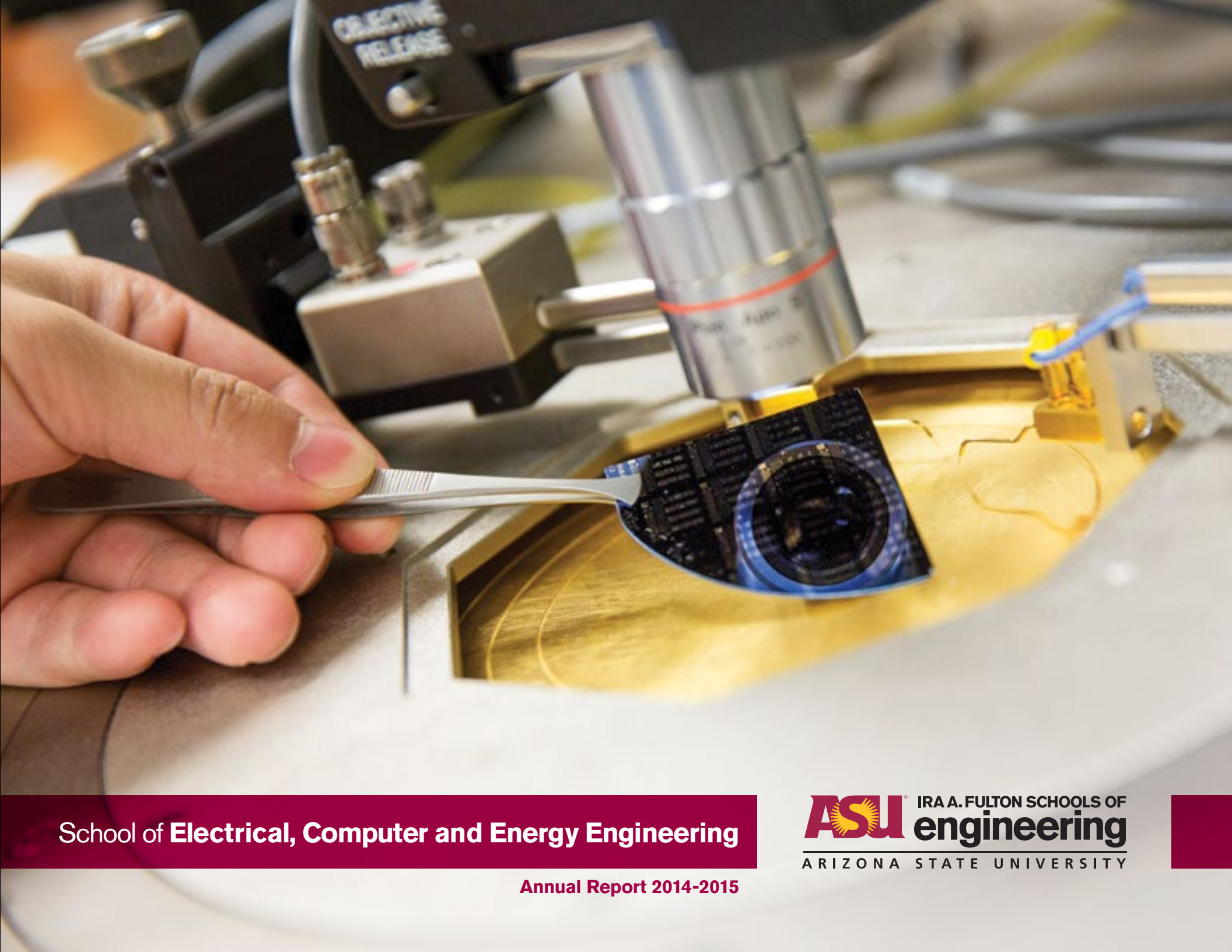

School of **Electrical, Computer and Energy Engineering**

IRA A. FULTON SCHOOLS OF engineering
ARIZONA STATE UNIVERSITY

Annual Report 2014-2015

IRA A. FULTON SCHOOLS OF engineering

ARIZONA STATE UNIVERSITY

IRA A. FULTON SCHOOLS OF ENGINEERING
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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 2014-2015
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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powering the future

The School of Electrical, Computer and Energy Engineering at Arizona State University is leading cutting-edge research in the areas of photovoltaics, power systems, integrated circuit design, semiconductor electronics, signal processing and more. Our technologies are integral to many of the systems and devices that we depend on every day. We are home to ASU's first Engineering Research Center, QESST, a center focused on solar energy solutions to the terawatt electricity challenge for the world. We seek to transform devices and systems to be faster, more reliable, more mobile, more resilient and more efficient.

We are also looking for ways to ensure that there are knowledgeable and innovative engineers prepared to take on the challenges of serving a highly connected and powered world. With the online delivery or our highly regarded ABET-accredited electrical engineering program, we are building the knowledge workforce for Arizona and beyond that is ready to meet these challenges.

We invite you to connect with us and learn more about the many ways that we are engineering a difference.

Continued strength

Stephen M. Phillips

The School of Electrical, Computer and Energy Engineering (ECEE) continues to strengthen its reputation by growing its research and education delivery enterprise. Our faculty, staff and students have enabled us to grow our externally funded sponsored project expenditures to an all-time record high of $31.8M in the fiscal year ending June 2015. The fiscal year awards total an even more impressive $33M, while proposals exceeded $150M. Evidence of our reputation in research includes a proposal yield exceeding 20 percent — awards exceeded 20 percent of proposals.

The National Science Foundation has continued funding for the Quantum Energy and Sustainable Solar Technologies (QESST) Engineering Research Center, an NSF/Department of Energy Engineering Research Center where ASU scientists are focused on the generation and distribution of photovoltaic solar energy. The NSF also awarded CAREER awards to assistant professors Pavan Turaga and Oliver Kosut. Turaga received the award in support of his research underlying the qualities of human movement. Kosut's award will be used to investigate and provide new techniques to bolster the resilience of communication networks in the presence of potentially damaging attacks. Associate Professor Daniel Bliss and Professor Yong-Hang Zhang were selected as fellows of IEEE and Professor Michael Kozicki was named a fellow of the National Academy of Inventors.

We continue to expand our faculty, hiring 11 new faculty members in the past two years to support our growing enrollment and to strengthen key research areas such as photovoltaics, power systems, power electronics, communications, networks, nanotechnology, photonics, integrated circuits, renewable energy and wide bandgap semiconductor materials and devices.

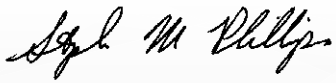
Our primary focus is the education of students, and they play prominent roles in our research — from graduate and undergraduate students to high school students. Brett Larsen is our outstanding undergraduate this year. His interest in engineering was inspired by science fiction. He wanted to develop futuristic technology that would improve people's lives. A Barrett honors student, he immersed himself in research, culminating in an internship at Conseil Européen pour la Recherche Nucléaire, better known as CERN or the European Council for Nuclear Research. Larsen was awarded the Goldwater Scholarship, the nation's premier award for undergraduates studying science, math and engineering.

Ibrahima Diop, from Senegal, was the first undergraduate MasterCard Foundation Scholar to graduate from ASU. He received his bachelor's degree in electrical engineering. The MasterCard Scholars program educates and prepares young people from Africa to lead change in their communities. Diop hopes to improve the power system in his country so that people have affordable and reliable electricity.

Enrollment in our academic programs continues to grow with more than 2,700 enrolled in fall 2015. This includes an all-time high enrollment of more than 336 doctoral students, an average of nearly five doctoral students per tenured or tenure-track faculty member. Our graduate programs remain highly recognized with our electrical engineering graduate program ranked 27 by U.S. News and World Report.

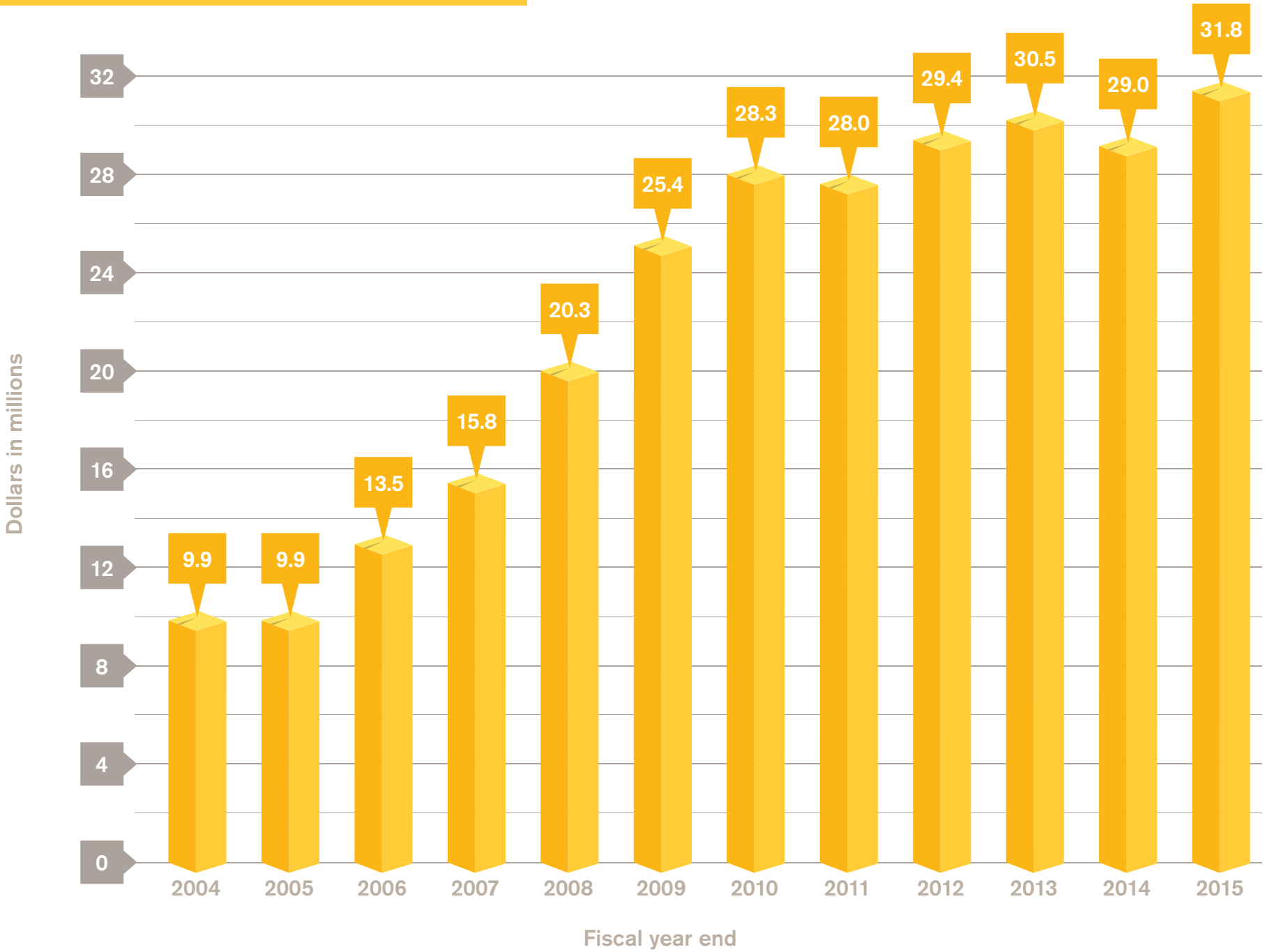
Our bachelor's program was the first ABET accredited, undergraduate engineering program in the country available 100 percent online. The demand among students who cannot come to campus is strong with enrollment growing from 100 in fall 2013, the first semester the degree was offered, to 800 in fall 2015. Students benefitting from online delivery include more than 200 military veterans and many working professionals. Andrew Ninh, a junior pursuing his bachelor's degree in electrical engineering online, developed an emerging health informatics startup company known as DocBot, which enables physicians to make fast, well-informed decisions about patient care. He was accepted into Singularity University's Startup Lab Accelerator Program which includes $100,000 in seed funding and a 10-week experience at their campus in Silicon Valley.

As always, these achievements are thanks to the extraordinary efforts of our dedicated faculty, staff, alumni and volunteers and to the excellent students that our programs attract.

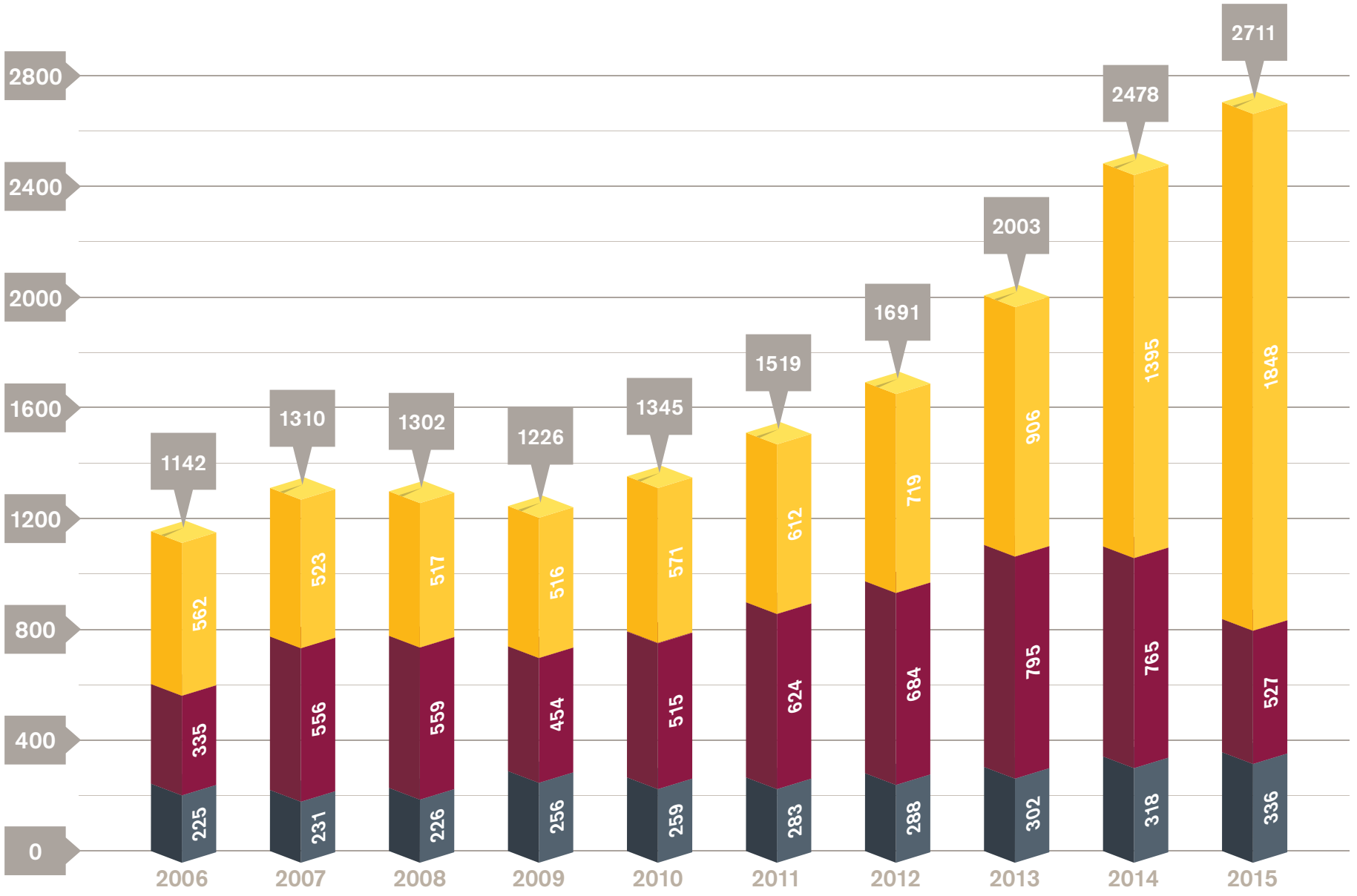


Stephen M. Phillips, Ph.D., P.E.
Professor of Electrical Engineering
Director of the School of Electrical, Computer and Energy Engineering

Sponsored research expenditures



ECEE enrollment



Faculty

Enrollment for fall 2015 includes an all-time high of more than 336 doctoral students, an average of nearly five doctoral students per tenured or tenure-track faculty member.

Honsberg receives double honors for outstanding professional achievement

Recognizing her contributions to the advancement of photovoltaics

Christiana Honsberg, professor and director of the Quantum Energy and Sustainable Solar Technologies Engineering Research Center, was recognized this academic year with two prestigious awards for outstanding professional achievement.

She was the recipient of the William R. Cherry Award in recognition of her multiple contributions to the advancement of photovoltaics (PV), and was honored with the Outstanding Faculty Award for 2014 by the Phoenix Section of the Institute of Electrical and Electronics Engineers (IEEE).

Honsberg was presented the Cherry Award at the IEEE Photovoltaic Specialists Conference that took place in New Orleans in June. She also had the distinction of delivering her Cherry Award acceptance talk during the conference opening keynote session.

Honsberg was nominated for the award by Martin Green, Scientia Professor at the Australian Centre for Advanced Photovoltaics at University of New South Wales. She was selected for demonstrating leadership in research, engineering and education of advanced concept, high-performance solar cells, across a range of technologies.

The William R. Cherry Award is named in honor of William R. Cherry, the founder of the PV community. In the 1950s, he was instrumental in establishing solar cells as the ideal power source for space satellites and for recognizing, advocating, and nurturing the use of PV systems for terrestrial applications.

The IEEE Outstanding Faculty Award recognizes Honsberg's contributions as a university faculty member working to develop a more sustainable future by making advances in the performance of solar energy systems.

Professor Christiana Honsberg, right, is a leading developer of new courses and degree programs designed to educate students about photovoltaics technology and renewable energy engineering.

Honsberg's notable contributions include the pioneering of advanced PV concepts ranging from the development of a generalized thermodynamic theory for determining efficiency limits of solar cells, to making seminal advances in the understanding of intermediate band, interband and quantum well approaches.

She also is a co-inventor of the so-called "Very High Efficiency Solar Cell (VHESC)" that combines optical/solar cell architectures that produced a sum-of-the-efficiencies result of 42.8 percent. In addition, Honsberg has contributed to the advancement of III-Nitride solar cells and has invented and licensed methods to produce high-performance Si solar cells.

She is the co-developer of the popular PV CD-ROM educational online course that is now widely used in solar cell education at universities across the world.

As director and lead investigator to the first U.S. multi-institutional Engineering Research Center (ERC) on photovoltaics, Quantum Energy and Sustainable Solar Technologies (QESST), which is jointly supported by the U.S. National Science Foundation and the U.S. Department of Energy, Honsberg leads and coordinates the ERC's R&D efforts across 30 national and international academic and industry partners, with a focus on enabling solutions to harness solar power in economically more viable and sustainable ways.

Reisslein receives Friedrich Wilhelm Bessel Research Award

Martin Reisslein, professor, was elected as a recipient of the Friedrich Wilhelm Bessel Research Award. Professor Eckehard Steinbach, from Technische Universitaet Muenchen in Munich, Germany, made the nomination. The Humboldt Foundation grants about 20 Friedrich Wilhelm Bessel Research Awards annually.

Martin Reisslein

This award recognizes lifetime achievements in research and is granted to scientists who are expected to continue producing cutting-edge achievements that will influence their discipline beyond their immediate field of work. The award winners are invited to carry out research projects of their choice in cooperation with specialist colleagues in Germany.

Reisslein has published more than 120 journal articles and more than 60 conference papers in the areas of multimedia networking over wired and wireless networks, video traffic characterization, optical networking and engineering education. He received the NSF Career Award in 2002, is a fellow of the Institute of Electrical and Electronics Engineers (Class of 2014), and a senior member of the Association for Computing Machinery (ACM). He received his doctoral degree in systems engineering from the University of Pennsylvania.

Karady receives IEEE Power Engineering Society Distinguished Individual Service Award

George Karady, Power Systems Chair Professor, received the Institute of Electrical and Electronics Engineers (IEEE) Power Engineering Society Distinguished Individual Service Award. He was honored for his many years of leadership and dedicated service to the Substations Committee that develops standards to improve the performance and reliability of high-voltage power electronics technology worldwide.

George Karady

Karady's expertise is in power electronics and high-voltage engineering and power systems. He was appointed as Salt River Chair Professor at ASU in 1986. Previously, he served as chief consulting electrical engineer, manager of electrical systems and chief engineer of computer technology at EBASCO Services, and electrical task supervisor for the Tokomak Fusion Test reactor project in Princeton.

Karady is an IEEE fellow with more than 130 journal and 220 conference publications. He is also co-author with Keith Holbert, associate professor, of the book, "Electrical Energy Conversion and Transport: An Interactive Computer-Based Approach." Karady received his doctoral degree in electrical engineering from Technical University of Budapest and an honorary doctorate from Technical University of Budapest in 1996.

Meldrum inducted into AIMBE College of Fellows

Deirdre Meldrum, professor, was elected to the American Institute for Medical and Biological Engineering College of Fellows for "outstanding contributions and pioneering work in the automation of innovative single-cell analysis systems for discovering biosignatures that predict human health and disease."

Meldrum serves as ASU's Senior Scientist and director of the Biodesign Institute's Center for Biosignatures Discovery Automation.

Deirdre Meldrum

AIMBE's mission is to recognize excellence and advocate for the fields of medical and biological engineering in order to advance society. Since 1991, AIMBE's College of Fellows has led the way for technological growth and advancement in the fields of medical and biological engineering. Fellows have helped revolutionize medicine and related fields in order to enhance and extend the lives of people all over the world.

The most accomplished and distinguished engineering and medical school chairs, research directors, professors, innovators, and successful entrepreneurs comprise the College of Fellows.

Promising research draws science foundation support for ASU engineer

Science Foundation Arizona's Bisgrove Scholars program is designed to help the state attract and keep outstanding academics and researchers with "the potential to transform ideas into great value for society."

Yuji Zhao, assistant professor, was selected to receive an award this year to support his research. He is working on advances in solid-state lighting based on light-emitting diode (LED) technology.

The foundation's Bisgrove Award provides winners $100,000 per year for two years to support their research endeavors

"With innovative engineering, LED lighting will provide significant energy savings, important environmental benefits and dramatic new ways to utilize and control light," Zhao says.

His team is developing "smart" LEDs for wireless communications and medical applications.

Yuji Zhao

The goal presents challenges, particularly technological limitations that cause LED devices to experience drop-offs in efficiency (called "efficiency droops"). Zhao's team is creating lighting structures using new types of materials to produce "droop-free" LEDs.

Zhao is also leading efforts to develop LED-based "Li-Fi" communications technology to replace Wi-Fi technology that would provide faster, safer and more reliable wireless network connection.

In addition, he is exploring the potential of "smart" lighting to control the wavelength of LED-based lighting in a way that would enable it to aid the healing of wounds. At certain wavelengths light has been shown to penetrate body tissue to a depth of about 10 millimeters, which is beneficial in treating problems close to the skin's surface such as wounds, cuts, scars, trigger and acupuncture points, as well as infections.

"A joint research venture between an ASU team and Mayo Clinic is being launched to develop safe, concentrated LED sources that would be therapeutically effective without adverse side effects," Zhao says.

Zhao earned a bachelor's degree in microelectronics at Fudan University in China and a doctoral degree in electrical and computer engineering at the University of California, Santa Barbara. While there, he won a record four consecutive Outstanding Research Awards from the university's Solid State Lighting & Energy Electronics Center.

His research on the semiconductor compound gallium nitride was recognized with a Most Cited Article of the Year Award from the research journal APEX (2012), an Editor's Pick of the Year Award from the journal APL (2012), and was featured in more than 100 international news outlets.

To date, the Bisgrove Scholar program has supported the work of 19 academic researchers, including seven at ASU.

Achievements earn Bliss, Zhang IEEE Fellow status

Outstanding accomplishments in engineering have earned Daniel Bliss and Yong-Hang Zhang honored status in one of the world's most prominent professional organizations.

They are among colleagues selected as new fellows of the Institute of Electrical and Electronics Engineers (IEEE). Fellow is a distinction reserved for the most prestigious IEEE members and is conferred by the Board of Directors upon engineers with an extraordinary record of accomplishments in their field.

The total number of new fellows selected in any one year does not exceed one-tenth of one percent of the total voting institute membership of approximately 400,000 from 160 countries.

Bliss, an associate professor, is being recognized for his contributions to adaptive sensor systems in radar and communications.

Zhang is a professor in the School and associate dean for research for the Ira A. Fulton Schools of Engineering. He is being recognized for his contributions to molecular beam epitaxy growth technology, infrared lasers and photodetectors.

Bliss research is focused on developing novel and disruptive system concepts with new capabilities or dramatically improved performance. In particular, his research addresses wireless communications, remote sensing and anticipatory medical analytics.

As tools in pursuing his research goals, Bliss employs information theory, estimation theory and signal processing, combined with thorough system analysis. Many of these system problems involve extracting information in noisy and difficult situations.

Bliss has made numerous significant research contributions in advanced adaptive wireless communications, both as an individual and as a leader of research teams. He has developed high-performance multiple-antenna receivers that have demonstrated experimentally communications performance dramatically better than traditional single antenna systems.

Bliss invented and developed high-performance multiple-input, multiple-output (MIMO) signal acquisition systems. Both the receiver and acquisition research led to patents.

Daniel Bliss

In the field of remote sensing, Bliss was one of the early and significant contributors to the theory of MIMO radar, particularly in its application to ground moving-target indicator radar. He led a team that was the first to demonstrate the performance benefits experimentally.

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. He also 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.

Author of the book, "Adaptive Wireless Communications: MIMO Channels and Networks," Bliss also has published more than 80 journal articles, conference papers, and book chapters. During his career he has been principal investigator on more than a dozen programs with applications in radio, radar and medical monitoring, attracting funding in excess of $20 million. He has advised or co-advised 12 doctoral and seven master's students, and mentored 11 undergraduates conducting research projects.

Bliss holds a doctoral degree in physics from the University of California, San Diego. He is a proud Sun Devil, having earned his bachelor's degree in electrical engineering from ASU.

Yong-Hang Zhang

Zhang leads the MBE Optoelectronics Group that is part of the Center for Photonics Innovation, which he directs. His research covers a broad area of optoelectronics involving the growth of semiconductor materials and their structural and optical properties, as well as semiconductor device design, fabrication and testing.

Over the past nine years, Zhang and his research group have developed more than two dozen invention disclosures in the areas of semiconductor lasers and light emitting devices, solar cells, photodetectors, and their integrated systems. Their underlying breakthroughs have applications in several market segments, including terrestrial and space solar cells, optical communication, and sensor technologies for environmental monitoring and defense.

Last year, Zhang was selected to receive a $135,000 award through the Defense University Research Instrumentation Program. The funding is being used to build more sophisticated and user-friendly materials and device testing systems for infrared detector research, which is also supported by a Department of Defense Multidisciplinary University Research Initiative (MURI) grant. This work has defense and commercial applications, such as night vision, security monitoring systems, and biomedical imaging.

The new equipment includes a state-of-the-art setup for testing detectors at various temperatures from room temperature to very low, minus-270 Celsius, and an upgraded optical spectroscopy, which measures the optical spectrum from materials or light-emitting devices. It gives ASU unique capabilities, improving efficiency and raising the visibility of current and future research.

Zhang has published approximately 260 journal articles, proceeding papers and book chapters. He has given more than 320 invited talks and conference presentations, and holds nine issued U.S. patents. He also has advised 34 doctoral students and sponsored 39 postdoctoral researchers.

Zhang joined the faculty at ASU in 1996 from Hughes Research Laboratories. He is a fellow of the Optical Society of America and holds a doctoral degree in solid-state physics from the University of Stuttgart, Germany.

Targeted hiring deepens expertise, grows faculty

The School of Electrical, Computer and Energy Engineering continues its faculty hiring with 11 new hires in the past two years. As the number of faculty in the School approaches 70, ECEE has deepened its faculty expertise in several key areas of research.

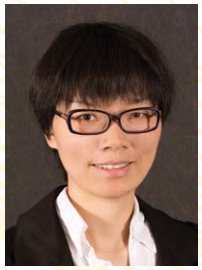
We are investing in faculty hires associated with our research centers including the externally funded QESST, PSERC, Power One IC (Connection One), SenSIP, Solar Power Laboratory, ASU Nanofab and the Center for Photonics Innovation. While building core research expertise, these faculty hires contribute to the teaching mission through classroom and online delivery of courses and recruitment and mentoring of graduate students.

Hires in the past two years include:

Richard Kiehl, professor, explores new device concepts, circuit architectures and self-assembly techniques for the development of nanometer-scale electronics for information processing, signal processing and sensing applications. His recent work includes the study of hybrid ferromagnet/semiconductor structures and dichalcogenide topological insulators for device applications.

John Brunhaver II, assistant professor, focuses on the design of energy-efficient computer hardware to address modern power and energy constraints, and explores the micro-architecture and architecture optimizations that are available when restricting the design space to a specific domain or application.

Richard King, professor, has focused on photovoltaics over the last 30 years. He has explored metamorphic III-V materials, sublattice ordering in (AL)GALnP, dilute nitride GaInNAs(Sb), high-transparency tunnel junctions, defects and recombination in compound semiconductors, and high-efficiency multijunction solar cells with three to six junctions.



Qin Lei, assistant professor, focuses on high-power converters for high voltage direct current (HVDC) transmission/medium voltage direct current (MVDC) transmission, medium voltage drive, grid-integration of renewable energy sources, transportation electrification/electric vehicle/hybrid electric vehicle, power management for smart-grid/micro-grid, wide-band gap device application (SiC, GaN) and energy storage.

Umit Ogras, assistant professor, focuses on design methodologies and power management for multicore architectures, digital VLSI design, embedded systems, multiprocessor systems-on-chip (MPSoC), multicore architectures and electronic design automation.

Jiangchao Qin, assistant professor, focuses on power electronics, power electronics-based power systems, high-voltage direct current (HVDC) transmission and DC grids, wide bandgap (WBG)-based converters, grid integration of renewable energy resources, microgrids, energy storage systems, hybrid electric vehicles and transportation electrification, and electric drives.

