.
- developed a holographic spectrum splitting filter that is capable of providing both high diffraction efficiency and broad spectral bandwidth with minimum power in spectral lobes. This represents a critical step towards realizing the high performance, large area and low cost optical components for high efficiency spectrum splitting PV systems.
- conducted quantitative analysis to investigate the role of module efficiency in lowering the total PV electricity cost through a levelized cost of energy analysis. The study highlights the importance of higher efficiency PV systems in reducing total system costs and electricity generation from the sun.
- found that the lateral transport length in the inversion layer formed at the heterointerface of silicon heterojunction (SHJ) solar cells is a strong function of bias voltage, and can exceed 50 microns as the device approaches operating voltages. Furthering the understanding of these types of solar cells will help guide device design in the future.
- designed, constructed and deployed a research-scale reactor for the rapid production of copper indium gallium diselenide, or CIGS. The reactor will be used to develop processes to form the films in as short a time as possible that can be transferred to lower cost manufacturing. Reduced manufacturing costs and improved solar cell performance will reduce the cost of solar electricity.
- conducted analysis of a large scale photovoltaic system, which showed potential of solar energy for southwestern climates. The installation of systems on the parking structures and roofs of ASU buildings helped ASU to reach 50 percent of its electricity use from photovoltaics.

QESST students have designed and implemented solar-cell fabrication processes for state-of-the-art solar cells. This Student-Led Pilot Line now produces cells reaching 17.6 percent efficiency with broadly applicable commercial solar cell processes. Commercial solar cells of this type range from 16.8 to 17.5 percent.

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

industry partners

Accustrata
Amtech
Applied Materials
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National Instruments
PV Recycling
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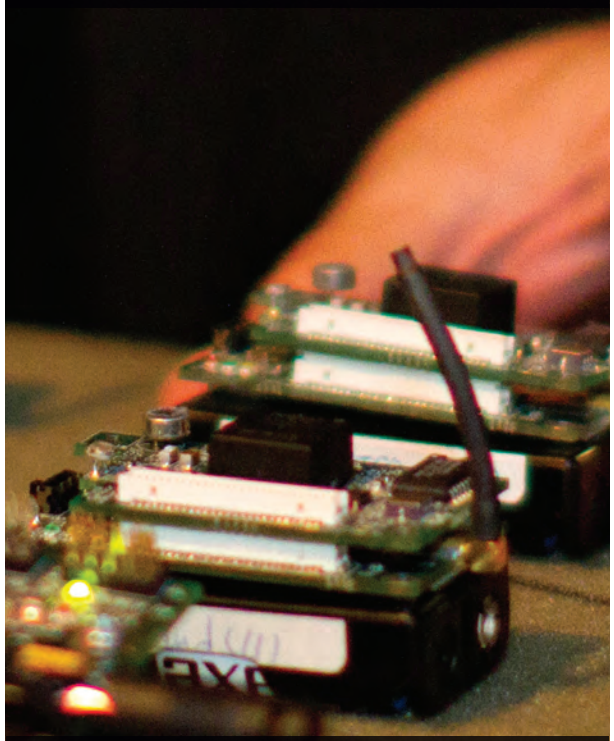
SenSIP: Sensor, Signal and Information Processing Center



Director: Andreas Spanias

sensip.asu.edu

research centers

The Sensor, Signal and Information

Processing Center (SenSIP), is an NSF 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 network technologies, including those used in chemical sensors, cell phones, audio, radar and sonar systems. Faculty affiliated with SenSIP have won sizable grants in these areas from several agencies and companies including DARPA, NSF, DTRA, Intel, LG, Raytheon and Qualcomm.

SenSIP partners with international universities. One of these is a collaboration among University of Cyprus, Polytechnic Milano in Italy, ETH Zurich (the Swiss Federal Institute of Technology) and Boston University. The center will work with these partners to accelerate advancements for use in sensor networks, "smart" power grids and telecommunications systems. The endeavor is being supported by the European Union through the Cyprus Research Promotion Foundation for four years. SenSIP participates in the annual review meetings that include presentations from all four international partners. One jointly advised KIOS-SenSIP Ph.D. student from the University of Cyprus successfully defended his dissertation on speech recognition in June 2012. A new student was recruited to work on sensors for health monitoring applications.

SenSIP also continues its partnership with Imperial College London's University Defence Research Centre. SenSIP and Imperial College Electrical Engineering signed a collaborative memorandum of understanding.

The partnership was funded by 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.

SenSIP also signed a collaborative agreement with the University of British Columbia to contribute on a project on "Sensors for the Digital Home." The project is being funded by Telus and the Natural Sciences and Engineering Research Council of Canada.

SenSIP will soon have a 4G/LTE facility for use in sensor localization and mobile health research. SenSIP recruited two new industry members in 2013: VE Corporation and Interactive Flow Systems. Existing membership agreements are in place with Sprint Communications (signed membership for four years), Brainstorm Technologies, Raytheon Missile Systems, Intel, Lockheed Martin and LG Electronics.

SenSIP funded research on solar panel monitoring transitioned from Mitsui (2011-2012) to ACT who will soon sign an agreement with SenSIP. ACT will donate 100 smart monitoring devices which will be used along with fault detection and optimization algorithms for monitoring of PV. In that context, SenSIP faculty have won two new three-year NSF grants (2013-16) for fault detection and application of consensus network theory on solar panel monitoring. A research monograph co-authored by SenSIP faculty has been published in 2012 by Morgan and Claypool publishers on this topic.

SenSIP is very active in app development and has recently developed Android and award-winning iOS apps for health monitoring and education applications.

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 a 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.

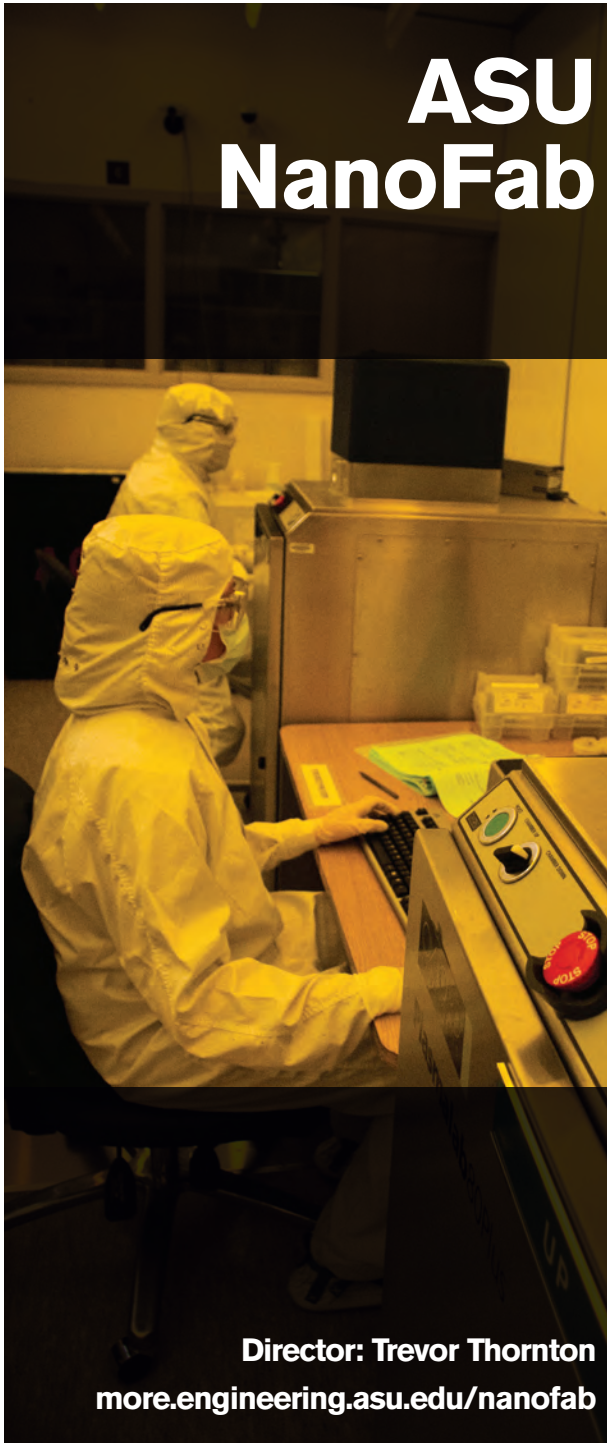
project highlights

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.



center customers

Intel
INanoBio
Laser Components DG, Inc.
NanoTEM
NthDegree Worldwide Technologies
Soitec Phoenix Labs
Sonata Biosciences, Inc.
SJT Micropower
SUMCO Phoenix Corp.
U.S. Army
Vitriflex
Zipton Labs

Flexible Electronics and Display Center

Director: Nick Colaneri

Associate Director: Mark Strnad

Backplane Electronics R&D Director: David Allee

flexdisplay.asu.edu

The Flexible Electronics and 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 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 center to create and implement a proven collaborative partnership model with over 40 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 2013, the center's researchers successfully manufactured the world's largest flexible color organic light-emitting display (OLED) prototype using advanced mixed-oxide thin-film transistors (TFTs). Measuring 14.7 diagonal inches, the device was developed in conjunction with Army Research Labs scientists. The new display is nearly twice as long as the one the center developed last year, which was the largest such display at the time.

The Center has made advancements in both OLED materials to enhance performance and the encapsulation process that protects the display. The new device is durable, thinner and ultra lightweight.

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.

One of the applications that the Army identified was integrated displays in soldier's clothing—providing real-time information and enhancing safety. The new technology has the potential to enable thin, lightweight, nonbreakable displays to keep soldiers safe.

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
dpiX
DuPont Teijin Films
E Ink Corporation
Etched In Time, Inc.
EV Group
FlexTech Alliance
GE
Henkel
HP
Honeywell
Honeywell Electronic Materials
Ito America
Kolon Industries, Inc.
L-3 Communications Display Systems
LG Display
PARC
Physical Optics Corporation
Plextronics, Inc.
Raytheon
Sunic
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.

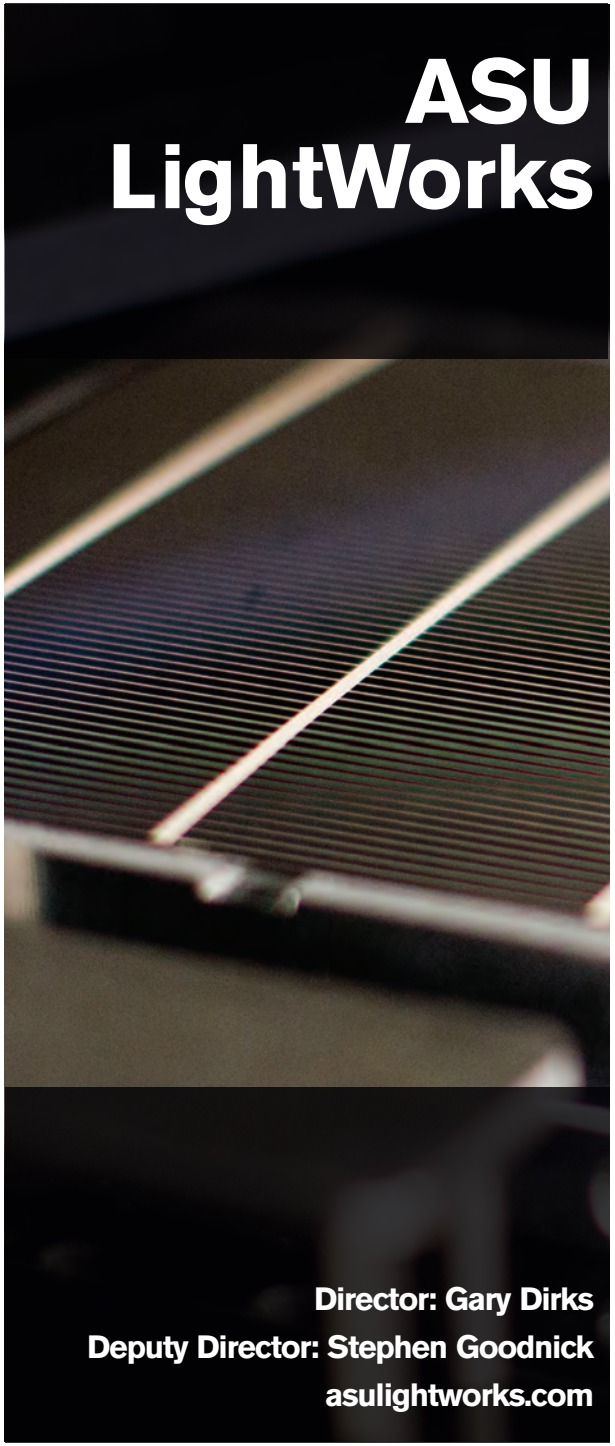
Research is aimed at a variety of applications, including low-cost, high-efficiency solar panel technologies, renewable biofuel and biohydrogen production, fungible fuels from CO_2, water and sunlight, and high-efficiency lighting, cooling and flexible display technologies.

