FOCUS ON TECHNOLOGY

DEPARTMENT OF
Electrical Engineering

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2003 - 2004
Online Education

EE Department takes its master's program to a new level – distance learning online

The ASU Electrical Engineering Department renowned faculty is teaching at a place it has never gone before – the World Wide Web.

This year, the EE Department is offering online classes for the Master of Science in Engineering in electrical engineering with no residency requirements. The online courses and M.S.E. program allow alumni and professionals to access ASU from anywhere in the world through flexible delivery.

While teaching through distance learning is nothing new to the EE Department, it is the first opportunity to pursue the M.S.E. in electrical engineering entirely via the Internet. The classes are modeled after those taught in person at ASU and have been transformed to allow students to access them from the workplace, home or during travel.

“I really enjoy having the freedom of taking classes at my own pace. Offering online courses at ASU allows me to balance my work, home, and school life,” said Tony Yu, an engineer at Medtronic. “In addition to the flexibility of taking courses online, you get an entire staff of dedicated support from the ASU Engineering Online Team whom have been committed in seeing me (and ultimately their programs) through to success.”

The material in the online courses is the same as the regular courses taught during the school year. Students taking the online classes have access to the same lectures through streamed media, the same books, and even the same interaction with other students and faculty through interactive portals in the ASU course management system.

This year, the EE Department enrolled more than 100 students in online courses and programs. The ASU Ira A. Fulton School of Engineering now offers over 10 graduate programs and areas of study online focused for the engineering professional.

For additional information, visit www.asuengineeringonline.com or call (480) 965-1740.
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It is a pleasure for me to report on the accomplishments of the Department of Electrical Engineering this past academic year, within the newly named Ira A. Fulton School of Engineering at Arizona State University. The generous $50 million endowment provided by local home builder Ira A. Fulton is already benefiting engineering students in the school through graduate and undergraduate stipends, laboratory support, and hiring of outstanding faculty through endowed chairs.

One of the most important milestones for us this year was our first successful ABET accreditation visit under the new EC2000 criteria in Fall 2003. The department has been preparing for this visit since 1997, following our last ABET accreditation under the old criteria. A great deal of effort has been directed toward building constituent groups of students, industry and faculty, and in establishing assessment strategies, including an assessment Web site which has proved invaluable in documenting continuous change and its impact on the undergraduate program. We were very pleased to have received full accreditation with no weaknesses or deficiencies identified. We now have a six-year window in which to look toward new changes and innovation in the undergraduate program in response to the changing needs of the global high-tech economy.
Our graduate program has been undergoing a rapid change due to the convergence of several factors. We are devoting more resources toward increasing and enhancing our Ph.D. program, as part of our effort to raise the research profile of the department. Ph.D. enrollment has grown from approximately 150 to more than 200 students in the past two years, due in large part to the increased level of funded research in the department. At the same time, a conscious effort has been made to increase the selectivity of the master’s program and decrease the numbers of students in the on-campus program. This decision, coupled with the greatly increased visa restrictions for foreign nationals over the past two years, have resulted in a net decline of master’s degree students for the first time last year. In its place, increased effort is currently being directed at increasing enrollment in online distance education programs through the recent introduction of the ASU M.Eng. online program.

The research productivity of the department has continued to grow, with research expenditures in excess of $9 million, and a large increase in new awards. In particular, several EE faculty members helped lead the successful awarding of the Army Flexible Display Center at ASU, which is the feature story of this year’s annual report. This $43.7 million center is the largest federal award in ASU’s history, and was strongly leveraged through ASU’s purchase of a former facility used for flat panel display R&D, containing 43,500 square feet of clean-room space within a 250,000-square-foot facility. The new center will be housed in the lab facility, and the additional capacity will be used to help attract future large center funding.

We are looking forward to continued growth and improved quality of our educational programs, and hope that you enjoy the snapshot provided of the department in this year’s annual report.

Sincerely,

Stephen M. Goodnick
Chair, Electrical Engineering
DeMassa will be greatly missed by EE Department

Tom was a wonderful colleague and friend. His dedication to excellence in teaching was an inspiration to students and professors alike.

Dr. Thomas A. DeMassa, emeritus faculty in electrical engineering, passed away Nov. 14, 2003. DeMassa began his career in the electrical engineering department in 1966 and retired in 1999, after working at ASU for 33 years. He will be greatly missed by the EE Department.

A well-respected instructor in electrical engineering, DeMassa was widely known for his research in digital circuits and systems, and published several papers and textbooks about his work. His honors included the School of Engineering Undergraduate Teaching Excellence Award, four NTU Outstanding Teacher Awards, the Detroit Alumni Scholarship, and the National Defense Act Graduate Fellowship.

In addition to electrical engineering, DeMassa also had another passion: football. He lettered in football at the University of Michigan where he received two masters' degrees and a doctorate. He was an avid fan of the Sun Devils football team, as well as the local high school teams, such as Dobson High School in Mesa where his son is head coach. His wife, Joann, worked as a secretary for ASU football for 25 years.

The lasting impact DeMassa made on the department will not be forgotten.

“Tom was a wonderful colleague and friend. His dedication to excellence in teaching was an inspiration to students and professors alike,” said Dr. Joseph Palais, a long-time colleague.

A scholarship fund has been created in his memory.

Contributions may be sent to the Business Manager for the DeMassa Memorial, Arizona State University, Department of Electrical Engineering, P.O. Box 875706, Tempe, AZ 85287-5706.

Goodnick named IEEE fellow

Stephen Goodnick, professor and department chair, was named a 2004 IEEE fellow for his contributions to carrier transport fundamentals and semiconductor devices.

Goodnick is the fifth ASU professor to become an IEEE fellow in the last four years. He joins 2003 fellow Andreas Spanias, 2002 fellow Sayfe Kiaei and 2001 fellows Samir El-Ghazaly and Sethuraman Panchanathan.
O’Neil wins Outstanding Supervisor Award

Cynthia O’Neil, business operations manager for the electrical engineering department, was one of the winners selected by ASU’s Classified Staff Council (CSC) for the 2003 Outstanding Supervisor Award. The mission of CSC’s award is to recognize managers who have a positive approach with their leadership. O’Neil, who was nominated by one of her employees, has exactly that.

“As a supervisor of many women of various ages, Cynthia has kept the lines of communication within the department open by relating to each woman’s individual circumstances,” EE staff member Kathleen Shumaker wrote in her nomination. “She understands that life doesn’t end here and she relates to other peoples’ various situations with the same reasoning. She uses the same concept on all of us. She sees our humanity, not just our job titles.”

She sees our humanity, not just our job titles.

Panchanathan receives Academic Collaboration Award

Professor Sethuraman Panchanathan received the Academic Collaboration Award from the ASU Disability Resources for Students (DRS) for his work with iCARE (information Technology Centric Assistive & Rehabilitative Environment), a program that helps students, who are blind, deaf-blind and visually-impaired, conduct everyday activities such as reading, surfing the Web and recognizing the world around them.

The program’s overall goal is “to enrich the lives of individuals who are blind including opening up educational opportunities,” Panchanathan said.

iCARE is led by Panchanathan and other faculty at Arizona State University. The program uses a blend of technology, low-tech concepts and support to make getting a degree in computer science and engineering more accessible, and is also designed to create a paperless interactive classroom environment.

Panchanathan said he was pleasantly surprised when he learned of this year’s award and thankful for the support of the ASU community for recognizing the hard work of the iCARE team.

For more information about iCARE, visit the Center for Cognitive Ubiquitous Computing (CUBiC) at http://cubic.asu.edu.
Kozicki’s company named one of the top 60 start-ups

A spin-off from Arizona State University research has made its mark on the industry. Professor Michael Kozicki has managed to make his company – Axon Technologies Corporation – a major success, according to Silicon Strategies’ Web site.

“To be included is excellent,” Kozicki said. “We are very excited about it.”

The publication rated his company as one of the top 60 start-ups in the nation. This honor is based on a company’s financial position, investors, markets and technology. The start-ups listed are involved in IC, MEMS, fab equipment, packaging and foundry sectors.

“We have technology that promises to make a huge difference to the industry in many senses,” Kozicki said. “We think we can make a big impact.”

Axon Technologies Corporation is an intellectual property licensing company which was spun out of ASU in 1996. It has leveraged its core competence in materials science to create a broad IP portfolio around Programmable Metallization Cell (PMC) technology. Based on novel ion conducting materials, PMC has applications in fields ranging from low power non-volatile memory and switches to microelectromechanical systems (MEMS) and microfluidic devices.

Spanias appointed IEEE distinguished lecturer

Professor Andreas Spanias was appointed by the IEEE Signal Processing Society as a distinguished lecturer for 2004.

The IEEE program is one of the premier outreach programs in electrical and computer engineering and its board of governors appoints up to six distinguished lecturers annually. These lecturers give open seminars to IEEE chapters, IEEE conferences, universities and selected technical events worldwide.