Anna Scaglione, professor, brings expertise spans the areas of statistical signal processing for communication, electric power systems and information networks. Her main research objective is advancing intelligent infrastructure through information systems and data analysis.

Jae-sun Seo, assistant professor, focuses on digital/mixed-signal circuit design, VLSI design for neuromorphic computing and machine learning, integrated voltage regulators, high-speed on-chip transceivers. His current areas of research include machine learning and neuromorphic hardware design, and on-chip voltage regulators for integrated power management.

Georgios Trichopoulos, assistant professor, brings in electromagnetics and antenna design. His research focuses on millimeter wave (mmW) and terahertz (THz) technology for biomedical sensing, imagining and high data-rate wireless communication applications.

Yu Yao, assistant professor, focuses on developing novel devices based on semiconductor nanostructures, nanophotonics, graphene and other 2D materials and applying them to address great challenges in communication, biomedical sensing and energy applications.

Yuji Zhao, assistant professor, is developing high-power and high-efficiency blue-green light emitting diodes by MOCVD growth on semipolar GaN bulk substrates. He is also working on high light extraction device design, strain induced optical polarization study, and carrier transport on high performance AlInGaN optoelectronic devices.

Research faculty, adjunct faculty and affiliated faculty

Richard Akis, associate research professor
Ph.D., McMaster University, Hamilton, Ontario.
Mesoscopic semiconductor devices, quantum chaos in open systems connection between classical and quantum mechanics.

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

Stuart Bowden, associate research professor
Ph.D., University of New South Wales, Australia.
Characterization of silicon materials for photovoltaic applications.

Karamvir Chatha, associate professor (affiliated faculty)
Ph.D., University of Cincinnati.
System level design methodologies and computer aided design tools for embedded and VLSI System-on-Chip devices.

Alan Chin, adjunct faculty; nliten Energy.

Srabanti Chowdhury, adjunct faculty.

Larry Cooper, adjunct faculty; Ret., Office of Naval Research.

Jeffrey Cotter, adjunct faculty; SunPower Corp.

Sandwip Dey, professor (affiliated faculty)
Ph.D., NY State College of Ceramics at Alfred University.
Materials fabrication, characterization, and functionalization for electronics and biomedical (sensing) applications.

Ding Ding, adjunct faculty; Soitec Phoenix Labs.

Tolga M. Duman, adjunct faculty.

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.

Gennady Gildenblat, professor emeritus.

Ravi Gorur, adjunct faculty.

Sandeep Gupta, professor (affiliated faculty)
Ph.D., The Ohio State University.
Wireless networks, mobile and ubiquitous/pervasive computing, embedded sensor networks for biomedical applications.

Jiping He, professor (affiliated faculty)
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.

Frank Hoppensteadt, professor emeritus.

Stephen D. Howard, adjunct faculty; Defense Science and Technology Organization.

Joseph Hui, professor emeritus.

Shane Johnson, research scientist (affiliated faculty)
Ph.D., University of British Columbia.
Epitaxial growth of III-V and II-VI materials and devices, optical and electronic properties of semiconductors, and semiconductor device physics and high efficiency multi-junction photovoltaic solar cells.

Narayan Kovvali, adjunct faculty; Cirrus Logic, Incorporated.

Elias Kyriakides, adjunct faculty; University of Cypress.

William Lepkowski, adjunct faculty; SJT Micropower.

Michael McGarry, adjunct faculty; University of Texas at El Paso.

Brian Mears, adjunct faculty; Intel Corporation.

Robert Metzger, adjunct faculty; Radiation Safety Engineering.

Michael Moran, adjunct faculty; The University of Melbourne.

Darryl Morrell, associate professor (affiliated faculty)
Ph.D., Brigham Young University.
Engineering pedagogy, engineering applications of probability theory, particularly decision theory.

Jitendran Muthuswamy, associate professor (affiliated faculty); Ph.D., Rensselaer Polytechnic Institute.
Microelectromechanical systems (MEMS) for neural communication and multifunctional neural prosthesis.

Nathan Newman, professor (affiliated faculty)
Ph.D., Stanford University.
Semiconductor, superconductor and dielectric materials, thin-film materials synthesis, materials characterization.

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

Katerina Raleva, adjunct faculty; SS Cyril and Methodius University.

Daniel Rivera, professor (affiliated faculty)
Ph.D., California Institute of Technology.
Life cycle and hierarchical issues in process control systems identification, robust process control.

Ronald Roedel, professor emeritus.

Jun Shen, adjunct faculty; JS Technologies.

Donghoon Shin, assistant research professor
Ph.D., Purdue University.
Security and privacy in communication networks, cyber physical systems, and emerging mobile systems.

Raymond Tsui, adjunct faculty; Raydis LLC.

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.

Sarma Vrudhula, professor (affiliated faculty)
Ph.D., University of Southern California.
VLSI CAD for low power; energy management and energy efficient computer design; thermal management in computer systems; logic synthesis and verification; statistical performance and power optimization for VLSI; and graph theoretic techniques for VLSI layout.

Seth Wilk, adjunct faculty; SJT Micropower.

Guoliang Xue, professor (affiliated faculty)
Ph.D., University of Minnesota.
Survivability and security in mobile social networks and smart grid, and optimization and economic approaches to network applications.

Lei Yang, assistant research professor
Ph.D., Arizona State University.
Networks and Smart Grid.

Research

A graduate student works in the Connection One Lab.

Mariana Bertoni, left, works with a student in her lab.

Collaborations with industry aim to boost solar energy technology

Mariana Bertoni and Stuart Bowden have roles in partnerships with industry that are part of an effort by the U.S. Department of Energy (DOE) to aid photovoltaic manufacturing and supply-chain companies to advance their technologies.

Their projects are among research and development endeavors the Department of Energy is supporting through its SunShot Solar Manufacturing 2 program, which is providing more than $24 million to 10 solar energy technology manufacturers based in the United States. The program supports development of innovative technology for novel manufacturing equipment and processes that will reduce costs and increase efficiency.

Both Assistant Professor Bertoni and Associate Research Professor Bowden are senior sustainability scientists in the Global Institute of Sustainability.

Bertoni is working with SolarWorld Industries America Inc. to develop technology for a novel silicon ingot growth, the process by which the material for solar cells is manufactured. Funding from the DOE will help transition SolarWorld's proprietary NeoGrowth manufacturing process from pilot stage into early-stage production.

SolarWorld — the largest U.S. solar panel manufacturer and one of the world's largest producers of solar technology — is headquartered in Hillsboro, Oregon.

The project will increase NeoGrowth production capacity to 300 megawatts of high-quality silicon wafers at a cost that is competitive with wafers on the open market.

Bertoni will identify the most detrimental defects present in the new crystals grown by SolarWorld and analyze the impact of the crystals on the performance of solar cells. The results will help SolarWorld optimize growth conditions to minimize as-grown defects and maximize the power conversion efficiency of the final solar cells.

"This technology has the potential to revolutionize the wafer manufacturing industry by increasing throughput and quality when compared to current market technologies," she said.

Bowden is working with Technic Inc. to eliminate the use of silver in the manufacturing of solar energy cells, and replace it with copper, a more abundant and less costly material. The goal is to develop a copper-plating technique that will reduce the cost of making solar cells without a decrease in performance quality.

Technic Inc. has established a global reputation for technical excellence in the electro-deposition of precious metals. It has more than 20 global facilities in 14 countries and is headquartered in Cranston, Rhode Island.

The solar photovoltaic industry presently uses 15 percent of the world's silver supply. Using copper instead could allow the significant growth in the industry and facilitate work at terawatt levels, Bowden said.

ASU will house the first installation of machinery for the new copper-plating process that will enable production of industrial-scale solar cells that do not require silver.

The two projects "demonstrate ASU's leadership in collaborating with industry partners to bring new technologies out of the lab and into the market," Bowden said.

A grant of $4 million to SolarWorld Industries America includes $400,000 for Bertoni's research.

A $900,000 grant to Technic Inc. allocates $400,000 for Bowden's research.

The projects boost ASU's growing research activity in photovoltaic technologies for solar energy generation.

The largest part of that research portfolio is the Engineering Research Center for Quantum Energy and Sustainable Solar Technologies (QESST) supported by the National Science Foundation and the Department of Energy to solve technological and economic challenges to harnessing solar power on larger scales.

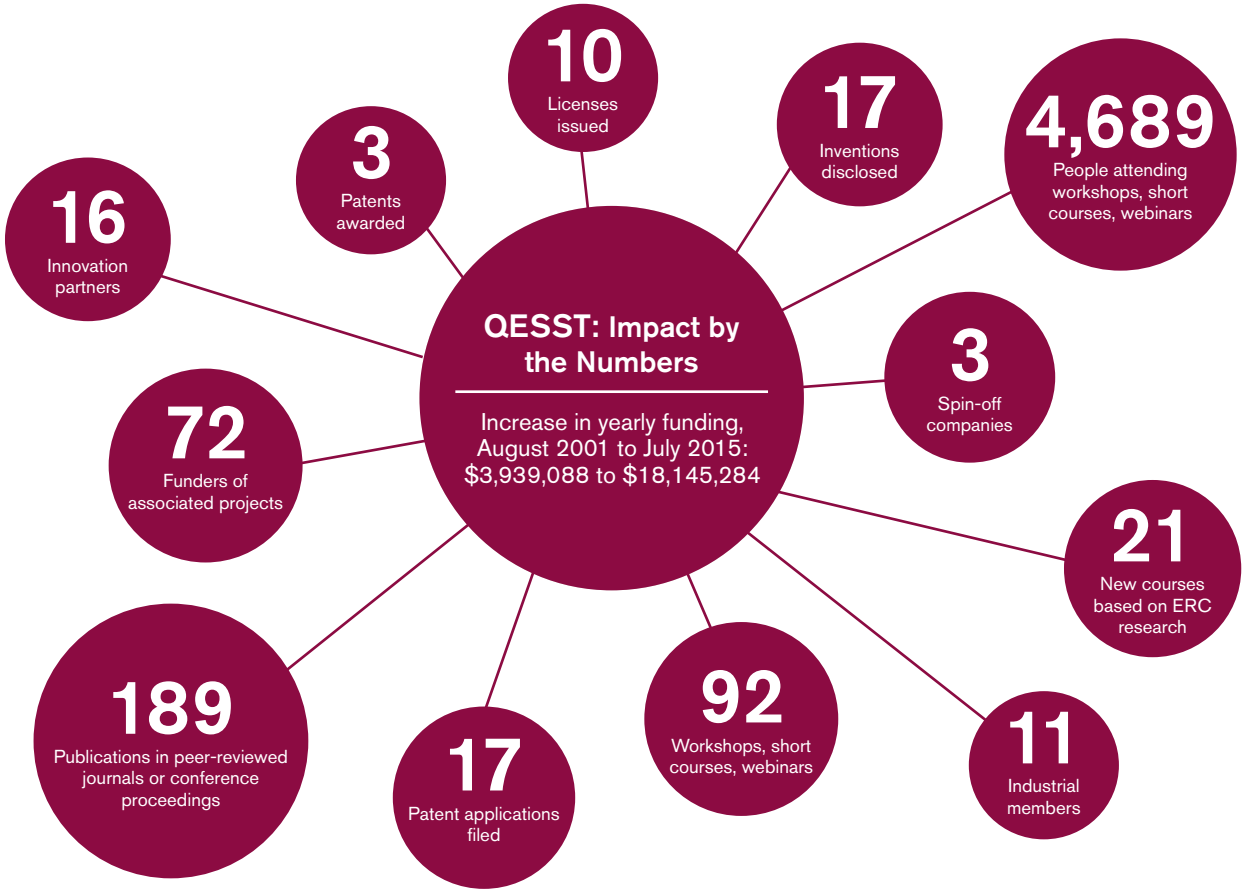
Bertoni and Bowden are part of the QESST research team.

Arizona State University engineers Mariana Bertoni and Stuart Bowden partner with industry on projects that boost ASU's growing research activity in photovoltaic technologies for solar energy generation.

QESST Engineering Research Center is developing photovoltaic and quantum energy converters that transform the existing electricity generation system

Photovoltaics leverages one of the 20th century's greatest scientific advances — quantum mechanics — to generate electricity. It is based on fundamentally different physical principles than other generation sources, allowing locally generated, high efficiency, scalable and environmentally benign energy systems.

Solar energy has the unique capacity to meet and exceed the entire world's energy demand. Over the last three decades, photovoltaics (PV) has developed from a niche market into a significant energy source. Despite these achievements as one of the newest forms of electricity generation, PV has enormous potential for further growth and improvements.



Tackling the terawatt challenge

By developing new approaches that lead to unprecedented performance and low cost for commercial solar cells, Arizona State University's Quantum Energy and Sustainable Solar Technologies (QESST) Engineering Research Center seeks to transform the existing electricity generation system, making it more sustainable and ubiquitous by developing photovoltaic and quantum energy converters that fundamentally alter how energy is used.

The center is based in the School of Electrical, Computer and Energy Engineering and ASU Professor Christiana Honsberg is the director and principal investigator.

QESST technologies cross the range of existing commercial technologies — silicon, thin films and tandem devices — and apply advances spanning manufacturing and new device approaches. Its challenge: How to generate terawatts of electricity with minimal impacts on the environment.

"QESST is leading the development of scalable, commercially relevant systems that overcome fundamental barriers in existing PV devices, allowing simultaneous increases in efficiency and reductions in cost," explained Professor Matthew Fraser, executive director of QESST. "These devices are being demonstrated in research test beds designed to move technology towards commercialization in collaboration with industrial partners to accelerate the translation of research to the market."

Since its inception in 2011, QESST researchers have reached several milestones. These include development of silicon solar cells that produce world-record, open-circuit voltages; demonstrated integration of advanced III/V semiconductor absorber layers on silicon substrates for full-spectrum utilization; and the manufacture of world-record efficiency silver-alloyed CIGS solar cells.

As a testament to its success, the National Science Foundation last year extended the center's original five-year funding commitment to 10 years with an anticipated 10-year total funding of approximately $35 million.

Engaging students and industry partners

According to Fraser, QESST is performing in top form as an Engineering Research Center.

"We are meeting three very important objectives. One, QESST has coalesced our research strengths in solar research and manufacturing, building a larger platform for this type of work at ASU. It truly has made us a center of excellence in this area, and in addition to direct ERC funding, we are seeing increased funding for associated projects," said Fraser.

The other two objectives involve the broader impacts of QESST — education and industry engagement. The Fulton Schools are seeing increasing industry engagement and an uptick in the number of students and faculty who want to come to ASU to be part of what the center is doing.

"QESST is motivating and educating students from young scholars and post-graduate student leaders to adult members of the broader community who are interested in how we will solve our future energy challenge," Fraser said.

Since its founding, QESST has provided educational opportunities and events that have reached more than 22,000 people, from K-12 and college students, to teachers, members of industry and the larger community.

Students in the Grand Challenge Scholars Program, a Fulton Schools program for high achieving students, investigated the effect of different wavelengths of light on the electrical output of solar cells during a visit to a QESST facility.

The center is focused on improving the effectiveness of energy engineering training through researching effective pedagogy, and providing teacher and faculty training to implement evidence based educational practice. To date, 21 new courses have been developed based on the center's research.

QESST is building strong collaborations between academia and industry with the goal of advancing and contributing to the global photovoltaics industry.

QESST industry members and innovation partners have grown to 27 and contribute significantly to the overall QESST mission. They help provide research direction, guidance to students, funding of associated projects, and partner with QESST on additional opportunities.

Some of the center's current industry members include: Applied Materials, ASE Inc., CFD Research Corp., First Solar, Hanwha Solar America, National Instruments, Sinton Instruments, Soitec, Technic Inc., Vecco Corporation and Yingli.

Sixty-four institutions are participating in research, technology transfer and education under the QESST umbrella. Core educational partners include Caltech, the University of Delaware, Massachusetts Institute of Technology and the University of New Mexico.

Technology advances earn international, state innovation awards

Biomedical technology advances achieved by **David Frakes** and his Arizona State University research team earned a World Technology Award in Health and Medicine, as well as one of the Arizona Governor's Celebration of Innovation Awards.

In addition to Frakes' state award, **Sarah Galvin**, an ASU electrical engineering student, was presented one of four Future Innovators of the Year awards. Galvin was recognized for a research project she developed as a student at Corona del Sol High School in Tempe.

Technology aids physicians in treating endovascular problems and brain aneurysms

Frakes is an associate professor with a joint appointment in ECEE and the School of Biological and Health Systems Engineering.

Through his Imaging Processing Applications Lab, he has led development of technology that aids physicians in devising patient-specific plans for endovascular treatments. It is expected to have a significant impact on the success of insertions of neurovascular stents to improve patient recovery.

The new technique for enhancing preparation for the treatment of blood vessel problems is among recent accomplishments deemed to have "the greatest likely long-term significance" by the international panel of scientists, engineers and inventors who select winners of the annual World Technology Awards.

The technology has become the basis for a startup company called Endovantage.

ASU professor David Frakes and biomedical engineering doctoral student Justin Ryan led work in the Image Processing Applications Lab that won an Arizona Innovator of the Year Award.

The state Celebration of Innovation Award recognized the achievement of Frakes' lab team in developing a cloud-based computer simulation platform enabling precise modeling of the conditions of patients with brain aneurysms.

The awards program is organized by the Arizona Technology Council in partnership with the Arizona Commerce Authority.

The modeling technology development is related to other biomedical projects that are bringing attention to Frakes' work. Among them is the 3D Cardiac Print Lab at Phoenix Children's Hospital, which is being run under Frakes' guidance by ASU biomedical engineering doctoral student Justin Ryan.

The lab produces 3D prints of individual patients' cardiovascular, respiratory and skeletal structures. The lab also provides physicians a novel virtual screening of the conditions of pediatric patients, helping surgeons ensure a proper fit of artificial hearts implanted into the patient.

See page 38 for more on David Frakes.

Engineering student works to develop next generation electronics

The Future Innovators of the Year Award recognized Sarah Galvin's research, which she began in high school, working with Professor Nathan Newman on developing next-generation electronics through her involvement with ASU's Southwest Center for Education and the Natural Environment (SCENE).

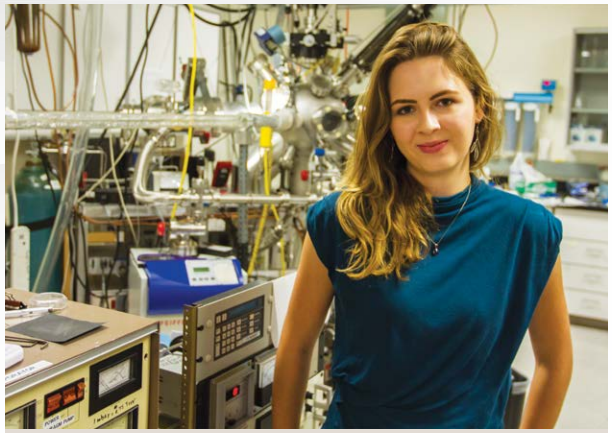
One of Newman's projects involved his lab team's efforts to help make the technological breakthroughs necessary to develop next-generation electronics. It involved applying quantum mechanics, manipulating electrons, combining existing materials and creating new ones to make new energy devices, and something called spintronics — short for spin transport electronics — all of which attracted Galvin.

For two years as she finished high school, Galvin spent what time she could in Newman's lab.

"When a material has a propensity of electrons with spin in one direction over that of another direction, then the material is magnetic," Newman explained. "Sarah's project focused on making materials that can inject electrons from such magnets with only one direction of spin, which produces 100 percent spin polarization, or as close to that as possible. She has been able to show that enhanced spin polarization can be achieved in the material that is deposited in the process, using less expensive methods than what have been used before."

"The technology promises not only higher-performing consumer electronics," Newman said, "but also new devices that could significantly improve the energy efficiency of the kind of advanced supercomputers used by the likes of Google, Yahoo and the National Security Agency."

Her success has helped to secure Galvin a position as an undergraduate research associate in Newman's lab, giving her the opportunity to continue pursuing advances in spintronics.



ASU electrical engineering student Sarah Galvin won a Future Innovator of the Year Award. Galvin got her start in research as a high school student, working with ASU engineering professor Nathan Newman on developing next-generation electronics through her involvement with ASU's Southwest Center for Education and the Natural Environment (SCENE).

Galvin has shared authorship credits with Newman and other members of his research team on a paper published in the prominent research journal Applied Physics Letters, a publication of the American Physics Institute.

Her work with Newman's lab drove Galvin's decision to major in electrical engineering. She also is a student in ASU's Barrett, The Honors College.

"I decided on engineering because I like being able to physically do things and create something," she said. "I like the mechanics of it, as opposed to some areas of science where you mostly observe and study things. In engineering, I can see where I might be able to do something that makes a difference, and so much is happening in electrical engineering right now."

Telemedicine device developed to help treat communication disorders lauded for technological innovation

Electrical engineering student Steven Sandoval and electrical engineering Assistant Professor Visar Berisha have played significant roles in a project to improve therapy for people in underserved communities who are living with communication disorders.

Sandoval teamed with two other Arizona State University students to develop Speaklear, a telemedicine device designed to enable speech-language pathologists to treat patients with communication disorders who are in remote locations.

The device won first place in a signal-processing technology application contest organized by the Acoustical Society of America. The project was a finalist in the sixth annual international Wireless Innovation Project competition sponsored by the Vodafone Americas Foundation, which is affiliated with one of the world's largest telecommunications companies.

The project began as a collaborative effort by Berisha and Julie Liss.

Berisha has a joint appointment on the faculty of ECEE and the Department of Speech and Hearing Science in ASU's College of Health Solutions. Liss is an associate dean of the College of Health Solutions and a professor in the Department of Speech and Hearing Science.

They recruited the students to work on developing their idea for Speaklear and mentored the team.

According to the World Health Organization, dysarthria, a motor speech disorder, affects approximately 46 million people worldwide, three million of whom live in the United States.

Dysarthria occurs when the muscles of the mouth, face and respiratory system fail to move or become weak after a stroke or brain injury. Symptoms may include slurred speech, hoarseness and a weak voice.

Speaklear works like any other application on smartphones or tablets. After it records speech samples, it provides a variety of calculations to assess speech production. This process helps the pathologist pinpoint the areas that are most problematic.

A traditional in-office therapy session draws upon the pathologists' training as much as it does their perceptual experience to hone in on problem areas, allowing them to cater the therapy to meet the needs of the patient.

The Speaklear project team worked with 25 pathologists and audiologists in the Phoenix area with at least 20 years of experience in the field to develop the traditional portion of the calculation.

Young engineering faculty rapidly building a track record of innovation and high performance

High-performing innovation teams require the perfect combination of bright new talent and more experienced players.

It's a strategy that is paying off for the Ira A. Fulton Schools of Engineering, which is building a track record of high performance by its young faculty members. A total of 20 prestigious awards have been netted over the past two years, bringing more than $11.5 million to support both research and education in the Fulton Schools.

These early career honors include the National Science Foundation (NSF) Early Faculty Development (CAREER) Program Awards, Air Force Office of Scientific Research Young Investigator Research Program (AFOSR YIP) Awards.

This year two faculty have been awarded CAREER Awards.

Pavan Turaga: Research on human movement could lead to "assistive" homes, workspaces

Imagine living in a house that knows you and can anticipate your activities when you're home. Imagine how this technology can help in the development of "assistive homes" for the elderly, and workspaces that feature built-in, ergonomic components that can improve employee health.

These are examples of long-term applications that could result from a National Science Foundation Faculty Early Career Development Program (CAREER) award recently awarded to Pavan Turaga, assistant professor in ECEE and the School of Arts, Media + Engineering in the Herberger Institute for Design.

Turaga received the award in support of his research into the underlying qualities of human movement.

Titled "CAREER: Role of geometry in dynamical modeling of human movement: Applications to activity quality assessment across Euclidean, non-Euclidean, and function spaces," the project expands on the central theme of Turaga's academic focus.

"My Ph.D work had a lot to do with geometry applied to other imaging problems, and it was a natural extension to look at human movement through the lens of geometry," Turaga said.

Turaga, whose areas of expertise include computer vision and human activity analysis, said that using such additional knowledge has classically been considered challenging in signal-processing literature, though "over the past several years, techniques from geometry have emerged as a possible lingua franca when considering signals with interesting physical constraints."

Turaga pointed out that human movement recorded from sensors has traditionally been studied as yet another signal, yet human movement has many interesting properties that make it distinct from other signals.

Pavan Turaga

"As an example, our skeletal structure imposes various constraints on how we move," he explained. "Most of us cannot contort our bodies into any shape we want, but there is a range of postures to which we are constrained. If we can use such physical constraints while modeling the underlying signals we are recording, one can possibly improve techniques for signal-processing, storage, matching and retrieval."

Over the course of the five-year project, Turaga aims to show how creative applications of mathematical principles can lead to discoveries that bear on the development of long-term therapies to address a wide range of health issues.

Although he sees the long-term impact of his research as mainly on the individual's health care, Turaga emphasized its potential for dual impact: "The CAREER agenda is meant to start a long-term research trajectory of both fundamental advances and its varied applications. The medical realm is only one possible application of this study."

Assistant Professor Oliver Kosut, left, and a student discuss the mathematics of modeling complex systems to improve security.

Oliver Kosut uses math to combat malicious attacks on complex communication and power networks

The vast and distributed nature of communication networks makes them inherently vulnerable to attack. If left unchecked, active attacks could significantly undermine the reliability of networks of connected devices just as they are becoming increasingly vital to modern society.

Oliver Kosut is less interested in whether or not a system can be hacked. His research focuses on combating active attacks, in which a malicious intruder acts to subvert the natural behavior of the system.

"Wireless and wired network systems cannot be trustworthy until they operate reliably in the presence of an active adversary that alters the behavior of the system," Kosut said. "I want to know how we can design the system to detect an attack and be more resilient."

An assistant professor, Kosut's research focuses on security and stochastic systems, with the goal of bringing theoretical insights to bear on complex interconnected systems, such as power grids or communications networks.

Stochastic systems are systems whose state is randomly determined, in that they have a random probability distribution, or pattern, that may be analyzed statistically but may not be predicted precisely.

"Theoretical tools help us discover and understand the properties and limits of complex systems," Kosut said. "We must understand them mathematically to build a model of the real system."

An example, he said, is the network coding for a simple wired network. What are the consequences when an adversary, sending bad information, controls some nodes?

Kosut said, jokingly, that a pad of paper and a pencil are the equipment he uses to conduct his research. One wall of his office is a massive white board covered in multicolored mathematical equations.

"Information is contained in math," he said. "What I do is math for the purpose of engineering. There is the beauty of mathematics, itself, but another level of beauty when it serves an application and real systems develop from that."

Kosut has published 26 academic articles on his work and this year was granted a prestigious National Science Foundation Faculty Early Career Development Program (CAREER) award to advance his research.

The CAREER award will be used to investigate and provide new techniques to bolster the resilience of communication networks in the presence of these potentially damaging attacks, with an eye toward the fundamental trade-offs between security (degree of protection against attacks) and performance (achievable communication rates among legitimate users).

To be effective, these solutions need to be correctly understood and used. Kosut will also develop an education and outreach program for students of all ages about security vulnerability and protection for networked systems.

Kosut joined ASU in 2012. Previously, he was a postdoctoral researcher in the Stochastic Systems Group at the Massachusetts Institute of Technology. He holds a doctoral degree in electrical and computer engineering from Cornell University and bachelor's degrees in electrical engineering and mathematics from the Massachusetts Institute of Technology.

Research centers

Zachary Holman, assistant professor

Connection One:
Communication Circuits and Systems

A National Science Foundation Industry/University Cooperative Research Center
Director: Sayfe Kiaei // connectionone.org

Focus:
Developing integrated circuits and system for wireless and wireline communication systems, including cellular systems, Wi-Fi next generation of wireless transceivers, sensors, antennas, bio-electronics, bio-telemetry and related areas.

Accomplishments:
Integrated radio ICs; Integrated wireless sensors; Power management circuits; MEMS speakers for digital hearing aids; Integrated Antennas; Advanced materials including GaN, SiC, for Power Amps; Implantable neuron sensors and nanosensors

University partners:
The Ohio State University
University of Hawaii

Industry and government partners:
Air Force Research Laboratory
Agilent
Altera Corp.
BAE Systems
Berriehill Research Corp.
Bridgestone Americas Tire Operations
CommScope, Inc.
Crystal IS
Freescale Semiconductor
Intel Corp.
Massachusetts Institute of Technology Lincoln Labs
Motorola
NeWave Sensor Solutions
NXP Semiconductors
Orton Foundation
PT Paneratech
Qualcomm
Raytheon Company
Ridgetop Group Inc.
Samsung
Space Micro Inc.
Texas Instruments
Timbre Technologies, Inc./TEL
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 Defense
U.S. Office of Naval Research
Zomega Terahertz Corp.

PSERC:
Power Systems Engineering Research Center

A National Science Foundation Industry/University Cooperative Research Center
Director: Vijay Vittal // Deputy Director: Dennis Ray // pserc.org

Focus:
The diverse challenges facing the electric power industry, educating the next generation of power engineers.