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:

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.



research centers

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 online textbook attracting 300,000 unique visitors a year.

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.

Center for Computational Nanoscience
Director: Marco Saraniti

The Center for Computational Nanoscience brings together multidisciplinary work 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.

faculty directory

James T. Aberle
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expertise: antennas, microwave and RF electronics, signal and power integrity

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:

Aberle, James T. and Bensalem, Brahim, "Ultra-high speed memory bus using microwave interconnects," 2012 IEEE 21st Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS), pp.3-6, 21-24 Oct. 2012.

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.

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, pp. 379-406, 2007.

David R. Allee
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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 Electronics and 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:

R. Wahl, F. Wang, H. Chung, G. Kunnen, S. Yip, E. Lee, E. Pun, G. Raupp, D. Allee, J. Ho, "Stability and low-frequency noise in InAs NW parallel array thin film transistors," IEEE Electron Device Letters, vol. 34, no. 6, pp. 765-767.

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David R. Allee, Guest Editorial, IEEE/OSA Journal of Display Technology, vol. 8, no. 7, 2012, p. 372.

John W. Murphy, George R. Kunnen, Israel Mejia, Manuel A. Quevedo-Lopez, David Allee, Bruce Gnade, "Optimizing diode thickness for thin-film solid state thermal neutron detectors," Applied Physics Letters, vol. 101, no. 14, 2012, 5 pages.

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.

Raja Ayyanar
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expertise: power electronics, DC-DC converters, power management, power conversion and control for renewable energy interface, especially PV and wind, electric vehicles and 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 80 journal and conference papers in the area of power electronics and renewable energy integration, and he holds three U.S. patents. Ayyanar was awarded the ONR Young Investigator Award in 2005.

selected publications:

S. Falcones, R. Ayyanar, X. Mao, "A DC–DC Multiport-Converter-Based Solid-State Transformer Integrating Distributed Generation and Storage," IEEE Transactions on Power Electronics, vol. 28, pp. 2192 – 2203, May 2013.

M. Fan, V. Vittal, G.T. Heydt, R. Ayyanar, "Probabilistic Power Flow Analysis with Generation Dispatch Including Photovoltaic Resources," IEEE Transactions on Power Systems, vol. 28, pp. 1797-1805, May 2013.

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, 2012, pp. 1315 – 1328.

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R. Ayyanar, W.J. Lambert, S. Chickemenahalli, "Transient Voltage Compensation System and Method," US Patent 8,243,410, August 14, 2012.

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, Apr. 2011.

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X. Mao, A.K. Jain, R. Ayyanar, "Hybrid Interleaved Space Vector PWM for Ripple Reduction in Modular Converters," IEEE Transactions on Power Electronics, vol. 26, July 2011, pp. 1954-1967.

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, Mar. 2010.

Bertan Bakkaloglu
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expertise: RF and mixed-signal IC design, integrated power management circuits for high reliability applications, 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. His current areas of research are power and battery management circuits, analog-to-digital and digital-to-analog converters for instrumentation and telecommunication circuits, frequency synthesizers, and self-test and self-healing of mixed signal circuits. He is on the Technical Program Committee for the IEEE Radio Frequency Integrated Circuits Conference 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:

H. Hedayati, B. Bakkaloglu, "A 3 GHz wideband ∑ Δ fractional-N synthesizer with switched-RC sample-and-hold PFD," IEEE Transactions on Very Large Scale Integration (VLSI) Systems, vol. 20, no. 9, pp. 1681-1690, 2012.

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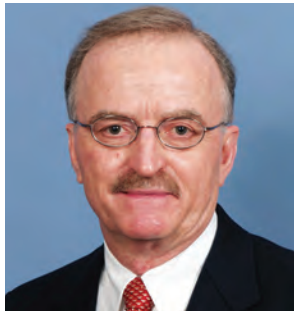

Constantine A. Balanis
Regents' Professor
Ph.D., The Ohio State University
balanis@asu.edu
480-965-3909

expertise: computational electromagnetic methods (FDTD, FEM, MoM, GO/GTD/UTD, PO/PTD) for antennas, EM scattering, and high-intensity radiated fields (HIRF), flexible and conformal antennas and high impedance surfaces, and 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 145 journal papers, 250 conference papers, 12 book chapters, eight 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, 2000; IEEE AP Society Chen-To Tai Distinguished Educator Award, 2005; Distinguished Achievement Award, IEEE Antennas Propagation Society, 2012; Distinguished Achievement Alumnus Award, College of Engineering, The Ohio State University, 2012; ASU Outstanding Graduate Mentor Award, 1996; ASU School of Engineering Graduate Teaching Excellence Award, 1987-1988; ASU College of Engineering Distinguished Achievement Award, 1991; IEEE Region 6 Individual Achievement Award, 1989; IEEE Phoenix Section Special Professionalism Award, 1992.

selected publications:

C. A. Balanis, Advanced Engineering Electromagnetics (2nd edition), Wiley, pp. 1018, 2012.

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

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, December 2011.

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Hugh Barnaby
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480-727-0289

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; Session Chairperson, 2008 IEEE IRPS, 2005 RADECS conference, 2002 IEEE NSREC; Short Course Chairman, IEEE NSREC 2007; Poster Chairman, IEEE NSREC 2006; Short Course Instructor, NSREC 2005; Awards Committee, IEEE NSREC 2003, 2008, Solid State Circuits Society Phoenix Section Chairman.

selected publications:

I. S. Esqueda, H. J Barnaby, "Modeling the Non-Uniform Distribution of Radiation-Induced Interface Traps," IEEE Trans. on Nuclear Science, vol. 59, no. 4, pp. 723-727, 2012.

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

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 Trans. on Nuclear Science, vol. 58, no. 6, pp. 2838-2844, 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," 2009 IEEE Radio Frequency Integrated Circuits Symposium, June 7-9, 2009, pp. 123-126.

X. J. Chen and H. J. Barnaby, "The effects of radiation induced interface traps on base current in gated bipolar test structures," Solid State Electronics, vol. 52, issue 5, pp. 683-687, May 2008.

H. Barnaby, "Total-ionizing-dose effects in modern CMOS technologies," IEEE Trans. on Nuclear Science, vol. 53, pp. 3103-3121, 2006 (review article).

Mariana I. Bertoni
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expertise: Defect engineering of solar cell materials, transparent conducting oxides, defects in semiconductors, synthesis, growth and deposition of semiconductors, electrical and optical characterization, X-ray microscopy and spectroscopys

biosketch: Mariana Bertoni joined ASU as an assistant professor in 2012. Prior to this, she held senior scientist positions at two emerging start-up firms in the photovoltaic industry and a visiting scientist appointment at the Massachusetts Institute of Technology (2010-2012). Her previous postgraduate experience includes a postdoctoral appointment at the Massachusetts Institute of Technology (2008-2010), a Marie Curie postdoctoral fellowship at Creavis Technologies & Innovation in Germany (2007-2008) and a visiting researcher appointment at the National Renewable Energy Laboratory. She has published over 35 research articles in peer-reviewed journals and presented more than 30 papers at scientific meetings. She serves in the Center for Nanoscale Materials proposal evaluation board at Argonne National Laboratory and is active in various committees and chairing positions at the IEEE photovoltaic specialists conferences.

honors and distinctions: ACERS Electronics division Edward C. Henry Award; Marie Curie Fellow, Fulbright Scholar

selected publications:

H. Choi, M. I. Bertoni, D. Fenning, J. Hofstetter, S. Castellanos, D.M. Powell, and T. Buonassisi, "Dislocation Density Reduction During Impurity Gettering in Multicrystalline Silicon," Journal of Photovoltaics, vol. 3, no. 1, pp. 189 – 198, 2013.

M. I. Bertoni, D. Fening, M. Rinio, M. Holt, V. Rose, J. Maser, and T. Buonassisi, "Nanoprobe X-ray fluorescence characterization of intragranular defects in large-area solar cells," Energy & Environmental Science, vol. 4, no. 10, pp. 4252 – 4257, 2011.

M. I. Bertoni, S. Hudelson, B. Newman, S. Bernardis, D. Fenning, H. Dekkers, E. Cornagliotti, A. Zuschlag, G. Hahn, G. Coletti, B. Lai, and T. Buonassisi, "Influence of defect type on hydrogen passivation efficacy in multicrystalline silicon solar cells," Prog. in Photovoltaics, vol. 19, no. 2, pp. 187–191, 2011.

M. I. Bertoni, J. E. Medvedeva, Y. Wang, A. J. Freeman, K. R. Poeppelmeier, and T. O. Mason, "Enhanced electronic conductivity in a si-substituted calcium aluminate," Journal of Applied Physics, vol. 102, pp. 113704, 2007

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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 bio-medical/analytical instrumentation

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

honors and distinctions: 2012 Top 5% Faculty at the Ira A. Fulton Schools of Engineering; 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:

Welch, D., Shah, S., Ozev, S., Blain Christen, J., "Experimental and Simulated Cycling of ISFET Electric Fields for Drift Reset," Electron Device Letters, vol. 34, no. 3, pp. 456-458, Feb. 2013

Welch, D., Blain Christen, J., "Seamless Integration of CMOS and Microfluidics Using Flip Chip Bonding," Journal of Micromechanics and Microengineering, vol. 23, no. 3, March 2013

Welch, D., Georgiou, J., Blain Christen, J., "Fully Differential Current-Mode MEMS Dual-Axis Optical Inclination Sensor," Sensors and Actuators A, vol. 192, pp. 133-139, pp. 1-7, April 2013

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

Song, J., Welch, D., Blain Christen, J., "A Fully Adjustable Dynamic Range Capacitance Sensing Circuit in a 0.15um 3D SOI Process, 2011 IEEE International Symposium on Circuits and Systems, May 2011

Blain Christen, J.M., Andreou, A.G, "Design, Fabrication and Testing of a Hybrid CMOS/PDMS Microsystem for Cell Culture and Incubation", IEEE Transactions on Biomedical Circuits and Systems, Volume 1, Number 1, March 2007, pp. 3-18, Invited Paper, TBCAS Best Paper 2007-2010 Award

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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: Daniel 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, remote sensing and physiological prediction. Bliss has been the principal investigator on numerous small and large programs, requiring a broader system perspective. 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. Bliss is a Senior Member of the IEEE.

selected publications:

D. W. Bliss and S. Govindasamy, "Adaptive Wireless Communications: MIMO Channels and Networks," Cambridge University Press, Cambridge, 2013.

K. W. Forsythe and D. W. Bliss, "MIMO Radar: Concepts, Performance Enhancements, and Applications," Signal Processing for MIMO Radar, Ed. Jian Li and Petre Stoica, Wiley Publishing, 2009.

J. M. Kantor, C. D. Richmond, D. W. Bliss, B. Correll, "Mean-Squared-Error Prediction for Bayesian Direction-of-Arrival Estimation," IEEE Journal on Signal Processing, Oct., 2013.

S. Govindasamy, D. W. Bliss and D. H. Staelin, "Asymptotic Spectral Efficiency of the Uplink in Spatially Distributed Wireless Networks with Multi-Antenna Base Stations," IEEE Transactions on Communications, July, 2013.

J. R. Williamson, D. W. Bliss, D. W. Browne and J. T. Narayananb, "Seizure prediction using EEG spatiotemporal correlation structure," Epilepsy & Behavior, Oct., 2012.

D. W. Bliss, "Optimal SISO and MIMO Spectral Efficiency to Minimize Hidden- Node Network Interference," IEEE Communications Letters, July, 2010.

D. W. Bliss and P. A. Parker, "Temporal Synchronization of MIMO Wireless Communication in the Presence of Interference," IEEE Transactions on Signal Processing, March, 2010.

D. W. Bliss and K. W. Forsythe, "Multiple-Input Multiple-Output (MIMO) Radar and Imaging: Degrees of Freedom and Resolution," IEEE Asilomar Conference on Signals, Systems & Computers, Pacific Grove, Calif., Nov. 2003.

Yu (Kevin) Cao
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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 160 articles, two books and four book chapters. 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: Best Paper Award at IEEE Computer Society Annual Symposium on VLSI, 2012; Teaching Excellence Award, Ira. A. Fulton Schools of Engineering, ASU, 2010, 2012 and 2013; 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 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:

Y. Cao, Predictive Technology Model for Robust Nanoelectronic Design, Springer, 2011 (http://dx.doi.org/10.1007/978-1-4614-0445-3).

