EE External Advisory Council

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<tr>
<th>Name</th>
<th>Title</th>
<th>Company</th>
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<tr>
<td>Ben Adamo</td>
<td>CEO</td>
<td>Phoenix Analog</td>
</tr>
<tr>
<td>Rick Anderson</td>
<td>Senior Software Engineering Manager</td>
<td>Tektronix</td>
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<td>Tom Butler</td>
<td>Engr. Section Manager</td>
<td>National Systems Division</td>
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<td>General Dynamics C4 Systems</td>
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<td>Bernadette Buddington</td>
<td>Manager</td>
<td>Lockheed Martin</td>
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<td>Jack Davis</td>
<td>President</td>
<td>APS</td>
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<td>Neil E. Hejny</td>
<td>Director, Electronics Center Manager</td>
<td>Raytheon Missile Systems</td>
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<td>Joseph W. Jackson</td>
<td>Manager, Flight Controls Business</td>
<td>Honeywell</td>
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<td>Tadija Janjic</td>
<td>Strategic Development Engineer</td>
<td>Texas Instruments</td>
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<tr>
<td>Karl Johnson</td>
<td>Director of Microwave and Mixed Signal Technologies</td>
<td>Freescale</td>
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<td>Mike Johnson</td>
<td>Vice President</td>
<td>Advanced Micro Devices</td>
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<td>David G. Leeper</td>
<td>Sr. Principal Engineer</td>
<td>Intel Corp.</td>
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<td>Eric C. Maas</td>
<td>Director</td>
<td>Motorola</td>
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<td>Robert L. Melcher</td>
<td>CTO</td>
<td>Syntax-Brillian Corp.</td>
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<td>Mark Phelps</td>
<td>Sr. Director</td>
<td>Electronic Systems Technology</td>
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<td>Kevin Stoddard</td>
<td>Control Systems Division Manager</td>
<td>Brooks-PRI</td>
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<td>Bill Twardy</td>
<td>Manager, Research for SRP</td>
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<td>Sam Werner</td>
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<td>Peter Zdebel</td>
<td>CTO</td>
<td>ON Semiconductor</td>
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<td>Thomas Zipperian</td>
<td>Unit Director, MESA Fabrication</td>
<td>Sandia National Laboratories</td>
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Having completed one year as chair, I am pleased to share with you the new developments in our department. Research has been a core strength of our department for many years. It is a fundamental component of our mission to educate students at both the graduate and undergraduate levels, and to serve the citizens of Arizona through economic development and entrepreneurial activities. Many of the articles in this annual report focus on research, its relationship to education and its power in earning accolades for the department and its faculty.

While there is no consensus on the best way to measure research performance, sponsored projects’ expenditures and awards are common metrics. This past fiscal year, July 2005-June 2006, EE faculty spent nearly $13.5 million on research projects, an impressive 36 percent increase over the previous year. Even more impressive is the over $15.5 million that the EE faculty received in new awards, a nearly 45 percent increase over last year. It is also noteworthy that this amount represents more than 31 percent of the Ira A. Fulton School of Engineering’s total awards and more than 8 percent of the entire university’s awards. All of the EE department’s faculty can take credit for leading this research effort, supported by our staff and students. New activities this year that contributed significantly to these statistics...
are the Applied NanoBioscience Center led by Professor Frederic Zenhausern of the BioDesign Institute, the Power Systems Engineering Research Center led by Professor Vijay Vittal, ConnectionOne/WinTech Center led by Professor Sayfe Kiaei and the Arizona Institute for Nanoelectronics led by Professor Stephen Goodnick. This institute consists of several centers led by EE faculty including Professor Yong-Hang Zhang, Professor Trevor Thornton and Professor Michael Kozicki.

Another indicator of EE’s growing research reputation is that we now enroll nearly 250 PhD students, the largest number in our history. This growth parallels the research funding increases and is another metric of research program strength. Enrollment in the master’s program also saw an increase from last year, partially due to the increasing popularity of our online course offerings and new programs such as the combined MSE and MBA program.

We continue to strengthen our department through new hires, including Assistant Professor Bahar Jalali-Farahani, who recently completed her PhD degree at Ohio State University, and Gennady Gildenblat, who is the Motorola Professor and was most recently on the faculty of Penn State University. Several of our current faculty have also been recognized, including Professor Vijay Vittal as the national director of the NSF Power Systems Engineering Research Center, Assistant Professor Yu Kevin Cao as NSF CAREER award winner and Professor Stephen Goodnick as associate vice president for research at ASU. We welcome the opportunity to share our accomplishments through this annual report.

Stephen M. Phillips
Professor and Chair

Financial Summary
Department of Electrical Engineering
Sponsored Research Expenditures

<table>
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<tr>
<th>Fiscal Year</th>
<th>Millions of Dollars</th>
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<td>2005</td>
<td>9.9 Million</td>
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<tr>
<td>2006</td>
<td>13.5 Million</td>
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Deirdre Meldrum, who has spent her career forging new scientific links, has now been appointed dean of ASU’s Ira A. Fulton School of Engineering.

Meldrum is an electrical engineering professor at the University of Washington, Seattle. She has also served as the principal investigator and co-director of the Microscale Life Sciences Center, a National Institutes of Health (NIH) Center of Excellence in Genomic Science that she helped establish.

This appointment is part of a major effort by ASU to move the Ira A. Fulton School of Engineering to the top level of engineering schools nationally. ASU will provide Meldrum with additional resources to hire new faculty and invest in start-up labs and research initiatives.

Former ASU Provost Milton Glick stated about the new dean, “Dr. Meldrum’s demonstrated ability to bring together multiple disciplines to work on ‘grand challenge’ type problems, and her dedication to including students in research programs are among the reasons we are so excited about her joining ASU.”