Spanias will give seminars in speech and audio coding, adaptive algorithms for array microphones and smart antennas and autoregressive modeling of DNA sequences. Spanias also was named an IEEE fellow last year.
The Department of Electrical Engineering welcomes five new members to its faculty

**Electromagnetics and Microwave Circuits**

Abbas Abbaspour-Tamijani, assistant professor, Ph.D., University of Michigan, Ann Arbor

Dr. Abbaspour-Tamijani received a Ph.D. in electrical engineering in 2003 from the University of Michigan, Ann Arbor, and a M.S. in electrical engineering in 1997 from the University of Tehran. His publications include four journal papers, 11 conference papers and five technical reports. Prior to ASU, Dr. Abbaspour-Tamijani was a graduate research assistant at the University of Michigan Radiation Lab and also worked at the UCLA Antenna Lab as a visiting student researcher. His research interests include microwave electronics.

**Electronic and Mixed-Signal Circuit Design**

Bertan Bakkaloglu, associate professor, Ph.D., Oregon State University

Dr. Bakkaloglu received a Ph.D. in electrical and computer engineering in 1995 from Oregon State University, and a M.S.C. in 1992 from the University of Houston, Texas. He has three patents and has published 16 papers. Prior to ASU, Dr. Bakkaloglu was with Texas Instruments' Broadband Silicon Technology Center where he was in charge of IC development and technical leadership for IC development for wireline communication transceivers. He also worked on mixed signal / RF and power management ICs for wireless handsets as a designer and technical lead. His research interests include RF and analog mixed-signal IC design.

**Solid-State Electronics**

Hugh J. Barnaby, assistant professor, Ph.D., Vanderbilt University

Dr. Barnaby received a Ph.D. in 2001 and M.S.E. in 1999 both in electrical engineering from Vanderbilt University in Nashville, Tenn. He has been an active researcher in the radiation effects field for almost 12 years, presenting and publishing more than 40 papers during this time. He recently was an assistant professor at the University of Arizona, focusing on research in microelectronics processing and fabrication, semiconductor devices, analog and mixed signal design and test, reliability and radiation effects and bioelectronic sensors and actuators. Dr. Barnaby also worked as a staff scientist for the microelectronics division at Mission Ranch Corporation in Albuquerque, N.M. His research interests include semiconductors in hostile environments and radiation environments.

**Lawrence T. Clark, associate professor, Ph.D., Arizona State University**

Dr. Clark received a Ph.D. in 1992 and a M.S. in 1987 in electrical engineering from Arizona State University, and was an adjunct professor at ASU as well. Prior to ASU, Dr. Clark was an associate professor at the University of New Mexico, supervising and performing research in low power and high performance VLSI design. Dr. Clark has 40 patents and 20 pending patents, and has published 21 papers. He also has several years of industry experience, recently working as a principal engineer at Intel where he managed circuit design for 1.5GHz XScale microprocessor design on 90nm technology and led 25 circuit designers. His research interests include low power and high performance VLSI circuit design.

**Arts, Media and Engineering**

Professor Gang Qian, assistant professor, Ph.D., University of Maryland, College Park

Dr. Qian received the B.E. degree in electrical engineering from the University of Science and Technology of China (USTC) in 1995, and the M. S. and Ph. D. degrees in electrical engineering from the University of Maryland at College Park in 1999 and 2002, respectively. He was a faculty research assistant in 2001 and a research associate in 2002 for the Center for Automation Research at the University of Maryland Institute for Advance Computer Studies. His research interests include human motion analysis, signal and image processing, computer vision, statistical learning and inference for computer vision, and image analysis.
Desai and Berisha win National Science Foundation graduate fellowships

Electrical engineering students Visar Berisha and Jennifer Nisha Desai received the Graduate Research Fellowship (GRF) award from the National Science Foundation (NSF). The NSF honors approximately 900 graduate students annually nationwide in science, mathematics and engineering.

Desai received her fellowship to pursue research in wireless communications with a focus on power management for wireless handsets. Berisha’s research will focus on speech and audio coding, specifically researching methods of obtaining higher audio fidelity through coders traditionally meant for speech.

The fellowship has a maximum tenure of three years and a stipend of $30,000 per year, and travel allowances are available. NSF fellows also have the opportunity to apply for start-up grants to use supercomputers at the foundation’s Partnership for Advanced Computational Infrastructure (PACI) facilities. They also can participate in the foundation’s prestigious Preparing Future Faculty and Preparing Future Professionals programs.

Desai named ARCS scholar

Doctoral student Jennifer Nisha Desai was named a 2004 ARCS scholar by the Phoenix chapter of the Achievement Rewards for College Scientists Foundation, which awards $6,000 scholarships to assist graduate research in the sciences. Jason Ayubi-Moak was an ARCS scholar in 2003.

Delp receives honorable mention at AEC/APC symposium

Deana Delp received honorable mention at the 2003 Advanced Equipment Control/Advanced Process Control (AEC/APC) Symposium for her work on the paper, “Availability Adjustments on Dominant X-Factor Contribution Machines for Improving Performance.”

Co-authors of the paper are Dr. Jenni Si from the Department of Electrical Engineering and Drs. Yuh-Chang Hwang and Buck Pei from ASU’s College of Business.

The AEC/APC Symposium annually conducts a student competition for papers, and several semiconductor industry participants support the contest. Winners receive an all-expense paid trip to the symposium to present their papers.

Delp is currently a faculty research/teaching associate at Arizona State University. She graduated with her doctorate in electrical engineering from ASU in December 2003 and was advised by Dr. Si.
## 2003/2004 Doctoral Graduates

### Summer 2003


### Fall 2003


**Fazla Rabbi M.B. Hossain**, “Characteristics of N-Type Silicon Schottky Contacts,” D. Schroder, chair.

**Dean Adam Badillo**, “Low Power, Low Phase Noise CMOS Ring Oscillators,” S. Kiaei, chair.


### Spring 2004


**Siamak Abedinpour**, “Distributed Monolithic Power Management for a System-on-a-Chip (SOC),” S. Kiaei, chair.


Graduate students Prem Kuchi and Raghuram Hiremagalur win Fulton School’s Entrepreneurship 2004

Prem Kuchi and Raghuram Hiremagalur won the annual Fulton School of Engineering’s Entrepreneurship 2004 competition for their business endeavor, MotionEase, a computer vision system that has affordable and timely motion capture.

Entrepreneurship 2004 is a competition in which students plan a start-up company and submit a business proposal to a panel of judges. After reviewing the proposals, judges then select the finalists, who present their business plan as part of the second round. Twenty-two student groups submitted proposals for the 2004 competition.

As winners, MotionEase will receive funding to begin the initial start up of their company. The judges also awarded an additional seed investment to Custom Microfluidics, proposed by bioengineering associate research scientist Anil Vuppu and bioengineering graduate student Tilak Jain.


AFRL Space Scholar

Electrical engineering graduate student John Spann has been selected by the Air Force Research Laboratory (AFRL) to participate in the Space Scholar Program.

The elite program, headquartered at Kirtland Air Force Base in Albuquerque, N.M., features top undergraduate juniors and seniors and graduate students in science and engineering. Last year, it mentored 29 students from 25 different colleges and the Air Force Academy.

Spann will work this summer at the Kirtland Air Force Base in low-power transistor technology, bringing to the program the research knowledge and skills he gained through working for the Center for Solid State Electronics Research at ASU.

University Graduate Scholarships Awarded

Visar Berisha, Aaron Fullerton, Joseph Ervin and Jonathan Stahlhut each won a three-year merit package through the University Graduate Scholars Program. The scholarship provides a stipend enhancement of $3,250 and a tuition waiver each year, in addition to the research or teaching assistantship provided by the department. Win Ly continues his UGS graduate assistantship awarded in 2001-2002; Joshua Hihath and Enrique Ledezma continue their assistantships awarded in 2002-2003.
EE Distinguished Senior Award

This year’s electrical engineering Distinguished Senior Award recipient is Christel Amburgey. Amburgey, a National Merit Scholar who graduated December 2003, was recognized by the department for maintaining a 3.9 GPA, while working with various ASU and community organizations, including serving as an officer for IEEE.

The department presents this award to the most outstanding EE senior. Candidates must participate in school activities and organizations, provide service to the Ira A. Fulton School of Engineering and demonstrate scholastic ability.

“I feel extremely honored,” she said. “There were a lot of other deserving students in my graduating class and I consider myself lucky to receive this honor.”

Amburgey graduated with Summa Cum Laude honors and is also a Barrett Honors College graduate. Her research interests include computational electromagnetism and material-wave interaction as well as electro-magnetic sensing in living organisms and the interaction between living organisms and electro-magnetic waves.