J. Suh, N. Suda, C. Xu, N. Hakim, Y. Cao, B. Bakkaloglu, "Programmable analog device array (PANDA): a methodology for transistor-level analog emulation," IEEE Transactions on Circuits and Systems I, vol. 60, no. 6, pp. 1369-1380, June 2013.

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 & Test of Computers, vol. 25, no. 4, pp. 322-332, July-August 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, February 2008.

Junseok Chae
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expertise: biomedical micro-/nano-devices, micro-electromechanical systems (MEMS) sensors/actuators, micro-EMS packaging, bioenergy in microscale environments

biosketch: Junseok Chae joined the ASU faculty in 2005. He received his M.S. and Ph.D. in electrical engineering in 2000 and 2003, respectively, from the University of Michigan, Ann Arbor. From 2003 to 2005, he was a post-doctoral research fellow at WIMS (Wireless Integrated MicroSystems) ERC (Engineering Research Center), University of Michigan. He has published over 100 conference/journal articles and book chapters. He holds a couple of U.S. patents and is a recipient of the NSF CAREER Award on a MEMS protein sensor array.

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), v. 13, n. 3, pp. 353-381, 2012.

S. Kim, X. Zhang, R. Daugherty, E. Lee, G. Kunnen, D. Allee, E. Forsythe, and J. Chae, "MEMS (Micro-Electro-Mechanical-Systems)-based Ultrasonic Electrostatic Actuators on a Flexible Substrate," IEEE Electron Device Letters, v. 33, n. 7, pp. 1072-1074, 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, v. 21, n. 2, pp. 302-307, 2012.

R. Wang, A. Lajevardi-Khosh, S. Choi, and J. Chae, "Regenerative Surface Plasmon Resonance (SPR) Biosensor: Real-time Measurement of Fibrinogen in Undiluted Human Serum Using the Competitive Adsorption of Proteins," Biosensors and Bioelectronics, v. 28, n. 1, pp. 304-307, 2011.

H. Schwerdt, W. Xu, S. Shekhar, A. Abbaspour-Tamijani, B. Towe, F. Miranda, J. Chae, "A Fully-Passive Wireless Microsystem for Recording of Neuropotentials using RF Backscattering Methods," IEEE Journal of Microelectromechanical Systems, v. 20, n. 5, pp. 1119-1130, 2011.

Chaitali Chakrabarti
Professor
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chaitali@asu.edu
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expertise: VLSI architectures for media processing and wireless communications, algorithm-architecture co-design of signal processing systems, low-power embedded systems and non-volatile memory system design

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. She is a Fellow of the IEEE.

honors and distinctions: Best Paper Awards in SAMOS'07, MICRO'08, SiPS'10 and HPCA'13; MICRO Top Picks in 2007 and 2010; Outstanding Educator Award, IEEE Phoenix section, 2001; Ira A. Fulton Schools of Engineering Top 5% Award, 2012; Distinguished Alumni Award, Dept. of Electrical and Computer Engineering, University of Maryland, College Park, 2013; IEEE Fellow.

selected publications:

R. Sampson, M. Yang, S. Wei, C. Chakrabarti and T. F. Wenisch, "Sonic Millip3De: Massively Parallel 3D Stacked Accelerator for 3D Ultrasound," Proc. of High Performance Computer Architecture, pp. 318-329, February 2013, Best Paper Award.

L. Miao, J. J. Zhang, C. Chakrabarti and A. Papandreou-Suppappola, "Efficient Bayesian Tracking of Multiple Sources of Neural Activity: Algorithms and Real-Time FPGA Implementation," IEEE Trans on Signal Processing, pp. 633-647, March 2013.

C. Yang, Y. Emre, Y. Cao and C. Chakrabarti, "Improving Reliability of Non-volatile Memory Technologies through Circuit-level Techniques and Error Control Coding," EURASIP Journal on Advances in Signal Processing, September 2012.

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

J. Zhuo, C. Chakrabarti, K. S. Lee, N. Chang, and S. Vrudhula, "Maximizing the lifetime of embedded systems powered by fuel-cell battery hybrids," IEEE Transactions on VLSI Systems, pp. 22-32, January 2009.

Srabanti Chowdhury
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expertise: power electronics, gallium nitride-based devices like HEMTs and CAVETs, device reliability, understanding failure modes (at a product level), device physics, study of dielectric materials and its characterization and device simulation, novel materials for power

biosketch: Chowdhury joined ASU in 2013. As part of her Ph.D. thesis, she fabricated the first gallium nitride vertical transistor that demonstrated high voltage handling igniting interest in vertical devices in GaN. The effort was funded by Toyota Motor Corporation, Japan to develop energy-efficient hybrid car inverter switches. In May 2010, she joined Transphorm, a leader in the gallium nitride technology, to develop reliable and manufacturable gallium nitride-based high-voltage devices (>900V) for efficient power conversions. During her tenure, she successfully designed and fabricated 900V-1200V gallium nitride high-electron-mobility transistors (HEMTs) on both silicon carbide and Si substrates. The devices with breakdown voltages greater than 1kV were successfully incorporated into modules for motor drive applications resulting in the first demonstration of a high-frequency, GaN-on-Si-based motor drive in the world. She has also been involved in developing novel techniques to make the devices fail-proof and reliable – essential for commercialization. Her other fundamental research focuses on understanding the physics of the device leading to different device properties. In experimental work done with Masataka Higashiwaki, the accepted origin of surface barrier height in AlGaN/GaN material systems was challenged by the new findings leading to renewed research interest and questions in the topic. Chowdhury was also actively involved in dielectric studies and characterization of materials using electrical measurements both during her Ph.D. research and work at Transphorm. She received her M.S. from UCSB and B.Tech. from the Institute of Radiophysics and Electronics, India with highest honors. She has coauthored over 12 journal publications and presented in over 15 conferences. Her ideas and designs have resulted in over 10 awarded or pending patents.

selected publications:

Lateral and Vertical transistors using the AlGaN/GaN heterostructure, Srabanti Chowdhury and Umesh K Mishra, IEEE Transaction on Electron Devices, Volume 60, Issue 10, (7 pages) [Invited Review].

Current status and scope of gallium nitride-based vertical transistors for high-power electronics application, Srabanti Chowdhury, Brian L Swenson, Man Hoi Wong and Umesh K Mishra, Semiconductor Science and Technology Volume 28 Number 7 07401 (8 pages) [Invited Review].

CAVET on Bulk GaN Substrates Achieved With MBE-Regrown AlGaN/GaN Layers to Suppress Dispersion, Srabanti Chowdhury, Man Hoi Wong, Brian L Swenson and Umesh K. Mishra, Electron Device Letters, IEEE Volume 33, Issue 1, January 2012 Pages: 41 – 43.

Enhancement and Depletion Mode AlGaN/GaN CAVET with Mg-Ion-Implanted GaN as Current Blocking Layer, Srabanti Chowdhury, Brian L Swenson and Umesh K. Mishra, Electron Device Letters, IEEE Volume 29, Issue 6, June 2008 Pages: 543 – 545.

Lawrence T. Clark
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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. He joined ASU in August 2004. Clark has been awarded 70 patents, with approximately 20 pending. He has published over 90 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. He 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. He is presently on partial leave, working with SuVolta Inc., where he is chief architect.

honors and distinctions: IEEE Senior Member; 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; previous associate editor, IEEE Transactions on Circuits and Systems II; previous guest editor, IEEE Journal of Solid State Circuits.

selected publications:

L. Clark, D. Patterson, N. Hindman, K. Holbert, and S. Guertin, "A Dual Mode Redundant Approach for Microprocessor Soft Error Hardness," IEEE Trans. Nuc. Science, Vol. 58, No. 6, pp. 3018-3025, December 2011.

N. Hindman, L. Clark, D. Patterson, and K. Holbert, "Fully Automated, Testable Design of Fine-Grained Triple Mode Redundant Logic," IEEE Trans. Nuc. Science, Vol. 58, No. 6, pp. 3046-3052, December 2011.

S. Mhambrey, S. Maurya and L. Clark, "Low complexity Out-of-Order Issue Logic using Static circuits," IEEE Trans. VLSI Syst., Vol. 21, No. 2, pp. 380-384, February 2012.

S. Chellapa, L. Clark and K. Holbert, "A 90-nm Radiation Hardened Clock Spine," IEEE Trans. Nuc. Science, Vol. 59, No. 4, pp. 1020-1026, December 2012.

R. Rogenmoser and L. Clark, "Reducing Transistor Variability for High Performance Low Power Chips," IEEE Micro, Vol. 33, No. 2, pp. 18-26, March 2013.

Douglas Cochran
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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:

B. Moran, S. Howard and D. Cochran, "Positive-Operator-Valued Measures: A General Setting for Frames," Excursions in Harmonic Analysis, vol. 2, pp. 49-64, 2013.

S. Datta, S. Howard and D. Cochran, "Geometry of the Welch Bounds," Linear Algebra and Applications, vol. 437, pp. 2455-2470, November 2012.

O. Yağan, D. Qian, J. Zhang, and D. Cochran, "Optimal Allocation of Interconnecting Links in Cyber-Physical Systems: Interdependence, Cascading Failures and Robustness," IEEE Transactions on Parallel and Distributed Systems, vol. 23, no. 9, pp. 1708-1721, September 2012.

D. Cochran, A. Gelb and Y. Wang, "Edge Detection from Truncated Fourier Data Using Spectral Mollifers," Advances in Computational Mathematics, vol. 38, no. 4, pp. 737-762, March 2012.

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

Rajib Datta
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expertise: power electronics, electric drives, power conversion and control for large-scale electrical systems including renewable energy interface, industrial applications of high power conversion systems and application of advanced semiconductor power devices

biosketch: Rajib Datta joined ASU in 2013 from General Electric Global Research Center where he managed the High Power Conversion Systems Group. Previously, Datta was a scientist in the high-power converter group at ABB Corporate Research Center, Germany. 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 within GE as well as projects funded by the Department of Energy, Office of Naval Research and the Advanced Research Projects Agency-Energy. He has been granted 15 US patents and holds a strong publication record, of which two IEEE Transactions publications have over 200 citations.

honors and distinctions: New Technology Award – Power Conversion and Delivery, GE Global Research, 2012; Technical Leadership Award - Electronics Power Conversion, GE Global Research, 2007; Technical Achievement Award - Electronics and Energy Conversion, GE Global Research, 2006; General Electric Award to Inventors, 2003

selected publications:

R.Datta, H.Weng, K.Chen, A.M.Ritter, R.Raju, "Multipulse Converter – Toplogy and Control for Utility Power Conversion," IEEE Industrial Electronics Conference (IECON), November 2006, France.

R.Datta, V.T.Ranganathan, "A Method of Tracking the Peak Power Points for a Variable Speed Wind Energy Conversion System," IEEE Transactions on Energy Conversion, vol. 18, March 2003

R.Datta, V.T.Ranganathan, "Variable Speed Wind Power Generation using Doubly-fed Wound Rotor Induction Machine – A Comparison with Alternative Schemes," IEEE Transactions on Energy Conversion, vol. 17, September 2002

R.Datta, V.T.Ranganathan, "Direct Power Control of Grid-Connected Wound Rotor Induction Machine without Rotor Position Sensors," IEEE Transactions on Power Electronics, vol. 16, May 2001

Rodolfo Diaz
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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.

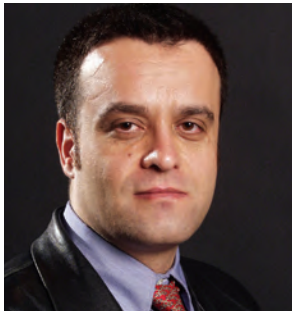
selected publications:

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
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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 since1998.

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:

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

Dario Fertonani, Tolga M. Duman and M. Fatih Erden, "Bounds on the capacity of channels with insertions, deletions and substitutions," IEEE Trans. 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 Trans. on Communications, vol. 58, no. 4, pp. 1102-1111, Apr. 2010.

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

David K. Ferry
Regents' Professor
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expertise: quantum effects in submicron semiconductor devices and nanostructures and the general development of quantum transport in open systems

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

selected publications:

D. K. Ferry, R. Akis, A. M. Burke, I. Knezevic, R. Brunner, R. Meisels, F. Kuchar and J. P. Bird, "Open Quantum Dots: Physics of the non-Hermitian Hamiltonian," Fortschritter der Physik, vol. 291, pp. 291-304 (2013).

D. K. Ferry, "Short-range potential scattering and its effect in graphene," Journal of Computational Electronics, vol. 12, pp. 76-84 (2013).

D. K. Ferry, "Evolution of Physics and Chemistry of Surfaces and Interfaces: A Perspective of the last 40 years," Journal of Vacuum Science and Technology B, vol. 31, July 2013 issue.