Meldrum will begin her tenure as dean in January 2007. She will also hold an academic chair, direct a new center within the Biodesign Institute and continue her many research endeavors. ASU will appoint an executive dean to aid her in running the school on a day-to-day basis.

Institute for Nano-Electronics Launched at ASU

Under the leadership of Director Stephen Goodnick, the Arizona Institute for Nano-Electronics (AINE) began operations in December 2005. AINE is focused on ASU research interests in nanoelectronics, and is expected to strongly impact future technology areas related to e.g., ultra-low power/ultra-high speed electronics, and hybrid biomolecular electronics at the interface between the biological and electronic worlds. The institute includes the Center for Nanophotonics, which is led by Electrical Engineering Professor Yong-Hang Zhang, and the Center for Biomolecular Integrated Circuits, which is led by Electrical Engineering Professor Trevor Thornton.
Cochran Earns Defense Public Service Medal

While Electrical Engineering Professor Douglas Cochran returned to ASU last year, his five years of service for the Department of Defense (DoD) were not forgotten. Cochran was awarded the Office of the Secretary of Defense Medal for exceptional public service in July 2005. During his time with the DoD, Professor Cochran served as the director of the applied and computational mathematics area within the Defense Advanced Research Projects Agency. The award cited Cochran’s research leadership in such fields as quantum information science, computational electromagnetics and pure mathematics.

Farmer Rewarded with NAE Membership

Another of ASU’s Ira A. Fulton School’s Department of Engineering faculty members has been elected to the prestigious National Academy of Engineering. Richard Farmer is the third electrical engineering professor to receive this honor, joining professors Gerald Heydt and Vijay Vittal. The NAE membership is considered one of the highest distinctions in engineering.

Farmer was a principal engineer with the Arizona Public Service Co. (APS), the state’s largest electric utility, for almost 30 years. During that time, he led projects that developed technology to improve the capacity, efficiency and reliability of electrical power generation and transmission systems.

The NAE cited the far-reaching impact of Farmer’s accomplishments in power systems engineering as the reason why he merited membership.

Farmer has also contributed his expertise to ASU by serving as a part-time faculty member since 1966, two years after earning his master’s degree at the university.

Farmer stated about the award, “It’s a big thing, but it’s just frosting on the cake. Awards are nice, but it’s the joy of a rewarding career that has the greatest meaning for me.”

EE Researchers Contribute to NASA Patent

Working with NASA’s AMES Research Center, Electrical Engineering Professor Lina Karam and doctoral student Zhen Liu, helped to develop a JPEG2000-compatible encoding system that can compress image data and achieve a desired visual quality while minimizing the bit-rate. In contrast, existing JPEG2000 encoders do not allow the user to specify a target distortion, but only a target bit-rate, which makes it difficult to achieve a target visual quality since different images usually result in different visual qualities when coded at the same bit-rate. A patent has been filed by NASA and a Tech Brief will appear in the NASA Tech Briefs journal.
Funding Boost Benefits ASU Media Scientists

$3 million was granted in 2005 to ASU’s Arts, Media and Engineering (AME) program by the National Science Foundation for an Integrative Graduate Education and Research Training (IGERT) program. The goal of the AME program, a collaborative effort of the Herberger College of Fine Arts and the Ira A. Fulton School of Engineering, is to create experiential media systems that integrate computation with physical human experience to produce technological advances in health, arts and everyday living. The Department of Electrical Engineering is a founding partner of the AME program and the IGERT. The grant will provide five years of support including graduate fellowships to doctoral students who are pursuing an AME concentration in electrical engineering. Thanassis Rikakis is the director of the AME program and the principal investigator of the IGERT. Andreas Spanias, an electrical engineering professor, is the associate director of the program and the co-principal investigator of the IGERT. Other electrical engineering faculty affiliated with AME include: Lina Karam, Gang Qian, Tony Rodriguez and Harvey Thornburg.

Alumnus Earns Engineering Acclaim

Among the 16 engineers selected as one of the “New Faces of Engineering” in the United States, was former ASU graduate Yazhou Liu. The recipients of this honor were chosen by the Engineers Week Foundation and were featured in a USA Today article. Liu earned his doctorate from the Ira A. Fulton School of Engineering in 2004. He currently works as an electrical engineer for the THALES group in Seattle and is helping to design a power conversion system for the Boeing Dream Liner 787. Liu credited Electrical Engineering Professor Gerald Heydt for his success. “He taught me a lot about research in my field and working styles that are helpful in my everyday job,” Liu said.

Goodnick Named Associate Vice President for Research

In May 2006, former Electrical Engineering Chair Stephen Goodnick took over as associate vice president for research at ASU. Goodnick, who also serves as the interim deputy dean and director of nanotechnology for the Ira. A. Fulton School of Engineering, plans to use his new position to further ASU’s nanoelectronic efforts. His will also be responsible for coordinating such research initiatives as alternative energy and MacroTechnology Works.

Dancers engage in a movement-based interactive dance performance.
Two Professors Honored for Teaching Skills

Two electrical engineering professors, Daniel Tylavsky and Frederic Zenhausern, were nominated to be the 2006 Professor of the Year. These professors were among the 25 ASU educators recognized for excellence in teaching. The nominations for Professor of the Year are made by students, and the final award is decided upon by a committee of students, faculty and members of the ASU Parent’s Association.

ASU Contributes to a Multi-Institutional Research Project

ASU was awarded a $1.7 million grant by the Defense Advanced Research Program Agency (DAPRA) to develop novel hybrid biomolecular nanodevices and systems that will potentially serve as biosensors in such areas as disease detection and drug-delivery systems. This award is part of an $11.7 million grant that was distributed among six other universities and the Rush Medical Hospital in Chicago. Electrical Engineering Professors Stephen Goodnick and Trevor Thornton are leading this research effort at ASU. Goodnick and Thornton concluded Phase I of the project in spring 2005 and plan to complete Phase II in December 2007.