Accomplishments:
Participation in The Future Grid Initiative, a U.S. Department of Energy project on how to support high penetrations of variable sustainable energy, such as wind, solar and hydro resources; Identification of six areas of technical challenges; White papers and workshop discussions on: The Information Hierarchy for the Future Grid, and Grid Enablers of Sustainable Energy Systems; Publication of a grand challenges white paper; Publication of a public report on the future grid initiative; Organized a NSF workshop holding industry leaders and academics to identify critical new topics of research

Industry and government partners:
ABB
Alstom Grid
American Electric Power
American Transmission Company
Arizona Public Service
BC Hydro
Bonneville Power Administration
California Independent System Operator Corp. (CAISO)
CenterPoint Energy
Dominion Virginia Power
Duke Energy
Entergy
Electric Power Research Institute (EPRI)
Exelon Corp.
FirstEnergy Corp.
GE Energy
Idaho Power Company
Institut de Recherche d'Hydro-Quebec (IREQ)
ISO New England
ITC Holdings
Lawrence Livermore National Laboratory
Midcontinent Independent System Operator (MISO)
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
The Energy Authority
Tennessee Valley Authority
Tri-State Generation and Transmission
U.S. Department of Energy
Western Area Power Administration

Power One IC:
Center for Integrated Power Management and System on a Chip

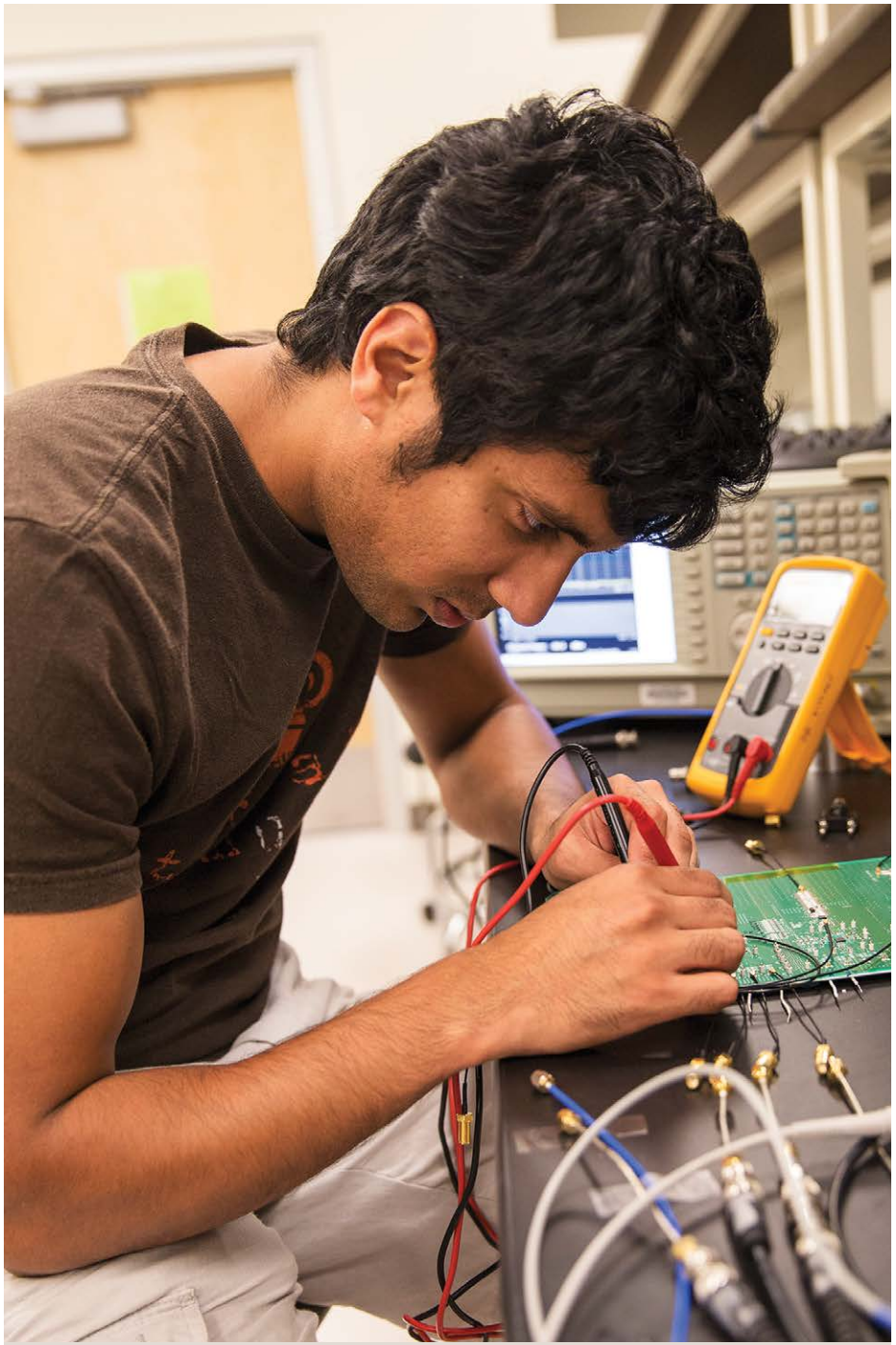
A National Science Foundation Industry/University Cooperative Research Center
Director: Sayfe Kiaei // Assistant Director: Bertan Bakkaloglu //poweroneic.asu.edu

Focus:
Developing portable fully autonomous and integrated power management circuits and systems. Power management integrated circuit (PMIC) chips are the core technology of the center. The center's research includes the application of advanced circuit, signal processing and control methods, to improve powermanagement and energy utilization in a wide range of electronic systems including battery-powered mobile electronics, high-frequency switching power supplies, energy efficiency, energy storage, and renewable-energy systems. Applications of this technology range from portable electronics and mobile systems to automotive electronics and wireless power transfer.

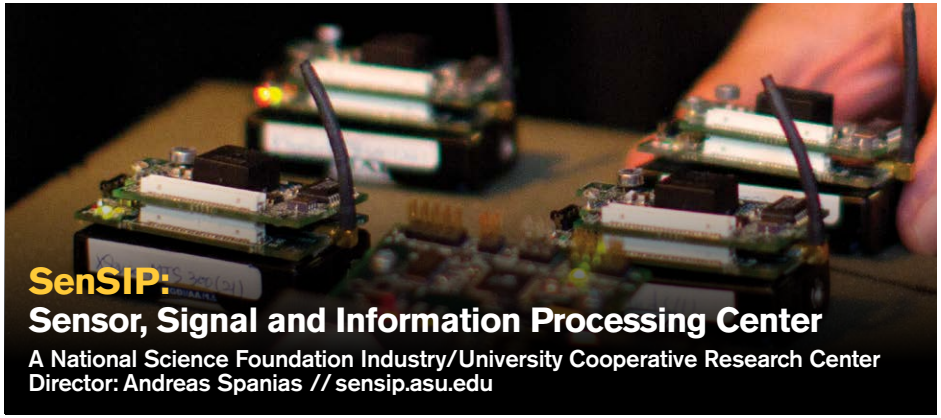
Accomplishments:
The newly formed center has been awarded a planning grant by the National Science Foundation. The first planning meeting with industry and academic partners was in July 2015.

University partners:
Dartmouth College
The Ohio State University
University of Colorado Boulder

Industry and government partners:
Freescale
Intel
Jet Propulsion Laboratory
National Instruments
NXP Semiconductors
Qualcomm
Samsung
Space Micro
Texas Instruments



A master's student works in the Power One IC lab.



SenSIP:
Sensor, Signal and Information Processing Center

A National Science Foundation Industry/University Cooperative Research Center
Director: Andreas Spanias // sensip.asu.edu

Focus:
Development of a broad array of digital signal processing, imaging and communications algorithms for sensor network technologies including those used in chemical sensors, Internet of Things, health monitoring, cell phones, security and radar systems.

Accomplishments:
Seven current industry memberships sponsoring research through the I/UCRC.

After a successful NSF proposal submitted in March 2015, the center was approved as a Phase 2 NSF I/UCRC Site (2016-2011).

Extended funding (until 2018) supporting activities in sensors, fault detection and machine learning algorithms for solar panel monitoring funded by NSF Grant Opportunities for Academic Liaison with Industry (GOALI) , ACT and Energy Wireless.

Developed digital signal processing and health monitoring award-winning apps. Apps were used for outreach sessions held at Phoenix Hermana's conference co-sponsored by Intel Corporation.

Two patents established in loudness estimation (latest 6/2015). Faculty and student affiliates also submitted four full patents in 2015 and two patent pre-disclosures.

One new Memorandum of Understanding signed for international research partnership with Tech de Monterrey on sensor localization. Affiliated research faculty won sizeable and competitive awards and contracts in sensor, signal processing and communications areas.

Two paper awards in 2015 to faculty and student affiliates; Outreach sessions with Corona del Sol High School supported by NSF Research Experience for Teachers supplement.

Ph.D. Fellowship established with Acoustical Society of America.

Two undergraduate students currently supported by NSF Research Experiences for Undergraduates and Veteran supplements.

Accomplishments *(continued)*:
A graduate training certificate in signal processing for sensor systems was established in 2015. NSF STEM Grant awarded in 2015 to embed undergraduate students in research on sensor networks.

NSF SBIR Supplement awarded by NSF to fund Interactive Flow Sensor Technologies membership in SenSIP.

An SenSIP LTE 4G+ facility donated by Sprint Communications for research in sensor localization was installed in 2015 in GWC405.

A SenSIP 18kW 8x13 solar monitoring facility equipped with sensors and transceivers is near completion at the ASU Research Park.

Partners:
Net-Centric Systems collaboration with UNT, SMU, MST and UTD funded by the NSF I/UCRC

University of Cyprus, Polytechnic Milano, and ETH Zurich research collaboration in sensor networks and telecommunications systems — funded by the Research Promotion Foundation (EU Prime)

Imperial College London's University Defence Research Centre. Collaboration on sensor localization research funded by British Council

Technologico de Monterey (ITESM), Collaboration in speech processing and communications research funded by NSF International Partnerships

University of British Columbia; Collaboration on Digital Home

Collaboration with ASU's Arts, Media + Engineering School

I/UCRC members with funding SenSIP projects (Seven memberships active):
Applied Core Technology, Inc.
Energy Wireless Systems and ViaSOL Energy
Freescale Semiconductor
IFSIntel Corporation
Raytheon Missile Systems
Sprint Communications

ASU LightWorks

Director: Gary Dirks // Deputy Director: Stephen Goodnick // asulightworks.com

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

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

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

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

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

The Solar Power Laboratory // Director: Christiana Honsberg

Focus:

The Solar Power Lab, also comprising part of the QESST Engineering Research Center, works on overcoming the barriers for existing solar cells to reach theoretical limits by focusing on increasing efficiency and reducing cost.

Accomplishments:

Diffused Junction Solar Cell Technical Progress: Largely due to its industrial relevance and as an educational vehicle, diffused junction pilot line solar cell fabrication activities continued last year and are routinely yielding cells with 17.5% efficiencies. Process flows to explore deposited BSG (borosilicate glass) and PSG (phosphosilicate glass) films as alternate diffusion sources are underway. At the highest level, initial results indicate that PECVD-deposited and annealed films can serve as a viable diffusion source with cell performance comparable to that observed for conventional cells fabricated using a POCl3 doping source. Also worthy of mention is a targeted foray into evaluation of plated metallization as a means of minimizing silver consumption and, therefore, cost of diffused junction solar cells. In fact, the very first cells with Ni/Cu contacts created by light induced plating have attained efficiencies around 16% with good Voc and fill factor.

Heterojunction Solar Cell Technical Progress: For over a month during the spring, pilot line production of silicon heterojunction solar cells successfully operated on the weekends. Five forty-wafer lots were fabricated with the mean cell efficiency at a respectable 19.4%. From these substrates, the first 28-cell PV module was assembled. Modelled after a commercially-available technique, internal development of a new probing method (and also solar cell interconnection method) was started in which probing bars are replaced with foil wire electrodes. Finally, an important offshoot of the heterojunction work is migration towards thin and flexible solar cells, and this work is well underway on substrates as thin as 55 µm (efficiency of 18%).

III-V Solar Cell Technical Progress: Advancements have been made on both growth and modeling fronts related to III-V solar cell activities over the last year. In one thrust, studies have concentrated on epitaxial growth of phosphorous-related compounds on Si and GaAs substrates to improve the design and functionality of Si-Ga(In)P(As)N solar cells. Additionally, MBE growth of GaSb and related compounds on GaAs substrates was explored for GaSb-related solar cells in conjunction with the University of New Mexico. Also, MBE deposition of GaAsN, InGaAsN and InGaAsSbN epitaxial layers on GaAs substrates was pursued for high-efficiency tandem solar cells. Finally, improvement in the MBE growth of III-nitride compounds, basically InGaN with In composition ranged from 12 up to 100%, was realized for high efficiency solar cell applications. On the theoretical side, improvements to the defect creation model in epitaxial structures were advanced.

Education and Outreach: Innumerable education and outreach programs were conducted by the Solar Power Lab over the last year. Perhaps the cornerstone of these activities is the Summer REU program, and this year 23 participants experienced a two-week "Solar Cell 101" fabrication exercise which segued into group deep-dive project assignments such as exploration of colored solar cells and laser edge isolation. Additionally, forty five incoming GCSP (Grand Challenge Scholars Program) freshman in engineering and science curricula were taken through a lecture, tour, activities, debate, and concluding talk at the MacroTechnology Works building. Activities undertaken focused on demonstrating the storage, wavelength properties, and electrical loading of solar power. Further, longstanding educational relationships were also fostered; representative is the fall visit by sixteen students from various disciplines (math, chemistry, and physics) at Scottsdale Community College. These students spent most of an afternoon at MTW for a class tour, an introduction to solar cell fabrication, and observation of characterization and fabrication activities. Also on the educational front, single-cell laminated and framed solar cell modules were made for various activities including support of internal outreach efforts, distribution to QESST partner universities (e.g., UNM), and local exhibitions (e.g., NFL Experience at the Phoenix Convention Center).

Expansion of Lab Capabilities: During the 2014-2015 fiscal year, fabrication capabilities were greatly enhanced by the addition of new equipment in the Solar Power Lab. In particular, a new Baccini Semi-automatic Lab Printer was ordered and installed, and solar cell fingers as small as 60 µm have been printed with good fidelity. Additionally, an MRC 943 sputter tool was refurbished by a local company and facilitates RF studies; initial emphasis is on SiO2/TiO2 deposition of Bragg reflectors for the PV Mirror project and hydrogenation of indium oxide for heterojunction solar cells. Finally, a much-needed Nd:YAG laser system manufactured by Electrox that can be used for scribing and cutting silicon wafers came online.

Accomplishments *(continued)*:
SPL Recharge Center: For the 2014 calendar year (reporting period), the SPL Recharge Center realized revenues of $22.9k, and activities to date in calendar year 2015 have already eclipsed this number. Participants include Natcore, Nth Degree, Regher Solar, First Solar, and the PVMC. Equally important as the incoming revenue stream is the fact that the Recharge Center serves as a springboard for deeper interactions with SPL such as sponsored research and QESST membership.

The Solar Power Laboratory affiliates and partners include QESST ERC partners plus:
Natcore
Nth Degree
Regher Solar
UCF/PVMC

Center for Photonics Innovation // Director: Yong-Hang Zhang // photonics.asu.edu

Focus:
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.

Accomplishments:
Cun-Zheng Ning's group demonstrate world's first white laser.

Yong-Hang Zhang's demonstrated new world records of carrier lifetime up to 2.7 μs and interface recombination velocity down to 0.1 cm/s for single-crystalline CdTe/MgCdTe double heterostructures.

David Smith received Helmholtz International Fellow Award.

Meng Tao published a new book "Terawatt Solar Photovoltaics: Roadblocks and Opportunities" (Springer, London, 2014).

An ARO funded MURI program led by Drs. Yong-Hang Zhang, David Smith, and Shane Johnson received additional funding beyond 5th year.

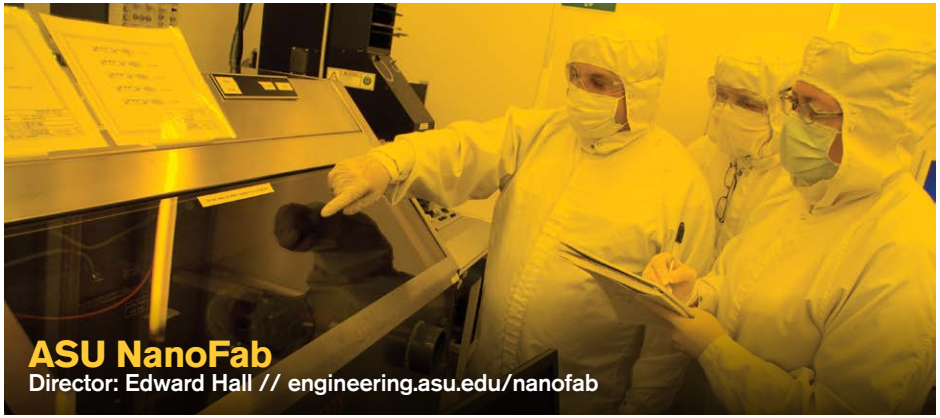
Jian Li received large research awards from DOE for OLEDs.

Zachary Holman received large research awards from DOE for new solar cells.

Yuji Zhao received Early Career Faculty Awards from Arizona Science Foundation and NASA.

Center for Computational Nanoscience // Director: Marco Saraniti

Focus:
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.



ASU NanoFab
Director: Edward Hall // engineering.asu.edu/nanofab

The ASU NanoFab is a flexible nano-processing facility that offers state-of-the-art device processing and characterization tools for student training, university research and for external company prototype development for ECEE and other research groups. The staff are experienced in areas that fit the needs of these groups. Core strengths are nanofabrication, unique silicon processing, molecular- and bio-electronics, micro-electro-mechanical-systems (MEMS), nano-fluidics, optoelectronics and device characterization.

Established companies and innovative start-ups especially benefit from using this advanced facility to accelerate their prototype development. We provide the facility, equipment and resources for a full range of operations — from the wet world of biosystems and chemistry to the dry world of inorganic materials and the hybrid structures in between.

Highlights:
A 4,000-square-foot, class-100 cleanroom, state-of-the-art equipment and experienced technical staff.

Past projects:
Carbon nanotubes for nanofluidics

Plasma lithography for cell networks formation

DNA profiling

MEMS structures

2D structures

GaN power device fabrication

Nanostructure sieves

QESST:
Quantum Energy and Sustainable Solar Technologies

A National Science Foundation-Department of Energy Engineering Research Center
Director: Christiana Honsberg // Executive Director: Matthew Fraser //qesst.asu.edu

Focus:
Photovoltaic science and technology, and transforming electricity generation to sustainably meet the growing demand for energy.

Accomplishments:
Developed novel thin crystalline silicon wafers with highly passivated surfaces with measured world-record open circuit voltages proving that devices with reduced silicon usage and high efficiency can be achieved to significantly reduce the cost of photovoltaic systems; 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 world-record efficiency silver-alloyed copper-indium-gallium-diselenide (A-CIGS) thin film solar cells which will enable wide-band gap absorber layers with lower structural disorder and improved device performance over traditional CIGS cells

University partners:

California Institute of Technology
Massachusetts Institute of Technology
University of Delaware
University of New Mexico
Georgia Institute of Technology
University of Arizona
University of Houston
Imperial College London
University of New South Wales
University of Tokyo

Industry and government partners:

Applied Materials
ASE Inc.
CFD Research Corp.
First Solar
Hanwha Solar America
National Instruments
Sinton Instruments
Soitec
Technic Inc.
Vecco Corporation
Yingli

QESST researchers — from undergraduate students to faculty — attend community and K-12 outreach events to lead hands-on demonstrations about solar power and share their knowledge and passion for photovoltaics technology.

Students

Our outstanding students earn honors nationally and internationally.

Electrical engineering student Ja'Lon Sisson took full advantage of undergraduate research opportunities to make his education the best that it could be. *Photographer: David E. Talbert*

Undergraduate research ignited Sisson's passion for engineering

Recent graduate is headed to Duke University on fellowship

Sometimes life reveals itself not in huge moments, but instead in smaller marks that make us who we are.

For Ja'Lon Sisson it was a fork in the road that many college students encounter. The work becomes difficult, there are a lot of distractions. They are faced with the question. "Do I have what it takes, and can I make the sacrifices needed to achieve my goal?" For Sisson, the answer was a resounding, "Yes."

Halfway through his academic career in the Fulton Schools, the aspiring electrical engineer found himself on academic probation. Working 30 hours a week at FedEx to pay his bills, he struggled to find the time necessary to do his school work.

Coming "close to the edge" was a wake-up call, informed by an experience in his home state of Nevada.

"I was interning at Nellis Air Force Base during the summer. I got to see the day-to-day operations of actual engineers, see how what I was learning in school could be applied to problems, finding solutions and things of that nature. I said to myself, 'I want this.' And I never looked back," Sisson said.

And in that moment he made a choice. He quit his job, took out student loans and launched himself full-force into his education and research.

As a newly minted Arizona State University graduate with a bachelor's degree in electrical engineering, Sisson remembers wanting to be an engineer from the age of three or four. He loved computers and video games.

"I loved to take things apart and put them back together," he said.

He also wanted to work for NASA. He learned that ASU had a NASA Space Grant Program and he applied in 2014. He was accepted.

Under the mentorship of Associate Professor Daniel Bliss, Sisson became a researcher. He worked on the simulation and design of radar systems with MATLAB, a tool for numerical computation and visualization. The initial simulated prototype was a mono-static radar that identified fixed targets, which was further developed into a bi-static model that actively tracked moving targets.

Sisson proudly presented his work at the NASA Space Grant Symposium during the last semester of his senior year.

He also became involved in a National Science Foundation renewable energy project with professor George Karady. ASU is a partner on the FREEDM (Future Renewable Electrical Energy Delivery and Management) Systems Engineering Research Center, and Sisson's research focused on systems for protecting the smart energy grid from faults.

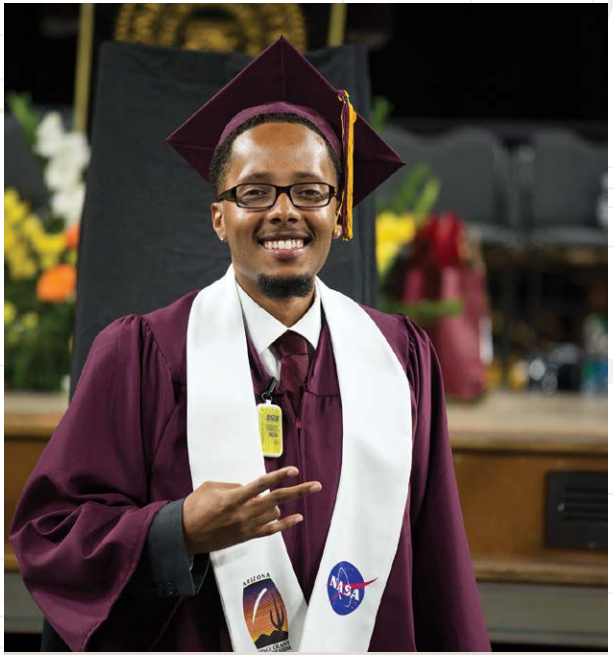
Lastly, his senior capstone project focused on near field communications, or NFC, and their security. Apple Pay on an iPhone is an example of NFC.

"I enjoyed so much working on that project with my friends. I loved being in the lab and getting my hands dirty," said Sisson. "I also liked learning to give presentations to communicate why the research matters."

The young engineer, who said he never doubted his ability even when times got tough, is now headed to graduate school at Duke University on a GEM fellowship through the National Consortium for Graduate Degrees for Minorities in Engineering and Science. Intel is his industry sponsor.

As for the future, Sisson is not sure about his long-term plan.

"I still don't know enough. I want to find what I love, and I am hopeful graduate school will help me find that," he said.



Ja'Lon Sisson, the proud graduate.

Culp powered up career, refused to be statistic

Carrie Culp could have been a statistic: single mother of three, high school diploma, hard-working but hamstrung by a lack of education, hanging onto the lower rungs of the financial ladder.

She could have been a statistic, but it isn't in her nature.

"I always liked a puzzle," she said. "I liked to put things together, to figure out how to make things work."

So she figured out how to make her life work, going to community college, transferring to the Fulton Schools, earning bachelor's and master's degrees in electrical engineering through the accelerated 4+1 program and landing an enviable job helping run the country's power grid at Midcontinent Independent System Operator Inc.

She loves to tell her story to those coming behind her.

Culp grew up in Buckeye, Arizona, where her family worked on farms chopping cotton, harvesting corn and working on tractors. When her parents got divorced, her mother worked four jobs to keep up with the bills, and Culp would pitch in and help.

She graduated from Buckeye Union High School, became a young mother and started doing office work. But it felt like a job with no future, and she always knew she should go back to school.

She signed up for math and English classes at Estrella Community College and engineering classes at Glendale Community College. She and her kids moved into her mom's house, and she re-engineered the Arizona room to become a bedroom and bathroom, rewiring the electricity by herself and adding plumbing with the help of her uncle, a master plumber.

Carrie Culp (standing, right) at work on her senior design project with fellow electrical engineering students Patricia Markison and Martin Solis. The team partnered with the Quantum Energy and Sustainable Solar Technologies Engineering Research Center at ASU for their senior design project to develop a solar-powered dialysis machine.

She got connected with the Motivated Engineer Transfer Students, or METS program, a program that connects community college students to the Ira A. Fulton Schools of Engineering.

She was offered a scholarship, enrolled at ASU and connected with others who had transferred. She also started volunteering to set up outreach visits for other Estrella students, and eventually her volunteer work became a job as an outreach coordinator for the program.

In the meantime, she worked with QESST, the Quantum Energy and Sustainable Solar Technologies Engineering Research Center, focusing her studies on solar energy.

She did internships, joined the Society of Women Engineers, the Society of Hispanic Professional Engineers and the Institute of Electrical and Electronics Engineers (IEEE) Eta Kappa Nu honor society. She worked with Engineering Projects in Community Service (EPICS), helping ship medical supplies to developing countries through Project C.U.R.E.

She was selected for a research position with North Carolina State University in their "Engineering the Grid" program, and received a scholarship from the IEEE Power and Energy Society in the inaugural round of the Scholarship Plus Initiative, established to attract high-quality engineering students to the power and energy field.

Culp landed a job working for MISO after an internship. The company describes itself as "an essential link in the safe, cost-effective delivery of electric power across much of North America."

"It's where transmission, generation and utilities all meet," Culp said. "They help figure out demand and loads. Someone will say, 'We're going to shut down this coal-fired plant,' and they will say, 'Well, that means part of Michigan will go black.' "

Culp is now working with the newly integrated MISO offices in New Orleans.

"There are a lot of transmission upgrades needed in the southern region, and part of my job is to analyze and model the proposed projects," Culp said. "I have to evaluate all the projects proposed for my region, reject ones that are not beneficial in the long term, further investigate those that have long-term potential, and sometimes propose my own project solution for stakeholders to consider."

"Some of the projects I design or verify are worth billions of dollars, so it is important to get the best benefit to cost."

HKN Epsilon Beta recognized for honors society's achievements

Arizona State University's HKN Epsilon Beta earned an Outstanding Chapter Award from the IEEE-HKN national organization for the fifth year in a row. Only around 20 of the 200 chapters receive this annual award that recognizes undergraduate chapters with the most impressive records of scholarship and activities.

Eta Kappa Nu (HKN) is the international honors society for the Institute of Electrical and Electronics Engineers (IEEE). HKN Epsilon Beta, Arizona State University's HKN chapter, brings together the highest performing students studying electrical engineering, computer engineering, computer systems engineering, computer science and biomedical engineering — all IEEE-designated fields of interest.

The honor society provides outreach and networking opportunities for more than 100 high-achieving engineering students.

Though the HKN Epsilon Beta Chapter primarily inducts students, professors and professionals can be inducted for meritorious work in an IEEE-related field.

On April 24, 2015 the club inducted Gary Tooker, ASU electrical engineering alumnus, former Motorola CEO and generous Fulton Schools supporter.

"HKN wasn't established when Mr. Tooker graduated in 1962, and as a result we want to honor his achievements and thank him for supporting Fulton Schools students," said Weidong Ye, treasurer of the HKN Epsilon Beta Chapter.

It is one of Tooker's many honors. The National Academy of Engineering (NAE) elected Tooker to become a member in 1996 for his contributions to the engineering profession. NAE membership is one of the highest honors an engineer can receive.

The HKN Epsilon Beta Chapter has inducted 80 members in the last two years and has more than 100 active members at ASU.

Members of the HKN Epsilon Beta Chapter at the 2015 Induction Ceremony.

Students at the 2015 HKN Induction Ceremony.

Ming Yang

Yang chosen as Spring 2015 Outstanding ASU Graduate Engineering Student

Outstanding graduate engineering students from the six schools in the Ira A. Fulton Schools of Engineering are recognized and honored for their academic performance and contribution to their field and community. The honor recognizes exceptional students who have not only performed well in the classroom, but who also have made an impact through research innovation, project-driven work, student organization activities, teaching innovation, entrepreneurial efforts and leadership.

Ming Yang was chosen as the outstanding graduate student for the School of Electrical, Computer and Energy Engineering

Yang wants to work on technologies that are going to change the world.

"I want to make it a better place, for everyone," he said.

Yang graduated with his doctoral degree in electrical engineering. He holds bachelor's and master's degrees from Beijing University of Posts and Telecommunications in China, and chose to come to the Fulton Schools to further his education because he considered it the "best" with "top research and faculty members."

Yang was the recipient of an ASU graduate fellowship and IEEE Phoenix section student scholarship. His research has been focused on the design of hand-held 3D medical ultrasound imaging systems.

"The contribution of my research is that I proposed several algorithms and VLSI architecture design techniques that reduce the computational complexity of the digital front end of 3D systems by about 20 times," he said. "I hope these techniques will one day help to build future cost-effective 3D medical ultrasound imaging devices everyone can afford."

Yang earned the Best Paper Award in the 19th IEEE International Symposium on High Performance Computer Architecture. He also has published four journal articles and eight conference papers. These include a paper in IEEE Transactions on Signal Processing and IEEE Micro Top Picks.

According to his advisor, Professor Chaitali Chakrabarti, "Ming is one of the best Ph.D. students that I have had. He has made excellent contributions in the area of hand-held 3D ultrasound imaging systems. Such systems are anticipated to be the stethoscope of the future."

Yang said the most rewarding thing about his graduate education at ASU is that he "learned to think and do research." The most challenging was that he learned to present and communicate his ideas with other researchers. He said this is a challenge, for Chinese students, because they lack training in presentation skills, "but ASU completed my training."

Yang is now working at Qualcomm in San Diego on the next generation modem for future wireless communication devices.

"The Internet has changed people's lives in many aspects. Now we are trying to connect common objects, like your vehicle, air conditioner, house, or even the city infrastructure to the Internet," he said. "I believe the Internet of Things will greatly change the world in the near future. I want to contribute to it by engineering."