L. Huang, R. Yang, Y.-C. Lai and D. K. Ferry, "Lead-position dependent regular oscillations and random fluctuations of conductance in graphene quantum dots," Journal of Physics Condensed Matter, vol. 25, 085502 (9 pages) (2013).

M. Nedjalkov, S. Selberherr, D. K. Ferry, D. Vasileska, P. Dollfus, D. Querlioz, I. Dimov and P. Schwaha, "Physical scales in the Wigner-Boltzmann equation," Annals of Physics, vol. 328, pp. 220-237 (2013).

R. Somphonsane, H. Ramamoorthy, G. Bohra, G. He, D. K. Ferry, Y. Ochiai, N. Aoki, and J. P. Bird, "Fast energy relaxation of hot carriers near the Dirac point in graphene," to appear in Nano Letters.

David H. Frakes
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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: ASU Faculty Achievement Award-Best Innovation, 2013; Mimics Innovation Award, 2013; ASU SBHSE Outstanding Graduate Faculty Member of the Year Award, 2013; ASME Summer Bioengineering Conference Best Paper Award, 3rd place, 2013; National Science Foundation CAREER Award, 2012; IEEE Conference on Bioinformatics and Bioengineering Best Paper competition finalist, 2012; ASU SBHSE Professor of the Year Award, 2012; ASU Faculty Women's Association Outstanding Mentor Award, 2011; 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; Arizona State University Centennial Professor of the Year Award, 2009; Georgia Institute of Technology Council of Outstanding Young Alumni, 2007.

selected publications:

Zwart C, Frakes D., "Segment Adaptive Gradient Angle Interpolation," IEEE Transactions on Image Processing, vol. 22(8), pp. 2960-9, August 2013.

Roszelle B, Gonzalez F, Babiker H, Ryan J, Albuquerque F, Frakes D., "Flow Diverter Effect on Cerebral Aneurysm Hemodynamics: An In Vitro Comparison of Telescoping Stents and the Pipeline," Neuroradiology. vol. 55(6), pp. 751-8, June 2013.

Babiker H, Gonzalez L, Chong B, Cheema S, Frakes D. Finite, "Element Modeling of Embolic Coil Deployment: Multifactor Characterization of Treatment Effects on Cerebral Aneurysm Hemodynamics," Journal of Biomechanics. accepted: June 2013.

Park S, Nigro J, Ryan J, Osborn M, Wellnitz C, Southard R, Sanders B, Lane J, Frakes D, Pophal S., "Total Artificial Heart in a Small Pediatric Patient with Biventricular Heart Failure," Perfusion. accepted: Apr 2013.

Babiker M, Gonzalez L, Albuquerque F, Collins D, Elvikis A, Zwart C, Roszelle B, Frakes D., "An In Vitro Study of Pulsatile Fluid Dynamics in Intracranial Aneurysm Models Treated with Embolic Coils and Flow Diverters," IEEE Transactions on Biomedical Engineering. vol. 60(4), pp. 1150-9, April 2013.

Gennady Gildenblat
Motorola Professor
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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 PhD degree 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. Professor Gildenblat has over 150 publications in these areas including several books, invited articles and US patents. In 1980, he joined the General Electric Corporate Research and Development Center in Schenectady, NY, 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, MA. From 1986, Professor 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:

Yao, W., Gildenblat, G., McAndrew, C. C. and Cassagnes, A., "Compact model of impact ionization in LDMOS transistors," IEEE Transactions on Electron Devices, 59(7), 1863-1869, 2012.

Yao, W., Gildenblat, G., McAndrew, C. C. and Cassagnes, A., "SP-HV: A scalable surface-potential-based compact model for LDMOS transistors," IEEE Transactions on Electron Devices, 59(3), 542-550, 2012.

Dessai, G. and Gildenblat, G., "Approximate closed-form solution of ambipolar input voltage equation for the common-gate symmetric FinFET," Solid-State Electronics, 75, 77-80, 2012.

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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 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: IEEE Fellow, 2004; Hans Fischer Senior Fellow, Technical University of Munich Institute for Advanced Study, 2013; IEEE Phoenix Section Outstanding Faculty Award, 2013; ASEE ECE Division Meritorious Service Award 2012; Robert M. Janowiak Outstanding Leadership and Service Award, Electrical and Computer Engineering Department Heads Association, 2008; Alexander von Humboldt Research Fellow, Germany, 1986; College of Engineering Research Award, Oregon State University,1996; Colorado State University College of Engineering Achievement in Academia Award, 1998; IEEE Phoenix Section Society Award for Outstanding Service, 2002.

selected publications:

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.

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(11), pp. 3876-3884, 2011.

C. B. Honsberg and S. M. Goodnick, "Realizing terawatt-scale solar electricity: nanotechnology-enabled physical mechanisms and material properties," invited paper in IEEE Nanotechnology Magazine, 6(2), p 6-14, 2012.

S. M. Goodnick and M. Saraniti, "Modeling and Simulation of Terahertz Devices," invited paper in IEEE Microwave Magazine, 13(7), 36-44, 2012.

Ravi Gorur
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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.

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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.

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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 diploma 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 Julich, 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.

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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.

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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 pricing mechanisms for the electric distribution system, improving calculation of reserve requirements, stochastic unit commitment models that incorporate intermittent (wind and solar) resources, and creating a robust corrective switching model for improved system reliability. Hedman is a member of the Power Systems Engineering Research Center (PSERC).

selected publications:

A. Korad and K. W. Hedman, "Robust corrective transmission switching for system reliability," IEEE Transactions on Power Systems, accepted for publication, June 2013.

R. P. O'Neill, E. A. Krall, K. W. Hedman, and S. S. Oren, "A model and approach to the challenge posed by optimal power systems planning," Mathematical Programming, accepted for publication, January 2013.

G. T. Heydt, R. Ayyanar, K. W. Hedman, and V. Vittal, "Electric power and energy engineering: the first century," Proceedings of the IEEE, vol. 100, no. 2, pp. 1315-1328, May 2012.

K. W. Hedman, S. S. Oren, and R. P. O'Neill, "Optimal transmission switching: economic efficiency and market implications," Journal of Regulatory Economics, vol. 40, no. 2, pp. 111-140, 2011.

Gerald T. Heydt
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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 for the Advancement of Science and Art 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 Research Center at ASU. He has industrial experience with the Commonwealth Edison Company in Chicago, Ill., 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 at ASU, a member of the National Academy of Engineering and a Fellow of the IEEE.

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

selected publications:

A. Q. Huang, M. L. Crow, G. T. Heydt, J. P. Zheng & S. 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.

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H. Zhang, G. Heydt, V. Vittal, J. Quintero, "An improved network model for transmission expansion planning considering reactive power and network losses," IEEE Transactions on Power Delivery, v. 28, No. 3, pp. 3471-3479, Aug. 2013.

G. T. Heydt, R. Ayyanar, K. W. Hedman, V. Vittal, "Electric power and energy engineering: the first century," Proc. IEEE, v. 100, pp. 1315-1328, May 13, 2012.

Keith Holbert
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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: Tau Beta Pi; Teaching Excellence Award from ASU College of Engineering, 1997; IEEE Senior Member; Outstanding Faculty Award, IEEE Phoenix Section, 2007; IEEE Transactions on Education Best Paper award, 2010; Guest Scientist, Los Alamos National Laboratory, 2005-2013; Top 5% Faculty, Fulton Schools of Engineering, 2012.

selected publications:

G. G. Karady, K. E. Holbert, Electrical Energy Conversion and Transport: An interactive computer-based approach, 2nd ed., IEEE Series on Power Engineering, Wiley Interscience, 2013.

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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.

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expertise: amorphous silicon/crystalline silicon heterojunction solar cells, light management in solar cells, transparent conductive oxides, semiconductor nanoparticles, optical and electronic properties of nanoscale materials, plasma synthesis of powders, deposition of powders and thin films

biosketch: Zachary C. Holman received a B.A. degree in physics from Reed College and a Ph.D. degree in mechanical engineering from the University of Minnesota. He spent two years as a postdoctoral fellow in the Institute of Microengineering at EPFL in Switzerland prior to joining the faculty at Arizona State University in 2013. He has published 20 peer-reviewed papers in the last three years.

selected publications:

Z. Holman, S. De Wolf, and C. Ballif, "Improving metal reflectors by suppressing surface plasmon polaritons: A priori calculation of the internal reflectance of a solar cell," Light: Science & Applications (in press).

A. Descoeudres, Z. Holman, L. Barraud, S. Morel, S. De Wolf, and C. Ballif, ">21% efficient silicon heterojunction solar cells on n- and p-type wafers compared," IEEE Journal of Photovoltaics 3, 83–89 (2013).

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Z. Holman, C.-Y. Liu, and U. Kortshagen, "Germanium and silicon nanocrystal thin-film field-effect transistors from solution," Nano Letters 10, 2661–2666 (2010).

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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 $In_xGa_{1-x}N$ (0.05<x<0.22) grown on GaN/sapphire," Thin Solid Fims, vol. 520, issue 22, Sept. 2012, pp. 6807-6812.

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

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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 the 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.

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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 was appointed Salt River Chair Professor at ASU in 1986. 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 Tokomak Fusion Test Reactor project in Princeton. Karady has graduated 23 doctoral and 48 master's students. He is an IEEE Fellow, and has published a book, several book chapters, and more than 132 journal and 199 conference papers.

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

selected publications:

G. Karady, K. Holbert, Electric Energy Conversion and Transport using an Interactive Computer-Based Approach, Second Edition, John Wiley and Sons Inc. ISBN 978-0-470-93699-3 2013.

J.R. Prigmore, J. A. Mendoza, G. G. Karady, "Comparison of Four Different Types of Ferromagnetic Materials for Fault Current Limiter Applications," IEEE Transaction on Power Delivery, vol. 28, no. 3, pp. 1491-1498, July 2013

S. Kucuksari and G. G. Karady, "Complete Model Development for an Optical Current Transformer," IEEE Transaction on Power Delivery, vol. 27, no. 4, pp. 1755-1762, October 2012.

Xianjun Zhang, 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. 1150–1508.

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

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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 IVMSP Technical 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
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expertise:
Power and Energy Management Circuits and Systems, Radio Frequency and analog Integrated Circuits, and Integrated Sensors.

biosketch: Sayfe Kiaei has been with ASU since January 2001. He is a professor and the director of the Connection One National Science Foundation Center, and Motorola Endowed Professor and Chair in Analog and RF Integrated Circuits. From 2008-2012 he was the Associate Dean of Research at the Ira A. Fulton Schools of Engineering. From 1993 to 2001, he was a Senior Member of 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. Before joining Motorola, Dr. Kiaei was an Associate Professor at Oregon State University from 1987-1993 where he taught courses and performed research in digital communications, VLSI system design, advanced CMOS IC design, and wireless systems. Dr. Kiaei assisted in the establishment of the Industry-University Center for the Design of Analog/Digital ICs (CDADIC) and served as a Co-Director of CDADIC for 10 years. He has published over 100 journal and conference papers and holds several patents and his research interests are in wireless transceiver design, RF and Mixed-Signal IC's in CMOS and SiGe. His research projects are funded by a large number of industrial sponsors, including Motorola Inc., Intel, the National Science Foundation, Texas Instruments and SRC. Dr. Kiaei is an IEEE Fellow, and has been the chair and on the technical program committee of several IEEE 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; Associate Dean for Research at ASU's Ira A. Fulton Schools of Engineering; Director of the Connection One Center.

selected publications:

Seungkee Min; Copani, T.; Kiaei, S.; Bakkaloglu, B., "A 90-nm CMOS 5-GHz Ring-Oscillator PLL With Delay-Discriminator-Based Active Phase-Noise Cancellation," Solid-State Circuits, IEEE Journal of, vol. 48, no. 5, pp.1151,1160, May 2013

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expertise: RF integrated transceivers on silicon and III-V materials (GaN); power management and distribution for high-frequency integrated circuits for consumer applications; low-power/long-term field deployment ICs for the military and green energy (solar arrays); programmable, broadband wireless transceivers for future generation (5G) wireless communication systems

biosketch: Jennifer Kitchen received a Ph.D. degree in electrical engineering at Arizona State University in 2007. During her graduate studies, Kitchen was a National Science Foundation Graduate Fellow, and a Semiconductor Research Corporation Master's Scholar. While at ASU, from 2003-2006, Kitchen worked for the RF power amplifier handset product group at Motorola, Inc., and Freescale Semiconductor. In 2007, she became the Arizona Design Center Manager for a startup company, Ubidyne, Inc., that aims to revolutionize wireless basestations by producing a digital antenna-embedded radio solution. In 2009, Kitchen joined ViaSat, Inc., as head of an IC (Integrated Circuit) design team within the Advanced Microwave Product Group. Her group focused on designing low-power integrated transceivers for SATCOM; among other chipsets for military applications. Kitchen joined the faculty of Arizona State University as an assistant professor of electrical engineering in 2012.