Recent Retiree

This past year, Electrical Engineering Associate Professor Elbadawy Elsharawy retired. Elsharawy began his teaching career at ASU in 1989. His research and teaching interests included microwave circuits, applied electromagnetics, anistropic devices, electronic packaging and cellular phone antennas.

New Hires

Bahar Jalali-Farahani, Assistant Professor, PhD, Ohio State University

Research interests include: Analog integrated circuits especially low power high performance designs, reliability issues in deep submicron technology, calibration techniques for analog to digital converters, and analog design for wireless communication systems.

Gennady Gildenblat, Motorola Professor, PhD Rensselaer Polytechnic Institute, Troy

Research interests include: Semiconductor transport physics and modeling, novel semiconductor devices, low temperature (10-300k) CMOS, hot carrier effects in MOS integrated circuits, and electronic application of wide-gap semiconductors.
ASU Receives Multiple MURI Awards

Up to $8.6 million in the Department of Defense Multidisciplinary University Research Initiative (MURI) funds have recently been awarded to two ASU teams working on aerospace research. Electrical Engineering Professor Yong-Hang Zhang is working on a team to create inexpensive lasers based on a family of silicon-based semiconductors. The second MURI team, which Electrical Engineering Professors Douglas Cochran and Antonia Papandreou-Suppappola are serving on as investigators, is developing a sensor system to monitor the structural stability of aircraft. Professor Papandreou-Suppappola is also an investigator with Professor Darryl Morrell on a MURI team that is studying waveform configuration for next-generation agile radar systems. They plan to improve radar system performance by making effective use of the transmitter agility. All three MURI grants were awarded for three years with the possibility of a two-year extension.

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

The ASU Electrical Engineering Department’s 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 MSE 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 MSE 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 who has 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.

The EE Department has more than 30 students in the MSE online program and serves over 100 students taking EE classes as part of the Master of Engineering degree. For additional information, visit www.asuengineeringonline.com or call (480) 965-1740.
<table>
<thead>
<tr>
<th>Doctoral Graduates</th>
<th>Summer 2005</th>
<th>Fall 2005</th>
<th>Chakravarthy Gopalan, “Programmable Metallization Cell Devices Based on Copper Doped Tungsten Oxide,” M. Kozicki, chair</th>
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<td></td>
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<td>Qian Ma, “Advanced Techniques for Diversity in Wireless Communications,” C. Tepedelenlioglu, chair</td>
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<td>Jui-Yi Lin, “Wavelet-Based Algorithm for Scattering and Inverse Scattering Problems,” G. Pan, chair</td>
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<td>Lei Ma, “Fast Algorithms for Image Segmentation and Video Target Tracking with Automatic Initialization,” J. Si, chair</td>
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<td>Xin Xie, “Fast Multiresolution Methods in Frequency and Time Domains for Radiation and EMC Applications,” G. Pan, chair</td>
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<td>Jing Hu, “Analysis of Motor Cortical Control and Adaptation in a Brain-Machine Interface Setting,” J. Si, chair</td>
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ELECTRICAL ENGINEERING

Doctoral Graduates contd.

Fall 2005 contd.


Gil Speyer, “Specific Problems in Molecular Electronics,”
D. Ferry, chair

Sai B. Narasimhamurthy, “Quanta Data Storage: Information Processing and Transportation Architecture for Storage Area Networks,”
J. Hui, chair

Xiaolin Mao, “Transformer Linear Thermal Modeling,”
D. Tylavsky, chair

J. Si, chair

Matthew Jacob Gilbert, “Three Dimensional Quantum Mechanical Simulations of Semiconductor Nanowire Transistors,”
D. Ferry, chair

Spring 2006

Tuyet-Trang Lam (Snow), “Selective Error Detection and Error Concealment for Error-Resilient Wavelet-Based Image Coding,”
L. Karam, chair

G. Heydt, chair

Sung-Hoon Oh, “Automatically Tuning Antenna System for Software-Defined and Cognitive Radio,”
J. Aberle, chair

Joon-Young Choi, “SOI Characterization with Mercury Contact Psuedo-MOSFET (HIGET),”
D. Schroder, chair

Jiun-Hsin Liao, “Characterization of Strained Silicon,”
D. Schroder, chair

Amit Singh Chhetri, “Sensor Scheduling and Efficient Algorithm Implementation for Target Tracking,”
A. Papandreou-Suppappola, D. Morrell, co-chairs

Ghassan Maalouli, “Estimation and Equalization of a Time Varying Channel in the Presence of Second Order Dynamics,”
A Spanias, chair

Derrick Lim, “Flourescence Enhancing Photonic Devices,”
R. Diaz, chair

Natthaphob Nimpathawan, “Consequences of Fault Currents Contributed by Distributed Generation,”
G. Heydt, chair

Basel Naser, “Time Resolved Measurements of Electron Transport in Quantum Point Contact,”
J. Bird, S. Goodnick, co-chairs

Khan A. Tarik, “Modeling of Schottky Junction Transistor Using Monte Carlo Device Simulation Technique,”
D. Vasileska, T. Thornton, co-chairs

Undergraduate Electrical Engineering Students Honors and Scholarships

Merit Scholars: 16
Honor Students: 57
Scholarships (private/corporate): $46,000
Per student average: $2421
Grads Awards

Year in Review

Palais Award

Dr. Jiangbo Wang (left) and Dr. Shuiqing Yu (right) were the co-recipients of the Palais Doctoral Outstanding Student Award for 2005-2006. Wang’s thesis was titled “Electric and Optical Properties of Novel Semiconductor Heterostructures,” and he was advised by Professor Yong-Hang Zhang. Yu was also advised by Professor Zhang on his thesis, “Gallium Arsenide Based Optoelectronics Devices.” Currently, both Wang and Yu are working on postdoctoral research in optoelectronics.