Yang said he is very proud of his parents, "who have fought through numerous difficult times in their lives and raised me in the best way they could. I am grateful to them for fostering my interests in science and engineering. Their unconditional love and sustained support has and will always motivate me to move forward."

Brett Larsen conducts research at ASU's Flexible Electronics and Display Center.

Brett Larsen chosen as Spring 2015 Outstanding ASU Undergraduate Engineering Student

Each spring and fall semester special recognition is bestowed upon high-achieving and exemplary students graduating from ASU's Ira A. Fulton Schools of Engineering. Faculty members select one undergraduate student from each engineering degree program.

Brett Larsen was chosen as the outstanding undergraduate from the School of Electrical, Computer and Energy Engineering.

Larsen's interest in engineering was inspired by science fiction. He wanted to develop futuristic technology that would improve lives, and chose electrical engineering because he was interested in circuit design and physics.

To say Larsen is bright, motivated and hard working is a bit of an understatement. Before he came to ASU, Larsen knew he was looking for experiences beyond the classroom. He wanted to get involved in research as soon as possible, and he had heard professors in engineering could provide him that opportunity and mentor him along the way.

He started research at ASU's Flexible Electronics and Display Center his freshman year as part of the Fulton Undergraduate Research Initiative (FURI), and his work on signal processing soon led to a paper presentation at SPIE's Defense, Sensing, and Security Conference. His latest project was working on electric and magnetic field imaging, "potentially using flexible electronics," Larsen said. "The main goal is to be able to quickly detect and disarm explosives by being able to image currents and voltages in a circuit."

After his sophomore year, Larsen interned at Sandia National Laboratories as a member of the lab's custom circuit design group. It was there that his path took a turn.

"I enjoyed working at a large national laboratory, but I realized that my interests lay outside of pure circuit design the day I took a tour of the Z-machine where one of our ultra-fast imaging arrays was to be used," he said. "The facility sparked my interest in participating in large collaborations in the pursuit of new physics. This inspired me to add a major in physics and apply to work at CERN [the European Council for Nuclear Research]."

The following summer Larsen conducted research at CERN in Geneva, Switzerland, as one of only 15 U.S. undergraduates. He said it was his "most rewarding experience."

"It hosts the Large Hadron Collider (LHC), the world's largest particle accelerator, and I had the opportunity to work with physicists and engineers on developing advanced detector technology for future runs of the LHC," said Larsen.

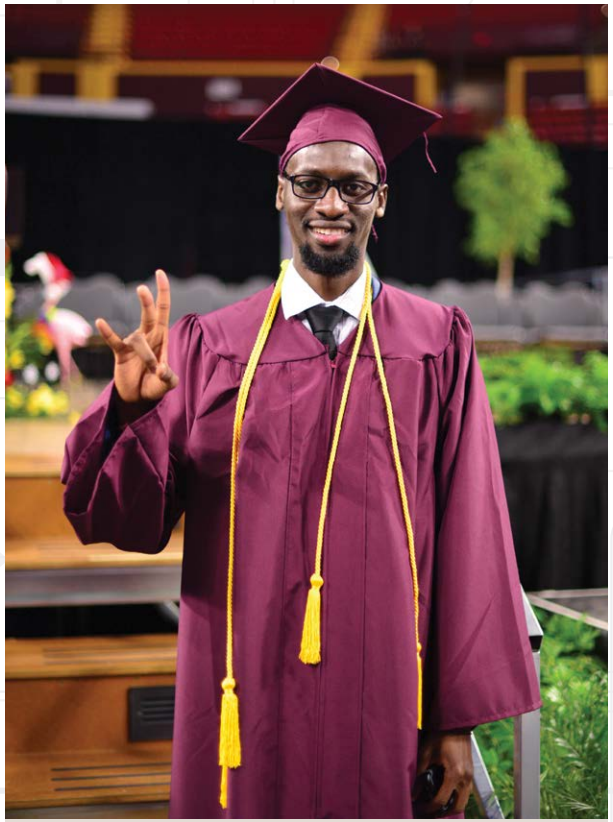
"I also had the opportunity to work with students from around the world, attend lectures by some of the foremost experts in particle physics, and travel around Europe on the weekends. It was an incredible experience."

During his time at ASU, Larsen received the Daniel Zusman Scholarship for Engineering Excellence, the Gary and Diane Tooker Scholarship for Engineering, the International Switching Symposium Endowed Scholarship, and the Dean's Exemplar Student Award. He also was recently awarded the Goldwater Scholarship, the nation's premier award for undergraduates studying science, math and engineering.

Larsen points to professors David Allee, Michael Goryll and Antonia Papandreou-Suppappola as his most influential teachers and mentors.

In addition to his classes and research, Larsen found a variety of co-curricular opportunities at ASU. He has worked as an engineering peer mentor in the honors residential community and led a science club at a local elementary school. He also was a member of the Barrett Choir.

Larsen is now pursuing a doctorate in physics at Stanford University. His goal is a career that combines computational physics research, science and technology policy, and U.S. science education.



Ibrahima Diop, from Senegal, graduated in December, earning a degree in electrical engineering, as ASU's first undergraduate MasterCard Foundation Scholar.

Diop is ASU's first undergraduate MasterCard Foundation Scholar to graduate

It's a question that lingered in a young boy's curious mind: Why do the lights go off?

That boy, Ibrahima Diop, grew up in the West African nation of Senegal. Electricity was a scarce resource and power outages are frequent.

"I would watch the lights go off, and I just needed to figure out why," Diop said. "That is how my fascination with electricity began."

Diop looked back at that time as he prepared to graduate from Arizona State University with his degree in electrical engineering. It was a distinctive path that brought him here, made possible by the MasterCard Foundation Scholars Program.

The program is a $500 million, 10-year initiative to educate and prepare young people — particularly from Africa — to lead change and make a positive social impact in their communities. Africa as a continent has the world's youngest population with 62 percent under the age of 25. Its economy is flourishing and in need of skilled workers, yet it faces the lowest secondary and university education enrollment rates.

ASU is one of the universities in the program, with 70 MasterCard Foundation Scholars currently enrolled, 22 in engineering. Diop was among the first class in 2012, and is the first undergraduate student to graduate.

A good student with an interest in math and science, Diop was focused on going to college. He looked toward the United States, which he knew had good schools, and having an uncle in Arizona made the Valley of the Sun a good place to call his second home.

Before he became a Sun Devil, Diop attended Chandler-Gilbert Community College (CGGC), where he earned his associate degree in applied science in engineering technology.

Though he did not know the English language when he arrived — Senegal being a French-speaking country — he would excel as both scholar and athlete.

"The language barrier, yes, that was a challenge," Diop said. "How do you exchange ideas? And it would take me two, three times as long to understand math word problems."

Diop overcame challenges of language — he now speaks fluent English — the Arizona heat and a new culture, to become an Academic All-American on CGGC's soccer team with a 3.7 grade point average.

With a desire to continue his education, Diop learned of the MasterCard Foundation Scholars Program, and the Fulton Schools was a perfect fit.

He credits Bassam Matar, an instructor in ECEE and engineering professor at Chandler-Gilbert Community College, for his guidance, advice, and for "being a good father figure" who helped him excel and reach his goals.

Along the way, Diop learned why the lights went out. He learned what it takes to turn a fuel source, such as coal or solar power, into electricity and how complicated and fascinating it is to transmit and distribute the power.

"The Senegal power plants were set up by the French during colonization and they are outdated," said Diop. "It is fixable. But it can't be just one or two people. You need political leadership, knowledgeable people, and an economic structure that is viable."

The future of Senegal, and Africa, is in the hands of young people like Diop, who will return home to contribute and hopefully lead change. The MasterCard Foundation Scholars program, he said, is a "wonderful program that brings like-minded, ambitious people together who could be potential leaders of Africa. We will stay connected and who knows where we will end up. Only borders separate us."

Looking back, could he ever have imagined he would be a college graduate and an engineer?

"If I use the situation I was in, what my eyes were telling me, there is no way for this to happen. All the reasons were there for me to fail," Diop said. "I have a strong belief that God always provides a way out, as long as you are doing the right thing."

ASU student satellite group aims for space

The Sun Devil Satellite Laboratory — an active student organization that fields competitive teams and engages in outreach for K-12 students — traveled to Texas for the CanSat Competition organized by the American Astronautical Society and the American Institute of Aeronautics and Astronautics. They finished 26th among 59 student teams from around the world.

The competition involved designing, building and launching an atmospheric re-entry container — a small one, roughly the size of standard soda can or lemonade mix container, hence the title CanSat for can satellite.

It involved "simulating reentry through the atmosphere with something important on board, like a super-complicated egg-drop experiment," said SDSL vice president Bryan Sonneveldt, an aerospace engineering student with a concentration on astronautics.

Each team's CanSat — carrying a hen's egg as a payload — was placed inside a rocket and launched upward about 1,000 meters. The rocket then separated and released the CanSat. The goal was to return the CanSat and the egg to the ground intact.

Along with Sonnenveldt, the SDSL CanSat team members were: electrical engineering students Raymond Barakat, Zach Burnham and Miao Tang; aerospace engineering students Heather Zunino, Sarah Smallwood and Ryan Teves; mechanical engineering student Jana Devries; and astrophysics student William Merino.

SDSL has several ongoing projects. They include construction of a vacuum chamber and a plasma pulse thruster that will be tested inside the chamber, and a CubeSat project in collaboration with ASU's School of Earth and Space Exploration that will produce a small satellite capable of being launched into space.

The group also plans to build and operate a small satellite attitude control system test bed for testing a satellite pointing system. Such a system controls the direction in which a satellite is oriented to observe certain areas, send and receive signals, rotate for stability, and point solar panels toward the Sun.

SDSL has about 15 active members — including students majoring in electrical and computer systems engineering, aerospace engineering, mechanical engineering, and astrophysics.

The Sun Devil Satellite Laboratory outreach program provides a hands-on introduction to engineering.

Doctoral graduates 2014–2015

Fall 2014

Mahmoud Khdour, Integrated On-chip Magnetic-Core Inductors with Externally Applied Magnetic Field for RF and Power Applications, Chair: Hongbin Yu

Prasanna Sattigeri, Exploring Latent Structure in Data Algorithms and Implementations, Chair: Andreas Spanias

Hanshuang Liang, Highly Sensitive in-Plane Strain Mapping Using a Laser Scanning Technique, Chair: Hongbin Yu

Qian Xu, Spatial and Multi-temporal Visual Change Detection with Application to SAR Image Analysis, Chair: Lina Karam

Meng Zhou, Multiple Detection and Tracking in Complex Time-Varying Environments, Chair: Antonia Papandreou-Suppappola

Brian O'Donnell, Biology-Based Matched Signal Processing and Physics-Based Modeling For Improved Detection Applications, Chair: Antonia Papandreou-Suppappola

Derek Caselli, Design and Fabrication of Monolithically-Integrated Laterally-Arrayed Multiple Band Gap Solar Cells using Composition-Graded Alloy Nanowires for Spectrum-Splitting Photovoltaic Systems, Chair: Cun-Zheng Ning

Michael DiNezza, Monocrystalline ZnTeCdTeMgCdTe Double Heterostructure Solar Cells, Chair: Yong-Hang Zhang

Nafati Aboserwal, Gain and Loss Factor for Conical Horns, and Impact of Ground Plane Edge Diffractions on Radiation Patterns of Uncoated and Coated Circular Aperture Antennas, Chair: Constantine Balanis

Joseph T. Smith, Flexible Electronics and Display Technology for Medical, Biological, and Life Science Applications, Chair: David Allee

Shankar Thirunakkarasu, Self-Calibration and Digital Trimming of Successive Approximation Analog-to-Digital Converters, Chair: Bertan Bakkaloglu

Rui Tang, Development of Deformable Electronics using MEMS based Fabrication Technologies, Chair: Hongyu Yu

Spring 2015

Brian Proulx, Social Structure in Wireless Networking: Modeling and Utility, Chair: Junshan Zhang

Xiaowen Gong, Socially-Aware and Security-Driven Design and Optimization in Cyber-Physical Systems, Chair: Junshan Zhang

Mohit S. Shah, Context Recognition Methods using Audio Signals for Human-Machine Interaction, Co-chairs: Andreas Spanias and Chaitali Chakrabarti

Sandeep Shambhulingaiah, Methodical Design Approaches to Multiple Node Collection Robustness for Flip-flop Soft Error Mitigation, Chair: Lawrence Clark

Houssam Y. Abbas, Test-based falsification and conformance testing for Cyber-Physical Systems, Co-chairs: Andreas Spanias and Chaitali Chakrabarti

Akshay Shashikumar Korad, Robust Corrective Topology Control for System Reliability and Renewable Integration, Chair: Kory Hedman

Brian Pierre, Algorithm and Model Development for Innovative High Power AC Transmission, Chair: Gerald Heydt

Fengyu Wang, Improving Reserve Requirements, Chair: Kory Hedman

Samuel Ebenezer, Sequential Monte Carlo Based Multiple Target Track-beforedetect, Chair: Antonia Papandreou-Suppappola

Adarsh Nagarajan, Model Development and Analysis of Districution Feeders with High Penetration of PV Generation Resources, Chair: Raja Ayyanar

Ketul Suturia, Modelling and Simulation Tools for Aging Effects in Scaled CMOS Design, Chair: Yu Cao

Ming Yang, In Support of High Quality 3-D Ultrasound Imaging For Hand-held Devices, Chair: Chaitali Chakrabarti

Summer 2015

Yang Feng, Solving for the Low-Voltage/Large-Angle Power-Flow Solutions by using the Holomorphic Embedding Method, Chair: Daniel Tylavsky

Youngdeug Kim, New Passive Methodology for Power Cable Monitoring and Fault Location, Chair: Keith Holbert

Srivatasan Chellappa, Radiation Hardened Clock Design, Chair: Lawrence Clark

Wei-Chieh Kao, Characterization of Silicon Carbide Metal Oxide, Chair: Michael Goryll

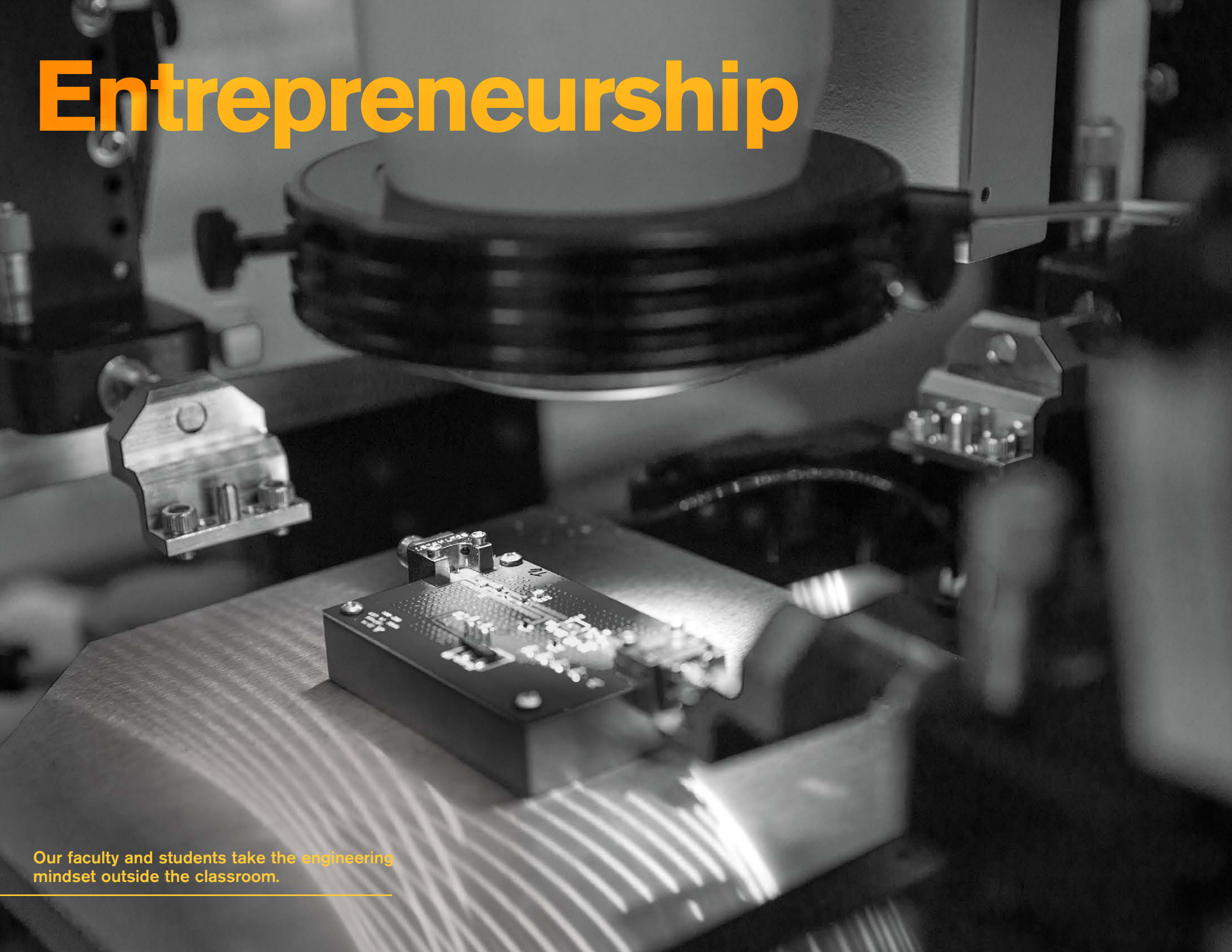
Bobo Liu, Conductance Fluctuations in GaAs Nanowires and Graphene Nanoribbons, Chair: David Ferry

Sunay Turkdogan, Growth and Characterization of Multisegment Chalcogenide Alloy Nanostructures for Photonic Applications in a Wide Spectral Range, Chair: Cun-Zheng Ning

Zhicheng Liu, Optical Characterization and Lasing Study of Nanowires, Chair: Cun-Zheng Nin

Xiaowen Gong was chosen as the 2014–2015 winner of the Palais Outstanding Doctoral Student Award.

Entrepreneurship



Our faculty and students take the engineering mindset outside the classroom.

Professor Michael Kozicki has more than 80 U.S. and international patents.

Kozicki named National Academy of Inventors fellow

Arizona State University electrical engineering professor Michael Kozicki has been named a fellow of the National Academy of Inventors (NAI).

Election to the academy's fellow status is a high professional distinction accorded to academic inventors who have demonstrated a prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development and the welfare of society.

The academic inventors and innovators elected to the rank of NAI Fellow are named inventors on U.S. patents, and were nominated by their peers for outstanding contributions to innovation in areas such as patents and licensing, innovative discovery and technology, significant impact on society, and support and enhancement of innovation.

Kozicki is a professor of electrical engineering, a member of the honors faculty, and director of the Center for Applied Nanoionics. He joined ASU in 1985 from Hughes Microelectronics and has maintained strong industrial ties since.

Although he is best known as the inventor of Conductive Bridging Random Access Memory (CBRAM®), an ultra-low energy data storage technology being commercialized by several companies, his more than 80 U.S. and international patents also include inventions ranging from a cleanroom wheelchair to bio-inspired optical devices. Kozicki's patents have been cited more than a thousand times and are ranked in the top tier by independent intellectual property organizations.

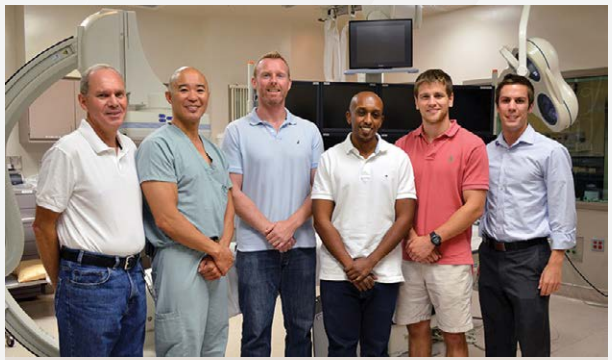
Kozicki also is a founder of Axon Technologies Corp. and Idendrix, Inc., served as chief scientist of Adesto Technologies during the early development of CBRAM®, and has been a visiting professor at the University of Edinburgh in the United Kingdom for the past decade. He is also a Chartered Engineer, the UK/EU equivalent of the professional engineer (PE) designation in the United States.

Kozicki has served as interim and founding director of entrepreneurial programs and director of the Center for Solid State Electronics Research in the Fulton Schools. He has published extensively, developed entrepreneurship-infused undergraduate and graduate courses in solid state electronics, is a frequent invited speaker at international meetings, and has made several television appearances to promote public understanding of science.

"Dr. Kozicki exemplifies the innovative and entrepreneurial spirit of faculty and researchers at ASU. He has made outstanding contributions to his field, economic development and society," said Sethuraman "Panch" Panchanathan, senior vice president for Knowledge Enterprise Development at ASU. "It is a great honor to have the NAI recognize his innovative and use-inspired work."

Those named this year bring the total number of NAI Fellows to 414, representing more than 150 prestigious research universities and governmental and non-profit research entities.

Innovative medical device modeling software sparks tech startup



The EndoVantage startup team includes (from left) healthcare entrepreneur Robert S. Green, Mayo Clinic physician Brian Chong, ASU Associate Professor David Frakes, ASU postdoctoral research associate Hiathem Babiker, research intern Nick Pracht, and ASU biomedical engineering doctoral student Justin Ryan.

ASU spinout promises global market impact

A business startup formed to commercialize technology developed by an Arizona State University professor and his students won an Arizona Innovation Challenge award from the Arizona Commerce Authority (ACA), the state's leading economic development agency.

Recipients of the award "represent innovative Arizona entrepreneurs who are creating technological solutions with the potential for global impact," the ACA said.

The award brought the company, EndoVantage, a grant of $250,000 to support development of its business operations.

The venture is based on a novel software platform that simulates the effects of deploying small medical devices (stents, for example) into blood vessels, as well as simulating the resulting blood flow changes.

In 2013, EndoVantage received a $100,000 grant from the Center for Individualized Medicine at Mayo Clinic and the Office of Knowledge Enterprise Development at Arizona State University. The competition, which included 20 ASU and Mayo Clinic teams, was intended to promote personalized healthcare, the next frontier in patient-specific medicine.

David Frakes and Haithem Babiker invented the EndoVantage technology platform in ASU's Image Processing Applications Laboratory, with help from Brian Chong, a physician at Mayo Clinic Hospital in Phoenix.

Frakes is the chief science office for EndoVantage. He is an associate professor in both ECEE and the School of Biological and Health Systems Engineering.

Babiker is the chief technology officer. He is a postdoctoral research associate in the School of Biological and Health Systems Engineering.

Justin Ryan, a biomedical engineering doctoral student working in Frakes' lab, is contributing to EndoVantage by providing 3D virtual modeling of blood vessels.

With the EndoVantage platform, clinicians "now for the first time can design the optimal endovascular treatment strategy for each patient before surgery," Frakes said. "This improves the quality of treatment and reduces costs."

The technology will also enable medical device companies to perform virtual testing of medical devices in hundreds of different virtual patient anatomies. That capability will help improve product design and prevent product defects and other risks to patients, Frakes said.

"Ultimately, the EndoVantage technology will lead to better medical devices, and better use of those devices in the clinic to save patients' lives," he said.

The spinout of EndoVantage from ASU was facilitated by Arizona Technology Enterprises (AzTE), ASU's technology transfer organization. AzTE has worked with Frakes' team throughout the process from commercialization to startup and revenue generation.

Longtime Arizona healthcare entrepreneur Robert S. Green joined the venture as president and chief executive officer. Green founded and operated six successful companies and is past president of the Arizona BioIndustry Association.

"ASU is on the leading edge of universities supporting research commercialization efforts by faculty," Green said. "The support we have received from AzTE and the Entrepreneurship and Innovation Group has been critical to our success to date."

Online engineering student starts venture, begins entrepreneurial fellowship

As an electrical engineering student with a knack for entrepreneurship, Andrew Ninh said his life is "developing a startup company by day and finishing coursework by night."

Ninh manages this lifestyle by pursuing his bachelor's degree completely online, a delivery mode offered to electrical engineering students at ASU. A Southern California native, Ninh is working on his studies from Fountain Valley, California.

Medical incident spurs entrepreneurial venture

A year and a half ago, Ninh spent the night of his high school graduation in intensive care after he experienced spontaneous pneumothorax, what Ninh describes as "[his] lung exploding."

Ninh's observations at the hospital were the basis for his emerging health informatics startup company known as DocBot, which enables physicians to make well-informed decisions about patient care — quickly.

Andrew Ninh (left) with business partner Tyler Dao at the Texas Christian University¹s Richards Barrentine Values and Ventures® Business Plan Competition. Photo courtesy of Andrew Ninh.

The technology runs rapid analytics on electronic health records and clinical sources providing physicians with quick and accurate data.

"DocBot removes technical obstacles by sorting, compiling and analyzing a wealth of patient knowledge that only a computer could realistically take on," said Ninh.

Working with his business partner Tyler Dao, a high school friend and computer science student at California State University, Long Beach, Ninh has been accumulating funding for DocBot.

DocBot earned a $5,000 stipend from Microsoft after Ninh's participation in the Microsoft Idea Camp last summer. The funding is being used to enable further technological developments in the area of user experience.

DocBot was also accepted to Singularity University's Startup Lab Accelerator Program. When the program began in September, Ninh received $100,000 in seed funding and a 10-week experience on the Singularity University campus in Silicon Valley where he will further develop DocBot alongside the Startup Lab Accelerator team.

Awarded prestigious Silicon Valley-based fellowship

Ninh also was selected as a 2015 Kleiner Perkins Caufield and Byers (KPCB) Engineering Fellow — a fellowship recently ranked in the Top 10 Best Overall Internships of 2015 by Vault.

The KPCB Engineering Fellowship received more than 2,500 applications from more than 200 universities, and Ninh was among the 61 students chosen from 30 schools including Harvard University, Massachusetts Institute of Technology, Princeton, Johns Hopkins, Cornell and Stanford. He is the first ASU student to achieve this prestigious engineering fellowship.

KPCB is a venture capital firm in Silicon Valley and the KPCB Fellows Program pairs top engineering students with leading startups in Silicon Valley for summer internships.

Starting this summer, Ninh will be working full-time with Zephyr Health, a data analytics company based in San Francisco. Ninh interviewed with a variety of companies, but Zephyr Health was his first choice. "They provide data intelligence and insights on life science data, such as clinical trials, which is very compatible with my work for DocBot," said Ninh.

As a KPCB fellow, Ninh's industry experience is supplemented with events and programming led by CEOs and executives from KPCB portfolio companies and KPCB Partners including Mike Abbott, Twitter's former vice president of engineering and John Doerr, a legendary venture capitalist who is well-known for helping to build Amazon, Google, Twitter and other companies.

Leveraging Fulton Schools resources

Ninh said he chose ASU because of its "progressive pedagogy" and the "breadth of its curriculum."

Though a lot of his research interests deal directly with computer science, Ninh chose to study electrical engineering because it pushes him to understand the hardware side of things.

"I think future success relies on being able to produce both the best of software and the best of hardware," said Ninh.

In addition, Ninh is working with the Fulton Schools Startup Center to receive additional support for DocBot.

"Like Andrew, some of our student entrepreneurs have never physically visited ASU, but have accessed classes and support services in innovative ways," said Brent Sebold, director of the Fulton Schools Startup Center.

More important than being on campus, Sebold distinguishes student entrepreneurs by their commitment to "ASU's distinct changemaking culture."

"Andrew isn't satisfied with simply passing classes and completing his degree online. He wants to change the world for the better and that's what being an ASU student is all about," said Sebold.

When asked what it takes to be both an engineer and an entrepreneur, Ninh said, "I like synthesis, particularly combining different ideas and disciplines to create value. Some call this engineering, some call it entrepreneurship, but for me it's always been, and will continue to be, a little bit of both."

Education innovation

ECEE students use the virtual lab to assemble physical circuits. The virtual lab implements a suite of instruments that is functionally similar to the instruments in a traditional lab.

Web-delivered education is a huge success as undergraduate electrical engineering program as enrollment surges

A small group of faculty began discussions in 2011 about how engineering undergraduate degrees might be offered to remote students. Initially, they surveyed approaches ranging from MOOCs (Massive, Open, Online Courses) to typical online "lecture-capture," as well as the studio-based online courses being developed at Arizona State University in other disciplines.

The discussions progressed to the launch in 2013 of the first ABET-accredited fully online undergraduate program in electrical engineering in the world. The program serves students — many who are older, raising families, working, or in the military — whose needs have not be met by other academic offerings. Enrollment has surged to more than 800 students in two years and is fast approaching the number of students enrolled in face-to-face classes.

This educational initiative goes well beyond the traditional offering of classes for remote students, and is attempting to define a new educational approach directed to the whole body of students, independent of their geographic location.

In this Q&A, School Director Stephen Phillips (S.P.) and Professor Marco Saraniti (M.S.) director of Web-delivered education in ECEE, discuss the program's development and success.

Q. How is your program unique?

S.P. We do not segregate online and face-to-face students; we don't have two programs. We have one program with one accreditation and one body of instructors available in different delivery systems — solely online, in a hybrid online-classroom format, and in a traditional classroom setting. This is the main novelty of our approach.

M.S. Indeed, some of the courses are Web-delivered also to resident students who elect not to go to a physical classroom and to manage their study time autonomously. The only difference is that the resident students take their exams on campus, while the remote students use a proctoring service.

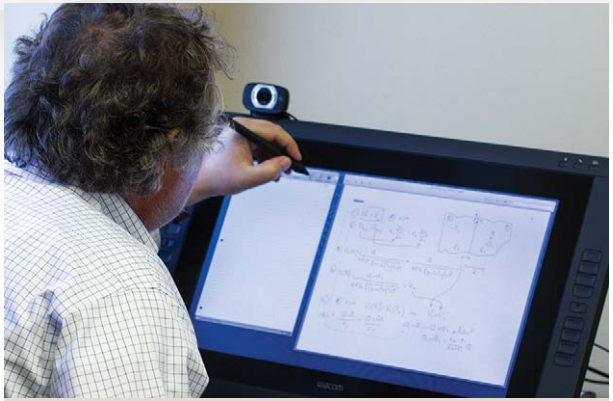
Q. You mentioned the novelty of your approach. What are the main differences from the MOOCs or the online programs offered elsewhere?