In her undergraduate program, she worked with a variety of research projects, including a project that simulated a power regulator to control the flow of power in transmission lines; a project to reduce the size of an integrated circuit for scuba diving communication; and projects in the Laboratory for Multi-Disciplinary Analysis and Design of Material Wave Interactions.

She is currently enrolled in the master’s program in electrical engineering at ASU and works for Dr. Rudy Diaz in the ASU Material-Wave Interaction Lab. In the future, Amburgey hopes to work in both the industry and academia.

Palais Award

Elias Kyriakides received the Palais Outstanding Doctoral Student Award for 2003-2004. He was advised by Professor Gerald Heydt, and is currently working with Dr. Heydt on parameter identification of synchronous generators as a faculty research associate.

Joseph Palais, professor and associate chair of graduate studies, and his wife Sandra established the Outstanding Doctoral Student Award. The award is presented annually to a graduating doctoral student with a minimum 3.75 GPA and at least one journal or conference publication. The recipient receives $500 and a commemorative plaque.

Kyriakides will not only leave ASU with this award, but also with the invaluable experience he has gained through the EE department, including the team spirit and close collaboration between department researchers.

“I have collaborated with faculty and students in the area of electric power engineering and in electrical engineering in general. The dedication of the people in EE to research and professional advancement is phenomenal,” he said. “Of course, I need to mention that my close collaboration with my advisor Dr. Gerald T. Heydt and the overall research experience with him will definitely prove to be beneficial to my professional life.”

Kyriakides’ research interests include parameter identification of synchronous generators, power system stability, state estimation, energy generation from renewable resources, distributed generation, and computer applications in power engineering. His goal is to pursue a career in academia and develop a successful independent research program in electrical engineering with a concentration in power systems.
Connection One is a National Science Foundation Industry/University Cooperative Research Center (I/UCRC) focused on communication circuits and systems. The center is a multi-university center, including University of Arizona and University of Hawaii. The center researches all aspects of educational and research programs entailing wireless and wireline communications, radio frequency, integrated circuit design, and mixed-signal analog/digital integrated circuits for communications and related areas.

Connection One’s name reflects its vision, which is to simplify and enable small, portable, all-in-one communication devices. The center pursues research projects that enable integration of many communication devices into one small package by combining innovative systems and integrated-circuitry techniques. This exclusive industry/university partnership encompasses an educational program, state-of-the-art research initiatives, and development of new devices that will handle multiple communication protocols on one small system using new transceiver System-on-a-Chip technology.

Connection One’s mission contains both an educational and a research component. With the support of industry, this center has established a state-of-the-art educational program in telecommunication mixed-signal integrated circuit design. Because the center is a cooperative research program where each project is sponsored and supported by an industrial member, there is a one-to-one link between the faculty, the students, and the industrial member. The center sponsors a fellowship program to allow students to perform research at ASU for nine months followed by an internship program for three to six months at an industrial site to facilitate technology transfer and to allow students to gain practical experience.

Connection One is currently involved with a number of research projects:
- 1.2V, 10-Bit Cyclic A/D Converter Incorporating an Active Feedback Frequency Compensation Op-Amp in 0.18 mm CMOS
- Optical Switching of RF Channel Data
- Low-Temperature/High-Energy Density/Micro-Fluidic Fuel Cell System for Portable Communication Applications
- Determination of Cost Saving and Improved Reliability in Scaled Circuits and Devices
- Optimization of SiGe HBT Designs for High-Speed RF Applications
- RF Front End Architectures for Software Defined Radios
- Switchable Dual Band Quadrature Voltage Controlled Oscillator
- Task Scheduling for Battery Powered Systems
- PAR Reduction for Single and Multi-Antenna OFDM Systems
- On-Chip Active Antennas for UWB
- Use of Novel Materials and Integration Methods to Develop On-Chip Band Reject Filters
- Automatic RF Match Control Circuit for Broadband Wireless Devices
- The Use of Optical Processing Techniques for the Design of High-Speed Scalable IP Routers
- Monolithic Power Management for Mixed-Signal Integrated Circuit
- Hierarchical Design Planning for Simultaneous Physical and Electronic Convergence
- Statistical Approaches to Signal Integrity & Performance Analysis in DSM CMOS Circuits
- Development of Behavioral Simulator of Analog-to-Digital Converters for Communication Applications
- Optical Switching of RF Channel Data
- Hierarchical Design Planning for Simultaneous Physical and Electronic Convergence
- Statistical Approaches to Signal Integrity & Performance Analysis in DSM CMOS Circuits
- Development of Behavioral Simulator of Analog-to-Digital Converters for Communication Applications

Connection One derives its funding from the National Science Foundation, the State of Arizona Proposition 301 Research and Development funds and industrial members, including Analog Devices, BAE Systems, Cisco, General Dynamics Decision Systems, Intel, Motorola, Raytheon, Silicon Laboratories, SiRF Technologies, Trex Enterprises and Texas Instruments.

More information about Connection One is available online at: www.connectionone.org.
CENTER MISSION
The Center for Low Power Electronics (CLPE), formed under the National Science Foundation’s State/Industry/University Cooperative Research Centers initiative, is a collaborative effort between Arizona State University and the University of Arizona to address fundamental industry-relevant research in the design of ultra-low power portable electronic computing and communication systems. CLPE is funded by the National Science Foundation, the state of Arizona, and industry.

CENTER LOCATION
Arizona State University and the University of Arizona. We can also be found on the Web by visiting the following site:
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The center’s mission is to conduct research, to develop technology and to provide educational programs that will engender international leadership in solid-state electronics. This mission is accomplished in several ways:

- The provision of critical resources and infrastructure
- The support and education of quality students
- The support of renowned and high-promise research faculty and staff in multidisciplinary environments
- The maintenance of significant levels of research funding from government and industry sources
- The publication and presentation of work in top journals and at leading conferences
- The transfer of technology to the commercial sector

Center highlights and major accomplishments:

The center provides critical resources and infrastructure for research and education in interdisciplinary solid-state electronics including 30 laboratories covering 30,000 square feet, which are administered and maintained by a staff of 15 people. The center has about 60 participating faculty, 20 post-doctoral researchers, and over 100 graduate students drawn from various disciplines, including electrical engineering, chemistry, chemical engineering, biology, bioengineering, biochemistry, materials science, mechanical engineering, industrial engineering, and physics. Since its inception in 1981, CSSER has witnessed phenomenal growth in the functionality and use of integrated circuits, much of it fueled by basic research in solid-state electronics. In addition to solid-state research, CSSER pursues new hybrid systems that combine the hard, dry world of metals and semiconductors with the soft, wet world of biology and biochemistry. Current research within CSSER centers on research to answer basic questions about how electrons travel in ultra-small transistor structures. At the same time CSSER is developing new microprocessor and memory chips, advanced lasers for optical communications, ways of processing semiconductor materials, and hybrid integrated circuits or biochips.

The center’s 4,000 square-foot class M3.5 cleanroom and associated facilities contain a wide range of equipment for advanced semiconductor processing and characterization, including electron beam lithography, deep-silicon and III-V ICP etchers, optical direct-wafer writer, molecular beam epitaxy, ultra-low temperature (10 mK) transport measurement, RF and ultra-low noise probe stations, photoluminescence, and high-speed optical testing. Our primary research groups include bio- and molecular electronics; low-power electronics; materials and process fundamentals; molecular beam epitaxy and optoelectronics; and nanostructures. Beyond these formal groupings, CSSER supports the research of faculty from the Ira A. Fulton School of Engineering, the College of Liberal Arts and Sciences, and the AZ Biodesign Institute in the areas of MEMS and nanofluidics, wide band gap semiconductors, high-k dielectrics, and nanomagnetics. In recent years, CSSER researchers have commercially developed a number of significant technologies, such as RF magnetic latching switches, programmable metallization cell (PMC) memory devices, resonant cavity light emitting diodes, and nano-based gas sensors.

More information about the CSSER is available online at: www.fulton.asu.edu/fulton/csser/.
PSERC is a National Science Foundation Industry/University Cooperative Research Center that is addressing challenges in the new electric power industry as it restructures to a competitive business environment. Finding innovative and efficient solutions to those challenges requires an unprecedented level of expertise, communication, and cooperation between the university and industry. Through collaboration, PSERC seeks innovative solutions to challenges in creating a power system with decentralized, market-based decision-making that stimulates productive interchange of ideas among university and industry professionals, leverages research funding from universities and industrial members, facilitates access to highly experienced faculty and superior quality students, prepares current and future professionals for the new power industry.

PSERC academic researchers at multiple universities across the U.S. specialize in power systems, applied mathematics, nonlinear systems, power electronics, control theory, computing, operations research, economics, industrial organization, and public policy. They provide research services and products that add value to industry and that support efficient and effective provision of electricity services while meeting environmental requirements.