Kitchen's research focuses on efficiency-enhancement, integration and programmability of high-frequency (RF) circuits and systems. She uses silicon as well as III-V materials, such as gallium nitride, to create high-efficiency power management and power amplifier systems. She is also working on integrated electronics for solar arrays.

selected publications:

J. Kitchen, W.Y. Chu, I. Deligoz, S. Kiaei and B. Bakkaloglu, "Combined linear and ΔM switch-mode PA supply modulator for polar transmitters," IEEE Journal of Solid-State Circuits, vol. 44, no. 2, pp. 404-413, February 2009.

J. Kitchen, I. Deligoz, S. Kiaei, and B. Bakkaloglu, "Polar modulated SiGe class E and F amplifiers using switch-mode supply modulation," IEEE Trans. Microwave Theory Tech., vol. 55, no. 5, pp. 845-856, May 2007.

J. Kitchen, W.Y. Chu, I. Deligoz, S. Kiaei and B. Bakkaloglu, "Combined linear and ΔM switch-mode PA supply modulator for polar transmitters," IEEE International Solid-State Circuits Conference, ISSCC 2007, February 2007.

J. Desai, I. Deligoz, S. Kiaei, and B. Bakkaloglu, "Fully-integrated, programmable, polar-modulated class E power amplifier," in Proceedings of Wireless Networks and Emerging Technologies 2006, Banff, Canada, July 2006.

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

biosketch: Oliver Kosut received B.S. degrees from the Massachusetts Institute of Technology in electrical engineering and mathematics in 2004, and a Ph.D. in electrical and computer engineering from Cornell University in 2010. He was a postdoctoral associate in the Stochastic Systems Group at MIT from 2010 to 2012. He joined ASU as an assistant professor in 2012. He was a finalist for three ISIT student paper awards, and a finalist for the IBM Ph.D. fellowship.

selected publications:

Y. Liu, O. Kosut, and A. Willsky, "Sampling from Gaussian graphical models using subgraph perturbations," International Symposium on Information Theory, July 2013.

O. Kosut, "Polytope codes for distributed storage in the presence of an active omniscient adversary," International Symposium on Information Theory, July 2013.

O. Kosut and L. Sankar, "Universal fixed-to-variable source coding in the finite blocklength regime," International Symposium on Information Theory, July 2013.

V. Y. F. Tan and O. Kosut, "The dispersion of Slepian-Wolf coding," International Symposium on Information Theory, July 2012.

O. Kosut, L. Jia, R. J. Thomas, L. Tong, "Malicious data attacks on the smart grid," IEEE Trans. on Smart Grid, vol. 2, pp. 645–658, October 2011.

Michael N. Kozicki
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expertise: Nanoionics, low-energy resistive memory, advanced interconnect/electrode systems, and nano-electromechanical systems (NEMS)

biosketch: Michael Kozicki joined ASU in 1985 from Hughes Microelectronics. He is a professor of electrical engineering and the director of the Center for Applied Nanoionics. 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. Professor 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 also a founder of two ASU spin-out companies involved in the development and licensing of solid-state ionic technologies, a visiting professor at the University of Edinburgh in the United Kingdom, and has served as Chief Scientist of Adesto Technologies and adjunct professor at GIST in Korea.

honors and distinctions: Founder, Axon Technologies Corporation and Idendrix, Inc.; Visiting Professor, College of Science and Engineering, University of Edinburgh; 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 and M.N. Kozicki, "Cation-based resistance change memory, " J. Phys. D - Appl. Phys., vol. 46, DOI: 10.1088/0022-3727/46/7/074005 (2013).

Wei Lu, Doo Seok Jeong , Michael Kozicki , and Rainer Waser, "Electrochemical metallization cells—blending nanoionics into nanoelectronics?" MRS Bulletin, vol. 37, 124-130 (2012).

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

N. Derhacobian, S.C.Hollmer, N. Gilbert, M.N. Kozicki, "Power and Energy Perspectives of Nonvolatile Memory Technologies," Proc. IEEE, vol. 98, 283-298 (2010).

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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 370 papers, including 335 published in refereed journals. His works have been cited more than 10,000 times. His current H-index and i10 index are 52 and 212, respectively (Google-Scholar based). In the past five years, he gave about 50 invited talks worldwide.

honors and distinctions: Outstanding Referee Award, American Physical Society, 2008; NSF ITR Award, 2003; Fellow of the American Physical Society since 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:

G. Yan, J. Ren, Y.-C. Lai, C. H. Lai and B. Li, "Controlling complex networks: how much energy is needed?" Physical Review Letters 108, 218703 (2012).

Z.-G. Huang, J.-Q. Zhang, J.-Q. Dong, L. Huang and Y.-C. Lai, "Emergence of grouping in multi-resource minority game dynamics," Nature Scientific Reports 2, 703; DOI:10.1038/srep00703 (2012).

X. Ni, L. Huang, Y.-C. Lai and L. M. Pecora, "Effect of chaos on relativistic quantum tunneling," Europhysics Letters 98, 50007 (2012). This paper was highlighted in Europhysics News, vol. 43, no. 6 (2012).

H.-Y. Xu, L. Huang, Y.-C. Lai, and C. Grebogi, "Chiral scars in chaotic Dirac fermion systems," Physical Review Letters 110, 064102 (2013).

M. Wu, R.-Q. Su, X.-H. Li, T. Ellis, Y.-C. Lai, and X. Wang, ``Engineering of regulated stochastic cell fate determination,'' Proceedings of the National Academy of Sciences (USA), published online on June 10, 2013.

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expertise: automation in life sciences, automation, micro- and nanotechnologies, microscale systems, lab-on-a-chip, 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 at Arizona State University and professor of electrical engineering. Currently, she is ASU Senior Scientist and the director for the Center for Biosignatures Discovery Automation at the Biodesign Institute at Arizona State University. Prior to ASU, she was a professor of electrical engineering at the University of Washington where she founded and directed the UW's Genomation Laboratory. Dr. Meldrum is PI, director of the NIH Center of Excellence in Genomic Sciences, Microscale Life Sciences Center funded for $36 million, August 2001-July 2013. She is an editor for the IEEE Transactions on Automation Science & Engineering, and was general chair for IEEE's Conference on Automation Science & Engineering 2007, IEEE BioRobotics Conference in 2008, and National Academy of Engineering Grand Challenges Summit in Phoenix in 2010.

honors and distinctions: Distinguished Lecturer IEEE Robotics & Automation Society 2006-2009; Dive in the Alvin submersible off R/V Atlantis to 2200m below sea level at Endeavor Ridge in NE Pacific Ocean August 2007; IEEE Fellow, 2004; Fellow of the American Association for the Advancement of Science, 2003; Presidential Early Career Award for Scientists and Engineers 1996-2001; NIH Special Emphasis Research Career Award 1993-1998. Member, National Advisory Council for Human Genome Research, 2006-2008 and 2011-present.

selected publications:

Haixin Zhu, Xianfeng Zhou, Fengyu Su, Yanqing Tian, Shashanka Ashili, Mark R. Holl, Deirdre R. Meldrum, "Micro-patterning and characterization of PHEMA-co-PAM-based optical chemical sensors for lab-on-a-chip applications," Sensors and Actuators B, vol. 173, pp. 817-823, August 6, 2012.

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Bo Wang, Shawn Pugh, David R.Nielsen, Weiwen Zhang, Deirdre R.Meldrum, "Engineering cyanobacteria for photosynthetic production of 3-hydroxybutyrate directly from CO2," Metabolic Engineering, vol. 16, pp. 68–77, 16 January 2013 (online), March 2013 (print).

David B. Agus, …, Deirdre R. Meldrum, et al., the PS-OC cell-line project team and the PS-OC network, "A physical sciences network characterization of nonmalignant and metastatic cells," Scientific Reports, 3:1449, 12 pages, April 26, 2013. (doi:10.1038/srep01449).

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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 as a professor of electrical engineering 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 (2001-2003) 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: CSC Technical Excellence Award 2003; CSC Civil Group Presidential Award 2001; MRJ Award for Technical Achievement 2000; NASA Group Achievement Award 1999; NASA Space Act Patent Award, 2005, 2007; IEEE/LEOS Distinguished Lecturer Award, 2007-2009; Optical Society Fellow; IEEE Fellow.

selected publications:

C.Z. Ning, "What is Laser Threshold?" IEEE J. Select. Top. Quant. Electron., 1503604, 19 (2013).

C.Z. Ning, "Semiconductor nanolasers (A tutorial)," Phys. Stat. Sol. B, 247, 774-788, 2010.

K. Ding, M. Hill, Z.C. Liu, L. J. Yin, P. J. van Veldhoven, and C.Z. Ning, "Record performance of electrical injection subwavelength metallic-cavity semiconductor lasers at room temperature," Opt. Express, 21, 4728 (2013).

C.Z. Ning, "Semiconductor Nanowire Lasers," in J.J. Coleman, A.C. Bryce, C.Jagadish, editors: Semiconductors and Semimetals, vol. 86, Academic Press, 2012, pp. 455-486.

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.

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).

K. Ding and C. Z. Ning, Metallic subwavelength-cavity semiconductor nanolaser. (An invited review). Light: Science and Applications (Nature Publishing), 1(7), e20 (2012).

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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.

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expertise: fiber optic communications, holography, distance education

biosketch: Joseph Palais joined the faculty in 1964 and is the School of Electrical, Computer and Energy 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, Fiber Optic Communications, 5th ed., Upper Saddle River: Prentice-Hall, 2005. Translations: Korean, Chinese, Persian, Japanese and Syrian.

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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 the ASU faculty 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 110 papers at national and international conferences. He has offered short courses on wavelets in electromagnetics at Moscow State University, the University of Canterbury, CSIRO in Sydney, IEEE Microwave Symposium, Peking University, the Chinese Aerospace Institute, the 13th 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 (©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 Journal of Computational Electronics.

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

selected publications:

Le Wang and G. Pan, "Coifman Wavelets in 3D Scattering from a Calibration Target Consisting of Doubly Periodic Sharp Metal Cones," IEEE Trans. Antennas and Propg., vol. 61, no. 9, pp. 4665-4674, Sept. 2013.

Z. Huang, G. Pan and K. Chen, "A Synchronized Multi-Grid Time Domain Method via Huygens Sub-gridding and Implicit Algorithms," IEEE Trans. Antennas and Propg., vol. 61, no. 5, pp. 2605-2614, May 2013.

J. Griffith and G. Pan, "Electromagnetic Fields Generated by Arbitrarily shaped Current Loops," IET Sci. Meas. Technol., vol. 6, iss. 4, pp. 298–305, June 2012.

Z. Guo, G. Pan and H. Pan, "Unified Formulation for Multiple Vias with or without Circular Pads in High Speed Interconnects," IEEE Trans. Advanced Packaging, vol. 1, no. 8, pp. 1226-1233, August 2011.

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Z. Huang, G. Pan and H. Pan, "Perfect Plane Wave Injection for Crank-Nicolson Time Domain Method," IET Proceedings of Microwaves, Antennas and Propg., vol. 4, no. 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 Trans. Advanced Packaging, vol. 33, no. 2, pp. 517-523, May 2010.

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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.

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expertise: applications and integration of microsystems including microelectromechanical systems (MEMS), microactuators, neural recording and neural stimulation; applications of systems and control including adaptive control, instrumentation and control of gas-turbine engines, control of microsystems, prosthetics, feedback control over nondeterministic networks

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 the faculty of Arizona State University 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

Stephen M. Phillips, Konstantinos Tsakalis, Ravi Gorur; "On the implementation of ABET feedback for program improvement," Proceedsing of the ASEE Annual Conference and Exposition, Vancouver, BC, 2011

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, FL, 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.

Sattigeri, P., Thiagarajan, J.J., Ramamurthy, K.N., Konnanath, B., Mathew, T., Spanias, A., Goryll, M., Thornton, T., Prasad, S., Phillips, S., "Signal processing for biologically inspired sensors," Communications, Control and Signal Processing (ISCCSP), 4th International Symposium on, pp 1-5, Cyprus, March 2010.

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

biosketch: Martin Reisslein joined the ASU faculty in 2000. He received a Dipl.-Ing. in electrical engineering from FH 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 105 journal articles. He has a Google Scholar h-index of 35 and a Web of Science h-index of 19. He serves as associate editor for the IEEE Transactions on Education, the Computer Networks Journal, and Optical Switching and Networking.

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:

J. Reisslein, A.M. Johnson, K.L. Bishop, J. Harvey and M. Reisslein, "Circuits Kit K-12 Outreach: Impact of Circuit Element Representation and Student Gender," IEEE Transactions on Education, vol. 56, no. 3, pp. 316-321, August 2013.