M.S. Most of the existing online programs tend to use modern technology to mimic the effect of traditional lecturing. In other words, they try to adapt new technology to a traditional delivery method. We do exactly the opposite. We design the instructional material around the new technology.

Q. Can you give an example?

S.P. For our introductory circuits course, the students purchase a commercially available lab kit that implements a suite of instruments on their laptops that is functionally similar to the instruments in our traditional physical lab. It also has a proto-board, where they assemble physical circuits identical to those of the resident students. This approach has been so successful that some of our resident students also want to do the labs at home rather than coming to campus for a scheduled lab session.

M.S. In another example, Professor Trevor Thornton just received a grant to acquire a remotely controllable electron microscope. I am working with him to prepare an instructional module on electron microscopy. Remote students will first watch videos explaining the theory and practice of electron microscopy. They will then purchase a rather inexpensive kit of



Marco Saraniti, professor, was one of a small group of faculty that started the first four-year, ABET-accredited fully online undergraduate electrical engineering program in the nation.

chemicals that will allow them to produce samples with suspensions of different nanoparticles.

The samples will be mailed to the lab, where a teaching or lab assistant will physically load the samples in the microscope. The student will then be able to remotely control the microscope, in real time, through a Web interface, and see the images of the nanoparticles they produced. Most of the lab instrumentation today has remote control capability. We can leverage our lab assistants to prepare the lab setup for remote students, as well as the resident students. This approach is completely different than putting a webcam in the back of a laboratory. The whole instructional module is built around the technology, not vice-versa.

Q. How do office hours work?

M.S. For many courses, they are administered using Web-conferencing software for all students, remote and resident. As mentioned, we tend to use the same technology whenever possible. Obviously, resident students can meet their instructors in person, but many prefer the flexibility of Web-conferencing software. And so do the instructors, who are not bound to their offices. We equip our instructors with portable

computer tablets so that they can communicate with the students from anywhere, provided they have a Wi-Fi connection.

Q. Isn't Web conferencing limited? How do you describe a technical diagram, or an equation?

M.S. The instructor shares the screen of the tablet with the student, who can see in real time what the instructor sees and writes on the screen with a stylus. At the end of the session, the handwritten electronic pages are saved in a PDF file that is transferred to the student. During the whole session, both student and instructor can see and talk to each other. This can be more efficient and accessible than meeting in person, and it can be done from anywhere.

Q. How have faculty received the new program?

S.P. I'm happy to report that the program has been received positively by many of our faculty. Our faculty members participating in online instruction have voluntarily performed the relatively lengthy process of developing the instructional material for Web delivery. As we mentioned, this is not a lecture capture, but a separately designed approach to deliver the material via the Web with high production value.

ASU's EdPlus offers an excellent infrastructure for development, including access to instructional design professionals. EdPlus also provides a financial reward, which is augmented by our school. Most importantly, the quality and the commitment related to course development could not be done without a high level of voluntary participation of the faculty.

MS. More quantitatively, the development of an individual course can take from 400 to 800 hours of work. This is a significant effort that could not be imposed on our instructors. They do it because they believe in the added value of the program.

Q. Can you elaborate on the "added value" of the program?

M.S. The basic idea of our approach is not to use technology to obtain results similar to those achieved by traditional lecturing. The idea is to use technology to do a better job than with traditional lecturing.

We are trying to achieve two main goals: 1) implement a better process of knowledge transfer, and 2) do it in a more scalable way. In other words, we want to serve more students and we want to do it more effectively than with traditional face-to-face lectures. This approach is not new. The idea of conjugating access and excellence is the intellectual foundation of ASU's New American University paradigm.

S.P. Another important feature is related to the demographics of our remote students. They are, on average, somewhat older than the resident students, and they are mostly transfer students with some college experience. A high percentage of them are working, and more than a third of them are active military or veterans. So we are serving a segment of the population that has been historically neglected by traditional higher education institutions. You can see how an appropriate use of technology can be instrumental to providing access to knowledge to a broader audience of students than a traditional delivery.

Q. Did you find any major problems along the way?

M.S. Dozens — this is not an easy task. For example, the educational material needs to be reorganized around the medium and its delivery means. This translates into hundreds of hours of work for each course. This initial investment is arduous, and there's no alternative to it. We don't want to put a webcam in the back of a class and produce a subpar product.

At present we have fewer than 20 people in ECEE involved part-time in the project. This includes support staff, the faculty members who develop the material and the ones who deliver the material by actually teaching the classes. The size of this body of educators will increase quickly, and we will have to implement standards for quality control. This is tricky because the novelty of the approach implies the determination of new metrics to assess its effectiveness. However, the new metrics need to be compatible with the ones currently in use for accreditation purposes.

S.P. Another issue is that, while the process of knowledge-transfer is scalable — meaning that we can deliver a course to more students with the same effort — the advising process does not scale. It's actually less efficient than for the resident students due to the diverse background of these students and the rigorous process for awarding transfer credit. This introduces complexity for our undergraduate advisors and is requiring additional resources.

Q. Why now? Why ASU?

M.S. The traditional approach to higher education is becoming unsustainable. The cost is skyrocketing, while the promise of improving the life of young people through knowledge is less and less certain. A university is a place that does one thing in two steps: generating knowledge and transferring it to students. The traditional approach to this mission is getting progressively less effective and more expensive. This is the reason for the urgency.

S.P. There is a very direct answer to the "Why us?" question. If there is a place where a program like this can be developed effectively, that place is ASU. We have a proud tradition in the introduction of innovative and sometimes unorthodox approaches to higher education. We were the first to prove that it is possible to increase the quality of the services we offer while simultaneously increasing the quantity of people we service. That's what we are, that's what we do.

Faculty expertise

Assistant Professor Lalitha Sankar, right, works with students.

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James T. Aberle received his bachelor's and master's degrees in electrical engineering from the Polytechnic Institute of New York (now Polytechnic University) in 1982 and 1985, respectively, and his Ph.D. in electrical engineering from the University of Massachusetts in 1989. From 1982 to 1985, he was employed by Hazeltine Corporation, Greenlawn, New York, 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, and is currently an associate professor of electrical engineering. His research interests include the design of radio frequency systems for wireless applications as well as the modeling of complex electromagnetic phenomena. In addition to his position as a faculty member at ASU, Aberle has 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).

Expertise: antennas, microwave and RF electronics, signal and power integrity

Selected publications

Bensalem, Brahim, and Aberle, James T., "A New High-Speed Memory Interconnect Architecture Using Microwave Interconnects and Multicarrier Signaling", IEEE Transactions on Components, Packaging and Manufacturing Technology, vol. 4, no. 2, Feb. 2014, pp. 332-340.

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David R. Allee is a professor of electrical engineering at Arizona State University. He has fabricated nanometer scale devices and invented several ultra-high resolution lithography techniques. Allee is currently the director of research for backplane electronics for the Flexible Display Center (flexdisplay.asu.edu) funded by the Army, and he is investigating a variety of flexible electronics applications with a focus on large area sensing arrays for radiation detection and electric and magnetic field imaging. He has been a regular consultant with several semiconductor industries. He has co-authored over 125 archival scientific publications and U.S. patents.

Expertise: flexible electronics, large area sensing arrays, VLF electric and magnetic fields, fundamental and external electrical noise, nuclear amplifiers, nanometer scale device and nanofabrication

Honors and distinctions: Consistently Top 5% of Teachers Award (2012 & 2015); Best Teacher Award, College of Engineering (2008); Young Faculty Teaching Excellence Award, College of Engineering (1994/1995); Chair of Flexible Electronics Conference at SPIE Defense, Security and Sensing (2013); Guest Editor for special issues of Journal of Display Technology and Sensors (online); Custom Integrated Circuits Conference, Technical Program Committee (2001-2005); Educational Session Chair (2005); and Analog Sub-committee Chair (2005).

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Rajapandian Ayyanar joined the Arizona State University faculty as an assistant professor in August 2000. He received a bachelor's degree in electrical engineering from P.S.G. College of Technology, India in 1989, a master's degree 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 100 journal and conference papers in the area of power electronics and renewable energy integration and holds five U.S. patents. Ayyanar was awarded the ONR Young Investigator Award in 2005.

Expertise: power electronics, DC-DC converters, power management, power conversion and control for renewable energy interface, especially PV and wind, electric vehicles, motor drives

Selected publications

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Bertan Bakkaloglu joined the Arizona State University faculty in August 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 the General Chair for 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.

Expertise: analog, RF and mixed-signal IC design, integrated power management circuits for high reliability applications, self-test and calibration of high reliability circuits, biomedical and chemical instrumentation ICs

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Constantine A. Balanis joined the electrical engineering faculty in 1983 and is now an ASU Regents' Professor. He has published over 150 journal papers, 260 conference papers, 12 book chapters, nine 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.

Expertise: computational electromagnetic methods (FDTD, FEM, MoM, GO/GTD/UTD, PO/PTD) for antennas and scattering, flexible and conformal antennas and high impedance surfaces, RCS reduction techniques, ferrite-loaded non-uniformly biased CBS antennas, smart/adaptive antennas for wireless communications

Honors and distinctions: ASU Regents' Professor; Honorary Doctorate, University of Thessaloniki (Greece); IEEE Life Fellow; IEEE Third Millennium Medal; IEEE AP Society Distinguished Achievement Award; IEEE AP Society Chen-To Tai Distinguished Educator Award; Ohio State University Distinguished Achievement Alumnus Award; LAPC James R. James Lifetime Achievement Award (UK); ASU Outstanding Graduate Mentor Award; ASU School of Engineering Graduate Teaching Excellence Award; ASU College of Engineering Distinguished Achievement Award; IEEE Region 6 Individual Achievement Award; IEEE Phoenix Section Professionalism Award.

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Hugh Barnaby joined the ASU faculty in 2004. Prior to coming to ASU, 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-enabled compact modeling, and memristor technologies and applications. He has been an active researcher in the microelectronics field for 18 years in both industry and academics, presenting and publishing more than 100 papers during this time.

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

Honors and distinctions: ONR Faculty Research Fellow; Senior Member IEEE; Session Chairperson, IEEE IRPS (2008), RADECS conference (2005, 2011), IEEE NSREC (2002, 2014); Short Course Chairman, IEEE NSREC (2007); Poster Chairman, IEEE NSREC (2006); Short Course Instructor, NSREC (2005), RAEECS (2013); Arizona State University Circuits Group Chairman; IEEE Transactions on Nuclear Science Associate Editor.

Selected publications

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M. S. Ailavajhala, Y. Gonzalez-Velo, C. Poweleit, H. Barnaby, M. N. Kozicki, K. Holbert, D. P. Butt, and M. Mitkova, "Gamma radiation induced effects in floppy and rigid Ge-containing chalcogenide thin films," Journal of Applied Physics, vol. 115, pp. 043502-043502-9, 2014.

P. Dandamudi, M. N. Kozicki, H. J. Barnaby, Y. Gonzalez-Velo, M. Mitkova, K. E. Holbert, M. Ailavajhala, and W. Yu, "Sensors Based on Radiation-Induced Diffusion of Silver in Germanium Selenide Glasses," IEEE Transactions on Nuclear Science, vol. 60, pp. 4257-4264, Dec 2013.

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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).

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Visar Berisha received his Ph.D. in electrical engineering from Arizona State University in 2007. From 2007 to 2009, he was a member of the technical staff at Massachusetts Institute of Technology Lincoln Laboratory, where he worked on signal processing for radar applications. Following his appointment at MIT, Berisha joined Raytheon Co. in 2009 as a principal research engineer where he was PI on a number of basic research activities in machine learning and signal processing. He has been a member of the faculty at ASU since fall 2013 with a joint appointment in the departments of Speech and Hearing Science and ECEE. The overarching goal of research conducted in his lab is to develop and apply new machine learning and statistical signal processing tools to better understand and model signal perception. With a focus on speech, the goal is to develop reliable, data-driven models that can mimic aspects of human cognition. Some recent projects include developing models of pathological speech perception, using natural language process to track cognitive-linguistic health, developing auditory perception models based on psychoacoustics and developing new machine learning tools for use with behavioral experiments. His research has been featured in the Science section of the New York Times, on National Public Radio and on a number of mainstream media outlets.

Expertise: statistical signal processing, speech perception and processing, psychoacoustics

Selected publications

A. Wisler, V. Berisha, A. Hero, and A. Spanias "Empirically Estimable Classification Bounds Based on a Non-parametric Divergence Measure," IEEE Transactions on Signal Processing. Accepted for Publication, August, 2015.

Y. Jiao, V. Berisha, M. Tu, and J. Liss, "Convex Weighting Criteria for Speaking Rate Estimation," IEEE Transactions on Audio, Speech, and Language Processing. Vol. 23, Issue No. 9, May 2015.

V. Berisha, S. Wang, A. LaCross, and J. Liss, "Tracking Discourse Complexity Preceding Alzheimer's Disease Diagnosis: A Case Study Comparing the Press Conferences of Presidents Ronald Reagan and George Herbert Walker Bush," Journal of Alzheimer's Disease. Vol. 45, Issue No. 3, 2015.

T. Schwedt, V. Berisha, and C. Chong, "Temporal Lobe Cortical Thickness Correlations Differentiate the Migraine Brain from the Healthy Brain," PLOS-ONE. Feb, 2015.

V. Berisha and A. Hero, "Empirical Non-Parametric Estimation of the Fisher Information," IEEE Signal Processing Letters, Vol 22, Issue No. 7, 2015.

V. Berisha and D. Cochran, "Active Data Labeling for Improved Classifier Generalizability," Signal Processing, October 2014.

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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.

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

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

Selected publications

R.P.S.M. Lobo; N. Bontemps; M.I. Bertoni; T.O. Mason; K.R. Poeppelmeier; A.J. Freeman; M.S. Park; J.E. Medvedeva, "Optical conductivity of mayenite: From insulator to metal," Journal of Physical Chemistry C. 2015;119(16):8849-8856.

B. Chen; H. Sahin; A. Suslu; L. Ding; M. I. Bertoni; F.M. Peeters; S. Tongay, "Environmental changes in $MoTe_2$ excitonic dynamics by defects-activated molecular interaction," ACS Nano. 2015;9(5):5326-5332.

D. P. Fenning; A. S. Zuschlag; J. Hofstetter; A. Frey; M. I. Bertoni; G. Hahn; T. Buonassisi, "Investigation of lifetime-limiting defects after high-temperature phosphorus diffusion in high-iron-content multicrystalline silicon," IEEE Journal of Photovoltaics. 2014;4(3):866-873.

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

Expertise: bio-compatible integration techniques for CMOS electronics/sensors, microfluidics and soft lithography, bio-MEMS, low power analog and mixed-mode circuits for bio-medical/analytical instrumentation, systems engineering focusing on multi-physics/multi-modal and feedback including neural, electrochemical and optical/fluorescence systems

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

Selected publications

Shah, S., Smith, J., Blain Christen, J., "Biosensing Platform on a Flexible Substrate", Sensors and Actuators B: Chemical, Vol. 210, pp. 197–203, April 2015

Smith, J., O'Brien, B., Lee, Y.K., Bawolek, E., Blain Christen, J., "Application of Flexible OLED Display Technology for Electro-Optical Stimulation and/or Silencing of Neural Activity" Journal of Display Techonology, Vol. 10, No. 6, pp 514–520, June 2014

Welch, D., Blain Christen, J., "Real-Time Feedback Control of pH within Microfluidics Using Integrated Sensing and Actuation" Lab on a Chip, Vol. 14, pp. 1191–1197, January 2014

Smith, J., O'Brien, B., Lee, Y.K., Bawolek, E., Blain Christen, J., "Application of Flexible OLED Display Technology for Electro-Optical Stimulation and/or Silencing of Neural Activity" Journal of Display Techonology, Vol. 10, No. 6, pp 514–520, June 2014

Welch, D., Blain Christen, J., "Seamless Integration of CMOS and microfluidics using Flip Chip Bonding" Journal of Micromechanics and Microengineering, Vol. 23, Issue 3, pp. 1-7, March 2013

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, March 2013

Wang, H., Luo, T., Lu, Z., Song, H., Blain Christen, J., "CMOS Self-Powered Monolithic Light-Direction Sensor with Digitized Output" Optics Letters, Vol. 39, No. 9, pp. 2618 - 2621, May 2014.

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Daniel Bliss is the director of the Bliss Laboratory for Information, Signals, and Systems (bliss.asu.edu), which brings together three researchers, eight doctoral, two master's and three undergraduate students. BLISS Lab currently has eight funded research programs. Bliss's research focuses on innovative system design based on information theory, estimation theory and statistical signal processing for the applications of adaptive wireless communications, remote sensing and physiological prediction. Bliss is also the director of the newly formed Center for Wireless Information Systems and Computational Architectures (wisca.asu.edu). During the 2014-2015 fiscal year, Bliss won four new research awards and one new phase for over $3 million. He 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. He also 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. In 2015 Bliss was named an IEEE Fellow and elected to the Radar System Panel of the IEEE AESS.

Expertise: adaptive multiple-input multiple-output (MIMO) wireless communications, distributed cooperative communications, full-duplex relays, MIMO radar, information theory, estimation bounds, channel phenomenology, statistical signal processing for anticipatory medical applications

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.

A. Sabharwal, P. Schniter, D. Guo, D. W. Bliss, S. Rangarajan, and R. Wichman, "In-band Full-duplex Wireless: Challenges and Opportunities," IEEE Journal on Selected Areas in Communication (JSAC), Sept., 2014.

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 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.

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John S. Brunhaver received a bachelor's degree in electrical and computer engineering from Northeastern University and a master's degree and Ph.D. in electrical engineering from Stanford University. In January of 2015 he joined ASU as an assistant professor of electrical computer and energy engineering. His current research focuses on the design of energy efficient computer architectures and the design automation techniques for implementing them. His thesis, written as a part of his Ph.D. work at Stanford University, is titled "The Design and Optimization of A Stencil Engine" and examines the procedural generation of hardware for image processing and image understanding.

Expertise: VLSI design, computer architecture, procedural hardware generation, computer vision accelerators, computer graphics hardware

Selected publications

Darkroom: Compiling High-Level Image Processing Code into Hardware Pipelines J Hegarty, JS Brunhaver, Z. DeVito, J. Ragan-Kelley, N. Cohen, S. Bell, A. Vasilyev, M. Horowitz, P. Hanrahan SIGGRAPH, 2014 41st International Conference and Exhibition on Computer Graphics and Interactive Techniques, 2014

FPU Generator for Design Space Exploration S Galal, O Shacham, JS Brunhaver, J Pu, A Vassiliev, M Horowitz Computer Arithmetic (ARITH), 2013 21st IEEE Symposium on, 25-34, 2013

Avoiding game over: Bringing design to the next level O Shacham, S Galal, S Sankaranarayanan, M Wachs, JS Brunhaver, A Vassiliev, W. Qadeer, S. Sankaranarayanan, A. Vassiliev, S. Richardson, M. Horowitz Design Automation Conference (DAC), 2012 49th ACM/EDAC/IEEE, 623-629, 2012.

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Kevin Cao joined the ASU faculty in 2004. He received a Ph.D. in electrical engineering in 2002 and a master's 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 200 articles, two books, eight book chapters and five patents. He has served on the technical program committee of many conferences and is an associate editor of the IEEE Transactions on CAD.

Expertise: physical modeling of nanoscale technologies, design solutions for variability and reliability, and neural-inspired hardware and algorithms for learning

Honors and distinctions: Best paper award, IEEE Computer Society Annual Symposium on VLSI (2012); Teaching excellence award, Ira. A. Fulton Schools of Engineering, ASU (2010, 2012, 2013, 2015); 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, 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).

K. B. Sutaria, A. Mohanty, R. Wang, R. Huang, Y. Cao, "Accelerated aging in analog and digital circuits with feedback," to be published in IEEE Transactions on Device and Materials Reliability.

D. Kadetotad, Z. Xu, A. Mohanty, P.-Y. Chen, B. Lin, J. Ye, S. Vrudhula, S. Yu, Y. Cao, J. Seo, "Parallel architecture with resistive crosspoint array for dictionary learning acceleration," IEEE Journal on Emerging and Selected Topics in Circuits and Systems, Special Issue on Solid-State Memristive Devices and Systems, vol. 5, no. 2, pp. 194-204, 2015.

Y. Cao, J. Velamala, K. Sutaria, M. S.-W. Chen, J. Ahlbin, I. S. Esqueda, M. Bajura, M. Fritze, "Cross-layer modeling and simulation of circuit reliability," IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, vol. 33, no. 1, pp. 8-23, January 2014.

J. B. Velamala, K. B. Sutaria, H. Shimuzu, H. Awano, T. Sato, G. Wirth, Y. Cao, "Compact modeling of statistical BTI under trapping/detrapping," IEEE Transactions on Electron Devices, vol. 60, no. 11, pp. 3645-3654, November 2013.

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.

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Junseok Chae received a bachelor's degree in metallurgical engineering from Korea University, Seoul, Korea, in 1998, and master's and Ph.D. degrees in electrical engineering and computer science from University of Michigan, Ann Arbor, in 2000 and 2003, respectively. He joined Arizona State University in 2005 as an assistant professor and is now an associate professor of electrical engineering. He has published over 100 journal and conference articles, six book chapters, one book and holds three U.S. patents. His areas of interests are MEMS (Micro-Electro-Mechanical-Systems) sensors/actuators, integrating MEMS with readout/control electronics and microdevices for bioenergy/biomedical applications. He received the first place prize and the best paper award in DAC (Design Automation Conference) student design contest in 2001. He received an NSF CAREER award on MEMS protein sensor array.

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

Honors and distinctions: NSF CAREER Award (2009); Best poster award in IEEE International Conference on Sensors (2007); First place prize and best paper, DAC (Design Automation Conference) Student Design Contest (2001)

Selected publications

H. Schwerdt, F. Miranda, and J. Chae, "Wireless Fully Passive Multichannel Recording of Neuropotentials using Photo-Activated RF Backscattering Methods," IEEE Transactions on Microwave Theory and Techniques, v. 63, n. 9, pp. 2965-2970, 2015

H. Ren, H. Tian, H. Lee, T. Park, F. Leung, T. Ren, and J. Chae, "Regulating the respiration of microbe: A bio-inspired high performance microbial supercapacitor with graphene based electrodes and its kinetic features," Nano Energy, v. 15, pp. 697-708, 2015

X. Zhang, W. Xu, and J. Chae, "A Temperature Compensation Concept for a Micromachined FBAR (Film Bulk Acoustic Resonator) Oscillator," IEEE Sensors Journal, v. 15, n. 9, pp. 5272-5277, 2015.

H. Schwerdt, U. Amjad, J. Appel, A. Elhadi, T. Lei, M. Preul, R. Bristol, and J. Chae, "In Vitro Hydrodynamic, Transient, and Overtime Performance of a Miniaturized Valve for Hydrocephalus," Annals of Biomedical Engineering, v. 43, n. 3, pp. 603-615, 2015

X. Zhang, H. Ren, S. Pyo, J. Lee, J. Kim, and J. Chae, "A High Efficiency DC-DC Boost Converter for a Miniaturized Microbial Fuel Cell," IEEE Transactions on Power Electronics, v. 30, n. 4, pp. 2041-2049, 2015.

H. Ren, S. Pyo, J. Lee, T. Park, F. Gittleson, F. Leung, J. Kim, A. Taylor, H. Lee, and J. Chae, "A High Power Density Miniaturized Microbial Fuel Cell Having Carbon Nanotube Anodes," Journal of Power Sources, v. 273, n. 1, pp. 823-830, 2015.

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Chaitali Chakrabarti received her B.Tech. in electronics and electrical communication engineering from the Indian Institute of Technology, Kharagpur, India, and her M.S. and Ph.D. degrees in electrical engineering from the University of Maryland, College Park. She is on the editorial board of IEEE JETCAS and an IEEE fellow.

Expertise: VLSI architectures for media processing and wireless communications, algorithm-architecture co-design of signal processing systems including medical imaging, low-power embedded systems, reliable memory system design

Honors and distinctions: Best Paper Awards in SAMOS (2007), MICRO (2008), SiPS (2010) and HPCA (2013); MICRO Top Picks (2007, 2010, 2014); Outstanding Educator Award, IEEE Phoenix section (2001); Ira A. Fulton Schools of Engineering Top 5% Award (2012, 2014); Distinguished Alumni Award, Dept. of Electrical and Computer Engineering, University of Maryland, College Park (2013); Fulton Exemplar Faculty Award (2014)

Selected publications

M. Yang, R. Sampson, S. Wei, T. F. Wenisch and C. Chakrabarti, "Separable Beamforming for 3-D Medical Ultrasound Imaging," IEEE Trans on Signal Processing, pp. 279-290, Feb 2015.

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, Feb 2013, Best Paper Award.

Y. Emre and C. Chakrabarti, "Energy and Quality-Aware Multimedia Signal Processing," IEEE Trans on Multimedia, pp. 1579-1593, Nov 2013.

B. Giridhar, M. Cieslak, D. Duggal, H.-M. Chen, R. Dreslinski, R. Patti, B. Hold, C. Chakrabarti, T. Mudge and D. Blaauw, "Exploring DRAM Optimizations for Energy-Efficient and Resilient Exascale Memories," Proceedings of the Supercomputing Conference, 23:1-23:12, 2013.

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, 2012:211, Sep 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.

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Lawrence T. Clark worked at Intel Corporation after receiving his bachelor's degree in computer science in 1983. While completing doctoral studies 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 re-joined Intel in 1992. Clark joined ASU in August 2004. Professor Clark has been awarded over 105 patents with approximately 15 pending. He has published over 120 peer-reviewed technical papers. He has about 20 years of industry experience in various aspects of VLSI, CMOS imager, microprocessor design, test engineering, as well as TCAD compact modeling. At Intel 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 also worked with SuVolta Inc. from 2009-2014, where he was chief architect.

Expertise: circuits and architectures for low power and high performance VLSI for harsh environments, CAD for VLSI

Honors and distinctions: Senior member, IEEE; Recipient of the Intel Achievement Award and multiple Intel divisional recognition awards; Best Paper Award, Int. Symposium on Low Power Design (ISLPED); 2013 Technical committee member for IEEE Custom Integrated Circuits Conference; Previous committee member for IEEE Nuclear and Space Radiation Effects Conference (NSREC) and Int. Symposium on Low Power Design (ISLPED); Previous associate editor, IEEE Transactions on Circuits and Systems II; Previous guest editor, IEEE Journal of Solid State Circuits and IEEE Transactions on Circuits and Systems I.

Selected publications

L. Clark, D. Zhao, T. Bakhishev, H. Ahn, E. Boling, M. Duane, K. Fujita, P. Gregory, T. Hoffmann, M. Hori, D. Kanai, D. Kidd, S. Lee, Y. Liu, J. Mitani, J. Nagayama, S. Pradhan, P. Ranade, R. Rogenmoser, L. Scudder, L. Shifren, Y. Torii, M. Wojko, Y. Asada, T. Ema, and S. Thompson "A Highly Integrated 65-nm SoC Process with Enhanced Power/Performance of Digital and Analog Circuits," Proc. IEDM, 2012.

R. Rogenmoser and L. Clark, "Reducing Transistor Variability for High Performance Low Power Chips," IEEE Micro, vol. 33, no. 2, March 2013.

L. Clark, S. Leshner and G. Tien, "SRAM Cell Optimization for Low AVT Transistors," Proc. ISLPED, 2013. Winner of Best Paper Award.

L. Clark, D. Patterson, C. Ramamurthy, and K. Holbert, "A Microprocessor Core Hardened by Microarchitecture and Circuit Techniques," IEEE Trans. Computers.," 2015.

S. Chellappa and L. Clark, "SRAM Based Unique Chip Identifier Techniques," IEEE Trans. VLSI Sys.," 2015.

S. Shambhulingaiah, C. Lieb, and L. Clark, "Circuit Simulation Based Validation of Flip-flop Robustness to Multiple Node Charge Collection," IEEE Trans. Nucl. Sci.," 2015.

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Douglas Cochran joined the ASU faculty in 1989. Between 2000-2005 and again from 2008-2010, 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 School of Engineering between 2005-2008. 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, as technical program co-chair for the 2015 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), and as general co-chair for the 1999 ICASSP 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 University of California San Diego and Massachusetts Institute of Technology.

Expertise: sensor signal processing, applied harmonic analysis, detection theory

Honors and distinctions: Fulbright Distinguished Chair in Science and Technology (2015-2016), Top 5% of Fulton School of Engineering Teaching Faculty Commendation (2007, 2013), U.S. Secretary of Defense Medal for Exceptional Public Service (2005), Engineering Teaching Excellence Award (1996-1997).

Selected publications

"Analysis of Fisher information and the Cramér-Rao bound for nonlinear parameter estimation after random compression," (with P. Pakrooh et al.), IEEE Transactions on Signal Processing, in press.

"Higher-dimensional coherence of subspaces," (with S. D. Howard and S. Sirianunpiboon), Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing, April 2015.

"Distributions of projections of uniformly distributed K-frames," (with S. D. Howard and S. Sirianunpiboon), Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing, April 2015.

"Active data labeling for improved classifier generalizability," (with V. Berisha), Signal Processing, vol. 108, pp. 272–277, March 2015.

"Operator-valued frames for the Heisenberg group," (with B. Robinson, W. Moran, and S. D. Howard), Journal of Fourier Analysis and Applications, March 2015.

"Optimal placement for barrier coverage in bistatic radar sensor networks," (with X. Gong, J. Zhang, and K. Xing), IEEE/ACM Transactions on Networking, vol. 99, October 2014.

Rodolfo Diaz

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During his 20 years in the aerospace industry, Rodolfo 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 faculty in 1998 as an associate professor of electrical engineering. Diaz is the former associate director of the Consortium for Metrology of Semiconductor Nanodefects, former interim director of the Consortium for Engineered Materials in the School of Materials at ASU. He also holds 27 patents ranging from the design of broadband radomes to the amplification of magnetic fields. From 2010 to 2012 he was on a part time IPA assignment to the Sensors Directorate, Meta-Electronics Branch, RYDM, WPAFB in Dayton, Ohio.