**PSERC Research**

Industry restructuring and technology change is creating new challenges for the operations, security and reliability of the power system, for the physical and institutional structures, and for delivery of economical and environmentally acceptable electricity services. PSERC’s research program focus is on helping the next generation electric power system evolve into a competitive, high-performance component of the nation’s infrastructure. Its research program is divided into three research stems.

**Research Stem 1: Markets**

The electric power industry is in transition toward a market-oriented structure with decentralized decision-making by a wide-ranging group of market participants. The research under this stem emphasizes the design and analysis of market mechanisms, computational tools and institutions that facilitate efficient coordination, investment, and operations while recognizing the economic and technical characteristics of power systems.

**Research Stem 2: Transmission and Distribution**

The power delivery infrastructure is critical to achieving efficiency, safety, security, and reliability in electricity supply. Improvements in this infrastructure could be achieved through innovations in software, hardware, materials, sensors, communications, and operating strategies. Therefore, a central goal of this research stem is the improvement of transmission and distribution systems through the application of technological advances.

**Research Stem 3: Systems**

Restructuring is leading to large and complex operational entities (such as Independent System Operators or Regional Transmission Organizations) while small-scale, dispersed generation technologies are increasing their penetration in power systems. The challenge is to develop new operations frameworks and approaches that will effectively cope with the growing complexity of a restructured industry. Systems research concentrates on operation of such complex, dynamic systems in general and power systems in particular.

More information on PSERC is available online at [http://www.pserc.wisc.edu/index_about.html](http://www.pserc.wisc.edu/index_about.html)
Research is underway for creating bendable computer displays – that could roll up and fit into your pocket, or wrap around your wrist like a watch – and could even be thrown away.

This is the overall concept of flexible display technology – something that won ASU its largest federal award, a $43.7 million agreement, on Feb. 10, 2004, from the U.S. Army to design flexible screens for troops.

Flexible display technology allows for the fabrication of a low-cost platform that might someday be disposable, said Dr. Frederic Zenhausern, research faculty member of both the Department of Electrical Engineering and the Department of Chemical and Materials Engineering. Researchers are able to design circuitry in a couple of different ways by integrating the sensor into the electronics.

ASU researchers plan to design a relatively small, conformal active matrix emissive and reflective display, he said. “We have all the technology in place,” Zenhausern said.

Researchers will also integrate the displays with wireless communications technology, according to the Flexible Display Center Web site. The technology will enhance combat strategy because troops will be connected to real-time displays that can continuously provide them with updates on anything from enemy positions to weather conditions.

The federal agreement is a five-year award with the possibility of being renewed for an additional five years for another $50 million, Zenhausern said.

Zenhausern is one of nine engineering faculty members who will lead the research effort and is currently the director of the Applied Nanobioscience Center. He helped bring this technology to The Biodesign Institute at ASU.
The Biodesign Institute is a multidisciplinary research and educational initiative that integrates biology and neurobiology research with advances in computing, optoelectronics, biomimetic materials and directed molecular assembly at meso-nanoscale, according to its Web site.

In addition to the Flexible Display Center and Applied Nanobioscience Center, The Biodesign Institute is also comprised of the BioOptical Nanotechnology, Evolutionary Functional Genomics, Infectious Diseases and Vaccinology, Neural Interface Design, Protein and Peptide Therapeutics, Rehabilitation Neuroscience and Rehabilitation Engineering, and Single Molecule Biophysics research centers.

Zenhausern, who originally worked for a Tempe-based research company that specialized in nanotechnology, microfluidics and life sciences, helped build the research team that will lead the initiative. He also helped secure state-of-the-art lab space for the initiative at ASU’s Research Park as well.

“We knew the tools, we knew the people, and we knew some of the technology as well,” he said.

The center’s disciplined research team and its commitment to customer needs are key factors in the Army’s decision to establish the Flexible Display Center at ASU, said Dr. George Poste, director of The Biodesign Institute.

In addition to ASU having a top research team on site, the fact that Research Park had ready lab space was another deciding factor, he said.

“I think what the Army saw was the fact that we had the facilities, we had the technology and we had a disciplined team,” Poste said.

The lab, which was originally a facility used for flat panel display R&D, is 250,000 square feet with 43,500 square feet of advanced clean room space and wet and dry labs.

Research Park is only the beginning of ASU’s research facilities. ASU is also currently building 1 million square feet of world-class research space to house additional projects.

Arizona’s passage of the Research Infrastructure Bill in June 2003 provided ASU with $185 million for its research facilities, helping bring top scientists and additional revenue to the area.

Poste said the passage of this bill was another element of ASU’s success in winning the federal award.

“Without those facilities you are not going to attract the best investigators who want top world-class facilities to work in,” he said.
The Flexible Display Center will have a 6-inch TFT pilot line this year, a GEN II pilot line in 2006 (6-inch transitioning to R&D), a full metrology and test lab, and an electro-optic materials R&D lab, said center director Dr. Greg Raupp. Researchers plan to have developed small scale (2.5-inch diagonal) test vehicles next year and prototypes (4-inch diagonal) in 2006.

“ASU has taken its seat at the national table in large-scale research ventures,” Raupp said. “The economic development opportunities are multiple and profound.”

ASU will now have one of the best thin film fabrication facilities in the country, said Shawn O’Rourke, technology leader for manufacturing and integration at the Flexible Display Center. Better than any other university.

“It’s a world-class, second-to-none facility,” he said. “It’s going to allow a completely new level of research product development and education that we haven’t had before.”

The project will also give researchers the opportunity to expand on biotechnology research and bridge the gap between that technology and flexible display technology, creating a whole new avenue of products, O’Rourke said.

Flexible display research can make almost any technology conform to its owner, he said. For example, cell phones could curve to the person’s hand or computer monitors could instead be thin, interactive screens that surround a desk.

“You can bring a certain architecture and design element to personal electronics that just isn’t there,” O’Rourke said.

This cutting-edge technology is something that is completely new to the EE department and ASU.

 “[The project] will get ASU and the EE department into a technology that we have not been involved in the past,” said Dr. Dieter Schroder, an electrical engineering professor and director of the Center for Low Power Electronics at ASU. Schroder specializes in semiconductors and is also part of the research team.

“We have traditionally been involved in conventional semiconductors,” he said. “And now this puts us into the realm of organic semiconductors which are new to us.”

Semiconductors have been
mostly been made out of a single crystal material, such as silicon, he said. But this new technology, in which circuits are made of flexible materials, like metals or plastics that are bendable, can be made in several ways.

“This technology will obviously filter into many different commercial applications,” Schroder said.

The success of this research could evolve into a completely new era of technology.

“If we are successful in making the translation to flexible electronics, then this really does constitute the next wave of electronics in everything,” Poste said. “From consumers, to industrial processes, to military and national security operations, because basically you are creating electronics that can fit into any space [and] be flexible and durable.

“It’s literally limited only by the imagination of the experimenter,” he added.

More than 16 companies and several universities, in addition to the military, are involved in the center’s research.

"The center is not really a research center," said Dr. David Allee, electrical engineering faculty member who is working with backplane electronics in the initiative. "It's a collaborative prototype line for flexible displays."

Participating universities include Penn State, University of Southern California, University of Arizona and Cornell. Business partners also include DuPont Displays, Kodak, Honeywell, General Dynamics, Raytheon, Universal Display Corporation, Kent Displays, E Ink, FlexICs, Three-Five Systems, General Atomics, Optiva, ECD, Southwall, the U.S. Display Consortium, and AGI. More prospective partners are currently in negotiations with the center.

For additional information about the Flexible Display Center and The Biodesign Institute at ASU, visit www.biodesign.org.
James T. Aberle received the B.S. and M.S. degrees in electrical engineering from Polytechnic Institute of New York (now Polytechnic University) in 1982 and 1985, respectively, and the Ph.D. degree in electrical engineering from the University of Massachusetts in 1989. From 1982 to 1985, he was employed by Hazeltine Corporation, Greenlawn, NY, where he worked on the development of wide-band phased array radar antennas. He was a graduate research assistant at the University of Massachusetts from 1985 to 1989, where he developed and validated computer models for printed antennas. He has been a faculty member at Arizona State University since 1989, where he is currently an associate professor of electrical engineering.

Research Interests: Antennas and RF systems for wireless communications; modeling of complex electromagnetic phenomena.

Honors and Distinctions: IEEE Senior Member; NASA-ASEE Summer Faculty Fellow, 1993; Member, Technical Advisory Board, e-tenna Corporation.

Selected Publications:

David Allee conducts research in ultra-small device fabrication and in low-voltage, low-power analog CMOS circuit design for analog-to-digital conversion and telemetry. The targeted applications are medical electronics and portable communication products where it is often desirable to place the entire mixed-signal system on a single chip. Current projects include cyclic, pipelined, and delta-sigma converters, along with low-power, low-noise, voltage-controlled oscillators using chip transformers. He is a founding member of the Center for Low Power Electronics (funded by the NSF, industry, and the state of Arizona), the Whitaker Center for Neuromechanical Control, and is the manager of the Focused Ion Beam User Facility. He has published over 35 refereed journal articles and publications at technical conferences and has conducted three invited talks at international conferences.