Graduate Scholarships in Electrical Engineering

ARCS-Achievement Rewards for College Scientists: Visar Berisha, Joseph Ervin and Joushua Hihat

Dean’s Award: Patrick Corrigan

DOE-Department of Energy Computational Science Fellowship: Aaron Cummings

Fulton Fellowship: William Lepowski, Michael McLain and Ryan Robison

IGERT-Integrative Graduate Education and Research Training Awards: James Bridgewater, Alex Fink, Kyle Foley, Ben Green, Leo Petrossian, Tsing Tsow and Gordon Wichern

Intel Fellowship: Tim Day

NSF-National Science Foundation Graduate Fellowship: Visar Berisha and Jennifer Desai

UGS-University Graduate Scholars Program Awards: Visar Berisha, James Bridgewater, Niranjan Chakravarthy, Varsha Chatlani, Ben Green, Hasanur Khan, Vadim Kushner, Jeremy Lambert, William Lepowski, Win Ly, Marc Tiu, Stanislav Ogurtsov, Bishnu Sapkota, Aaron Williams, Dong Zheng, Joseph Ervin, Aaron Fullerton and Aaron Williams

WASEO: Jerrald Willis
Senior Design Prize Competition

The senior design prize is awarded to seniors in electrical engineering for the best projects in Spring 2006. The winners were selected by the Electrical Engineering External Advisory Council (EEEAC).

The 2006 winners, Abhinav Aneel, Justin Eise, Davide O’Neill and Ninad Patel, worked in the field of electronic circuits. Their project, the Arizona State University Device Layout System (ASU DevilS), was an automated Perl-based integrated circuit layout system designed to automatically generate the cell layout for standard logic gates on a deep submicron process. The students were advised by professors Lawrence Clark and David Allee.

Student Captures INTELEC Fellowship

The 2006 Joseph J. Suozzi INTELEC Fellowship in Power Electronics was awarded to Brad Oraw. This $10,000 grant will enable Oraw, who is pursuing a PhD in electrical engineering, to spend one year working on power conversion for data and telecommunication systems. “This award is a tremendous honor that embodies the quality of work emerging from the power electronics group at ASU,” Oraw said.
The ASU Signal Processing and Communications Group (SPCom) is part of the Electrical Engineering Department. Research activities of the group’s 13 faculty members are supported by laboratory facilities representing the following focus areas: Digital Signal Processing, Sensor and Information Processing, Speech and Audio Processing, Image Processing, Communications and Multimedia Networks and Java Systems.

Over the past seven years, five SPCom faculty members have received NSF CAREER awards. EE graduate students are key contributors to the group’s research, and several SPCom doctoral graduates now hold prestigious faculty and research positions at such institutions as the University of Texas, Polytechnic University of New York, MIT Lincoln Laboratory and IBM Research. SPCom’s visibility has been enhanced by its working relationship with Raytheon on sensing applications, its collaboration with ASU’s Arts, Media and Engineering program and its partnership in NIH activities. Research sponsors of the group include DARPA, AFOSR, the Office of the Secretary of Defense, the NSF, General Dynamics, Motorola, Intel and Seagate. The group has founded and led the FSE Sensor, Signal and Information Processing (SenSIP) cluster, which is transitioning into a multidisciplinary research center with international activities.

Sensing and Information Processing

Sensors are ubiquitous in today’s technology products and systems. From power plants to medical devices, navigation to safety, sensors are increasingly important in many aspects of our daily lives. Spurred by advancing device technologies, highly advanced, agile sensors are emerging as a next-generation technology for many applications, such as surveillance, medical imaging and...
structural health monitoring.

Over the past few years, Professors Cochran, Papandreou-Suppappola and Morrell have been working to integrate the mathematical foundations of sensing and processing with a special emphasis on developing new algorithms to exploit the agility of emerging sensor systems. Towards this goal, they have received significant research funding from several DoD agencies and programs. SPCom members are currently involved in two DoD Multi-Disciplinary University Research Initiatives (MURI) projects, which are providing $11 million in research funding to ASU over five years. The faculty’s research on these projects, one of which ASU is serving as the lead, entails collaboration with Raytheon, AFRL, NRL, Princeton, Purdue, Harvard, the Universities of Maryland and Melbourne. Other noteworthy collaborative activities in the sensing area include multimodal sensing with AME and analysis of ion-channel sensor signals (Professors Spanias, Goodnick and Thornton).

Speech and Audio Processing

The speech and audio coding initiative is led by Professor Andreas Spanias and spans research in perceptual speech and audio coding and adaptive signal processing. It also incorporates several other research foci underpinning new technological capabilities, including adaptive signal enhancement, which utilizes vector quantization, Hidden Markov models (HMM) with extensions to denoising and classifying biomedical signals.

Sponsored work in speech processing includes a 5-year, $1.5 million dollar ASU program, which was funded by Intel Corp. Under this initiative, SPCom researchers contributed speech coding software for the Intel ProShare teleconferencing software package and to the design of a low-power Intel DSP core 60172®. These contributions were recognized by awards from Intel Corporation citing technical leadership and outstanding contributions. Audio coding work was recognized by the IEEE Donald Fink award in 2002.