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

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

O'Donnell, B.; LeBaron, R.; Diaz, R.; Papandreou-Suppappola, A; "Physics-based sea clutter model for improved detection of low radar cross-section targets" 2014 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), p 6830-3, 2014

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Sebastian, T.; Clavijo, S.; Diaz, R.; Daniel, C.; Auckland, D.; "A new realization of an efficient broadband conformal magnetic current dipole antenna"; 2013 IEEE Antennas and Propagation Society International Symposium (APSURSI), p 1290-1, 2013

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David Ferry joined ASU in 1983 following positions at Texas Tech University, The Office of Naval Research and Colorado State University. He has published more than 800 articles, books and chapters and has organized many conferences.

Expertise: quantum effects in submicron semiconductor devices and nanostructures, general development of quantum transport in open systems

Honors and distinctions: Regents' professor at ASU; Fellow, Institute of Electrical and Electronics Engineering; IEEE Cledo Brunetti Award (1999); Fellow, American Physical Society; Fellow, IEEE; Fellow, Institute of Physics; 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, Semiconductors: Bonds and Bands (Institute of Physics Publishing, Bristol, UK, 2013).

D. K. Ferry, Fifty Years in the Semiconductor Underground (Pan Stanford Publishing, Singapore, 2015)

D. K. Ferry, Transport in Semiconductor Mesoscopic Devices (Institute of Physics Publishing, Bristol, UK, 2015).

S. Oda and D. K. Ferry, Silicon Nanoelectronics, 2nd Ed. (Taylor and Francis, to appear late 2015).

W. Lepkowski, S. J. Wilk, A. Parsi, M. Saraniti, D. Ferry, and T. J. Thornton, "Avalanche breakdown in SOI MESFETs," Solid-State Electronics 91, 78-80 (2014).

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D. K. Ferry, R. Akis, and R. Brunner, "Probing the quantum-classical connection with open quantum dots," Physcia Scripta 90, expected online publication September 2015.

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David Frakes joined ASU in 2008. He received a bachelor's degree in electrical engineering and master'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. Frakes is currently on leave from ASU serving as a Technical Program Lead in the Advanced Technologies and Projects (ATAP) Group at Google.

Expertise: image and video processing, fluid dynamics, computer vision, medical device design; endovascular treatment of cerebral aneurysms, surgical planning for congenital heart defects, video surveillance, motion estimation and tracking

Honors and distinctions: World Technology Network Award — Health and Medicine Category (2014); State of Arizona Innovator of the Year Award — Academia Category (2014); Mimics Innovation Award — 1st Place Poster Competition (2014); ASU SBHSE Outstanding Graduate Faculty Member of the Year Award (2014); ASU Faculty Achievement Award — Best Innovation (2013); ASU SBHSE Outstanding Graduate Faculty Member of the Year Award (2013); ASU School of Biological and Health Systems Engineering Professor of the Year Award (2012); ASU Faculty Women's Association Outstanding Mentor Award (2012); Arizona State University Top 5% Excellence in Instruction Award (2011); IEEE Phoenix Section Outstanding Faculty Award (2011)

Selected publications

Ryan J, Moe T, Richardson R, Frakes D, Nigro JJ, Pophal SG. A Novel Approach to Neonatal Management of Tetralogy of Fallot, with Pulmonary Atresia, and Multiple Aortopulmonary Collaterals. JACC: Cardiovascular Imaging. vol 8(1), pp 103-4, Jan 2015.

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Stephen Goodnick is the deputy director of the ASU LightWorks initiative. He recently served as the associate vice president for research from 2006-2008, and prior to that as deputy dean of the Ira A. Fulton Schools of Engineering. He came to ASU in fall 1996 as a 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 a past president of the board of governors of the IEEE Eta Kappa Nu engineering honor society and past 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.

Expertise: solid state device physics, transport in nanostructures, nanoelectronic devices and circuits, computational electronics, RF and microwave devices, optoelectronic, energy conversion devices

Honors and distinctions: IEEE Region 6 Outstanding Educator Award (2013); 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); Fellow, IEEE, (2004); IEEE Phoenix Section Society Award for Outstanding Service (2002); Colorado State University College of Engineering Achievement in Academia Award (1998); College of Engineering Research Award, Oregon State University (1996); Alexander von Humboldt Research Fellow, Germany (1986)

Selected publications

N. Chandra, C. J. Tracy, J.-H. Cho, S. T. Picraux, R. Hathwar, and S. M. Goodnick, "Vertically grown Ge nanowire Schottky diodes on Si and Ge substrates," Journal Applied Physics 118, 014301 (2015).

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Michael Goryll joined the ASU faculty 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 during the years 2003-2005. Before joining ASU, Goryll spent several years at the Research Centre Jülich, the largest national research lab in Germany, focusing on SiGe chemical vapor deposition and biosensor development.

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

Honors and distinctions: NSF CAREER Award Recipient (2012), Top Engineering Faculty Teaching Award at ASU (2012), Helmholtz Research Fellowship for Outstanding Young Investigators granted by the Research Centre Jülich, Germany (2001-2005), post-graduate scholarship granted by the RWTH Aachen University, Germany (1997-2000)

Selected publications

J. T. Smith, S. S. Shah, M. Goryll, J. R. Stowell, and D. R. Allee, "Flexible ISFET Biosensor Using IGZO Metal Oxide TFTs and an ITO Sensing Layer", IEEE Sensors Journal vol. 14(4), pp. 937-938 ,2014

C. Corredor, Wen-Che Hou, S. A. Klein, B. Y. Moghadam, M. Goryll, K. Doudrick, P. Westerhoff, J. D. Posner, "Disruption of model cell membranes by carbon nanotubes", Carbon vol 60, pp. 67-75, 2013

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Kory W. Hedman specializes in three disciplines and holds six degrees: bachelor's degrees in electrical engineering and economics from the University of Washington in 2004, master's degrees in economics and electrical engineering from Iowa State University in 2006 and 2007, respectively, and a master's degree and Ph.D. both in operations research from the University of California, Berkeley in 2008 and 2010, respectively.

Hedman joined the School of Electrical, Computer, and Energy Engineering at Arizona State University as an assistant professor in 2010 and is a graduate faculty in industrial engineering. Hedman was awarded the 2014 Fulton Exemplar Faculty award, in its inaugural year; given to less than 5% of the best faculty in the Fulton Schools at ASU. Hedman has also received numerous ASU teaching awards and various research and service awards. Hedman's research includes operations research applied to electric power systems, high performance computing, power systems operations and planning, cyber-security for electric power systems, management of renewable resources and distributed resources, energy market design and pricing, and transmission topology control. Hedman has previously worked for the California ISO in Folsom, California and the Federal Energy Regulatory Commission in Washington, D.C.

Expertise: power and energy systems, operations research, renewable energy, power system economics, operations and planning, transmission engineering, mathematical programming, stochastic optimization, market design, energy economics, financial engineering

Selected publications

A. Korad and K. W. Hedman, "Enhancement of do-not-exceed limits with robust corrective topology control," IEEE Transactions on Power Systems, accepted Jun. 1, 2015.

Y. M. Al-Abdullah, M. Abdi-Khorsand, and K. W. Hedman, "The role of out-of-market corrections in day-ahead scheduling," IEEE Transactions on Power Systems, vol. 30, no. 4, pp. 1937-1946, Jul. 2015.

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J. D. Lyon, K. W. Hedman, and M. Zhang, "Reserve requirements to efficiently manage intra-zonal congestion," IEEE Transactions on Power Systems, vol. 29, no. 1, pp. 251-258, 2014.

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Gerald Thomas Heydt is from Las Vegas, Nevada. He holds a bachelor's degree in electrical engi-neering from the Cooper Union in New York and master's and doctoral degrees in electrical engineer-ing from Purdue University. He spent near 25 years as a faculty member at Purdue University until, in 1994, he took the position of site director of the NSF and industrially supported Power Systems Re-search Center at ASU. He has industry experience with the Commonwealth Edison Company in Chi-cago, E.G. & G. in Mercury, Nevada, and with the United Nations Development Program. In 1990, he served as the program manager of the National Science Foundation program in power systems engineering. He is the author of two books in the area of power engineering. Heydt is a Regents' Professor and professor of advanced technology at ASU, a member of the National Academy of Engineering and a life fellow of the IEEE.

Expertise: power engineering, electric power quality, distribution engineering, transmission engineering, com-puter applications in power engineering, power engineering education, power system sensors and instrumentation

Honors and distinctions: Life Fellow, IEEE; Member, U.S. National Academy of Engineering; 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

Sara Eftekharnejad, G. Heydt, V. Vittal, "Optimal generation dispatch with high penetration of photo-voltaic generation," IEEE Transactions on Sustainability, Paper TSTE-00422-2013, July, 2015, v. 6, No. 3, pp. 1013–1020.

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M. Al-Muhaini, G. T. Heydt, "Evaluating future power distribution system reliability including distributed generation," IEEE Transactions on Power Delivery, v. 28, No 4, October 2013, pp. 2264–2272.

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Keith Holbert is the director of the nuclear power generation program. He joined the faculty in 1989. Holbert is a registered professional (nuclear) engineer and has published over 150 refereed journal and conference papers, two textbooks and holds one patent.

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

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 (2005-2014); Top 5% Faculty, Fulton Schools of Engineering (2012).

Selected publications

R. L. Murray, K. E. Holbert, Nuclear Energy: An Introduction to the Concepts, Systems, and Applications of Nuclear Processes, 7th ed., Elsevier Butterworth-Heinemann, 2014.

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.

E. B. Johnson, C. Whitney, K. E. Holbert, T. Zhang, T. Stannard, A. Christie, P. Harper, B. Anderson, J. F. Christian, "Activation analysis study on Li-ion batteries for nuclear forensic applications," Nuclear Instruments and Methods in Physics Research A, vol. 784, June 2015, pp. 430-437.

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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.

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

Selected publications

M. Boccard and Z. Holman, "Amorphous silicon carbide passivating layers for crystalline-silicon-based heterojunction solar cells," Journal of Applied Physics (in press).

Z. Yu, K. Fisher, B. Wheelwright, R. Angel, and Z. Holman, "PVMirror: A new concept for tandem solar cells and hybrid solar converters," IEEE Journal of Photovoltaics (in press).

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Christiana Honsberg joined the electrical engineering faculty in 2008 and is currently a professor. She received her BS, MS and PhD from University of Delaware in 1986, 1989, and 1992, respectively, all in electrical engineering. 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.

Expertise: ultra-high efficiency solar cells, and silicon solar cells

Selected publications

Y. Kim; K.Y. Ban; Darius Kuciauskas; P. Dippo; C. B. Honsberg, "Impact of delta-doping position on photoluminescence in type-II InAs/GaAsSb quantum dots," Semiconductor Science and Technology. 2015;30(3)

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J. Y. Choi; T.L. Alford; C. B. Honsberg, "Fabrication of periodic silicon nanopillars in a two-dimensional hexagonal array with enhanced control on structural dimension and period," Langmuir. 2015;31(13):4018-4023.

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C. B. Honsberg, and M. Y. Levy, "Nanostructured absorbers for multiple transition solar cells," IEEE Transaction on Electron Devices, vol. 56, no. 3, 706-711, 2008.

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O. Jani, I. Ferguson, C. B. Honsberg, and S. Kurtz, "Design and characterization of GaN/ InGaN solar cells," Applied Physics Lett., vol. 91, no. 13, 1-3, 2007.

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George G. Karady received his master's and doctoral 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 55 master's students. He is an IEEE Fellow and has published a book, several book chapters, 136 journal and 220 conference papers.

Expertise: power electronics, high-voltage engineering, power systems

Honors and distinctions: Fellow of IEEE (1978); IEEE PES Technical Committee Distinguished Individual Service Award (2015); Best Transaction Paper Award (with K. Holbert) (2010); Chair, Awards Committee, IEEE PES Chapter and membership division (2000-2005); President, IEEE Phoenix Section (2004); Honorary doctorate, Technical University of Budapest (1999); IEEE Third Millennium Medal; IEEE PES Working Group (WG) Recognition Award (2002); Chair, WG that prepared IEEE Standard 1313-2.

Selected publications

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

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Xianjun Zhang, George G. Karady, Kalyan R. Piratla, Samuel T. Ariaratnam: Optimal Allocation of CHP-Based Distributed Generation on Urban Energy Distribution Networks. IEEE Transactions on Sustainable Energy, pp. 246-253, Vol. 5, No. 1, January 2014

Jay R Prigmore, Jorge A. Mendoza, and George G. Karady: "A neodymium hybrid fault current limiter". International Transactions on Electrical Energy Systems, DOI: 10.1002/ETEP.1915 2014.

Jiajun Liu, George Karady, "Influence of Insulation Barrier on AC Creepage Breakdown with Grounded Back Electrode", IEEE Transactions on Dielectrics and Electrical Insulation, Vol. 22, No. 3, pp. 1694-1701, 2015.

Lina Karam

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Lina Karam received her BA in engineering from American University of Beirut in 1989, her MS and PhD degrees in electrical engineering from Georgia Institute of Technology in 1992 and 1995, respectively. She is currently a full professor and is the director of the Image, Video, and Usability (IVU) Lab and the Real-Time Embedded Signal Processing (RESP) Labs at ASU. She is an IEEE Fellow, the highest grade level in IEEE which is conferred each year to no more than one-tenth of 1% of all IEEE voting members, for her contributions in the image and video processing, visual communications, and digital filtering areas. She is currently serving as the General Chair of the IEEE International Conference on Image Processing (ICIP 2016). She is serving on the editorial board of the IEEE Signal Processing Magazine and previously served on the editorial boards of the IEEE Transactions on Image Processing, IEEE Signal Processing Letters, and Foundations and Trends in Signal Processing. She is a founding member of the International Workshop on Video Processing and Quality Metrics for Consumer Electronics (VPQM) and of the International Workshop on Quality of Multimedia Experience (QoMEX). Karam is an elected member of the IEEE Circuits and Systems Society's DSP Technical Committee (1996-present), of the IEEE Signal Processing Society's (SPS) IVMSP Technical Committee (2005-2011, 2014-present).

Expertise: image and video processing, compression, and transmission, computer vision, visual quality assessment, human visual perception, multidimensional signal processing, digital filtering, source coding, and bio-medical imaging

Honors and distinctions: National Science Foundation CAREER Award; NASA Technical Innovation Award; AUB Distinguished Alumnus Award; IEEE Phoenix Section Outstanding Faculty Award; Intel Outstanding Researcher Award; IEEE Fellow; IEEE SPS Best Journal Paper Award.

Selected patents:

Lina J. Karam and Asaad F. Said, "Automatic cell migration and proliferation analysis," United States Patent 9,082,164. Issued July 14, 2015

Applications: Cancer Diagnosis, Drug Discovery, Cell Migration Rate, Cell Count, biomedical imaging

Katherine Blinick, Lina Karam, Glen Abousleman, "System and Method for Transmission of Video Signals using Multiple Channels," United States Patent 7,551,671 B2. Issued June 23, 2009

Selected publications

Srenivas Varadarajan and Lina J. Karam, "A No-Reference Texture Regularity Metric Based on Visual Saliency," IEEE Transactions on Image Processing, pp. 2784 - 2796, Sept. 2015.

Jinjin Li, Bonnie Bennett, Lina J. Karam, and Jeffrey S. Pettinato, "Stereo Vision Based Automated Solder Ball Height and Substrate Coplanarity Inspection," IEEE Transactions on Automation Science and Engineering, 15 pages, March 2015.

Qian Xu, Srenivas Varadarajan, Chaitali Chakrabarti, and Lina J. Karam, "A Distributed Canny Edge Detector: Algorithm and FPGA Implementation," IEEE Transactions on Image Processing, vol. 23, issue 7, pp. 2944-2960, July 2014.

Lina J. Karam, W. Bastiaan Klein, and Karon MacLean, "Perception-based Media Processing," Proceedings of the IEEE, vol. 101, issue 9, pp. 1900-1904, Sep. 2013.

Sayfe Kiaei

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Kiaei has been with ASU since January 2001. He is a professor and Motorola Endowed professor and chair in analog and RF integrated circuits. He directs ASU's Center on Global Energy Research and is also the director of NSF Connection One research center with a focus on integrated communication system. Kiaei was the associate dean of research at the Ira A. Fulton Schools of Engineering from 2009 to 2102. 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. Kiaei was an associate professor at Oregon State University from 1987 to 1993. He was the co-director of the industry-university center for the Design of Analog/Digital ICs (CDADIC). 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. 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.

Expertise: radio frequency and analog integrated circuits, integrated power management IC

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

Selected publications

Chang, D.; Kitchen, J.N.; Bakkaloglu, B.; Kiaei, S.; Ozev, S., "Design-Time Reliability for RF Circuits," in IEEE transaction on Very Large Scale Integration (VLSI) Systems, 2015.

Marti-Arbona, E.; Mandal, D.; Bakkaloglu, B.; Kiaei, S., "Low power integrated on-chip current to digital converter," Applied Power Electronics Conference and Exposition (APEC), March 2015.

Marti-Arbona, E.; Mandal, D.; Bakkaloglu, B.; Kiaei, S., "PV panel power optimization using MPPT," in Applied Power Electronics Conference and Exposition (APEC), March 2015

Doohwang Chang; Ozev, S.; Bakkaloglu, B.; Kiaei, S.; Afacan, E.; Dundar, G., "Reliability enhancement using in-field monitoring and recovery for RF circuits," in VLSI Test Symposium (VTS), 2014.

Deng, Lingfei; Kundur, Vinay; Naga, Naveen Sai Jangala; Ozel, Muhlis Kenan; Yilmaz, Ender; Ozev, Sule; Bakkaloglu, Bertan; Kiaei, Sayfe; Pratap, Divya; Dar, Tehmoor, "Electrical calibration of spring-mass MEMS capacitive accelerometers," in Design, Automation & Test in Europe Conference & Exhibition (DATE),March 2013.

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Lee, J.; Copani, T.; Mayhugh Jr., T.; Aravind, B.; Kiaei, S. and Bakkaloglu, B. "A 280 mW, 0.07% THD+N class-D audio amplifier using a frequency-domain quantizer," Analog Integrated Circuits and Signal Processing, 173-186, 2012.

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Expertise: DNA nanoelectronics: self-assembly of nanoscale components by DNA scaffolding, electronic devices based on hybrid organic/inorganic nanostructures. Spintronics: devices based on collective behavior in nanoparticle arrays. Nanoscale architectures: information processing paradigms based on locally connected networks. General subject areas: electronic devices and integrated circuits based on heterostructures, nanostructures, and molecular systems. Novel concepts for nanoscale electronic devices and circuits; fabrication by directed self-assembly techniques. Collaborative, interdisciplinary research exploring the interface between nanotechnology and biotechnology for applications in computing, signal processing and sensing.

Selected publications

R. J. Macedo, S. E. Harrison, T. S. Dorofeeva, J. S. Harris, and R. A. Kiehl, "Nanoscale Probing of Local Electrical Characteristics on MBE-Grown Bi2Te3 Surfaces under Ambient Conditions," Nano Letters, vol. 15 (7), pp 4241–4247, 2015. DOI: 10.1021/acs.nanolett.5b00542.

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S. Hihath, P. M. Riechers, J. Chen, C. B. Murray, R. A. Kiehl, "TEM Analysis of Fe3O4/GaAs hybrid ferromagnet/semiconductor nanostructures", 2012 MSA Microscopy and Microanalysis Meeting, Phoenix, Ariz., July 29 - August 2, 2012

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Y. Y. Pinto, J. D. Le, N. C. Seeman, K. Musier-Forsyth, T. A. Taton, and R. A. Kiehl, "Sequence-encoded self-assembly of multiple-nanocomponent arrays by 2D DNA scaffolding," Nano Lett., Vol. 4, pp. 2399-2402, Dec. 2005.

T. Ohshima and R. A. Kiehl, "Operation of bistable phase-locked single-electron tunneling logic elements," J. Appl. Phys., Vol. 80, pp. 912-923, July, 1996.

Book chapter: R. A. Kiehl, "Complementary Heterostructure FET Integrated Circuits," chapter in High-Speed Heterostructure Devices, R. A. Kiehl and T.C.L.G. Sollner, Eds., (Semiconductors and Semimetals Treatise, Vol. 41, R. K. Willardson, A. C. Beer, and E. R. Weber, Treatise Eds.), Academic Press:New York, 1994.

R. A. Kiehl, P. M. Solomon, and D. J. Frank, "Heterojunction FET's in III-V compounds (Invited)," IBM J. Research and Devel., Vol. 34, pp. 506-529, July, 1990.

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Richard King received his Ph.D. and M.S. in electrical engineering and his B.S. degree in physics from Stanford University. Prior to joining ASU he was Principal Scientist and Technical Fellow at Spectrolab, Inc. His research on photovoltaics over the last 30 years has explored metamorphic III-V materials, high-lifetime back-contact silicon solar cells, dilute nitride GaInNAs(Sb), ordered and disordered (Al)GaInP, characterization of defects and recombination in compound semiconductors, high-transparency tunnel junctions and integration into high-efficiency multijunction solar cells with 3 to 6 junctions. In 2006, this work led to the first solar cell of any type to reach over 40% efficiency. King is the recipient of the 2010 William R. Cherry Award given by the IEEE for "outstanding contributions to photovoltaic science and technology," and is a co-founding editor of the IEEE Journal of Photovoltaics.

Expertise: high-efficiency silicon and III-V photovoltaics, solid-state device physics, recombination at semiconductor defects and interfaces, multijunction solar cells, thin-film compound semiconductor growth and characterization

Selected publications

R. R. King, C. M. Fetzer, P. Chiu, W. Hong, X.-Q. Liu, A. Zakaria, K. Edmondson, D. Krut, D. Law, J. Boisvert, and N. H. Karam, "Effects of Temperature-Induced Bandgap Shift in 5-Junction Solar Cells," Proc. 28th European Photovoltaic Solar Energy Conf., Paris, France, Sep. 30 - Oct. 4, 2013.

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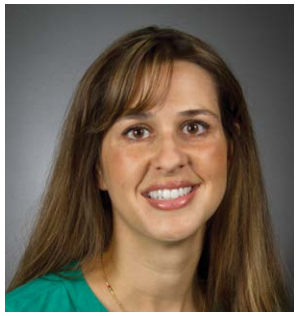
R. R. King, A. Boca, W. Hong, X.-Q. Liu, D. Bhusari, D. Larrabee, K. M. Edmondson, D. C. Law, C. M. Fetzer, S. Mesropian, and N. H. Karam, "Band-Gap-Engineered Architectures for High-Efficiency Multijunction Concentrator Solar Cells," Proc. 24th European Photovoltaic Solar Energy Conf., Hamburg, Germany, Sep. 21-25, 2009, pp. 55-61, ISBN 3-936338-25-6.

R. R. King, A. Boca, K. M. Edmondson, M. J. Romero, H. Yoon, D. C. Law, C. M. Fetzer, M. Haddad, A. Zakaria, W. Hong, S. Mesropian, D. D. Krut, G. S. Kinsey, P. Pien, R. A. Sherif, and N. H. Karam, "Raising the Efficiency Ceiling with Multijunction III-V Concentrator Photovoltaics," Proc. 23rd European Photovoltaic Solar Energy Conf., Valencia, Spain, Sep. 1-5, 2008, pp. 24-29.

R. R. King, D. C. Law, K. M. Edmondson, C. M. Fetzer, G. S. Kinsey, H. Yoon, R. A. Sherif, and N. H. Karam, "40% efficient metamorphic GaInP / GaInAs / Ge multijunction solar cells," Appl. Phys. Lett., 90(18), 183516, 2007, doi: 10.1063/1.2734507.



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Jennifer Kitchen received her Ph.D. 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.

Her 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.

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 and broadband wireless transceivers for future generation (5G) wireless communication systems

Selected publications

M.R. Hasin, J. Kitchen and B. Ardouin, "GaN-on-Si Transformer-Coupled Class D Power Amplifier", in Proceedings of IEEE Radio Wireless Week, Jan 2015.

M. Ruhul Hasin, J. Kitchen, and B. Ardouin, "Characterization of High-Frequency GaN Circuits for Next Generation Wireless Systems," Government Microcircuit Applications & Critical Technology Conf. (GOMACTech), March 2014.

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.

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Oliver Kosut received bachelor's degrees from the Massachusetts Institute of Technology in electrical engineering and mathematics in 2004, and a doctoral degree in electrical and computer engineering from Cornell University in 2010. He was a postdoctoral associate in the Laboratory for Information and Decision Systems at Massachusetts Institute of Technology from 2010 to 2012, before joining ASU as an assistant professor in 2012. He received an NSF CAREER award in 2015.

Expertise: information theory, power systems and smart grids, cyber-security, machine learning

Selected publications

J. Liang, O. Kosut, and L. Sankar, "Cyber Attacks on AC State Estimation: Unobservability and Physical Consequences," Power & Energy Society General Meeting, July 2014.

O. Kosut, L. Tong, and D. N. C. Tse, "Polytope codes against adversaries in networks," IEEE Trans. on Information Theory, vol. 60, no. 6, pp. 3308–3344, June 2014.

V. Y. F. Tan and O. Kosut, "On the dispersion of three network information theory problems," IEEE Trans. on Information Theory, vol. 60, no. 2, pp. 881–903, Feb. 2014.

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

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.

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Gerald Thomas Heydt is fromMichael Kozicki joined ASU in 1985 from Hughes Microelectronics. He is a professor of electrical engineering and a fellow of the National Academy of Inventors. He is the inventor of the Programmable Metallization Cell, a technology platform for several innovations including Conductive Bridging Random Access Memory (CBRAM®). He has produced over 200 papers, patents and presentations that have been cited around 7,000 times. Kozicki is also a founder of Axon Technologies Corp. and Idendrix, Inc., and served as chief scientist of Silicon Valley start-up Adesto Technologies.

He has developed entrepreneurship-infused undergraduate and graduate courses in solid state electronics, is a frequent invited speaker at international meetings and has made several television appearances to promote public understanding of science. He has extensive international ties, including as a visiting professor at the University of Edinburgh in Scotland, adjunct professor at Gwangju Institute of Science and Technology in Korea and also holds the professional designation of chartered engineer in the UK/EU. 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.

Expertise: nanoionics, dendritic/fractal structures, low-energy resistive memory (CBRAM, RRAM)

Honors and distinctions: Fellow, National Academy of Inventors; Chartered Engineer (UK/EC Professional Engineer); Member, Institute of Physics; Member, IEEE/HKN; Founder, Axon Technologies Corporation and Idendrix, Inc.; Charter member of the ASU Academic Council; ASU Faculty Achievement Award (Most Significant Invention) (2007); Founding Member, Globalscot Network (appointed by the First Minister of Scotland); 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

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

J.R. Jameson, N. Gilbert, F. Koushan, J. Saenz, J. Wang, S. Hollmer, and M.N. Kozicki, "Effects of cooperative ionic motion on programming kinetics of conductive-bridge memory cells," Appl. Phys., Lett., Vol. 100, DOI: 10.1063/1.3675870 (2012).

W. Lu, D.S. Jeong, M.N. Kozicki, R. Waser, "Electrochemical metallization cells-blending nanoionics into nanoelectronics?" MRS Bulletin, Vol. 37, 124-130 (2012).

Valov and M.N. Kozicki, "Cation-based resistance change memory," J. Phys. D-Appl. Phys., vol. 46, art. no.: 074005 (2013).

Y. Gonzalez-Velo, H. J. Barnaby, M. N. Kozicki, C. Gopalan, and K. Holbert, "Total Ionizing Dose Retention Capability of Conductive Bridging Random Access Memory," IEEE Elec. Dev. Lett., IEEE, vol. 35, pp. 205-207, 2014.

Ying-Cheng Lai

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Ying-Cheng Lai joined the ASU faculty 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 around 370 refereed-journal papers. His works have been cited more than 13,500 times. His current H-index and i10 index are 59 and 250, respectively, according to Google Scholar. In the past five years he gave about 50 invited talks worldwide.

Expertise: nonlinear dynamics, complex networks, quantum transport in nanostructures, graphene physics, signal processing, biological physics

Honors and distinctions: Outstanding Referee Award, American Physical Society (2008); NSF ITR Award (2003); Fellow of the American Physical Society (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

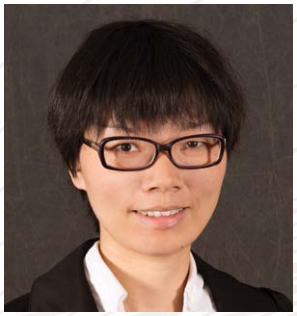
G.-L. Wang, L. Huang, Y.-C. Lai, and C. Grebogi, "Nonlinear dynamics and quantum entanglement in optomechanical systems," Physical Review Letters 112, 110406, 1-6 (2014).

Z.-S. Shen, W.-X. Wang, Y. Fan, Z.-R. Di, and Y.-C. Lai, "Reconstructing propagation networks with natural diversity and identifying hidden source," Nature Communications 5, 4323, 1-10 (2014).

Y.-C. Lai, "Controlling complex, nonlinear dynamical networks," National Science Review 1, 339-341 (2014).

L. Ying, G.-L. Wang, L. Huang, and Y.-C. Lai, "Quantum chaotic tunneling in graphene systems with electron-electron interactions," Physical Review B 90, 224301, 1-14 (2014).

H.-Y. Xu, L. Huang, Y.-C. Lai, and C. Grebogi, "Superpersistent currents and whispering gallery modes in relativistic quantum chaotic systems," Scientific Reports 5, 8963, 1-8 (2015).



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Qin Lei will join the ASU faculty as an assistant professor in January 2016. She received her bachelor's degree from Huazhong University of Science and Technology, China, in 2006, and her doctoral degree from Michigan State University in 2012. She joined the High Power Conversion Lab of GE Global Research in Niskayuna, New York as an electrical engineer after graduation. She currently works as an electrical engineer in ULC robotics in Long Island, New York.