Research Interests: Ultra-small device fabrication, mixed-signal circuit design for analog-to-digital conversion and telemetry.

Honors and Distinctions: Young Faculty Teaching Excellence Award, 1994-1995; two patent applications filed; AEA Faculty Development Fellowship, Stanford University, 1984-1989; Voorheis Honor Scholarship, University of Cincinnati, 1979-1984.

Selected Publications:

Rajapandian Ayyanar joined the ASU faculty as an assistant professor in August 2000. He received the B.E. in electrical engineering from P.S.G. College of Technology, India, in 1989; the M.S. in power electronics from the Indian Institute of Science in 1995; and the Ph.D. in power electronics from the University of Minnesota in 2000. He has published 20 journal and conference papers, is a member of IEEE, and is the co-author of one patent.

Research Interests: Topologies and new control techniques for switch-mode power conversion, especially DC-DC converters, digital PWM techniques for motor drives, power systems applications of power electronics.

Selected Publications:
Constantine A. Balanis
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Ph.D.: Ohio State University, 1969

Constantine Balanis joined the ASU faculty in 1983 and is now a Regents’ Professor of electrical engineering. He has published nearly 110 journal papers, 190 conference papers, seven book chapters, seven magazine/newsletter papers, and numerous scientific reports. He has also published two textbooks: one on antennas and the other on advanced engineering electromagnetics.

Research Interests: Computational electromagnetic methods (FDTD, FEM, MoM, GO/GTD/UTD, PO/PTD) for antennas, scattering, and high-intensity radiated fields (HIRF); smart/adaptive antennas for wireless communications; electromagnetic wave multipath propagation.

Honors and Distinctions: Regents’ Professor, Honorary Doctorate-University of Thessaloniki (Greece), IEEE Life Fellow, IEEE Third Millennium Medal, ASU School of Engineering Graduate Teaching Excellence Award, ASU College of Engineering Distinguished Achievement Award, IEEE Region 6 Individual Achievement Award, IEEE Phoenix Section Special Professionalism Award.

Selected Publications:

Chaitali Chakrabarti
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Ph.D.: University of Maryland, 1990

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 has been at ASU since 1990 where she is now a full professor. She is a member of the Center for Low Power Electronics, Consortium of Embedded and Inter-Networking Technologies, and Connection One and conducts research in various aspects of low-power system design.

Research Interests: VLSI architectures and algorithms for media processing and communications; low-power system design, including memory design and compilation; CAD tools for VLSI.


Selected Publications:


Affiliate professors add breadth to department

Several professors from other departments are formally affiliated with the Department of Electrical Engineering. Their duties are primarily in research, advising and student mentoring. They contribute a breadth of research opportunity beyond that provided by regular faculty.

Terry Alford (Ph.D., Cornell): Electron materials and characterization.

Karam Chatha (Ph.D., University of Cincinnati): Embedded system and VLSI design.


Richard Farmer (M.S., Arizona State University): Power system transients, analysis, transmission, and distribution.

Sandeep Gupta (Ph.D., Ohio State): Wireless networks and mobile computing; ubiquitous/pervasive computing; biosensor networks.

Jiping He (Ph.D. Maryland, College Park): Controls, bioengineering.

Timothy E. Lindquist (Ph.D., Iowa State University): Computer science.


Sethuraman Panchanathan (Ph.D., University of Ottawa): Multimedia computing and communications; multimedia hardware architectures; VLSI architectures for real-time video.

Douglas Cochran
Office: GWC 414
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Ph.D.: Harvard University, 1990

Douglas Cochran joined the ASU faculty in 1989. He holds Ph.D. and S.M. degrees in applied mathematics from Harvard University and degrees in mathematics from UCSD and MIT. Before coming to ASU, he was a senior scientist at BBN Laboratories. He has served as a consultant to Motorola and the Australian Defense Science and Technology Organisation, as associate editor of the IEEE Transactions on Signal Processing, and as general co-chair of the 1999 IEEE International Conference on Acoustics, Speech, and Signal Processing. Professor Cochran is currently on leave serving as program manager for the Applied and Computational Mathematics Program in the DARPA Defense Sciences Office.

Research Interests: Signal processing, harmonic analysis, detection theory.

Honors and Distinctions: CEAS Teaching Excellence Award, 1996-1997; IEEE Senior Member.

Selected Publications:

Rodolfo E. Diaz
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Ph.D.: UCLA, 1992

During his 20 years in the aerospace industry, Dr. 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 is a full professor in electrical engineering, the associate director of the Consortium for Meteorology of Semiconductor Nanodefects, and holds ten patents ranging from the design of broadband radomes to the amplification of magnetic fields.

Research Interests: Optical scattering of subwavelength objects in complex environments, analytic theory of natural and artificial media, 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:
Tolga Duman received the B.S. from Bilkent University, Turkey, in 1993 and the M.S. and Ph.D. degrees from Northeastern University in 1995 and 1998, respectively, all in electrical engineering. He has been with the Department of Electrical Engineering of ASU since August 1998 as an assistant professor.

Research Interests: Digital communications, wireless and mobile communications, channel coding, turbo codes and turbo-coded modulation systems, coding for magnetic recording channels, coding for wireless communications.


Selected Publications:


Elbadawy Elsharawy joined ASU in 1989 where he is currently an associate professor. Dr. Elsharawy also has two important patents in his portfolio: “Stacked Microstrip Antenna for Wireless Communications,” U.S. patent 5,945,950, and “Heterojunction Bipolar Transistor Having Wide-Band Gap,” U.S. patent 5,912,481.

Research Interests: Microwave circuits, applied electromagnetics, anistropic devices, electronic packaging, cellular phone antennas.

Honors and Distinctions: Senior Member of IEEE, MTT-13 Technical Committee member, and an elected member of Commissions A and D, National URSI.

Selected Publications:


Elbadawy Elsharawy
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Ph.D.: University of Massachusetts, Amherst, 1989

David Ferry joined ASU in 1983, following stints at Texas Tech University, the Office of Naval Research, and Colorado State University. He has published more than 600 articles, books and chapters, and has organized many conferences.

Research Interests: Transport physics and modeling of quantum effects in submicron semiconductor devices; electron beam lithography for ultra-submicron quantum functional devices.

Honors and Distinctions: Regents’ Professor at ASU; IEEE Cledo Brunetti Award, 1999; fellow of both the American Physical Society and IEEE; 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:


C. Prasad, D. K. Ferry, D. Vasileska, and H. H.Wieder, “Electron heating measurements in an In0.52Al0.48As/In0.53Ga0.47As/In0.52Al0.48 as heterostructure systems,” Journal of Vacuum Science and Technology B, Vol. 21, 1936-1939, 2003.


Stephen Goodnick came to ASU in Fall 1996 as Department Chair. Prior to that, he was a professor of electrical and computer engineering at Oregon State University from 1986 to 1996. 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 served as President (2003-2004) of the Electrical and Computer Engineering Department Heads Association (ECEDHA), and as Program Chair of the Fourth IEEE Conference on Nanotechnology. Dr. Goodnick has published over 150 refereed journal articles, books, and book chapters.

**Research Interests:** Transport in semiconductor devices, computational electronics, quantum and nanostructured devices and device technology, high-frequency and optical devices.

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

**Selected Publications:**

**Selected Publications:**
**FACULTY LISTINGS**

**Robert Grondin**  
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Ph.D.: University of Michigan, 1982  

Bob Grondin received the B.S., M.S., and Ph.D. degrees in electrical engineering from the University of Michigan. He spent 1981 to 1983 as a post-doctoral research fellow at Colorado State University and joined the faculty of electrical engineering at ASU in 1983. He is currently an associate professor and serves as Director of Student Academic Services in the Ira A. Fulton School of Engineering.

**Research Interests:** Solid-state and physical electronics: the physics of high-speed devices and ultrafast phenomena in semiconductors.

**Honors and Distinctions:** NSF Presidential Young Investigator, 1985; Presidential Young Investigators Award, 1985; IEEE Outstanding Student Branch Advisor, 1986.

**Selected Publications:**  


**Gerald Thomas Heydt**  
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Phone: 480-965-5307  
Ph.D.: Purdue University, 1970  

Gerald Thomas Heydt is from Las Vegas, Nev. He holds the B.S.E.E. degree from the Cooper Union in New York and the M.S.E.E. and Ph.D. degrees from Purdue University. He spent approximately 25 years as a faculty member at Purdue, and in 1994, he took the position of Director of the NSF Center for the Power Systems Research Center at ASU. He has industrial experience with the Commonwealth Edison Company, Chicago, E.G. & G. in Mercury, Nev., and with the United Nations Development Program. In 1990, he served as the program manager of the National Science Foundation program in power systems engineering. He is the author of two books in the area of power engineering.