M.S. Kiaei, K. Fouli, M. Scheutzow, M. Maier, M. Reisslein, and C. Assi, "Low-latency Polling Schemes for Long-Reach Passive Optical Networks," IEEE Transaction on Communications, vol. 61, no. 7, pp. 2936-2945, July 2013.

A. Mercian, M.P. McGarry, and M. Reisslein, "Offline and Online Multi-Thread Polling in Long-Reach PONs: A Critical Evaluation," IEEE/OSA Journal of Lightwave Technology, vol. 31, no. 12, pp. 2018–2028, June 2013.

A. Pulipaka, P. Seeling, M. Reisslein, and L.J. Karam, "Traffic and Statistical Multiplexing Characterization of 3-D Video Representation Formats," IEEE Transactions on Broadcasting, vol. 59, no. 2, pp. 382–389, June 2013.

X. Wei, F. Aurzada, M.P. McGarry and M. Reisslein, "EIBT: Exclusive Intervals for Bulk Transfers on EPONs," IEEE/OSA Journal of Lightwave Technology, vol. 31, no. 1, pp. 99–110, January 2013.

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, pp. 480-487, November 2012.

P. Seeling and M. Reisslein, "Video Transport Evaluation With H.264 Video Traces," IEEE Communications Surveys and Tutorials, vol. 14, no. 4, pp. 1142–1165, Fourth Quarter 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, pp. 440-453, September 2012.

Armando A. Rodriguez
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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 Yorque 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 Pumpa Irrigation System in Nepal," Journal of Ecology and Society, vol. 15, no. 3, article 39 (online, 46 pages), 2010. (Ralf Yorque Memorial Prize).

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Lalitha Sankar
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expertise: cyber-security and privacy in the Smart Grid, privacy of electronic data, information-theoretic privacy measures, applications of game theory to privacy problems, finite block-length source coding, distributed state estimation and optimal power flow with privacy guarantees in the Smart Grid

biosketch: Lalitha Sankar received a BTech degree in engineering physics from the Indian Institute of Technology, Bombay, in 1992, an M.S. degree in electrical engineering from the University of Maryland in 1994, and a Ph.D. degree in electrical engineering from Rutgers University in 2007. From 2010-2012, she was an associate research scholar at Princeton University. From 2007-2010, Sankar was a postdoctoral fellow supported by the Princeton University Council on Science and Technology. Prior to her doctoral studies, she was a senior member of technical staff at AT&T Shannon Laboratories from 1995-2002.

selected publications:

L. Sankar, S. Raj Rajagopalan and H. V. Poor, "Utility-privacy tradeoff in databases: An information-theoretic approach," IEEE Transactions on Information Forencics and Security, Special Issue on Privacy and Trust Management in Cloud and Distributed Systems, vol. 8, no. 6, June 2013.

L. Sankar, S. R. Rajagopalan, S. Mohajer and H. V. Poor, "Smart meter privacy: A theoretical framework," IEEE Transactions on Smart Grid, vol. 4, no. 2, pp. 837-846, June 2013.

R. Tandon, L. Sankar and H. V. Poor, "Lossy discriminatory source coding: Side-information privacy," IEEE Transactions on Information Theory, vol. 59, no. 9, Sept. 2013.

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L. Sankar, S. Kar, R. Tandon and H. V. Poor, "Competitive privacy in the smart grid: An information-theoretic approach," Proc. of the IEEE Smart Grid Communications Conference, Brussels, Belgium, Oct. 17-20, 2011.

V. Belmega, L. Sankar, H. V. Poor and M. Debbah, "Pricing mechanisms for distributed state estimation," Proc. IEEE International Symposium on Communications, Control, and Signal Processing, May 3-5, 2012.

O. Kosut and L. Sankar, "Universal fixed-to-variable source coding in the finite blocklength regime," Proc. of the IEEE International Symposium on Information Theory, Istanbul, Turkey, July 7-12, 2013.

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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 joined the faculty of the School of Electrical, Computer and Energy Engineering of ASU in August 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 development of Monte Carlo and cellular automaton techniques for 2-D and 3-D 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:

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

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, p. 054516, March 2010.

P. Joshi, A. Smolyanitsky, L. Petrossian, M. Goryll, M. Saraniti, T. J. Thornton, "Field effect modulation of ionic conductance of cylindrical silicon-on-insulator nanopore array," Journal of Applied Physics ,vol. 107, no. 5, pp. 054701-054701-6, March 2010.

D. Guerra, D. K. Ferry, M. Saraniti and S. M. Goodnick, "Millimeter-wave power amplifier circuit-device simulations through coupled Harmonic Balance-Monte Carlo particle-based device simulator," IEEE MTT-S International Microwave Symposium Digest, 2012, 10.1109/MWSYM.2012.6258430, 3 pp., 2012 IEEE/MTT-S International Microwave Symposium, pp.17-22 , 2012.

S. M. Goodnick and M. Saraniti, "Modeling and Simulation of Terahertz Devices," invited paper in IEEE Microwave Magazine, 13(7), pp. 36-44, 2012.

Jennie Si
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expertise: learning and approximate dynamic programming, estimation and filtering of stochastic processes, neural networks, neurophysiological basis for control, cortical neural information processing, and brain machine interface

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 the ASU faculty in 1991, where she is currently a professor.

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

selected publications:

Yuan Yuan, Chenhui Yang and Jennie Si. "The M-Sorter: an automatic and robust spike detection and classification system," Journal of Neuroscience Method,. 210: 281-290, 2012.

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

Chenhui Yang, Byron Olson, and Jennie Si, "A multiscale correlation of wavelet coefficients approach to spike detection," Neural Computation. 23(1): 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 Trans. 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 Trans. on Systems, Man, and Cybernetics, Part B, vol. 38, no. 4, pp. 1008-1013, Aug. 2008.

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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. Schlesser, 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.

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expertise: digital signal processing, multimedia, speech and audio coding, adaptive filters, real-time processing of sensor data, DSP for the arts

biosketch: Andreas Spanias joined ASU in 1988. He has published more than 65 journal and 200 conference papers and contributed several book chapters. He authored two textbooks in DSP and audio coding and four Morgan-Claypool Lecture Series research monographs. He has served as associate editor of IEEE Transactions on Signal Processing, as the general co-chair of the IEEE ICASSP-99 and as vice-president of the IEEE Signal Processing Society (SPS). He received the 2005 IEEE SPS Meritorious Service Award. He is currently associate director of the ASU School of Arts, Media and Engineering (AME), Director of the SenSIP Center and Industry Consortium which is an NSF I/UCRC, PI of a major multi-university NSF program and Co-PI on the NSF AME IGERT. He is a book series editor for Morgan-Claypool Lecture Series. He co-authored two U.S. patents with six more pending.

honors and distinctions: IEEE Fellow; 2004 IEEE Distinguished Lecturer; IEEE 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; the mobile iPhone/iPad app iJDSP (jdsp.asu.edu) won the Premier award in Oct. 2012 by the UC-Berkeley NEEDS panel (the Premier award is co-sponsored by Microsoft Research, Wiley and TechSmith)

selected publications:

M. Banavar, C. Tepedelenlioglu and A. Spanias, "Distributed SNR Estimation with Power Constrained Signaling," IEEE Trans. Signal Processing, vol. 60, pp. 3289-3294, 2012.

M.K. Banavar, A.D. Smith, C. Tepedelenlioglu and A. Spanias, "On the Effectiveness of Multiple Antennas in Distributed Detection over Fading MACs," IEEE Trans. Wireless Communications, vol. 11, pp. 1744-1752, May 2012.

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C. Tepedelenlioglu, M.K. Banavar and A. Spanias, "On the Asymptotic Efficiency of Distributed Estimation Systems with Constant Modulus Signals," IEEE Tran. on Information Theory, vol. 57, pp. 7125-7130, Oct. 2011.

H. Krishnamoorthi, A. Spanias and V. Berisha, "A frequency/detector pruning approach for loudness estimation," IEEE Signal Processing Letters, vol. 16, pp. 997-1000, Dec. 2009.

Meng Tao
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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 as a professor of electrical engineering, and heads The Laboratory for Terawatt Photovoltaics.

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

selected publications:

M. Tao, "Impurity Segregation in Electrochemical Processes and Its Application to Electrorefining of Ultrapure Silicon," Electrochimica Acta, vol. 89, pp. 688-91 (2013).

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).

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. 1559-61 (2003).

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. 71-3 (2007).

M. Tao, "A Kinetic Model for Metalorganic Chemical Vapor Deposition from Ga(CH3)3 and AsH3," Journal of Applied Physics, vol. 87, pp. 3554-62 (2000).

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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.

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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
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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. 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; Best Student Paper Award presented at the 2009 High Temperature Electronics Network (HiTEN 2009) for paper entitled "250°C Voltage Compliant SOI MESFETs for High Power PWM Drive Circuits"; Plenary lecture entitled "University Innovation: How Today's Academic Research Seeds Tomorrow's Commercial Breakthroughs" presented at the 38th International Symposium for Testing and Failure Analysis (ISTFA), November 12, 2012.

selected publications:

S. J. Wilk, W. Lepkowski and T. J. Thornton, "32 dBm Power Amplifier on 45 nm SOI CMOS," IEEE Microwave and Wireless Components Letters, vol. 23, pp. 161-163, 2013.

M. R. Ghajar, S. J. Wilk, W. Lepkowski, B. Bakkaloglu and T. J. Thornton, "Backgate Modulation Technique for Higher Efficiency Envelope Tracking," in IEEE Transactions on Microwave Theory and Techniques, vol. 61, pp. 1-9, 2013.

W. Lepkowski, S. J. Wilk, M. R. Ghajar, A. Parsi and T. J. Thornton, "Silicon-on-Insulator MESFETS at the 45nm node," International Journal of High Speed Electronics & Systems, vol. 21, pp. 1250012, 2012.

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, pp. 1628-1634, 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, pp. 054701-054706, 2010.

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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 the ASU faculty in 1988 and is currently a professor. He received his MS in chemical engineering in 1984, an MS in electrical engineering in 1985, and a PhD in electrical engineering in 1988, all from the University of Southern California. He holds ten patents and has published one book, 51 journal articles and 109 conference papers.

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

selected publications:

Tsakalis, K. S., & Dash, S., "Approximate H∞ loop shaping in PID parameter adaptation," International Journal of Adaptive Control and Signal Processing, 27(1-2), 136-152, 2013.

K. Tsakalis and S. Dash, "Identification for PID Control," in PID Control in the Third Millennium, A. Visioli, R. Villanova Eds., Chapter 10, 283-317, Springer-Verlag London Limited, 2012.

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, Apr. 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.

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.

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.

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expertise: Computer Vision, Human Activity Analysis, Machine Learning, Rehabilitation and preventive interventions.

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:

V. Venkataraman, P. Turaga, N. Lehrer, M. Baran, T. Rikakis, S. L. Wolf, "Attractor-Shape for Dynamical Analysis of Human Movement: Applications in Stroke Rehabilitation and Action Recognition," in International Workshop on Human Activity Understanding from 3D Data (HAU3D'13, held in conjunction with CVPR 2013), Portland, Ore., 2013.

A. Srivastava, P. Turaga, S. Kurtek, "On Advances in Differential-Geometric Approaches for 2D and 3D Shape Analysis and Activity Recognition," Elsevier Image and Vision Computing, June 2012.

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 Precis: 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.

Daniel Tylavsky
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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: Senior Member of IEEE; 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:

D. Shi, D. J. Tylavsky, N. Logic, "An Adaptive Method for Detection and Correction of Errors in PMU Measurements," IEEE Transactions on Smart Grid, Digital Identifier: 10.1109/TSG.2012.2207468, Dec 2012, pp. 1575-1583.

M. Zhang, Y. Li, D. J. Tylavsky, "Dynamic Loading of Substation Distribution Transformers in a Production Grade Environment," North American Power Symposium 2012, Champaign Ill., Sept. 2012, pgs. 6.

Y. Qi, D. Shi, D. J. Tylavsky, "Impact of Assumptions on dc Power Flow Accuracy," North American Power Symposium 2012, Champaign Ill., Sept. 2012, pgs. 6.

N. Li, D. Shi, D. Shawhan, D. J. Tylavsky, J. Taber, R. Zimmerman, "Optimal Generation Investment Planning: Pt 2:, Application to the ERCOT System," North American Power Symposium 2012, Champaign Ill., Sept. 2012, pgs. 6.

D. Shi, D. Shawhan, N. Li, D. J. Tylavsky, J. Taber, R. Zimmerman, "Optimal Generation Investment Planning: Pt 1:, Network Equivalents," North American Power Symposium 2012, Champaign Ill., Sept. 2012, pgs. 6.