Image and Video Processing

Professor Karam leads work in image, video and multi-dimensional signal processing. Karam has received an NSF Career award and an award from NASA AMES Research for her work in perceptual-based image coding, which has recently been incorporated within the JPEG2000 image coding standard. Karam’s group work on image and video compression, enhancement and transmission has been integrated by General Dynamics into their SelectFocusTM Image and Video commercial products. Her research in this area has also successfully demonstrated, for the first time, the wireless transmission of digital imagery and video over the worldwide Iridium satellite communication system. As a result, digital multimedia data can now be transmitted globally—even to remote and isolated areas. This is crucial for outreach efforts, disaster management and many applications including telemedicine, distance training, remote sensing and surveillance.

Communication Networks

A prime goal of SPCom telecommunication research is to understand the traffic and quality...
statistics of encoded video and the resulting implications for multimedia transport over networks such as the Internet. By performing wireless networking research that examines efficient clustering, routing and media streaming in mobile ad hoc networks (MANETs), Professor Martin Reisslein has produced the first MANET routing protocol with complexity less than the total network size. Professor Joseph Hui’s work also addresses communication networks. He analyzes routing and switching for Gigabit wireless networks with smart antennas and Terabit optical networks with dense wavelength divisions. Additionally, Hui devises new application protocol for storage and multimedia networks.

The convergence of network and physical layer issues is another major theme of network research. Traditionally, network and communication theory researchers investigate problems using “different languages.” The fast growing area of wireless networks, including cross-layer optimization and network information theory, serves as a bridge between these two communities and is likely to enable future technologies for efficient wireless spectrum use. Professor Junshan Zhang is pursuing research in cross-layer design and network information theory in sensor/ad-hoc networks. Zhang’s efforts have been funded by NSF and Intel, and he was recently recognized by a young investigator award from the Office of Naval Research.

Physical Layer Communications

Professor Cihan Tependelenlioglu has centered his research on modeling the wireless communications channel, estimating its parameters and analyzing and designing the modulation of coding schemes such as Orthogonal Frequency Division Multiplexing, ultra-wideband communications and adaptive modulation and coding for single and multiple antenna systems. Additionally, Professor Papandreou-Suppappola researches time-varying signal processing for wireless communications including time-frequency techniques for modulation and channel modeling. Professor Tolga M. Duman’s work, which includes coding, modulation and information theory with applications in wireless and recording systems, also revolves around physical layer communication issues. Duman is currently examining the problem of underwater acoustic (UWA) communications. His research team is collaborating with Space and Naval Warfare Research Systems Center (SPAWARSYSCEN) and Heat, Light, Sound (HLS) Research, to address the UWA communication needs of the U.S. Navy. The team is investigating the applicability of multiple-input, multiple-output (MIMO) for UWA channels. MIMO is an exciting technology that may address such obstacles as multipath and fading in underwater communications. By using a combination of sophisticated channel coding, multi-carrier modulation and powerful iterative equalization techniques, Duman’s team has already increased the effective throughput of the shallow water links by close to an order of magnitude, demonstrated in actual at-sea experiments. Such improvements will open the frontiers for several different classes of applications, such as real-time image and video transfer and underwater networks, which were previously thought to be too demanding for practical implementation on UWA links. This project has been funded by SPAWAR and the Navy’s small business transfer technology program, ONR STTR.
Low-power VLSI Signal Processing

Traditionally, research in design and implementation of signal processing systems has focused on finding the best way to map an already designed algorithm into an architectural platform. However, by modifying the specifics of the algorithm to suit the constraints of the architecture, Professor Chakrabarti believes that a more efficient implementation can be achieved. Her research team is collaborating with researchers at Duke University and Penn State University on a DARPA-funded project on an automated framework for algorithm-architecture co-design for FPGA platforms. This research team is also sharing NSF funding with the University of Michigan for a project involving an algorithm-compiler-architecture co-design strategy for designing an ultra low power baseband processor of a software-defined radio.

Due to the increasing demand for portability, low-power systems are a priority for SPCom researchers. In order to design such systems, power has to be reduced at all levels of the design — from algorithm level down to gate level. At the algorithm level, Chakrabarti’s team has been able to show how power reduction can be achieved by migrating seamlessly to a lower complexity algorithm during run-time in response to changes in channel conditions or quality requirements.

Java-DSP Development

The development of a Java digital signal processing software package (J-DSP) is a major accomplishment of SPCom. Designed by Professor Spanias and his team of collaborators and graduate students, J-DSP was ranked by the Berkeley NEEDS committee as one of the top three educational resources in 2003. This software allows students to design and manipulate the basic building blocks of a DSP system and to experiment with simulations of digital cell phones, MP3 compression and real-time sensing. Spanias is building on the success of this software by spearheading an effort at ASU to develop a multi-disciplinary distance learning initiative that will train the next-generation engineers. With the aid of $1.1 million in NSF grants, ASU is working with four other universities to enhance, evaluate and disseminate the Java technology. Several electrical engineering faculty members, including Professors Duman, Karam, Papandreou-Suppappola, Tepedelenlioglu, Tsakalis and Zhang, have collaborated with Spanias on some of these J-DSP efforts.

Arts, Media and Engineering

SPCom faculty formally collaborates with the Arts, Media and Engineering (AME) program, and an established degree concentration is available for graduate studies in this area. Professor Spanias, associate director of AME, is Co-PI on a $3 million NSF IGERT grant that supports some of the AME activities. Research, led by
Professor Gang Qian, entails examining movement in a holistic way and trying to teach computers to understand this language in much the same way that humans do. Such research can result in a more natural movement-based mechanism for human computer interaction.

Professors Thornburg and Spanias' work with AME include a source localization project with microphone arrays. While Spanias and his students have developed adaptive algorithms for microphone arrays, Thornburg is developing new methods, based on probabilistic models that use dynamic Bayesian networks, to segment, analyze and recognize patterns in human activity occurring in situated environments. Ongoing applications include joint gesture segmentation and temporal structure inference from conducting performance, and audio summarization of continuously-monitored everyday sound environments. AME work has been applied to biofeedback for rehabilitation, K-12 mediated education and interactive dance performance.