**Research Interests:** Power engineering, electric power quality, distribution engineering, transmission engineering, computer applications in power engineering, power engineering education.

**Honors and Distinctions:** Fellow of the IEEE; member of the United States National Academy of Engineering; Edison Electric Institute Power Engineering Educator Award, 1989; IEEE Power Engineering Society Power Engineering Educator of the Year, 1995.

**Selected Publications:**  


**Keith E. Holbert**  
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Phone: 480-965-8594  
Ph.D.: University of Tennessee, 1989  

Keith Holbert joined the faculty in 1989. He is a registered professional engineer and has published over 50 journal and conference papers.

**Research Interests:** Process monitoring and diagnostics, sensor fault detection, instrumentation development, fuzzy logic, spacecraft charging, radiation effects on electronics.

**Honors and Distinctions:** Tau Beta Pi; Teaching Excellence Award from ASU College of Engineering, 1997; IEEE Senior Member.

**Selected Publications:**  


Joseph Y. Hui joined ASU as ISS Chair Professor in 1999. He received his B.S., M.S., and Ph.D. degrees from MIT and has held research and teaching positions at Bellcore, Rutgers University, and the Chinese University of Hong Kong before joining ASU. He is the founder of IXTech and IXSoft, Inc.

Research Interests: Wireless networks, gigabit wireless communications, ATM switching and routing, teletraffic analysis, coding and information theory, space-time communications.

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

Selected Publications:


Youngjoong Joo joined the ASU faculty as an assistant professor in January 2001. Before that, he worked as a research engineer at Georgia Institute of Technology. He received the B.S. and M.S. in electrical engineering from Korea University in 1988 and 1990, respectively, and the Ph.D. in electrical engineering from the Georgia Institute of Technology in 1999.

Research Interests: Design of sub-micron CMOS analog and mixed-signal circuits, smart camera systems, high-speed optical transceivers, UWB transceivers.

Selected Publications:


George Karady received his B.S.E.E. and Ph.D. degrees in electrical engineering from Technical University of Budapest, in 1999 the IEEE Third Millennium Medal, and in 2002 IEEE Power Engineering Society Working Group Recognition Award as the chair of WG that prepared IEEE Standard 1313-2.

Research Interests: Power electronics, high-voltage engineering, power systems.

Honors and Distinctions: Fellow of IEEE, chairman of IEEE WG on Non-Ceramic Insulators, WG on Power Electronic Equipment. He also chairs the Award Committee of the IEEE PES Chapters and Membership Division and is serving as a president of the IEEE Phoenix Section. In 1996, Dr. Karady received an Honorary Doctoral Degree from Technical University of Budapest, and in 2002 IEEE Power Engineering Society Working Group Recognition Award as the chair of WG that prepared IEEE Standard 1313-2.

Selected Publications:


Lina Karam received the B.E. in electrical engineering from the American University of Beirut in 1989 and the M.S. and Ph.D. degrees in electrical engineering from the Georgia Institute of Technology in 1992 and 1995, respectively. She is currently an associate professor in the Department of Electrical Engineering at ASU. She worked at Schlumberger Well Services and in the Signal Processing Department of AT&T Bell Labs during 1992 and 1994, respectively.

Research Interests: Image and video processing and compression, multidimensional signal processing, error-resilient source coding, digital filter design, human visual perception.

Honors and Distinctions: Society of Women Engineers Outstanding Graduate Student Award, 1994; Georgia Tech Graduate Student Senate Presidential Citation Award, 1994; NSF CAREER Award, 1998. She is an associate editor of the IEEE Transactions on Image Processing and an elected member of the IEEE Circuits and Systems Society’s Technical Committee.

Selected Publications:

Dr. Kiae is a professor in the Ira A. Fulton School of Engineering and the director of both WINTech and Connection One research centers. He joined the Department of Electrical Engineering at Arizona State University in January 2001. WINTech is a comprehensive research center for Arizona State University researchers and established industry partners to do advanced work on enabling technology needed in the development of fully autonomous nanoscale communication devices and systems. WINTech has a heavy emphasis on deliverables and technology transfer through the invention of new materials and devices, algorithms and communication protocols, the development of simulation tools and libraries to support the system design and the algorithms developed in real-life simulation environment, and fabricated systems to demonstrate measured results. Connection One is a National Science Foundation Industry/University Cooperative Research Center established by the Ira A. Fulton School of Engineering. The vision of this center, to simplify and enable a small portable all-in-one communication device, is reflected in its name: Connection One. An exclusive industry/university partnership combines an academic environment with state-of-the-art research initiatives. As a Cooperative Research Program, each Connection One project is sponsored and supported by an industrial member, providing a one-on-one link between faculty/students and industry. Dr. Kiae is teaching classes in wireless transceiver design, communication circuits, and analog circuits. His research team includes more than 12 research associates and graduate students at ASU.

Research Interests: Wireless transceiver design, RF, mixed-signal ICs.

Honors and Distinctions: Carter Best Teacher Award, IEEE Darlington Best Paper Award, IEEE Fellow, and the Motorola 10X Design Award.

Selected Publications:

Bruce Kim joined the ASU faculty as an associate professor in August 2000 after teaching at Michigan State and Tufts Universities. He received the B.S. from the University of California-Irvine in 1981 and the M.S. from the University of Arizona in 1985, both in electrical engineering. He completed the Ph.D. in electrical and computer engineering at the Georgia Institute of Technology in 1996.

Research Interests: RF IC design, MEMS, analog/mixed-signal testing, advanced integrated passives, electronic packaging/materials.

Honors and Distinctions: IEEE Senior Member; IEEE Phoenix Section Outstanding Technical Contribution Award, 2003; Outstanding Contribution Award, IEEE Computer Society, 2002; Certificate of Appreciation Award, IEEE MTTS, 2002; Best Poster Award, IEEE RFTAG Conference, 2002; Meritorious Service Award, IEEE Computer Society, 2001; Professor of the Year, Corporate Leaders Program, ASU, 2001; IEEE Computer Society Certificate of Appreciation, 1999; NSF/IEEE Award for educational Internet-based modules, 1999; Best paper of the session, IEEE Multi-Chip Module Conference, 1998; NSF CAREER Award, 1997.

Selected Publications:
Michael N. Kozicki

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Ph.D.: University of Edinburgh, UK, 1985

Michael Kozicki joined ASU in 1985 from Hughes Microelectronics. He develops new materials, processes, and device structures for next generation integrated circuits and systems. He holds several dozen key patents in Programmable Metallization Cell technology, in which solid electrolytes are used for the storage and control of information and for the manipulation of mass on the nanoscale. He has published extensively on solid-state electronics and has developed undergraduate and graduate courses in this area. He is also a founder of Axon Technologies, an ASU spin-off company involved in the development and licensing of solid-state ionic technologies. Professor Kozicki is currently Interim Director of Entrepreneurial Programs in the Fulton School of Engineering.

Research Interests: Silicon integrated-circuit processing, integrated/solid-state ionic, low-energy non-volatile memories, interconnect systems, optical switches, tunable nanomechanical resonators, microfluidics.

Honors and Distinctions: Founder, Axon Technologies Corporation; Founding Member, Globalscot Network; Honorary Fellow, Faculty of Science and Engineering, University of Edinburgh; Entrepreneur-in-Residence, St. Margaret's Academy, Livingston, Scotland; Technology Development, and Transfer Sub-committee Chair of the Governor's Council on Innovation and Technology; Charter member of the ASU Academic Council; Chartered Engineer (UK/EC Professional Engineer); Member of the ASU Technology Venture Clinic Board; Last Lecture Series Nominee; IEEE Phoenix Section Outstanding Educator, Research Award, 2001; College of Extended Education Outstanding Faculty Award, 1995; Lemelson-MIT Prize for Invention and Innovation Nominee, 1994

Selected Publications:

Ying-Cheng Lai

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Ph.D.: University of Maryland, College Park, 1992

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 190 papers, including 160 published in refereed journals. In the past five years, he gave about 50 invited seminars and colloquia worldwide.

Research Interests: Applied chaotic dynamics, complex networks, quantum chaos, signal processing, computational biology.

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

Selected Publications:

Darryl Morrell

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Phone: 480-965-2045
Ph.D.: Brigham Young University, 1988

Darryl Morrell joined the ASU faculty in 1988. His research centers on applications of stochastic decision and estimation theory to engineering problems. He is currently investigating target detection, localization, and identification using configurable sensors. Other areas of interest include information theory, communication system analysis and simulation, signal and data compression, and the epistemic foundations of decision theory. At a graduate level, he has taught courses in information theory, estimation and detection, stochastic filtering, probability and stochastic processes, and error correcting codes. At the undergraduate level, he has taught courses in circuit analysis, probability theory, communication systems, signals and systems, and technical design and communication. He has also been actively involved in the implementation of ABET’s EC2000 at the college and department level.