D. Shi, D. J. Tylavsky, "An Improved Bus Aggregation Technique for Generating Network Equivalents," 2012 IEEE Power Engineering Society General Meeting, San Diego, Calif., July 2012, pgs. 8.

O. Amoda, D. J. Tylavsky, G. McCulla, W. Knuth, "Acceptability of Three Transformer Hottest-Spot Temperature Models," IEEE Transactions on Power Delivery, vol. 27, no. 1, Jan. 2012, pp. 13-22.

D. Shi, D. J. Tylavsky, K. M. Koellner, N. Logic, and D.E. Wheeler, "Transmission line parameter identification using PMU measurements," Euro. Trans. Electr. Power, vol. 21, no 4, (Nov. 2011), pp. 1574-1588.

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480-965-6651

expertise: semiconductor device physics, semiconductor transport, 1-D to 3-D device modeling, quantum field theory and its application to real device structures, heating effects in nanoscale devices, current collapse in GaN HEMTs, optoelectronics including modeling of solar cells and photodetectors

biosketch: Dragica Vasileska joined the ASU faculty in 1997. She has published over 170 journal articles in prestigious refereed journals, 15 book chapters and presented over 200 articles in conferences in the areas of solid-state electronics, transport in semiconductors and semiconductor device modeling. She is the third largest contributor in the NSF Network for Computational Nanotechnology's www.nanoHUB.org with a total of 360 contributions and more than 15 educational simulation modules. She is an author of four books (D. Vasileska and S. M. Goodnick, Computational Electronics, Morgan & Claypool, 2006; D. Vasileska, Editor, Cutting Edge Nanotechnology, March 2010, D. Vasileska, S. M. Goodnick and G. Klimeck: Computational Electronics: From Semi-Classical to Quantum Transport Modeling, CRC Press, June 2010, and D. Vasileska and S. M. Goodnick, Editors, Nanoelectronic Devices: Semiclassical and Quantum Transport Modeling, Springer, in press). She has also given numerous invited talks. She is a senior member of IEEE, the American Physical Society and Phi Kappa Phi.

honors and distinctions: Listed in Who's Who 2007; NSF CAREER Award, 1998; 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:

D. Vasileska, "Modeling Thermal Effects in Nano-Devices," Microelectronic Engineering, vol. 109 (9), pp. 163–167, 2013.

M. Nedjalkov, S. Selberherr, D. K. Ferry, D. Vasileska, P. Dollfus, D. Querlioz, I. Dimov, P. Schwaha, "Physical Scales in the Wigner-Boltzmann Equation," Annals of Physics, Vol. 328, pp. 220-237, 2013.

M. Nedjalkov, "Wigner quasi-particle attributes—An asymptotic perspective," Appl. Phys. Lett., vol. 102, pp. 163113-6 (2013).

B. Padmanabhan, D. Vasileska and S. M. Goodnick, "Current degradation in GaN HEMTs: Is Self-Heating Responsible?" ECS (Electrochemical Society) Transactions, vol. 49(1): pp.103-109, 2012.

G. Wirth, D. Vasileska, N. Ashraf, L. Brusamarello, R. Della Giustina and P. Srinivasan, "Compact Modeling and Simulation of Random Telegraph Noise Under Non-stationary Conditions in the Presence of Random Dopants," Microelectronics Reliability, Volume 52, Issue 12, December 2012, Pages 2955-2961.

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.

Vijay Vittal
Professor
Director, Power Systems Engineering Research Center
Ph.D., Iowa State University
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480-965-1879

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 the ASU faculty in 2005. Prior to ASU, he was an Anston Marston Distinguished Professor at the 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 I/UCRC 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, D.C. He was the editor-in-chief of the IEEE Transactions on Power Systems from 2005-2011. Vittal has published 137 articles in refereed journals, 116 refereed conference proceeding articles, eleven books and book chapters, and 13 research and technical reports.

honors and distinctions: IEEE Herman Halperin Transmission and Distribution Field Award, 2013; ASU Foundation Professor of Power Systems Engineering, 2013; Ira A. Fulton Chaired Professor, 2005; National Academy of Engineering, 2004; 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:

Vittal V., R. Ayyanar, Grid Integration and Dynamic Impact of Wind Energy, Springer, New York, 2013.

Eftekharnejad, S., V. Vittal, G.T. Heydt, B. Keel, J. Loehr, "Impact of Increased Penetration of Photovoltaic Generation on Power Systems," IEEE Transactions on Power Systems, vol. 28, no. 2, pp. 893-901, May 2013.

Zhang, Q., Y. Chakhchoukh, V. Vittal, G.T. Heydt, N. Logic, S. Sturgill, "Buffer Length Optimization for PMU Measurements Integrated into State Estimation," IEEE Transactions on Power Systems, vol. 28, no. 2, pp. 1657-1665, May 2013.

Fan, M., V. Vittal, G.T. Heydt, R. Ayyanar, "Probabilistic Power Flow Analysis with Generation Dispatch Including Photovoltaic Resources," IEEE Transactions on Power Systems, vol. 28, no. 2, pp.1797-1805, May 2013.

Lei Ying
Associate Professor
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expertise: stochastic networks including big data and cloud computing, cyber security, P2P networks, social networks and wireless networks

biosketch: Lei Ying joined ASU in 2012 from Iowa State University where he was the Northrup Gruman Assistant Professor in the Department of Electrical and Computer Engineering. His research focuses on developing fundamental models and basic theories for the design and analysis of large-scale, complex and socially aware information networks.

honors and distinctions: NSF CAREER Award, 2010; Defense Threat Reduction Agency Young Investigator Award, 2009

selected publications:

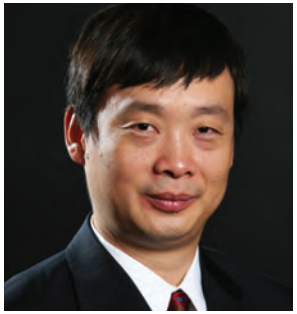
R. Srikant and Lei Ying. "Communication Networks—An Optimization, Control and Stochastic Networks Perspective," to be published by Cambridge University Press.

X. Kang, J. J. Jaramillo and Lei Ying. "Stability of Longest-Queue-First Scheduling in Linear Wireless Networks with Multihop Traffic and One-Hop Interference." Proc. CDC 2013, Firenze, Italy, 2013.

X. Kang, W. Wang, J. J. Jaramillo and Lei Ying. "On the Performance of Largest-Deficit-First for Scheduling Real-Time Traffic in Wireless Networks." Proc. MobiHoc 2013, Bangalore, India, July 2013.

W. Wang, K. Zhu, Lei Ying, J. Tan and L. Zhang. "Map Task Scheduling in MapReduce with Data Locality: Throughput and Heavy-Traffic Optimality." Proc. INFOCOM 2013, Turin, Italy, April 2013.

K. Zhu and Lei Ying. "Information Source Detection in the SIR Model: A Sample Path Based Approach." Proc. Information Theory and Applications Workshop (ITA), San Diego, Calif., February 2013.



Hongbin Yu
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expertise: nanostructure and nano device 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; integrated microwave devices

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

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

selected publications:

Teng Ma, Hanshuang Liang, George Chen, Benny Poon, Hanqing Jiang and Hongbin Yu, "Micro-strain sensing using wrinkled stiff thin films on soft substrates as tunable optical grating," Opt. Express, vol. 21, pp. 11994-12001, 2013.

Hao Wu, Shirong Zhao, Donald S. Gardner and Hongbin Yu, "Improved high frequency response and quality factor of on-chip ferromagnetic thin film inductors by laminating and patterning Co-Zr-Ta-B Films," IEEE Transactions on Magnetics, 49, 4176, 2013.

Tej Belagodu, Ebraheem Ali Azhar and Hongbin Yu, "Conductance Modulation of ZnO Nanowires Through Surface Molecular Functionalization," Nanoscale, 4, 7030-7033, 2012.

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," Appl. Phys. Lett. 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," J. Appl. Phys., 111, 102806, 2012.

Wei Xu, Alan Chin, Laura Ye, Cun-Zheng Ning and Hongbin Yu, "Space-Charge limited Charge Transport in GaSb Nanowires," J. Appl. Phys. 111, 104515 (2012).

Wei Xu, Saurabh Sinha, Tawab Dastagir, Hao Wu, Bertan Bakkaloglu, Donald S. Gardner, Yu Cao and HongbinYu, "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 cold islands with DNA origami nanotubes," Nano Lett., vol. 10, 33073, 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," Appl. Phys. Lett., vol. 96, 041111, 2010.

Hongyu Yu
Assistant Professor
Ph.D., University of Southern California
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(480) 747-7454

expertise: sensor devices, such as acoustic transducers, inertial sensors, and fluidic sensors, and integrated sensor systems, such as flexible, stretchable and deformable platforms.

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 is focused on microelectromechanical systems (MEMS) and other micro systems for Earth and space exploration. His goal is to provide portable platforms and instruments for consumer electronics and scientists to explore a variety of Earth environments and space science, such as seismology and biogeochemistry. His current projects include: miniature seismometers for Earth and moon exploration, flexible and stretchable shear stress sensor for river and hot spring monitoring, stretchable and deformable electronics, 3-D MEMS/NEMS manufacturing and lithium-ion batteries.

selected publications:

H. Huang, M. Liang, R. Tang, J. Oiler, T. Ma and H. Yu, "Dynamic Behavior of an Electrolyte Droplet-based Low Frequency Accelerometer based on Molecular Electronic Transducer," IEEE Electron Device Letters, in press.

T. Ma, Y. Wang. R. Tang, H. Yu and H. Jiang, "Pre-patterned ZnO Nanoribbons on Soft Substrates for Stretchable Energy Harvesting Applications," Journal of Applied Physics, vol. 113, issue: 20, article no.: 204503. DOI: 10.1063/1.4807320. Published: May 28, 2013.

R. Tang, H. Huang, J. Oiler, M. Liang and H. Yu, "Three Dimensional Flexible Thermal Sensor for Intravascular Flow Monitoring," IEEE sensors journal, in press.

H. Huang, B. Carande, R. Tang, J. Oiler, D. Zuitsev, V. Agafonov and H. Yu, "A Micro Seismometer based on Molecular Electronic Transducer Technology for Planetary Exploration," Applied Physics Letters, vol. 102, issue 19, article no. 193512. DOI: 10.1063/1.4806983. Published: May 13, 2013.

E. Kim, H. Tu, C. Lv, H. Jiang, H. Yu and Y. Xu, "A Robust Polymer Microcable Structure for Flexible Devices," Applied Physics Letters, 102(3), pp:1-4, article no. 033506, 2013. DOI: 10.1063/1.4788917.

H. Huang, V. Agafonov and H. Yu, "Molecular Electric Transducers as Motion Sensors: A Review," Sensors, 13(4), 4581-4597, 2013. DOI: 10.3390/s130404581.

Junshan Zhang
Professor
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expertise: network optimization/control, cyber-physical systems with applications to smart grid, wireless networks, mobile social networks, stochastic modeling and analysis

biosketch: Junshan Zhang joined the ASU faculty as an assistant professor in 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. in electrical and computer engineering from Purdue University in 2000. He is the recipient of a 2003 NSF CAREER Award and a 2005 ONR YIP award. He was general chair for IEEE Communication Theory Workshop 2007 and TPC co-chair for INFOCOM 2012. He is currently a Distinguished Lecturer of the IEEE Communications Society.

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

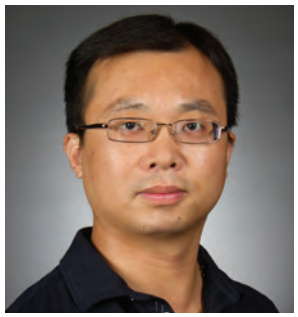
selected publications:

Xu Chen, Brian Proulx, Xiaowen Gong, Junshan Zhang, "Social trust and social reciprocity based cooperative D2D communications," ACM MobiHoc 2013: 187-196.

Xiaowen Gong, Junshan Zhang, Douglas Cochran, Kai Xing, "Barrier coverage in bistatic radar sensor networks: Cassini oval sensing and optimal placement," ACM MobiHoc 2013: 49-58.

Lei Yang, Hongseok Kim, Junshan Zhang, Mung Chiang, Chee Wei Tan, "Pricing-Based Decentralized Spectrum Access Control in Cognitive Radio Networks," IEEE/ACM Trans. Networking 21(2): 522-535 (2013).

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, 1464-1477 (2010).