Expertise: high power converters for high voltage direct current (HVDC) transmission/medium voltage direct current (MVDC) transmission, medium voltage drive, grid-integration of renewable energy sources, transportation electrification/electric vehicle/hybrid electric vehicle, power management for smart-grid/micro-grid, wide-band gap device application (SiC, GaN), energy storage

Honors and distinctions: Technical Bronze Award, GE Global Research, Niskayuna, NY (2014); Innovation patent award, GE Global Research, Niskayuna, NY (2013); Best presentation award in 27th APEC, FL (2012); Student demo award in ECCE, AZ (2011); Best presentation award in 25th APEC, CA (2010)

Selected publications

Shen, Jie, Stefan Schroeder, Kunlun Chen, Shuitao Yang, Q. U. Bo, and Qin Lei. "System and method for unified common mode voltage injection." U.S. Patent Application 14/317,361, filed June 27, 2014;

Qin Lei, Jie Shen, Stefan Schroeder, Disclosure, docket 275537-1, "GENERALIZED NEUTRAL POINT BALANCE METHOD FOR N-LEVEL MULTILEVEL CONVERTER," 20-NOV-14.

Qin Lei; Fang Zheng Peng; Shuitao Yang, "Multiloop control method for high-performance microgrid inverter through load voltage and current decoupling with only output voltage feedback," Power Electronics, IEEE Transactions on , vol.26, no.3, pp.953,960, March 2011;

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Qin Lei; Peng, F.Z.; Miaosen Shen, "Switched-coupled-inductor inverter," Energy Conversion Congress and Exposition (ECCE), 2013 IEEE , vol., no., pp.5280,5287, 15-19 Sept. 2013.

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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 of the Center for Biosignatures Discovery Automation in 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. 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 was a founding 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.

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

Honors and distinctions: Elected Fellow of the American Institute for Medical and Biological Engineering, 2015; Elected Fellow of the Institute of Electrical and Electronics Engineers, 2004; Elected 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 2011-2014; 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.

Selected publications

Xiangxing Kong, Fengyu Su, Liqiang Zhang, Jordan Yaron, Fred Lee, Zhengwei Shi, Yanqing Tian, and Deirdre R. Meldrum, "A Highly Selective Mitochondria-Targeting Fluorescent K+ Sensor," Angewandte Chemie. 2015;127.

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Cun-Zheng Ning joined ASU in 2006 as a full professor from 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. In 2013 he was a guest professor at Technical University Berlin and Tsinghua University in Beijing. Ning has published over 170 journal papers and given over 160 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 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.

Expertise: nanophotonics, nanowires, nanolasers, surface plasmonic enhanced light emitters, nanomaterials based solar cells

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). Fellow of the Optical Society, IEEE and Electromagnetic Academy (FEMA).

Selected publications

F. Fan, S. Turkdogan, Z. Liu, D. Shelhammer, and C.Z. Ning, A monolithic white laser, Nature Nanotechnology,10, 796(2015)

P. Nichols, Z. Liu, L.Yin, S. Turkdogan, F.Fan, and C.Z. Ning, CdPbS Alloy Nanowires and Heterostructures with Simultaneous Emission in Mid-Infrared and Visible Wavelengths, Nano Letters, 15, 909(2015)

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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)

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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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Umit Y. Ogras joined ASU as an assistant professor in 2013. Ogras received his Ph.D. degree in electrical and computer engineering from Carnegie Mellon University in 2007. From 2008 to 2013, he worked as a research scientist at the Strategic CAD Laboratories, Intel Corporation. His research interests are in low-power VLSI systems and embedded system design. In particular, his research focuses on design methodologies and power management for multicore architectures.

Expertise: digital VLSI design, embedded systems, multiprocessor systems-on-chip (MPSoC), multicore architectures, electronic design automation

Honors and distinctions: Donald O. Pederson IEEE Trans. on CAD Best paper award (2012), Best paper award of IEEE Trans. on VLSI Systems (2011), Intel Strategic CAD Labs Research Award (2012), Outstanding dissertation award from the European Design Automation Association (EDAA) (2008).

Selected publications

Md Muztoba, Ujjwal Gupta, Tanvir Mustofa, Umit Y. Ogras, "Robust Communication with IoT Devices using Wearable Brain Machine Interfaces," in Proc. of Intl. Conference on Computer-Aided Design, November 2015.

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U. Y. Ogras, P. Bogdan, R. Marculescu, "An Analytical Approach for Network-on-Chip Performance Analysis," IEEE Trans. Comput.-Aided Des. Integr. Circuits Syst., vol. 29, pp. 2001-2013, Dec. 2010. (IEEE D.O. Pederson Trans. On CAD Best Paper Award)

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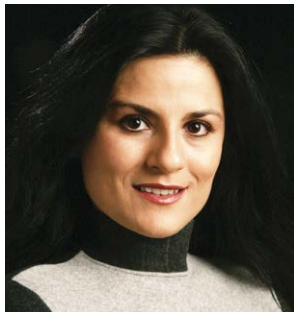

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Sule Ozev received her bachelor's degree in electrical engineering from Bogazici University, Turkey, and her master's and doctoral degrees in computer science and engineering from University of California, San Diego in 1995, 1998 and 2002, respectively. Ozev joined the electrical engineering faculty in August 2008 and is currently an associate professor. She served as an associate editor for IEEE Transactions on VLSI systems (2007-2014) and serves on various program committees, including IEEE VLSI Test Symposium (2008-2015), IEEE International Test Conference (2007-2015), IEEE International Conference on Computer Design (2004-2015), and IEEE European Test Symposium (2006-2015). She is the program chair of the International Conference on Computer Design (2013-2015) and was the general chair for IEEE International Mixed-Signals, Sensors and Systems 2009. In 2006, Ozev received an NSF CAREER Award. She has published over 100 conference and journal papers and holds one U.S. patent.

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

Honors and distinctions: Honorable mention award, VTS (2015); Best paper award,VTS (2014); Honorable mention award, VTS (2013); Honorable mention award, International Test Conference (2011); Best student paper award, International Test Conference (2009); 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

Ramachandran Venkatasubramanian and Sule Ozev, "A Comparator-Based Rail Clamp", to appear in IEEE Transactions on VLSI Systems.

Ender Yilmaz and Sule Ozev, "Adaptive-Learning-Based Importance Sampling for Analog Circuit DPPM Estimation", IEEE Design & Test Magazine, Volume:32 , Issue: 1, pp. 36-43, 2015.

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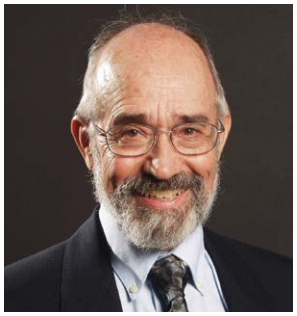
Jae Woong Jeong, Jennifer Kitchen, Sule Ozev, "Robust Amplitude Measurement for RF BIST Applications" IEEE European Test Symposium, May 2015.

Navankur Beohar, Priyanka Bakliwal, Sidhanto Roy, Debashis Mandal, Bertan Bakkaloglu, Sule Ozev, "Disturbance-free BIST for Loop Characterization of DC-DC Buck Converters", IEEE VLSI Test Symposium, 2015.

Doohwang Chang, Bertan Bakkaloglu, Sule Ozev, "Enabling Unauthorized RF Transmission below Noise Floor with no Detectable Impact on Primary Communication Performance", IEEE VLSI Test Symposium, 2015.



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Joseph Palais joined the faculty in 1964 and is the graduate program chair. He is also the academic director for the Online and Professional Programs for Global Outreach and Extended Education in 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.

Expertise: fiber optic communications, holography, distance education

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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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 71 research articles in refereed journals and presented 113 papers at national/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.

Expertise: computational electromagnetics, high-speed electronics packaging, magnetic resonant imaging RF coil design and analysis, inverse scattering, rough surface scattering, millimeter-wave antenna systems

Honors and distinctions: IET Fellow; IEEE Senior Member; Outstanding Paper Award, Government Microcircuit Applications Conference (1990)

Selected publications

J. Griffith and G. Pan, "Time Harmonic Fields Produced by Circular Current Loops," IEEE Trans. Magnetics, vol. 47, no. 8, pp. 2029-2033, August 2011.

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G. Lei and G. Pan, "Integral identities for bi-Laplacian problems and their applications to vibrating plates," Hokkaido Mathematical Journal, vol. XLII, no. 3, pp. 425-443, Oct. 2013.

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Antonia Papandreou-Suppappola joined the ASU faculty as an assistant professor in 1999 and was promoted to associate professor in 2004 and professor in 2008.

Her professional service includes: chair of the Women in Signal Processing committee, IEEE Signal Processing Society (2014-2017); member, IEEE Signal Processing Society Board of Governors (2010-2012); technical area chair, Array Processing and Statistical Signal Processing, Asilomar Conference on Signals, Systems, and Computers (2010); Special Sessions Chair, IEEE International Conference of Acoustics, Speech and Signal Processing (2010); general chair, Sensor Signal and Information Processing Workshop (2008); guest editor, special issue on Waveform-Agile Sensing and Processing, IEEE Signal Processing Magazine (2009); guest editor, special issue on Adaptive Waveform Design for Agile Sensing, IEEE Journal on Selected Topics in Signal Processing (2007); associate editor, IEEE Transactions on Signal Processing (2005-2009); technical committee member, IEEE Signal Processing Society on Signal Processing Theory and Methods (2003-2008) and treasurer of the IEEE Signal Processing Society Conference Board (2004-2006).

Expertise: time-varying signal and system processing; statistical processing for detection, estimation and tracking; signal processing algorithm development for biomedical, biological and structural health monitoring; wireless communications applications

Honors and distinctions: Fulton Exemplar Faculty Award (2014); Doctoral Research Award (2014), IEEE Fellow (2013), Fulton School of Engineering Award (2013), Bob Owens Memorial Best Paper Award in IEEE Workshop on Signal Processing Systems (2010), Top 5% of Fulton School of Engineering Teaching Excellence Award (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

S. P. Ebenezer and A. Papandreou-Suppappola, "Low RCS target tracking in estimated rapidly-varying sea clutter using a Kronecker product approximation algorithm," IEEE Journal of Selected Topics in Signal Processing, December 2015.

B. O' Donnell, A. Maurer, A. Papandreou-Suppappola, P. Stafford, "Time-frequency analysis of peptide microarray data: Application to brain cancer immunosignatures," Cancer Informatics, pp. 219-233, vol. 14, June 2015.

D. Chakraborty, N. Kovvali, A. Papandreou-Suppappola, A. Chattopadhyay, "An adaptive learning damage estimation method for structural health monitoring," Journal of Intelligent Material, Systems and Structures, pp. 125-143, vol. 26, January 2015.

M. Banavar, J. J. Zhang, B. Chakraborty, H. Kwon, Y. Li, H. Jiang, A. Spanias, C. Tepedelenlioglu, C. Chakrabarti, A. Papandreou-Suppappola, "An overview of recent advances on distributed and agile sensing algorithms and implementation," Digital Signal Processing, pp. 1-14, vol. 39, April 2015.

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Stephen M. Phillips received a bachelor's degree in electrical engineering from Cornell University and a master's degree and Ph.D. in electrical engineering from Stanford University. 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. 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 an ABET program evaluator and as a member of the board of directors of ABET. He is a professional engineer registered in the state of Ohio.

Expertise: applications and integration of microsystems including microelectromechanical systems (MEMS), microelectronics, microactuators, neural recording and neural stimulation; applications of systems and control including adaptive control, control of microsystems, prosthetics, feedback control over nondeterministic networks

Selected publications

Stephen M. Phillips, An Undergraduate Electrical Engineering Degree Available via Online Delivery, NAE/NSF workshop on power and energy curriculum, Washington, DC, 2015

Narendra V. Lakamraju, Sameer M. Venugopal, Stephen M. Phillips, David R. Allee

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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.

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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.

Ahmad T. Al-Hammouri, Vincenzo Liberatore, Michael S. Branicky, and Stephen M. Phillips, Complete Stability Region Characterization for PI-AQM, SIGBED Review, Vol. 3 No. 2, pp 1-6, ISSN 1551-3688, April 2006.

B. Mi, H. Kahn, F. Merat, A. H. Heuer, D. A. Smith, and S. M. Phillips, "Static and electrically actuated shaped MEMS mirrors," Journal of Microelectromechanical Systems, vol. 14, no. 1, pp. 29-36, 2005.

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Jiangchao Qin joined the ASU faculty as an assistant professor in August 2015. He received a bachelor's degree from Xi'an Jiaotong University, China, in 2002, and a Ph.D. from Purdue University, West Lafayette, IN, USA, in 2014. He spent the summer of 2012 in the High-Power Energy Conversion Lab, GE Global Research in Niskayuna, New York, as a research intern. From 2014 to 2015, he worked as a postdoctoral fellow at Georgia Institute of Technology, Atlanta, Georgia.

Expertise: power electronics, power electronics-based power systems, high voltage direct current (HVDC) transmission and DC grids, wide bandgap (WBG)-based converters, grid integration of renewable energy resources, microgrids, energy storage systems, hybrid electric vehicles and transportation electrification, electric drives

Selected publications

Q. Yang, J. Qin, and M. Saeedifard, "A Post-Fault Strategy to Control the Modular Multilevel Converter under Submodule Failure," IEEE Trans. on Power Delivery.

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J. Qin and M. Saeedifard, "Predictive Control of a Modular Multi-Level Converter for a Back-to-Back HVDC Transmission System," IEEE Trans. on Power Delivery, Vol. 27, No. 3, pp. 1538-1547, 2012.

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Martin Reisslein joined the ASU faculty in 2000. He received a Dipl.-Ing. in electrical engineering from FH Dieburg, Germany, in 1994, and a Ph.D. in systems engineering from the University of Pennsylvania in 1998. He has published over 125 journal articles. He has a Google Scholar h-index of 40 and a Web of Science h-index of 23. He serves as associate editor for the IEEE Transactions on Education, the Computer Networks Journal and Optical Switching and Networking.

Expertise: metro and access fiber/wireless networks, multimedia streaming, multimedia traffic characteristics, software defined networking, engineering education

Honors and distinctions: NSF CAREER Award (2002); Editor-in-chief, IEEE Communications Surveys and Tutorials (2002-2007); ACM Senior Member, ASEE Member, IEEE Fellow; IEEE Communication Society Best Tutorial Paper Award (2009), Friedrich Wilhelm Bessel Research Award from the Alexander von Humboldt Foundation (2015)

Selected publications

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

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M. Reisslein, B. Rinner, and A.K. Roy Chowdhury, "Smart Camera Networks [Guest Editors' Introduction]," IEEE Computer, vol. 47, no. 5, pp. 23-25, May 2014.

X. Wei, F. Aurzada, M.P. McGarry, and M. Reisslein, "DyCaPPON: Dynamic circuit and packet passive optical network," Optical Switching and Netw., vol. 13, pp. 135-147, July 2014.

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A. M. Johnson, J. Reisslein, and M. Reisslein, "Transitional Feedback Schedules During Computer-based Problem-solving Practice," Computers & Education, vol. 81, pp. 270-280, February 2015.

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Prior to joining the ASU faculty in 1990, Armando A. Rodriguez worked at Massachusetts Institute of Technology, 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, and authored three engineering texts. Rodriguez has given over 70 invited presentations, 13 of which were plenary, at international and national forums, conferences and corporations. Since 1994, he has directed an extensive engineering mentoring research program that has served over 400 students. He has served as the co-director of an NSF-WAESO funded Bridge to the Doctorate Program involving 12 NSF fellows. He has served on various National Academy panels/committees including, Mechanical Science and Engineering, Survivability and Lethality Analysis, Army Research Laboratory (ARL) Autonomous Systems and the Committee on Engineering Education.

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

Honors and distinctions: AT&T Bell Laboratories Fellowship, Boeing A.D. Welliver Fellowship, Fulton Top 5% Teaching Award, CEAS Teaching Excellence Award, IEEE International Outstanding Advisor Award, ASU Faculty Fellow, ASU Professor of the Year Finalist, Ralf Yorque Memorial Prize, White House Presidential Excellence Award for Science, Mathematics and Engineering.

Selected publications

K. Puttannaiah, J. A. Echols, and A.A. Rodriguez, "A Generalized H-Infinity Control Design Framework for Stable Multivariable Plants Subject to Simultaneous Output and Input Loop Breaking Specifications," American Control Conference (ACC), pp. 3310-3315, 2015.

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Lalitha Sankar received a bachelor's degree in engineering physics from the Indian Institute of Technology, Bombay, in 1992, a master's degree in electrical engineering from the University of Maryland in 1994 and a Ph.D. 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. She received the NSF CAREER Award in January 2014, and an academic excellence award from Rutgers in 2008. She is also the lead PI on a $1.4M 4-year NSF grant on cybersecurity of the electric power system.

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 security and privacy guarantees in the Smart Grid

Selected publications

C. Huang, L. Sankar, and A. D. Sarwate, "Incentive Schemes For Privacy-Sensitive Consumers," Proc. Conf. on Decision and Game Theory for Security, Nov. 2015.

J. Hu, L. Sankar, and D. Mir, "Cluster-and-Connect: A More Realistic Model for the Electric Power Network Topology," Proc. IEEE Conference on Smart Grid Communications, Nov. 2015.

J. Hu, L. Sankar, and D. Mir, "Cluster-and-Connect: An Algorithmic Approach to Generating Synthetic Electric Power Network Topology," Proc. IEEE Allerton Conference on Computers, Communications, and Control, Sep. 2015.

B. Moraffah and L. Sankar, "Private Interactive Mechanism," Proc. IEEE Allerton Conference on Computers, Communications, and Control, Sep. 2015.

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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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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 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 co-author of four book chapters, four technical reports and more than 90 publications. His current research focuses mainly on computational electronics applied to the simulation of semiconductor devices and biological structures. His recent scientific work covers the following fields: the development of Monte Carlo and cellular automaton techniques for 2D and 3D simulation of semiconductor devices, simulation and engineering of semiconductor devices and the development of numerical methods for the modeling and simulation of phonon dynamics in semiconductors.

Expertise: computational electronics, biophysics

Selected publications

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.

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Anna Scaglione's expertise spans the areas of statistical signal processing for communication, electric power systems and information networks. Her main research focus is advancing intelligent infrastructures, through system modeling, optimization and data analysis. Specific topics include decentralized information processing in sensor networks and among social agents as well as cybersecurity and demand response for reliable energy delivery. She is a fellow of the IEEE, recipient of the 2013 IEEE Fink Award and 2000 Best Paper Award in the IEEE Signal Processing Society.

Expertise: statistical signal and array processing, sensor networks and network science, communication and information theory, energy delivery and power systems

Selected publications

H.-T. Wai, A. Scaglione, "Consensus on State and Time: Decentralized Regression with Asynchronous Sampling," vol.63, no.11, pp.2972-2985, June1, 2015

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Jae-sun Seo joined ASU in 2014. He received a bachelor's degree from Seoul National University in 2001, and a master's degree and Ph.D. from the University of Michigan in 2006 and 2010, respectively, all in electrical engineering. From January 2010 to December 2013, he was with IBM T. J. Watson Research Center, where he worked on energy-efficient integrated circuits for high-performance processors and cognitive computing chips. His current areas of research include machine learning and neuromorphic hardware design, and on-chip voltage regulators for integrated power management. He serves on the technical program committee for ISLPED and the organizing committee for ICCD.

Expertise: digital/mixed-signal circuit design, VLSI design for neuromorphic computing and machine learning, integrated voltage regulators, high-speed on-chip transceivers

Honors and distinctions: IBM Major Outstanding Technical Achievement Award (2012); IBM Invention Achievement Award (2011); Samsung Scholarship Foundation Fellow (2004-2009)

Selected publications

D. Kadetotad, Z. Xu, A. Mohanty, P. Chen, Binbin Lin, J. Ye, S. Vrudhula, S. Yu, Y. Cao, and J. Seo, "Parallel Architecture with Resistive Crosspoint Array for Dictionary Learning Acceleration," IEEE Journal on Emerging and Selected Topics in Circuits and Systems (JETCAS), vol. 5, no. 2, pp. 194-204, June 2015.

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Jennie Si received her bachelor's and master's degrees from Tsinghua University in 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.

Expertise: learning and approximate dynamic programming, estimation and filtering of stochastic processes, neural networks, neurophysiological basis for learning and cognitive processing, cortical neural information processing

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

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

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Brian Skromme joined the ASU faculty 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 130 refereed publications in solid-state electronics and engineering education.

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; development of educational software for engineering courses, engineering education

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, P. J. Rayes, B. E. McNamara, V. Seetharam, X. Gao, T. Thompson, X. Wang, B. Cheng, Y.-F. Huang, and D. H. Robinson, "Step-based tutoring system for introductory linear circuit analysis," in the Proceedings of the 2015 IEEE Frontiers in Education Conference (Inst. Electrical & Electronics Engrs., Piscataway, NJ, 2015), to be published.

B. J. Skromme and D. H. Robinson, "Addressing barriers to learning in linear circuit analysis," in the Proceedings of the 2015 American Society for Engineering Education Annual Conference & Exposition (Amer. Soc. Engrg. Educat., Washington, D.C., 2015), pp. 14125-1–14125-15.

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B. J. Skromme, P. J. Rayes, B. Cheng, B. McNamara, A. S. Gibson, A. Barrus, J. M. Quick, and R. K. Atkinson, Y.-F. Huang, and D. H. Robinson, "Expansion and evaluation of a step-based tutorial program for linear circuit analysis," in the Proceedings of the 2014 American Society for Engineering Education Annual Conference & Exposition (Amer. Soc. Engrg. Educat., Washington, D.C., 2014), pp. 10301-1–10301-14.

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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 Trans. Electron Devices 57 (4), 749-754 (2010).

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Andreas Spanias joined ASU in 1988. He has published more than 75 journal and 200 conference papers and contributed several book chapters. He authored two textbooks in DSP and audio coding and eight 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 served as the founding 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 (US 8,392,198 B1, US 20110150229 A1).

Expertise: digital signal processing, multimedia, speech and audio coding, adaptive filters, real-time processing of sensor data, DSP for media applications

Honors and distinctions: IEEE Fellow; IEEE Distinguished Lecturer (2004); 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); Harden-Simmons Prize Paper Award (2015), UNESCO Club Award on Scholarly Achievements (2015), Premier award by the UC-Berkeley NEEDS panel (co-sponsored by Microsoft Research, Wiley and TechSmith) (2015)

Selected publications

M. Banavar, C. Tepedelenlioglu, A. Spanias, "Robust Consensus in the Presence of Impulsive Channel Noise," IEEE Trans. on Signal Processing, Vol. 63, pp. 2118-2129, March 2015.

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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.

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Meng Tao's current research covers a wide range of topics in terawatt solar photovoltaics including, 1) earth-abundant semiconducting chalcogenides and transparent conducting oxides for thin-film photovoltaics, 2) substitution of silver electrode in silicon solar cells with low-cost earth-abundant aluminum, 3) energy-efficient electrorefining for solar-grade silicon directly from metallurgical-grade silicon, 4) value-added recycling of silicon solar cells and modules and 5) solar-powered electrolysis for solar electricity storage with a metal/metal oxide loop.

He joined ASU in 2011 as a professor of electrical engineering, and now heads the Laboratory for Terawatt Photovoltaics. Tao also played a critical role in the establishment of the U.S. Photovoltaic Manufacturing Consortium under SEMATECH.

Expertise: semiconductor surfaces, interfaces and thin films, terawatt-scale photovoltaics for solar energy conversion, chemical vapor deposition and its derivatives, electrochemistry in solar photovoltaics, solar photovoltaic systems and applications

Honors and distinctions: South Central Bell Professorship (2001); College of Engineering Outstanding Young Faculty Award (2004); University Outstanding Research Award (2011)

Selected publications

M. Tao, Terawatt Solar Photovoltaics — Roadblocks and Opportunities (Springer 2014).

W.-C. Sun, X. Han, and M. Tao, "Electroplating of Aluminum on Silicon in an Ionic Liquid," ECS Electrochemistry Letters, vol. 4, pp. D5-7 (2015).

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

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X. Yang and M. Tao, "A Kinetic Model for Si1-xGex Growth from SiH4 and GeH4 by CVD," Journal of the Electrochemical Society, vol. 154, pp. H53-9 (2007).

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NJ Tao joined the ASU faculty as a professor of electrical engineering and an affiliated professor of chemistry and biochemistry in 2001. Before that, he worked as an assistant and associate professor at Florida International University. He has 20 patent applications and over 200 published journal articles, which have been cited around 15,000 times. He has given over 200 invited and keynote talks worldwide.

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

Honors and distinctions: Fellow, AAAS; Fellow, America Physical Society; 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

Xiaonan Shan, Ismael Díez-Pérez, Luojia Wang, Peter Wiktor, Ying Gu, Lihua Zhang, Wei Wang, Jin Lu, Shaopeng Wang, Qihuang Gong, Jinghong Li and N.J. Tao, "Imaging the electrocatalytic activity of single nanoparticles" Nature Nano, 7, 668–672(2012).

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C. Bruot, J. Hihath, and N.J. Tao, "Mechanically Controlled Molecular Orbital Alignment in Single Molecule Junctions", Nature Nano. 7, 35-40(2012).

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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 Chem., 3, 6, 226-231(2011).

I. 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 Comm., 1, 31(2010).

X. Shan, U. Patel, S. Wang, R. Iglesias, N. J. Tao, "Imaging Local Electrochemical Current Via Surface Plasmon Resonance", Science, 327, 1363-1366(2010).

S.P. Wang, X.N. Shan, U. Patel, X.P. Huang, J. Lu, J.H. and Li, N.J. Tao, "Label-free imaging, detection and mass measurement of single viruses by Surface Plasmon Resonance", PNAS, 107, 16028-16032(2010).

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Cihan Tepedelenlioglu joined the ASU faculty as an assistant professor in July 2001. He received a bachelor's degree from the Florida Institute of Technology in 1995, a master's degree from the University of Virginia in 1998 and a Ph.D. from the University of Minnesota in 2001, all in electrical engineering. In 2001, he received the NSF CAREER award.

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

Honors and distinctions: NSF CAREER Award(2001); member, Tau Beta Pi

Selected publications

A. Rajan, C. Tepedelenlioglu, "Stochastic Ordering of Fading Channels Through the Shannon Transform", IEEE Transactions on Information Theory, vol. 61, no. 4, April 2015.

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

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Trevor Thornton joined the ASU faculty 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 in New Jersey. He is currently the director of the Southwest regional node of the NSF-supported National Nanofabrication Infrastructure Network (NNIN). Thornton has published more than 150 journal and conference papers and has seven issued patents related to the commercial development of CMOS compatible MESFETs.

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

Honors and distinctions: Microwave and Wireless Components Letters Tatsuo Itoh Prize from the IEEE Microwave Theory and Techniques, 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) (2012), Best Student Paper, High Temperature Electronics Network (2009), ASU Co-Curricular Programs Last Lecture Award (2001)

Selected publications

W. Lepkowski, S. J. Wilk, and T. J. Thornton "Scaling SOI MESFETs at the 45nm CMOS Node" IEEE Electron Device Letters, vol. 36, pp. 14-16 (2015).

S.J. Wilk, W. Lepkowski, P. Habibimehr and T.J. Thornton "4-Terminal Angelov Model for SOI CMOS MESFETs" IEEE Radio Frequency Integrated Circuits Symposium, Phoenix, AZ, 17–19 May (2015)

W. Lepkowski, S. J. Wilk, A. Parsi, M. Saraniti, D. Ferry, and T. J. Thornton "Avalanche breakdown in SOI MESFETs" Solid-State Electronics, vol. 91, pp. 78-80 (2014).

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).

W. Lepkowski, S. J. Wilk, J. Kam, T. J. Thornton "40V MESFETs Fabricated on 32nm SOI CMOS" IEEE Custom Integrated Circuits Conference (CICC 2013), Digest of Papers, pp. 1-4, DOI: 10.1109/CICC.2013.6658399 (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).

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Georgios C. Trichopoulos joined ASU as an assistant professor in 2015. He received his Ph.D. in electrical and computer engineering from Ohio State University in 2013. From 2013 to 2015, he worked as a postdoctoral researcher and then senior researcher at the ElectroScience Lab at Ohio State University. His research interests are in on-chip antenna design and high frequency sensors. In particular, his research focuses on millimeter wave (mmW) and terahertz (THz) technology for applications in biomedical sensing, imaging systems and short-range wireless communications. He is a co-founder of TeraProbes Inc., a technology start-up company specializing in non-contact device and circuit measurements.

Honors and distinctions: IEEE Antennas and Propagation International Symposium Student Best Paper Award (2013), Student Innovator of the Year Finalist, The Ohio State University (2013), IEEE Antennas and Propagation Symposium Student Paper Competition Finalist (2014), Inspiration Award, ElectronicProducts.com (technology portal) (2014)

Selected publications

Y. Karisan, C. Caglayan, G. C. Trichopoulos, and K. Sertel, "Lumped-element parasitic equivalent circuit extraction of millimeter-wave HEMTs through full-wave electromagnetic modeling" IEEE Trans. Microwave Theory Tech. (Accepted).

G. C. Trichopoulos and K. Sertel, "Broadband terahertz computed tomography using a 5k-pixel real-time THz camera," Journal of Infrared, Millimeter, and Terahertz Waves, Volume 36, Issue 7, pp 675-686, July 2015.

C. Caglayan, G. C. Trichopoulos and K. Sertel, "Non-contact probes for on-wafer characterization of THz devices and integrated circuits," IEEE Trans. Microwave Theory Tech., vol. 62, no. 11, pp. 2791–2801, Nov 2014.

G. C. Trichopoulos, H.L. Mosbacker, D. Burdette, and K. Sertel, "A broadband focal plane array camera for real-time THz imaging applications," IEEE Trans. Antennas and Propagation, vol.61, no.4, pp.1733-1740, April 2013.

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Konstantinos Tsakalis joined the ASU faculty in 1988 and is currently a professor. He received a master's degree in chemical engineering in 1984, a master's degree in electrical engineering in 1985 and a Ph.D. in electrical engineering in 1988, all from the University of Southern California. He holds 10 patents and has published one book, 54 journal and 117 conference papers.