Biomedical Signal Processing Applications

Students and faculty working in the signal and image processing labs are actively participating in the development of next-generation techniques for magnetic resonance imaging (MRI), including methods for medical data collection and reconstruction and motion-corrected imaging. Such techniques can result in better and more accurate diagnosis and, consequently, better prevention and faster cure. This work is performed in collaboration with Dr. Jim Pipe in the MRI department at the Barrow Neurological Institute (BNI). Other collaborative efforts of SPCom faculty and students include epileptic seizure prediction (with Professor Iasemides) and DNA sequence analysis using spectral estimation techniques.

Due to the increasing demand for portability, low-power systems are a priority for SPCom researchers. In order to design such systems, power has to be reduced at all levels of the design — from algorithm level down to gate level.

SPCom Faculty

<table>
<thead>
<tr>
<th>Chaitali Charabarti</th>
<th>Andreas Spanias</th>
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<tr>
<td>Douglas Cochran</td>
<td>Antonia Papandreou-Suppappola</td>
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<td>Darryl Morrell</td>
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Connection One is a National Science Foundation Industry/University Cooperative Research Center established by the Ira A. Fulton School of Engineering. The Connection One Research Center is at the forefront of developing the next generation antennas, low-power computer chips, advanced transistor models and cutting-edge multiple-function circuitry to enhance technologies ranging from cellular to environmental and defense applications.

The NSF-funded center partners with universities and corporations to bring together the academic laboratory with state-of-the-art research initiatives and real-world market applications. In addition to Arizona State University (the lead university), the Center includes the University of Arizona, the University of Hawaii, Rensselaer Polytechnic University and The Ohio State University. Industrial partners include: Analog Devices, BAE Systems, Crystal IS, Freescale Semiconductor, General Dynamics C4 Systems, IBM, Intel, Kyocera, Motorola, Raytheon, Sensor Electronic Technology Inc., Space Micro, Texas Instruments, Timbre and Velox.

The Center has grown tremendously over the past four years. New labs were built this past year in the following areas: RF IC design, mixed-signal analog/digital IC testing, VLSI design and system testing, MEMS system fabrication, electromagnetic anechoic chamber, in addition to an RF screen room testing facility. The Center is involved in the design of multiple RF and analog/digital ICs. Some of the IC fabrication processes currently being used include: TSMC, IBM, Honeywell, Freescale, SPAWR, Peregrine, as well as being a member of DARPA Trusted Foundry group.

Connection One currently has 2 Post Docs, 43 PhD students, 20 Master students, and 3 undergraduates conducting research on the following projects:

- MEMS and Nano Technologies for RF and Mixed-Signal ICs
- RF Transmitter and Receiver Design
- Ultra-Low Power System Design
- VLSI Design
- RADHARD Electronics
- RFIC and Remote Sensing Wireless Devices
- Ultra-Low Power Smart Sensors
- High-Efficiency Power Amplifier Design
- A/D and D/A Converters
- Integrated Power Converters and Power Management Systems
- Terahertz Plasma Wave Electronics for Testing Silicon VLSI
- On-Chip High-Q Filters
- Software-Defined and Cognitive Radio
- Modeling of Semiconductor Devices for Wireless Applications
- MEMS Based Sensors

Additional information on Connection One is available at: http://www.connectionone.org

A grant from the National Science Foundation is helping Connection One professors to develop nano-scale digital hearing aids. Professors Bertan Bakkalogu, Junseok Chae and Sayfe Kiaei are investigating new techniques that will help perfect existing hearing aid devices both electronically and physically. In addition to making hearing aids smaller and more flexible, the professor will also research ways to save battery power.
Center Highlights and Major Accomplishments

The Center is organized into four main areas: materials and device modeling, low-power analog circuit design, low-power digital circuits and systems design, and physical design of low-power circuits and systems.

The Center’s research ranges from semiconductor material and basic device issues to device/circuit design and modeling; data-dependent algorithm design, energy-efficient code generation, memory design, dynamically reconfigurable, mixed-signal, lower-power systems; substrate noise coupling, hot carriers, MOSFET noise and dynamic power management techniques. Analog-to-digital converters, incorporating correlated double sampling and swing reduction to improve performance and reduce power consumption at low-power supply voltages typical of deep sub-micron CMOS processes, have been designed and fabricated. The development of high-level transformations includes those at the algorithm level and system level (memory, bus interface, etc.). Three faculty members at ASU and three faculty members from the University of Arizona together with 12 graduate students carry out this research.

Center Location
Arizona State University and the University of Arizona.

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.

Additional information on the Center for Low Power Electronics is available at: http://clpe.ece.arizona.edu
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 10 people. The Center has about 50 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 focuses 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.

Additional information on CSSER facilities is available at: http://www.fulton.asu.edu/nanofab
PSERC is a National Science Foundation Industry/University Cooperative Research Center that is addressing challenges in the new electric power industry as it evolves from its historical business structure. Challenges for success in this demanding business environment are being raised by new market structures and ways of doing business, new technologies, the demands of customers for customized services, strategic choices between centralized and decentralized technologies, institutional changes creating mega-RTOs, a graying industry that needs well-trained power engineers, and new environmental priorities. Yet the basic function of the industry—to produce and to deliver power, safely and reliably—has not changed. The challenges call for new strategies, technologies, analytical capabilities and tools, and operating practices, along with sound public policy guidance. Under the banner of PSERC, multiple U.S. universities are working collaboratively with industry to:

- engage in forward-thinking about future scenarios for the industry and the challenges that might arise from them
- conduct research for innovative solutions to these challenges using multidisciplinary research expertise in a unique multi-campus work environment
- facilitate interchange of ideas and collaboration among academia, industry and government on critical industry issues
- educate the next generation of power industry engineers.