Yanchao Zhang
Associate Professor
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480-727-0039

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

biosketch: Yanchao Zhang joined Arizona State University in June 2010 as an associate professor in the School of Electrical, Computer, and Energy Engineering. Before ASU, he was an assistant professor of electrical and computer engineering at New Jersey Institute of Technology from 2006 to 2010. He is an editor of IEEE Transactions on Vehicular Technology and a technical editor of IEEE Wireless Communications Magazine. He also routinely serves as a TPC member for major international conferences such as INFOCOM, ICDCS, ICNP, MobiHoc, PerCom, NDSS, SECON, MASS, and WiSec.

honors and distinctions: NSF CAREER Award, 2009

selected publications:

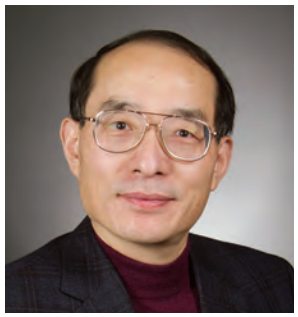
Rui Zhang, Yanchao Zhang and Kui Ren, "Distributed privacy-preserving access control in sensor networks," IEEE Transactions on Parallel and Distributed Systems, vol. 23, no. 8, pp. 1427-1438, August 2012.

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, Special Issue on Cooperative Networking Challenges and Applications, vol. 30, no. 2, pp. 433-441, February 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.

Rui Zhang, Jinxue Zhang, Yanchao Zhang and Chi Zhang, "Secure crowdsourcing-based cooperative spectrum sensing," IEEE International Conference on Computer Communications (INFOCOM'13), Turin, Italy, April 2013.

Jingchao Sun, Rui Zhang and Yanchao Zhang, "Privacy-preserving spatiotemporal matching," IEEE International Conference on Computer Communications (INFOCOM'13), Turin, Italy, April 2013.



Yong-Hang Zhang
Fulton Entrepreneurial Professor
Director, Center for Photonics Innovation
Ph.D., Max-Planck-Institute for Solid States and University Stuttgart, Germany
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expertise: optoelectronic materials and devices such as solar cells, laser diodes and photodetectors

biosketch: Yong-Hang Zhang joined the faculty in 1996 from Hughes Research Laboratories. He has published approximately 250 book chapters and research articles in refereed journals and conference proceedings, has been issued eight U.S. patents, edited three conference proceedings and authored or co-authored more than 300 invited and contributed conference presentations.

honors and distinctions: OSA Fellow; 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. Fan, L. Ouyang, X. Liu, J. K. Furdyna, D. J. Smith and Y.-H. Zhang, "GaSb/ZnTe double-heterostructures grown using molecular beam epitaxy Journal of Crystal Growth," J. of Cryst. Growth 371 (1), 122–125 (2013).

S. H. Lim, J.-J. Li, E. H. Steenbergen, Y.-H. Zhang, "Luminescence coupling effects on multi-junction solar cell external quantum efficiency measurement," Progress in Photovoltaics: Research and Applications, 21, 344–350 (2013).

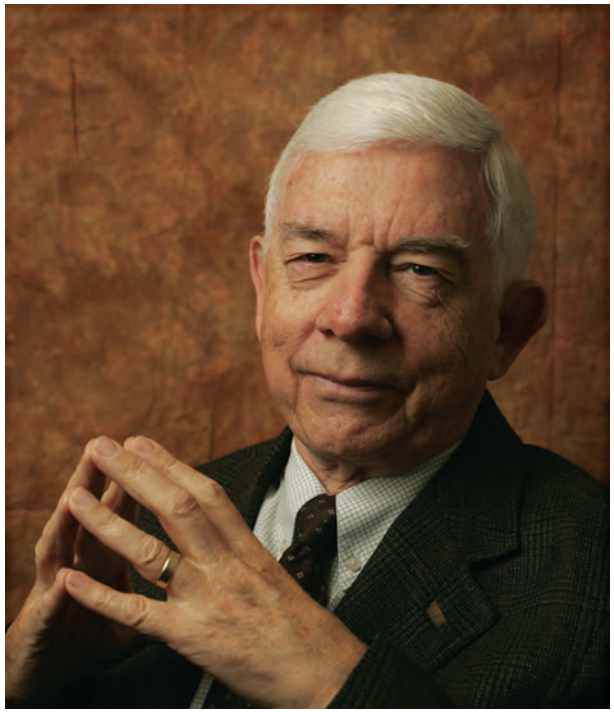
E. H. Steenbergen, B. C. Connelly, G. D. Metcalfe, H. Shen, M. Wraback, D. Lubyshev, Y. Qiu, J. M. Fastenau, A. W. K. Liu, S. Elhamri, O. O. Cellek and Y.-H. Zhang, "Significantly improved minority carrier lifetime observed in a long-wavelength infrared III-V type-II superlattice comprised of InAs/InAsSb,"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

D. Ding, S. R. Johnson, S.-Q. Yu, S.-N. Wu and Y.-H. Zhang, "A Semi-Analytical Model for Semiconductor Solar Cells," J. Appl. Phys. 110, 123104 (2011).

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," J. of Cryst. Growth, vol. 311, pp. 2116, 2009.

in memoriam

Dieter Schroder, Regents' Professor, noted semiconductor technology expert and revered mentor to many in the Ira A. Fulton Schools of Engineering passed away in December 2012.



The longtime electrical engineering professor served at ASU for over 30 years. He is remembered by colleagues and students as a skilled teacher and communicator, and a kind and patient man.

Schroder joined the faculty in 1981 after 13 years at Westinghouse Research Labs. His industry experience at Westinghouse, along with close working relationships at Motorola, Intel, Sperry Flight Systems, Texas Instruments and Litton Industries gave him a unique perspective as a teacher and mentor.

Schroder graduated 64 master's students and 42 doctoral students during his time at ASU. Among his many teaching accolades, he was named Outstanding Doctoral Mentor by the ASU Graduate College, and earned the Daniel Jankowski Legacy Award and six engineering teaching excellence awards from the Ira A. Fulton Schools of Engineering.

His knowledge of semiconductor characterization and the significance of his research earned him an international reputation. Schroder helped make ASU a leader in solid-state electronics research. Under his direction, researchers at the Center for Low-Power Electronics helped solve the problem of how to make integrated circuits operate more speedily while also controlling the excessive heat the circuits generated in the process. The solutions are widely applied in the computer microprocessor industry.

More recently, he served as deputy director of Quantum Energy and Sustainable Solar Technologies (QESST), an NSF-DOE Engineering Research Center established at ASU in 2011.

During his career, Schroder published two books, including the textbook, "Semiconductor Material and Device Characterization" which is used worldwide. He is also credited with 10 book chapters, 178 journal articles and 167 conference presentations. He edited 11 books and was awarded five patents.

Philipos Loizou, an electrical engineering alumnus and pioneer in cochlear implants, passed away in June 2012.

Loizou was a professor of electrical engineering at the University of Texas at Dallas, where he was honored last year as the Cecil H. and Ida Green Professor in Systems Biology Science. Prior to joining the Erik Jonsson School of Engineering and Computer Science faculty at UTD in 1999, Loizou taught at the University of Arkansas.

Loizou was recognized for his advances in signal and speech processing, speech perception and cochlear implants. Loizou helped improve the performance of cochlear implants by programming the devices to operate more effectively in a range of listening conditions. His work attracted funding from the National Institutes of Health.

He was a fellow of the Acoustical Society of America and authored or co-authored more than 170 publications including his book, Speech Enhancement Theory and Practice (Signal Processing and Communications).

Loizou earned his bachelor's, master's and doctoral degrees in electrical engineering at Arizona State University where he also completed a postdoctoral fellowship and found his passion researching cochlear implants.

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Faculty and staff recognition

IMPACT and Fulton Difference Award Nominees

Innovation – Jared Broderick

Mentoring – Clayton Javurek

Performance – Emily Fassett, Cynthia Moayedpardazi

Customer Service – Loriann Brichetto, Evie Selberg

Fulton Difference – Cynthia Moayedpardazi, Margaret Creedon, Emily Fassett

ASU Service Recognition

30 years – Daniel Tylavsky

25 years – Craig Birtcher, Ravi Gorur

20 years – Darleen Mandt

15 years – Rodolfo Diaz, Cheryl McAfee, Trevor Thornton

10 years – Susan Edgington, Michael Goryll, Stephen Phillips

5 years – Jennifer Blain Christen, Laura DiPaolo, George Maracas, Dan Patterson, Lori Robbins, Marco Saraniti

ASU SUN Awards

Sabrina Beck
Loriann Brichetto
Jared Broderick
Rebecca Davis
Laura DiPaolo
Theo Eckhardt
Susan Edgington
Jerry Eller
Stephen Goodnick
Theresa Herr
Sayfe Kiaei
Esther Korner
Thomas Lewis
Jenna Marturano
Cheryl McAfee
Nina Millmyn
Michele Nobles
Nancy Osgood
Lori Robbins
Donna Rosenlof

Electrical engineering seniors Patricia Markison, Martin Solis and Carrie Culp, partnered with QESST for their senior design project to develop a solar-powered dialysis machine.

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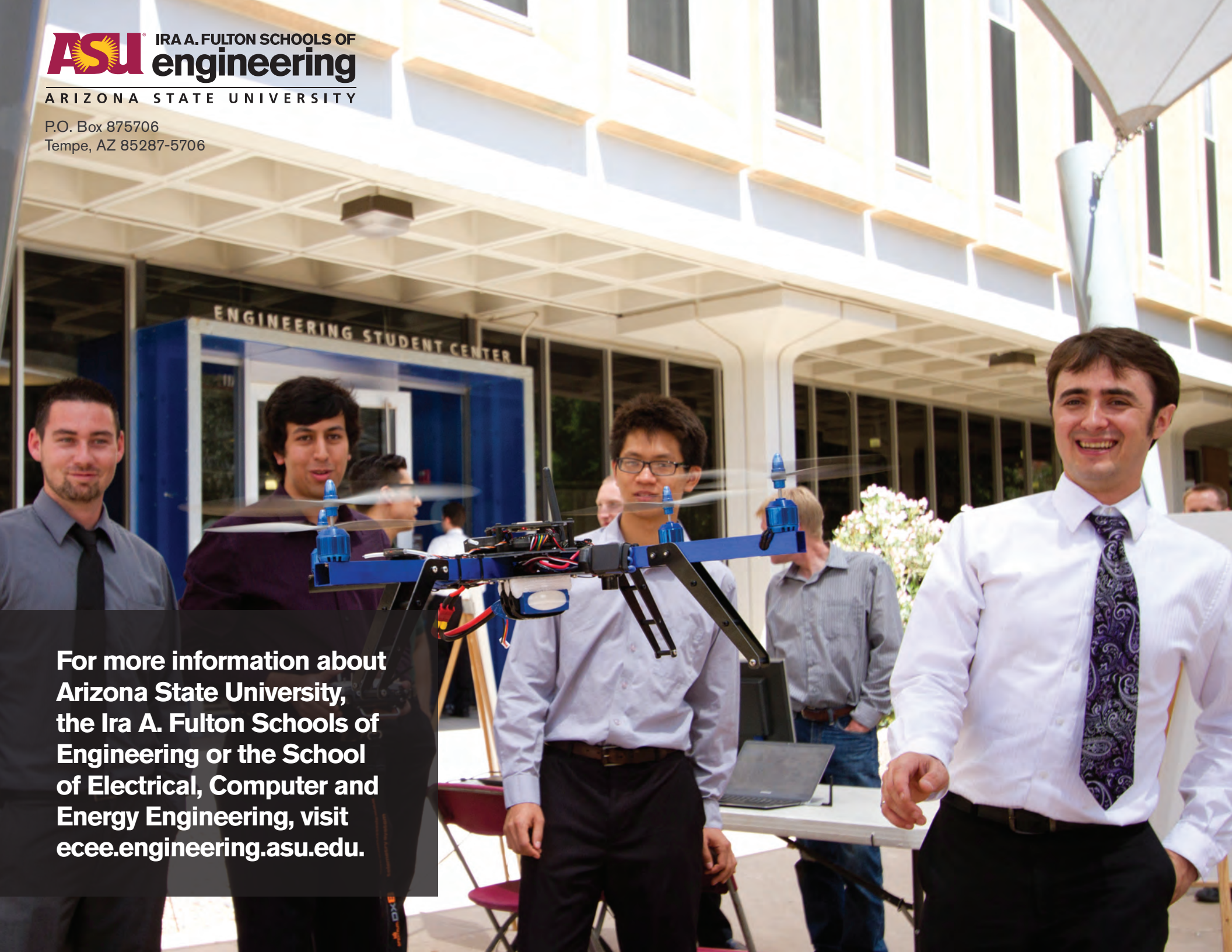

For more information about Arizona State University, the Ira A. Fulton Schools of Engineering or the School of Electrical, Computer and Energy Engineering, visit ecee.engineering.asu.edu.