Research Interests: Stochastic decision theory, sensor scheduling, particle filtering, target tracking.

Honors and Distinctions: Phi Kappa Phi, Tau Beta Pi, Sigma Xi.

Selected Publications:
Joseph Palais joined the faculty in 1964 and is now the Associate Chair for Graduate Studies. He has published a textbook on fiber optics. The book has been translated into Japanese, Korean and Persian. 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.

Research Interests: Fiber optic communications, holography, distance education.

Honors and Distinctions: IEEE Life Fellow, IEEE EAB Achievement Award, IEEE Phoenix Achievement Award, University Continuing Education Association Conference and Professional Programs Faculty Service Award.

Selected Publications:

George Pan joined the faculty in 1995 as a professor and the director of the Electronic Packaging Laboratory. He has written three book chapters, published over 50 research articles in refereed journals, and presented 82 papers at international conferences. He has presented short courses on wavelets in electromagnetics at Moscow State University, the University of Canterbury, CSIRO in Sydney, IEEE Microwave Symposium, Beijing University, and the Chinese Aerospace Institute. His book, “Wavelets in Electromagnetics and Device Modeling” © 2003, is among John Wiley's best-selling titles.

Research Interests: Computational electromagnetics, high-speed electronics packaging, magnetic resonant imaging RF coil design and analysis, rough surface scattering.

Honors and Distinctions: IEEE Senior Member; Outstanding Paper Award; Government Microcircuit Applications Conference, Nov. 1990.

Selected Publications:

Antonia Papandreou-Suppappola joined the ASU faculty as an assistant professor in August 1999. Before that, she held a Navy-supported research faculty position at the Department of Electrical and Computer Engineering at the University of Rhode Island. She has published over 60 refereed journal papers, book chapters, and conference papers.


Selected Publications:
Stephen M. Phillips
Office: ERC 181
Phone: (480) 965-6622
Ph.D.: Stanford University, 1988

Stephen M. Phillips received the B.S. degree in electrical engineering from Cornell University in 1984 and the M.S. and Ph.D. degrees in electrical engineering from Stanford University in 1985 and 1988, respectively. From 1988 to 2002 he served on the faculty of Case Western Reserve University where he held appointments in the Departments of Electrical Engineering and Applied Physics; Systems, Control and Industrial Engineering; and subsequently Electrical Engineering and Computer Science. From 1995 to 2002 he also served as director of the Center for Automation and Intelligent System Research. In 2002 he joined the faculty of Arizona State University as Professor of Electrical Engineering. He has held visiting positions at the NASA Lewis (now Glenn) Research Center and at the University of Washington and is a Professional Engineer registered in Ohio.

Research Interests: Applications and integration of microsystems including microelectromechanical systems (MEMS), microfluidics, microactuators, biological Microsystems; applications of systems and control including adaptive control, control of Microsystems, feedback control over nondeterministic networks.


Selected Publications:


Gang Qian
Office: Matthews Center, 240A
Phone: (480) 965-3704
Ph.D.: University of Maryland, College Park, 2002

Gang Qian joined the ASU faculty as an assistant professor in August 2003. Previously, he worked as a faculty research assistant in 2001 and a research associate in 2002 for the Center for Automation Research at the University of Maryland Institute for Advanced Computer Studies. He received the B.S. degree in electrical engineering from the University of Science and Technology of China (USTC) in 1995, and the M.S. and Ph.D. degrees in electrical engineering from the University of Maryland at College Park in 1999 and 2002, respectively.

Research Interests: Human motion analysis, signal and image processing, computer vision, statistical learning and inference for computer vision, image analysis.

Honors and Distinctions: University Guo-Mo-Ruo Golden Medal, USTC, 1994; Member of IEEE.

Selected Publications:


Martin Reisslein
Office: GWC 411A
Phone: 480-965-8593

Martin Reisslein joined the ASU faculty as an assistant professor in 2000. He received the Dipl.-Ing. in electrical engineering from FH Dieburg, Germany, in 1994; the M.S. in electrical engineering from the University of Pennsylvania in 1996; and the Ph.D. in systems engineering from the University of Pennsylvania in 1998. He has published over 20 journal articles and over 25 conference papers.

Research Interests: Multimedia streaming in wireless environments, traffic characteristics of encoded video, Metro WDM networks.


Selected Publications:


Prior to joining the faculty in 1990, Armando Rodriguez worked at MIT, IBM, AT&T Bell Laboratories, and Raytheon Missile Systems. He has also worked at Elgin Air Force Base and Boeing Defense and Space Systems. He has published more than 100 technical papers in refereed journals and conference proceedings and over 50 invited papers. Dr. Rodriguez has given more than 60 invited presentations at international and national forums, conferences, and corporations. This includes over 10 plenary talks.

Research Interests: Control of nonlinear distributed parameter systems; approximation theory; sampled data control; modeling, simulation, animation, and real-time control (MoSART); control of dynamical systems; control of flexible autonomous machines operating in an uncertain environment (FAME); and control of semiconductor, aerospace, robotic systems.

Honors and Distinctions: AT&T Bell Laboratories Fellowship; Boeing A.D. Welliver Fellowship; CEAS Teaching Excellence Award; IEEE International Outstanding Advisor Award; White House Presidential Excellence Award for Science, Mathematics, and Engineering; ASU Faculty Fellow; ASU Professor of the Year Finalist; Senior Member of IEEE.


Armando Antonio Rodriguez
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E-mail: aar@asu.edu
Phone: 480-965-3712
Ph.D.: Massachusetts Institute of Technology, 1990

Ronald J. Roedel
Office: ECG 102
E-mail: r.roedel@asu.edu
Phone: 480-965-4462
Ph.D.: UCLA, 1976

Ronald Roedel joined the faculty in 1981 and is now Associate Dean of the Ira A. Fulton School of Engineering. He has always tried to carry out research and teaching activities in equal measure. Recently, he has become involved in curriculum reform issues, active-learning strategies, and technology-enhanced education. On the research side, he has been involved in semiconductor research for more than 25 years, first with silicon, then with compound semiconductor materials, and now with silicon again. He is the author or co-author of 35 publications and has roughly 50 presentations, two book chapters, and two patents in the fields of semiconductor characterization and engineering education.

Research Interests: Semiconductor materials and devices with a special interest in modeling devices made from large bandgap materials, engineering pedagogy with a special interest in distance learning.

Honors and Distinctions: ASU College of Engineering Teaching Excellence Award three times; NSF Presidential Young Investigator Award, 1984; and the ASU Parents Association Professor of the Year Award, 1999.


Dieter K. Schroder
Office: ERC 111
E-mail: schroder@asu.edu
Phone: 480-965-6621
Ph.D.: University of Illinois, 1968

Dieter Schroder joined the ASU faculty in 1981 after 13 years at the Westinghouse Research Labs. He has published two books, 145 journal articles, eight book chapters, 135 conference presentations, edited nine books, holds five patents, and has graduated 59 M.S. students and 28 Ph.D. students.

Research Interests: Semiconductor devices, defects in semiconductors, semiconductor material and device characterization, electrical/lifetime measurements, low-power electronics, device modeling, MOS devices.


Jun Shen joined the faculty in 1996 after six years of experience with Motorola's Phoenix Corporate Research Labs. He is the author or co-author of over 50 refereed articles and many other conference publications. He is also the inventor or co-inventor of 28 issued U.S. patents.

Research Interests: MEMS, physics of organic LEDs, and novel logic and memory devices and circuits.

Honors and Distinctions: Motorola Distinguished Innovator Award, Motorola SPS Technical Achievement Award, IEEE Senior Member.

Selected Publications:

Jenni Si received her B.S. and M.S. degrees from Tsinghua University, Beijing, China, and her Ph.D. from the University of Notre Dame, all in electrical engineering. She joined the ASU faculty in 1991 where she is currently a professor.

Research Interests: Learning and adaptive systems; approximate dynamic programming for nonlinear dynamic system optimization; cortical information processing and modeling in animal brains, brain-machine interface; pattern analysis and machine intelligence.

Honors and Distinctions: Listed in many Marquis Who’s Who publications since late 1990s; NSF/White House Presidential Faculty Fellow, 1995; Motorola Excellence Award, 1995; NSF Research Institution Award, 1993; past associate editor of IEEE Transactions on Automatic Control and IEEE Transactions on Semiconductor Manufacturing; associate editor of IEEE Transactions on Neural Networks; one of the 10 students who received the highest honor at Tsinghua University in Beijing, China, 1984.