The multidisciplinary expertise of PSERC’s researchers includes power systems, applied mathematics, complex systems, computing, control theory, power electronics, operations research, non-linear systems, economics, industrial organization and public policy. PSERC partners with private and public organizations that provide integrated energy services, transmission and distribution services, power system planning, control and oversight, market management services and public policy development.

PSERC Research

PSERC’s comprehensive research program spans markets, T&D technologies and systems to find opportunities for advancing high performance electric power systems through better ideas.

Research Stem 1: Markets

Market research focuses on market design, verification and validation within the context of electricity market restructuring. Representative research topics are active load participation, auction policies and strategies, market mechanisms, restructured market assessment and transmission asset valuation.

Research Stem 2: Transmission and Distribution

This research improves performance of T&D systems by finding new applications for innovative technologies. Representative research topics are automation, intelligent devices and control concepts, management of an aging infrastructure, protection systems, stability and dynamic limits, substation data integration and functionality, and state estimation.

Research Stem 3: Systems

Systems research seeks ways to increase use, efficiency and reliability of increasingly complex and dynamic power systems. Representative research topics are cascading events, complex systems, computational methods for large systems, control schemes, distribution system reliability, risk assessment, security assessment, transfer limits and visualization.

Vittal Takes Reins of National Power Systems Center

Professor Vijay Vittal was appointed in 2005 to head the Power Systems Engineering Research Center (PSERC). Vittal replaces Bob Thomas of Cornell University who served as the center’s director for nine years. With this shift in directorship, ASU has become the lead school of the 13-university organization. According to Vittal, “To be the lead university in this group gives us national and international exposure.”

Additional information on PSERC is available at http://www.pserc.org
ASU’s Department of Electrical Engineering Among Top 30 in the Nation

ASU’S DEPARTMENT OF ELECTRICAL ENGINEERING HAS DONE IT AGAIN!

U.S. News and World Report ranked the EE Department’s program as one of the top electrical engineering schools in the nation. ASU maintained 29th place in the report for the second year in a row. The department offers graduate, undergraduate and online programs that focus on seven different research areas and partners with major industry players to produce cutting-edge research and technology.

For more information about the EE Department, visit its Web site at http://www.fulton.asu.edu/~eee

To find out more about the Fulton School of Engineering, visit http://www.fulton.asu.edu

Abbas Abbaspour-Tamijani
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Office: GWC 320
Assistant Professor, PhD, University of Michigan, Ann Arbor

Dr. Abbas Abbaspour-Tamijani joined ASU in Fall 2004. He received his PhD in electrical engineering from the University of Michigan, Ann Arbor, in 2003, and BS and MS degrees from the University of Tehran, Tehran, Iran, in 1994 and 1997, respectively. Prior to joining ASU, he worked as a research fellow in the Radiation Laboratory of the University of Michigan, and as the senior antenna and RF engineer with Motia Inc, Pasadena, Calif. Dr. Abbaspour-Tamijani is a member of the IEEE Microwave Theory and Techniques, Antennas and Propagation and Engineering in Medicine and Biology societies.

Research Interests: RF-MEMS technology with applications to reconfigurable antennas and tunable networks, integrated and multifunction millimeter-wave modules and biomedical applications of microwaves.

Selected Publications:

James T. Aberle
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Office: GWC 326
Associate Professor, PhD, University of Massachusetts

James T. Aberle received the BS and MS degrees in electrical engineering from the Polytechnic Institute of New York (now Polytechnic University) in 1982 and 1985, respectively, and the PhD degree in electrical engineering from the University of Massachusetts in 1989. From 1982 to 1985, he was employed by Hazeltine Corporation, Greenlawn, N.Y., where he worked on the development of wide-band phased array antennas. 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, 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, Dr. 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).

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

Selected Publications:

Personal Web site:
http://www.fulton.asu.edu/~aberle
David R. Allee  
E-mail: allee@asu.edu  
Phone: (480) 965-6470  
Office: ERC 153  
Associate Professor, PhD, Stanford University

Dr. David R. Allee (BS in electrical engineering, University of Cincinnati; MS and PhD in electrical engineering, Stanford University) is an associate professor in the Department of Electrical Engineering at Arizona State University. While at Stanford University and as a research associate at Cambridge University, Dr. Allee fabricated scaled field effect transistors with ultra-short gate lengths using custom e-beam lithography. He also invented several ultra-high resolution lithography techniques including direct e-beam irradiation of SiO2, and nanometer scale patterning of various organic and inorganic films with scanning tunneling lithography (ASU). Since joining Arizona State University, his primary focus has been on analog integrated circuit design. As a founding member of the NSF Centers for Low Power Electronics, Connection One and the Whitaker Center for Neuromechanical Control, he has designed several custom analog to digital converter and telemetry ICs.

Dr. Allee also is currently team leader for backplane electronics for the Flexible Display Center recently funded by the U.S. Army, and he is investigating a variety of flexible electronics applications. He has been a regular consultant with several semiconductor industries on low voltage, low power mixed signal CMOS circuit design. Dr. Allee has co-authored 35 scientific publications and three U.S. patents.

Research Interests:  
Novel topologies and new control techniques for switch-mode power conversion, especially DC-DC converters, modular, fault-tolerant power conversion architecture, digital PWM techniques for motor drives, power systems applications of power electronics.

Selected Publications:  
R. Ayyanar, and N. Mohan, “Zero Voltage Switching DC-DC Converter,” U.S. patents 6,611,444 and 6,310,785.