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

Honors and distinctions: Licensed chemical engineer, Technical Chamber of Greece; member IEEE, Sigma Xi

Selected publications

Steenis, J. ; Tsakalis, K. ; Ayyanar, R., ``An Approach to Bumpless Control for LPV Modeled Inverters in a Microgrid'', IEEE Transactions on Power Electronics, V.29, 11, 6214-6223, 2014.

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.

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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.

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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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Pavan Turaga joined ASU in fall 2011 as an assistant professor jointly between the departments of Arts, Media and Engineering and Electrical Engineering (ECEE). 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, University of Maryland. His research interests are in computer vision and machine learning with applications to human activity analysis and its applications in areas such as security and human health.

Expertise: computer vision, human activity analysis, machine learning, rehabilitation and preventive interventions

Honors and distinctions: NSF CAREER Award (2015), IEEE Senior Member (2014), University of Maryland Distinguished Dissertation award (2009), IBM Emerging Leader in Multimedia (2008)

Selected publications

Kuldeep Kulkarni, Pavan Turaga, ``Reconstruction-free action inference from compressive imagers", accepted at IEEE Transactions on Pattern Analysis and Machine Intelligence, July 2015.

R. Anirudh, P. Turaga "Geometry-based Symbolic Approximation for Fast Sequence Matching on Manifolds", accepted at the International Journal of Computer Vision, June 2015.

R. Anirudh, P. Turaga, J. Su, A. Srivastava, "Elastic Functional Coding of Human Actions: From Vector-Fields to Latent Variables", in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), June 2015.

A. Sivakumar, R. Anirudh, P. Turaga, "Geometric Compression of Orientation Signals for Fast Gesture Analysis", in IEEE Data Compression Conference (DCC), April 2015

Vinay Venkataraman, Pavan Turaga, Michael Baran, Nicole Lehrer, Tingfang Du, Long Cheng, Thanassis Rikakis, and Steven L. Wolf, ``Component-Level Tuning of Kinematic Features from Composite Therapist Impressions of Movement Quality", at IEEE Journal on Biomedical and Health Informatics (J-BHI) Nov 2014.

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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.

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

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

A, J. Lamadrid; D. L. Shawhan; C. E. Murillo-Sanchez; R. D. Zimmerman; Y. Zhu; D. J. Tylavsky; A. G. Kindle; Z. Dar, "Stochastically optimized, carbon-reducing dispatch of storage, generation, and loads," IEEE Transactions on Power Systems,2015;30 (2):1064-1075.

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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 Illinois, Sep. 2012, pgs. 6.

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

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D. Shi, D. J. Tylavsky, "An Improved Bus Aggregation Technique for Generating Network Equivalents" 2012 IEEE Power Engineering Society General Meeting, San Diego, CA, Jul. 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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Dragica Vasileska joined the ASU faculty in August 1997. She has published over 180 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 380 contributions and 18 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 Nanodechnology, 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 and plenary talks. She is a senior member of IEEE and a member of Phi Kappa Phi.

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

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 (1985 and 1990)

Selected publications

D. Brinkman at al., "Self-Consistent Simulation of CdTe Solar Cells with Active Defects", J. Applied Phys. (in press)

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

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A. Ashok, D. Vasileska, O. Hartin and S. M. Goodnick, Importance of the Gate-Dependent Polarization Charge on the Operation of GaN HEMTs, IEEE Transactions on Electron Devices, Vol. 56, pp. 998-1006, May 2009.

H. R. Khan, D. Mamaluy and D. Vasileska, "Approaching Optimal Characteristics of 10 nm High Performance Devices" a Quantum Transport Simulation Study of Si FinFET, IEEE Trans. Electron Devices, Vol. 55(1), pp. 743-753 (2008).

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.

K. Raleva, D. Vasileska, and S. M. Goodnick, "Is SOD technology the solution to heating problems in SOI devices?" Electron Device Letters, IEEE, vol. 29, issue 6, pp. 621-624, June 2008.

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Vijay Vittal joined the ASU faculty in 2005. Prior to ASU, he was an Anston Marston Distinguished Professor at Iowa State University's, Electrical and Computer Engineering Department. In addition, he was a Murray and Ruth Harpole Professor and director of the university's Electric Power Research Center and site director of the NSF/IUCRC Power System 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 to 2011. Vittal has published 154 articles in refereed journals, 130 refereed conference proceeding articles, twelve books and book chapters, and 13 research and technical reports.

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

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); Member 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).

Book:

Kezunovic, M., S. Meliopoulos, V. Venkatasubramanian, V. Vittal, Application of Time-Synchronized Measurements in Power System Transmission Networks, Springer, 2014.

Selected publications

Murugesan, V., Y. Chakhchoukh, V. Vittal, G.T. Heydt, N. Logic, and S. Sturgill, "Error Detection and Error Correction for PMU Data as Applied to State Estimators," IEE Power and Energy Technology Systems Journal, Vol. 2, pp. 1-9, 2015.

Eftekharnejad, S., G.T. Heydt, and V. Vittal, "Optimal Generation Dispatch with High Penetration of Photovoltaic Generation," IEEE Transactions on Sustainable Energy, Vol. 6, No. 3, pp. 1013-1020, July 2015.

Yang, L., M. He, J. Zhang, and V. Vittal, "Support Vector Machine Enhanced Markov Model for Short-term Wind Power Forecast," IEEE Transactions on Sustainable Energy, Vol. 6, No.3, pp. 791-799, July 2015..

Ganger, D., J. Zhang, V. Vittal, "Statistical Characterization of Wind Power Ramps Via Extreme Value Analysis, "IEEE Transactions on Power Systems, Vol. 29, No. 6, pp. 3118-3119, November, 2014.

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He, M., L. Yang, J. Zhang, and V. Vittal, "A Spatio-temporal Analysis Approach for Short-term Forecast of Wind Generation," IEEE Trans. on Power Systems, Vol. 29, No. 4, pp.1611-1622, July, 2014.

Chakhchoukh, Y., V. Vittal, G.T. Heydt, "PMU Based State Estimation by Integrating Correlation," IEEE Transactions on Power Systems, Vol. 29, No.2, pp. 617-626, March 2014.

Fan, M., V. Vittal, G.T. Heydt, R. Ayyanar, "Preprocessing Uncertain Photovoltaic Data," IEEE Transactions on Sustainable Energy, Vol. 5, No. 1, pp. 351-352, January 2014.

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Yu Yao received BS and MS degrees in electrical engineering from Tsinghua University and PhD degree in electrical engineering from Princeton University in 2011. From 2011 to 2014, she worked as a postdoctoral fellow at Harvard University. In 2015, she joined the faculty of Arizona State University as assistant professor of electrical engineering.

Expertise: electronic transport and optic properties of semiconductor nanostructures, two dimensional materials, nanophotonic structures and their applications in advanced optoelectronics and reconfigurable optical devices; mid-infrared technology and its application for infrared sensing, medical and imaging

Selected publications

S Zhang, MA Kats, Y Cui, Y Zhou, Y Yao, S Ramanathan, F Capasso, "Current-modulated optical properties of vanadium dioxide thin films in the phase transition region", Applied Physics Letters 105 (21), 211104, 2014.

Y. Yao, M. A. Kats, R. Shankar, Y. Song, J. Kong, M. Loncar, and F. Capasso, " Electrically tunable metasurface perfect absorbers for ultrathin mid-infrared optical modulators", Nano Letters, 14, 6526-6532, 2014.

Y. Yao, R. Shankar, P. Rauter, Y. Song, M. Loncar, J. Kong, and F. Capasso, "High responsivity mid-infrared graphene detectors with antenna enhanced photo-carrier generation and collection", Nano Letters, 14, 3749–3754, 2014.

Y. Yao, M. A. Kats, R. Shankar, Y. Song, M. Loncar, J. Kong, and F. Capasso, "Wide wavelength tuning of optical antennas on graphene with nanosecond response time", Nano Letters, 14, 214-219, 2014.

Y. Yao, M. A. Kats, P. Genevet, N. Yu, Y. Song, J. Kong, and F. Capasso, "Broad electrical tuning of graphene-loaded plasmonic antennas", Nano Letters, 13, 1257–1264, 2013.

Y. Yao, A.J. Hoffman, and C.F. Gmachl, "Mid-infrared quantum cascade lasers", (invited) Nature Photonics, 6, 432-439, 2012.

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Patent:

Q Liu, Y Yao, AJ Hoffman, M Escarra, KJ Franz, J Khurgin, Y Dikmelik, et. al, Highly power-efficient and broadband quantum cascade lasers, US Patent 8,644,358

Invited conference presentations:

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Y. Yao, M. A. Kats, R. Shankar,Y. Song, J. Kong, M. Loncar, and F. Capasso, "Ultra-compact high speed mid-IR modulators based on electrically tunable metasurfaces", IEEE. Summer topicals meeting series, Montréal, Québec, Canada, July, 2014.

Y. Yao, M. A. Kats, R. Shankar,Y. Song, J. Kong, M. Loncar, and F. Capasso, "Electrically tunable plasmonic antennas on graphene", Photonics West, San Francisco, CA, Jan. 2014.

Y. Yao, T. Tsai, X. Wang, G. Wysocki, and C.F. Gmachl. 'Broadband Quantum Cascade Lasers Based on Strongly-coupled Transitions with an External Cavity Tuning Range over 340 cm-1', International Conference on Intersubband Transitions in Quantum Wells (ITQW), Badesi, Italy, Sep. 2011.

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Lei Ying received his bachelor's degree from Tsinghua University in Beijing, China, and his master's and doctoral degrees in electrical and computer engineering from the University of Illinois at Urbana-Champaign. He is currently an associate professor at Arizona State University, and an Associate Editor of the IEEE/ACM Transactions on Networking. His research interest is broadly in the area of stochastic networks, including cloud computing, communication networks and social networks. He is coauthor with R. Srikant of the book Communication Networks: An Optimization, Control and Stochastic Networks Perspective, Cambridge University Press, 2014.

Expertise: stochastic networks, including cloud computing, communication networks and social networks

Honors and distinctions: Young Investigator Award from the Defense Threat Reduction Agency (DTRA) (2009), NSF CAREER Award (2010), Northrop Grumman Assistant Professor in the Department of Electrical and Computer Engineering at Iowa State University (2010-2012), Best paper award at IEEE INFOCOM (2015), A notable book in the Computing Reviews' 19th Annual Best of Computing list (Communication Networks: An Optimization, Control and Stochastic Networks Perspective).

Selected publications

R. Srikant and Lei Ying. "Communication Networks—An Optimization, Control and Stochastic Networks Perspective," Cambridge University Press, 2014.

Lei Ying, R. Srikant and X. Kang. The Power of Slightly More than One Sample in Randomized Load Balancing. Proc. INFOCOM 2015, Hong Kong, China, April, 2015. (Best Paper Award).

K. Zhu and Lei Ying. "A Robust Information Source Estimator with Sparse Observations." Proc. INFOCOM 2014, Toronto, Canada, April, 2014.

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.

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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 master's degree in physics in 1996 from Peking University, China, and conducted his post-doctoral research at California Institute of Technology and University of California at Los Angeles.

Expertise: nanostructure and nano device fabrication and characterization, nanoelectronics, flexible, transparent and wearable 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

Honors and distinctions: Graduate Research Award, American Vacuum Society (2001)

Selected publications

Priyanka Manchanda, Vinit Sharma, Hongbin Yu, D. J. Sellmyer, and Ralph Skomski, Magnetism of Ta Dichalcogenide Monolayers Tuned by Strain and Hydrogenation' Appl. Phys. Lett., 107 032402, (2015).

Hao Wu, Shirong Zhao, Donald S. Gardner, and Hongbin Yu, "Control of magnetic flux and eddy currents in magnetic films for on-chip radio frequency (RF) inductors: Role of the magnetic vias", J. Appl. Phys. 115, 17E719 (2014).

Luying Li, Zhaofeng Gan, Martha R. McCartney, Hanshuang Liang, Hongbin Yu, Yihua Gao, Jianbo Wang and David J. Smith , 'Determination of Polarization-Fields across Polytype Interfaces in InAs Nanopillars' Advanced Materials, 26, 1052-1057, 2014.

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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).

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Hongyu Yu joined ASU in 2008 holding a joint position at the School of Earth and Space Exploration and ECEE. He received his bachelor's and master's degrees in electronics engineering from Tsinghua University, Beijing, China, in 1997 and 2000, respectively, and a Ph.D. in electrical engineering from the University of Southern California in 2005. His research area is focused on MicroElectroMechanical Systems (MEMS) and other micro systems for earth and space exploration and consumer electronics. His research is to provide portable platforms consumer electronics and instruments for and scientists to explore variety of earth environments and space science, such as micro seismometer and bio-chemistry liquid sensors for planetary exploration. His current projects also include the manufacture of high energy density lithium ion batteries and deformable electronics (including origami electronics) as a universal platforms for consumer products.

Expertise: sensor devices (such as acoustic transducers, inertial sensor and fluidic sensors), integrated sensor systems (flexible, stretchable and deformable platforms)

Selected publications

Z. Song, X. Wang, C. Lv, Y. An, M. Liang, T. Ma, D. He, Y.-J. Zheng, S.-Q. Huang, H. Yu, and H. Jiang, "Kirigami-Based Stretchable Lithium-Ion Batteries," Scientific Reports, DOI: 10.1038/srep10988, 2015

M. Liang, H. Yu, M. Ngan, S. Nickerson, E. Nofen, and L. Dai, "MEMS Accelerometer Based on Molecular Electronic Transducers Using Ionic Liquid," IEEE Nano 2015, Rome, Italy

R. Tang, H. Huang, H. Tu, H. Liang, M. Liang, Z. Song, Y. Xu, H. Jiang, and H. Yu, 2014, "Origami-enabled Deformable Silicon Solar Cells," Applied Physics Letters, 104, 083501

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Shimeng Yu received a bachelor's degree in microelectronics from Peking University in 2009, and a master's degree and Ph.D. in electrical engineering from Stanford University in 2011 and in 2013, respectively. He did summer internships in IMEC, Belgium in 2011, and IBM TJ Watson Research Center in 2012. He is currently an assistant professor of electrical engineering and computer engineering at Arizona State University.

His research interests are emerging nano-devices and circuits beyond CMOS technology with focus on the resistive switching memories, and new computing paradigms beyond von-Neumann architecture with a focus on the brain-inspired neuromorphic computing. He has published more than 30 journal papers and 70 conference papers with over 2,000 citations and an H-index of 24.

Among his honors, he was awarded the Stanford Graduate Fellowship from 2009 to 2012, the IEEE Electron Devices Society Masters Student Fellowship in 2010, and the IEEE Electron Devices Society Ph.D. Student Fellowship in 2012. He has served on the Technical Committee of Nanoelectronics and Gigascale Systems, IEEE Circuits and Systems Society since 2014.

Expertise: emerging nano-devices and circuits beyond CMOS technology, new computing paradigms beyond von-Neumann architecture

Selected publications

S. Yu, P.-Y. Chen, Y. Cao, L. Xia, Y. Wang, H. Wu, "Scaling-up resistive synaptic arrays for neuro-inspired architecture: challenges and prospect," IEEE International Electron Devices Meeting (IEDM) 2015, Washington DC, USA, invited.

P.-Y. Chen, B. Lin, I.-T. Wang, T.-H. Hou, J. Ye, S. Vrudhula, J.-S. Seo, Y. Cao, and S. Yu, "Mitigating effects of non-ideal synaptic device characteristics for on-chip learning," IEEE/ACM International Conference on Computer-Aided Design (ICCAD) 2015, Austin, TX, USA.

P.-Y. Chen, D. Kadetotad, Z. Xu, A. Mohanty, B. Lin, J. Ye, S. Vrudhula, J.-S. Seo, Y. Cao, S. Yu, "Technology-design co-optimization of resistive cross-point array for accelerating learning algorithms on chip," IEEE Design, Automation & Test in Europe (DATE) 2015, Grenoble, France.

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R. Fang, Y. Gonzalez-Velo, W. Chen, K. Holbert, M. Kozicki, H. Barnaby, S. Yu, "Total ionizing dose effect of γ-ray radiation on the switching characteristics and filament stability of HfOx resistive random access memory," Appl. Phys. Lett., 104, 183507, 2014.

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S. Yu, R. Jeyasingh, Y. Wu, and H.-S. P. Wong, "Understanding the conduction and switching mechanism of metal oxide RRAM through low frequency noise and AC conductance measurement and analysis," IEEE International Electron Devices Meeting (IEDM) 2011, pp. 275-278, Washington DC, USA.

S. Yu, X. Guan, and H.-S. P. Wong, "On the stochastic nature of resistive switching in metal oxide RRAM: physical modeling, Monte Carlo simulation, and experimental characterization," IEEE International Electron Devices Meeting (IEDM) 2011, pp. 413-416, Washington DC, USA.

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Junshan Zhang joined the ASU faculty as an assistant professor in August 2000. He received a bachelor's degree in electrical engineering from the Huazhong University of Science and Technology, China, in 1993, a master's degree in mathematical 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 the TPC co-chair for IEEE INFOCOM 2012 and ACM MOBIHOC 2015.

Expertise: wireless networks, mobile social networks, network optimization/ control, cyber-physical systems, smart grid, stochastic modeling and analysis

Honors and distinctions: IEEE fellow, NSF CAREER Award (2003), ONR YIP Award (2005), IEEE INFOCOM Best Paper Award runner-up (2009), IEEE ICC Best Paper Award (2008), IEEE INFOCOM Best Paper Award runner-up (2014)

Selected publications

Xu Chen, Xiaowen Gong, Lei Yang, and Junshan Zhang: "A Social Group Utility Maximization Framework with Applications in Database Assisted Spectrum Access," IEEE INFOCOM 2014.

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

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

Miao He, Vijay Vittal, and Junshan Zhang: "Online dynamic security assessment with missing PMU measurements: A data mining approach," IEEE Transactions on Power Systems. 2013; 28(2):1969-1977.

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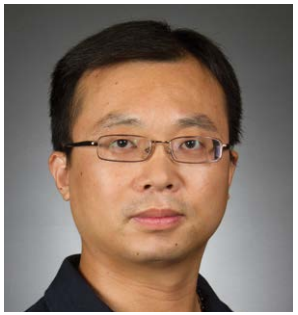

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Yanchao Zhang joined Arizona State University in June 2010 as an associate professor in the School of Electrical, Computer, and Energy Engineering. Before ASU, he was an assistant professor of electrical and computer engineering at New Jersey Institute of Technology from 2006 to 2010. He is on the editorial boards of IEEE Transactions on Mobile Computing, IEEE Transactions on Control of Network Systems, IEEE Transactions on Vehicular Technology and IEEE Wireless Communications. Zhang's primary research is about security and privacy issues in computer and networked systems, with current focus areas in emerging wireless networks, mobile crowdsourcing, Internet-of-Things, social networks, wireless/mobile systems for disabled people, wireless/mobile health and mobile and wearable devices. He received an NSF CAREER Award in 2009, is a senior member of IEEE, and was a co-chair of the 2015 NSF Workshop on Wireless Security.

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

Honors and distinctions: NSF CAREER Award (2009)

Selected publications

Rui Zhang, Jingchao Sun, Yanchao Zhang, and Chi Zhang, "Secure spatial top-K query processing via untrusted location-based service providers, " IEEE Transactions on Dependable and Secure Computing, vol. 12, no. 1, pp. 111-124, January/February 2015.

Xiaocong Jin, Jingchao Sun, Rui Zhang, and Yanchao Zhang, "SafeDSA: Safeguard dynamic spectrum access against fake secondary users," ACM Conference on Computer and Communications Security (CCS'15), Denver, Colorado, October 2015

Jinxue Zhang, Jingchao Sun, Rui Zhang, and Yanchao Zhang, "Your actions tell where you are: Uncovering Twitter users in a metropolitan area," IEEE Conference on Communications and Network Security (CNS'15), Florence, Italy, September 2015

Xiaocong Jin, Jingchao Sun, Rui Zhang, Yanchao Zhang, and Chi Zhang, "SpecGuard: Spectrum misuse detection in dynamic spectrum access systems," IEEE International Conference on Computer Communications (INFOCOM'15), Hong Kong, China, April 2015

Yimin Chen, Jingchao Sun, Rui Zhang, and Yanchao Zhang, "Your song your way: Rhythm-based two-factor authentication for multi-touch mobile devices," IEEE International Conference on Computer Communications (INFOCOM'15), Hong Kong, China, April 2015

Yong-Hang Zhang

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Yong-Hang Zhang joined the faculty in 1996 from Hughes Research Laboratories. He has published over 260 book chapters and research articles in refereed journals and conference proceedings, has 11 issued U.S. patents, has edited 3 conference proceedings and authored or co-authored more than 330 invited and contributed conference presentations.

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

Honors and distinctions: IEEE and OSA Fellow, Innovation and Excellence in Laser Technology and Applications Award from Hughes Research Labs, multiple best student presentation awards, chair and co-chair of numerous international conferences and workshops

Selected publications

A.D. Prins, M.K. Lewis, Z.L. Bushell, S.J. Sweeney, S. Liu, Y.-H. Zhang, Evidence for a defect level above the conduction band edge of InAs/InAsSb type-II superlattices for applications in efficient infrared photodetectors, Appl. Phys. Letts. 106, 171111 (2015)

X.-H. Zhao, M. J. DiNezza, S. Liu, C. M. Campbell, Y. Zhao, and Y.-H. Zhang, Determination of CdTe bulk carrier lifetime and interface recombination velocity of CdTe/MgCdTe double heterostructures grown by molecular beam epitaxy, Appl. Phys. Letts. 105, 252101 (2014).

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.

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Yuji Zhao received the B.S. degree in Microelectronics from Fudan University, China, in 2008, and the Ph.D degree in Electrical and Computer Engineering from University of California, Santa Barbara (UCSB) in 2012. Prior to joining ASU in 2014, he was an assistant project scientist in the Materials Department and Solid State Lighting and Energy Center (SSLEC) at UCSB. Zhao has worked extensively on GaN materials and devices, with more than 50 conference and journal publications, one book chapter, and over 10 patents, and has won Outstanding Research Award from UCSB for a record four consecutive times (2010 to 2013). His work on GaN LEDs and lasers was recognized with a Most Cited Article of the Year Award from Applied Physics Express, an Editor's Pick of the Year Award from Applied Physics Letters, a Best Paper Award from CLEO, and was featured in over 100 international news outlets in five languages, including Science, Nature Photonics, Optical Society of America (OSA), Compound Semiconductors, and Yahoo. Since joining ASU in August 2014, he has received 2015 Bisgrove Scholar Faculty Award and 2015 NASA Early Career Faculty Award.

Expertise: electronics and photonics; MOCVD growth and device applications of GaN wide bandgap semiconductors, including LEDs, lasers, solar cells, and power transistors; nanofabrication and nanoscale characterizations; new physics, materials, and devices for future solid-state electronics

Selected publications

J. Xue, Y. Zhao, S. H. Oh, J. S. Speck, S. P. DenBaars, S. Nakamura, and R. J. Ram, "Thermally Enhanced Blue Light-Emitting Diodes", Appl. Phys. Lett., in press (2015).

C. C. Pan, Q. Yan, H. Fu, Y. Zhao, Y. R. Wu, C. G. Van de Walle, S. Nakamura, and S. P. DenBaars, "High optical power and low efficiency droop blue light-emitting diodes using compositionally step-graded InGaN barrier", Electron. Lett., vol. 51, pp. 1187–1189 (2015).

K. Gelzinyte, S Marcinkevicius, Y. Zhao, D. L. Becerra, S. Nakamura, S. P. DenBaars, and J. S. Speck, "High spatial uniformity of photoluminescence spectra in semipolar (20-21) plane InGaN/GaN quantum wells", J. Appl. Phys., vol. 117, 023111 (2015).

D. L. Becerra, Y. Zhao, S. H. Oh, C. D. Pynn, K. Fujito, S. P. DenBaars, and S. Nakamura, "High-power low-droop violet semipolar (30-3-1) InGaN/GaN light-emitting diodes with thick active layer design", Appl. Phys. Lett., vol. 105, 171106 (2014).

Y. Zhao, R. M. Farrell, Y. R. Wu, and J. S. Speck, "Optical polarization ratio and valance band separation for nonpolar and semipolar InGaN quantum well light-emitting devices", Jpn. J. Appl. Phys. Selected Topics in Applied Physics, vol. 53, 100206 (2014). Invited Review.

Faculty and staff recognition

IMPACT and Fulton Difference Awards

Our advising team was recognized with a Teamwork Award at the 2015 IMPACT and Fulton Difference Awards Lunch. The award recognizes a team within the Ira A. Fulton Schools of Engineering that strives for the highest possible standards and distinguishes themselves by exemplifying teamwork, communication and positive interaction.

Congratulations to:

Lauren Levin
Elizabeth Moore
Gia McLaughlin
Pamela Van Husen
Allison Lake
Esther Korner
Toni Mengert
Maria Balderas
Cheryl McAfee

The IMPACT Awards are designed to promote, recognize and reward excellence in contributions made to the Fulton Schools of Engineering and the University, through innovative projects, mentoring, accomplishments in performance, personal achievements, advances in customer service and teamwork. The Fulton Difference Award recognizes a supervisor who, through their ability to motivate, communicate, inspire and develop their staff, has contributed to the Fulton Difference and provided exemplary leadership.

Other staff nominated for recognition included:

Julie Castro
Laura DiPaolo
Scott Duncan
Emily Fassett
Michelle Iafrat
Jenna Marturano
Joelina Peck
Loriann Brichetto
Regina Sanborn

SUN Awards

Serving University Needs (SUN) Awards are given between peers to recognize and honor individual excellence in areas such as continuous improvement, creativity, customer satisfaction, excellent performance, fostering cooperation, sustainability, valuing diversity and promoting Arizona State University. These awards honor the ways ASU employees work together to accomplish shared university goals.

Congratulations to our faculty and staff that were recognized by their peers.

James Aberle
Delilah Alirez
Maria Balderas
Jennifer Blain Christen
Loriann Brichetto
Jared Broderick
Julie Castro
Rebecca Davis
Laura DiPaolo
Emily Fassett
Michael Goryll
Theresa Herr
Michelle Iafrat
Esther Korner
Michael Kozicki
Allison Lake
Lauren Levin
Thomas Lewis
Darleen Mandt
Jenna Marturano
Cheryl McAfee
Gia McLaughlin
Toni Mengert
Cynthia Moayedpardazi
Elizabeth Moore
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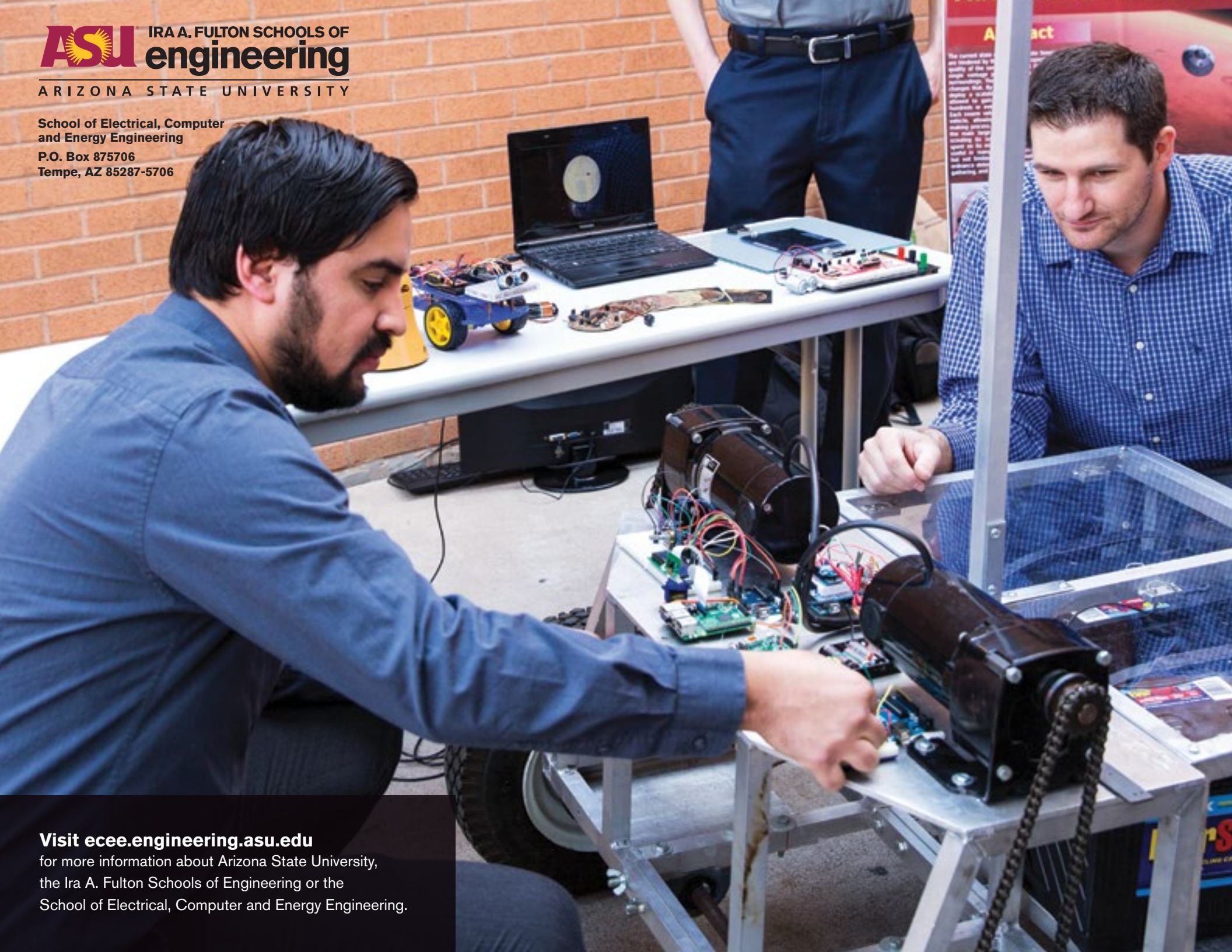

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