Selected Publications:

Brian Skromme joined the ASU faculty in 1989, where he is presently an associate professor in solid-state electronics. From 1985 to 1989, he was a member of the technical staff at Bellcore. He has written over 105 refereed publications in solid-state electronics.

Research Interests: 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.

Honors and Distinctions:Eta Kappa Nu; Young Faculty Teaching Award, 1990-1991; Golden Key National Honor Society Outstanding Professor Award, 1991; listed in Who’s Who in Science and Engineering and Who’s Who in Engineering Education.

Selected Publications:
Andreas Spanias joined the ASU faculty in 1988. He has published 40 journal and 100 conference papers and contributed three book chapters in speech and audio processing. He has served as associate editor of IEEE Transactions on Signal Processing and as the general co-chair of the 1999 International Conference on Acoustics, Speech, and Signal Processing (ICASSP-99) and as vice-president for the IEEE Signal Processing Society. He and former Ph.D. student Ted Painter received the prestigious 2002 IEEE Donald G. Fink Prize Paper Award for their IEEE Proceedings paper entitled “Perceptual Coding of Digital Audio.” He was recently elected IEEE Fellow and appointed IEEE Distinguished Lecturer.

Research Interests: Digital signal processing, multimedia signal processing, speech and audio coding, adaptive filters, signal processing for the arts.


Selected Publications:


Nongjian Tao joined the ASU faculty as a professor of electrical engineering and an affiliated professor of chemistry and biochemistry in August 2001. Before that, he worked as an assistant and associate professor at Florida International University. He received the B.S. in physics from Anhui University in 1984 and the Ph.D. in condensed matter physics from Arizona State University in 1988. He holds two patents, has published over 100 refereed journal articles and 10 book chapters, and given over 70 invited talks at national and international conferences.

Research Interests: Molecular electronics, nanostructured materials and devices, chemical and biological sensors, interfaces between biological molecules and solid materials, electrochemical nanofabrications.

Honors and Distinctions: Hellmuth Fisher Medal 2003, Excellence in Research Award, Florida International University, 2000; Molecular Imaging Young Microscopist.

Selected Publications:

Cihan Tepedelenlioglu joined the ASU faculty as an assistant professor in July 2001. He received the B.S. from the Florida Institute of Technology in 1995, the M.S. from the University of Virginia in 1998, and the Ph.D. from the University of Minnesota in 2001, all in electrical engineering. In 2001 he received the NSF (early) CAREER award.

Research Interests: Wireless communications, statistical signal processing, estimation and equalization algorithms for wireless systems, filterbanks and multirate systems, carrier synchronization for OFDM systems, power estimation and handoff algorithms, space-time coding, ultrawideband communications.

Honors and Distinctions: NSF CAREER Award, 2001.

Selected Publications:
Trevor Thornton joined the faculty in 1998 having spent eight years at Imperial College in London and two years as a member of the technical staff at Bell Communications Research, New Jersey. He invented the split-gate transistor, which was used to demonstrate the quantization of the ballistic resistance. He is currently the Director of the Center for Solid State Electronics Research.

**Research Interests:** Nanostructures, molecular electronics, short gate length MOSFETs, the micropower applications of sub-threshold FETs.

**Honors and Distinctions:** Recipient of ASU Co-Curricular Programs Last Lecture Award, 2001.

**Selected Publications:**

Konstantinos S. Tsakalis joined the ASU faculty in 1988 and is now a professor. He received the M.S. in chemical engineering in 1984, the M.S. in electrical engineering in 1985, and the Ph.D. in electrical engineering in 1988, all from the University of Southern California. He holds several patents and has published over 80 journal and conference papers.

**Research Interests:** Applications of control, optimization, and system identification theory to semiconductor manufacturing, chemical process control, prediction and control of epileptic seizures.

**Honors and Distinctions:** Licensed chemical engineer, Technical Chamber of Greece; member IEEE; Sigma Xi.

**Selected Publications:**

Daniel Tylavsky is internationally known for applying computation technology to the analysis and simulation of the 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 $2.8 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.

**Research Interests:** Electric power systems, numerical methods applied to large-scale system problems, parallel numerical algorithms, new educational methods and technologies.

**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.

**Selected Publications:**
Dragica Vasileska joined the ASU faculty in August 1997. She has published over 100 articles in refereed journals, book chapters, and in conference proceedings in the areas of solid-state electronics, transport in semiconductors, and semiconductor device modeling. She has also given numerous invited talks. She is a member of IEEE, the American Physical Society and Phi Kappa Phi.

Research Interests: Semiconductor device physics, semiconductor transport, 1-D to 3-D device modeling, quantum field theory and its application to real device structures, spin transport.

Honors and Distinctions: NSF CAREER Award, 1998; University Cyril and Methodius, Skopje, Republic of Macedonia, College of Engineering Award for Best Achievement in One Year, 1981-1985; University Cyril and Methodius, Skopje, Republic of Macedonia, Award for Best Student from the College of Engineering in 1985 and in 1990.

Selected Publications:


D. Vasileska, C. Prasad, H. H. Wieder and D. K. Ferry, “Green’s Function Approach for Transport Calculation in a In0.53Ga0.47As/In0.52Al0.48As Modulation-Doped Heterostructure,” J. Appl. Phys., Vol. 93, 3359-3363, 2003.


Junshan Zhang joined the ASU faculty as an assistant professor in August 2000. He received the B.S. in electrical engineering from HUST, China, in July 1993; the M.S. in statistics from the University of Georgia in December 1996; and the Ph.D. in electrical engineering from Purdue University in 2000. He is the recipient of a 2003 NSF CAREER Award. He won the 2003 Faculty Research Award from the IEEE Phoenix Section. He was chair of the IEEE Communications and Signal Processing Phoenix Chapter from 2001 to 2003.

Research Interests: Wireless networks and information theory, including cross-layer design of wireless networks, CDMA, ad hoc networking, wireless communication, radio resource allocation, network information theory.

Honors and Distinctions: Member of IEEE and ASEE, 2003 NSF CAREER award.

Selected Publications:


Yong-Hang Zhang joined the faculty in 1996 from Hughes Research Laboratories. He has published over 70 research articles and a book chapter, secured three U.S. patents, and edited several conference proceedings. He has presented more than 70 invited and contributed papers at various international scientific conferences.

Research Interests: Molecular beam epitaxy (MBE), optoelectronic devices and their applications.

Honors and Distinctions: IEEE Senior Member, Innovation and Excellence in Laser Technology and Applications Award from Hughes Research Labs, listed in Who’s Who in Science and Engineering, Who’s Who in the World, chairs and co-chairs of numerous international conferences or workshops.

Selected Publications:


Alumni News

Find out about fellow classmates in new EE alumni newsletter

The Department of Electrical Engineering has developed a new conduit to connect with their alumni – the EE Connections newsletter.

The alumni newsletter, which is published biannually, features profiles of EE graduates, department news and research and faculty updates.

For the next newsletter this fall, the EE department would like to hear your story. Please send any career updates, favorite ASU memories, and address changes to the department so to keep your information up to date and ensure that you receive a copy of the alumni newsletter.

To sign up for the newsletter, please fill out the form at www.fulton.asu.edu/~eee/Forms/Alumni_Update.doc and e-mail it to eeinfo@asu.edu. Also, to read previous editions of the newsletter, visit www.fulton.asu.edu/~eee/AlumniNewsletter/index.html.
Online Education

EE Department takes its master’s program to a new level – distance learning online

The ASU Electrical Engineering Department renowned faculty is teaching at a place it has never gone before – the World Wide Web.

This year, the EE Department is offering online classes for the Master of Science in Engineering in electrical engineering with no residency requirements. The online courses and M.S.E. program allow alumni and professionals to access ASU from anywhere in the world through flexible delivery.

While teaching through distance learning is nothing new to the EE Department, it is the first opportunity to pursue the M.S.E. in electrical engineering entirely via the Internet. The classes are modeled after those taught in person at ASU and have been transformed to allow students to access them from the workplace, home or during travel.

“I really enjoy having the freedom of taking classes at my own pace. Offering online courses at ASU allows me to balance my work, home, and school life,” said Tony Yu, an engineer at Medtronic. “In addition to the flexibility of taking courses online, you get an entire staff of dedicated support from the ASU Engineering Online Team whom have been committed in seeing me (and ultimately their programs) through to success.”

The material in the online courses is the same as the regular courses taught during the school year. Students taking the online classes have access to the same lectures through streamed media, the same books, and even the same interaction with other students and faculty through interactive portals in the ASU course management system.

This year, the EE Department enrolled more than 100 students in online courses and programs. The ASU Ira A. Fulton School of Engineering now offers over 10 graduate programs and areas of study online focused for the engineering professional.

For additional information, visit www.asuengineeringonline.com or call (480) 965-1740.
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DEPARTMENT OF
Electrical Engineering

2003 - 2004