Raja Ayyanar  
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Phone: (480) 727-7307  
Office: ERC 587  
Assistant Professor, PhD, University of Minnesota

Rajapandian Ayyanar joined the ASU faculty as an assistant professor in August 2000. He received the BE in electrical engineering from P.S.G. College of Technology, India, in 1989; the MS in power electronics from the Indian Institute of Science in 1995; and the PhD in power electronics from the University of Minnesota in 2000. He has published over 30 journal and conference papers in the area of switch mode power electronics and holds two U.S. patents. Dr. Ayyanar was awarded the ONR Young Investigator Award in 2005.

Research Interests: Novel topologies and new control techniques for switch-mode power conversion, especially DC-DC converters, modular, fault-tolerant power conversion architecture, digital PWM techniques for motor drives, power systems applications of power electronics.

Selected Publications:  
R. Ayyanar, and N. Mohan, “Zero Voltage Switching DC-DC Converter,” U.S. patents 6,611,444 and 6,310,785.


Bertan Bakkaloglu  
E-mail: Bertan.Bakkaloglu@asu.edu  
Phone: (480) 727-0293  
Office: GWC 311  
Associate Professor, PhD, Oregon State University

Bertan Bakkaloglu joined the ASU faculty in August 2004. He received a PhD in electrical and computer engineering in 1995 from Oregon State University and a MSC in 1992 from the University of Houston, Texas. Prior to ASU, Dr. Bakkaloglu was with Texas Instruments where he was responsible for analog, mixed signal and RF system-on-chip development for wireless and wireline communication transceivers. He is a technical committee member for IEEE Radio Frequency Integrated Circuits Conference and founding chair of the IEEE Solid State Circuits Society Phoenix Chapter.

Research Interests: RF and mixed-signal IC design, wireless and wireline communication circuits and systems, broadband communication ICs and systems, integrated power management for digital communication transceivers.

Selected Publications:  


Constantine A. Balanis
E-mail: balanis@asu.edu
Phone: (480) 965-3909
Office: GWC 452
Regents’ Professor, PhD, Ohio State University

Constantine A. Balanis joined the ASU faculty in 1983 and is now a Regents’ Professor of electrical engineering. He has published over 118 journal papers, 202 conference papers, ten book chapters, eight magazine/newsletter papers and numerous scientific reports. He has also published two textbooks: Antenna Theory: Analysis and Design and 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, and electromagnetic wave multipath propagation.

Honors and Distinctions: Regents’ Professor, Honorary Doctorate-University of Thessaloniki (Greece), IEEE Life Fellow, IEEE Third Millennium Medal, IEEE AP Society Chen-To Tai Distinguished Educator Award, 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 Special Professionalism Award.

Selected Publications:

Personal Web site: http://www.fulton.asu.edu/~balanis/

Hugh Barnaby
E-mail: hibarnaby@asu.edu
Phone: (480) 727-0289
Office: GWC 316
Assistant Professor, PhD, Vanderbilt University

Hugh Barnaby joined the ASU faculty in 2004. He received a PhD in 2001 and MSE in 1999 both in electrical engineering from Vanderbilt University in Nashville, Tenn. Dr. Barnaby’s current research focuses on the analysis, modeling and experimental characterization of hostile environment (radiation, low and high temperature) effects in semiconductor materials, devices, and integrated circuits. His work also focuses on the development of design and processing techniques that enable the reliable operation of electronics in these environments. Dr. Barnaby has served as an active researcher in the microelectronics field for over 13 years in both industry and academics, presenting and publishing more than 60 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 bio-electronic sensors and actuators. Dr. Barnaby, a senior member of IEEE, also worked as a staff scientist for the microelectronics division at Mission Research Corporation in Albuquerque, N.M., where he performed radiation effects and reliability analysis on VLSI digital and analog/mixed-signal circuits.

Research Interests: Semiconductors for hostile environments, device physics and modeling, microelectronic device and sensor design and manufacturing, analog/mixed signal circuit design and test.


Selected Publications:

Yu (Kevin) Cao
E-mail: ycao@asu.edu
Phone: (480) 965-1472
Office: GWC 336
Assistant Professor, PhD, University of California, Berkeley

Kevin Cao joined the ASU faculty in 2004. He received a PhD in electrical engineering in 2002 and a MA in biophysics in 1999 from the University of California, Berkeley, and conducted his post-doctoral research at the Berkeley Wireless Research Center. At the BWRC center, his research focused on circuit techniques and design methodologies to improve the reliability of VLSI systems under increasing parametric variations and ultra-low power design for computation and communication. He has one patent and has published over 30 journal and conference papers and the book, Nana-CMOS Circuit and Physical Design.

Research Interests: Reliable nanometer system integration, robust low-power VLSI circuit design and CAD tools, high-speed interconnect architectures and signaling techniques, design of digital imaging systems.

Honors and Distinctions: 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:
Junseok Chae joined the ASU faculty in 2005. He received a PhD in electrical engineering in 2003 and a MS in 2000 from the University of Michigan, Ann Arbor. From 2003 to 2005 he was a postdoctoral research fellow at WIMS (Wireless Integrated MicroSystems), University of Michigan. He joined the faculty of Arizona State University in August 2005, where he is currently an assistant professor in electrical engineering.

His areas of interests are MEMS sensors, mixed-signal interface electronics, MEMS packaging, ultra-fast pulse (femto-second) laser for micro-nano-structures and Cell-on-a-Chip Bio-MEMS. He has published over 20 journal and conference articles and a book chapter, "Monolithically Integrated Inertial Sensors" in the 2nd volume of Advanced Micro and Nanosystems (AMN), CMOS-based MEMS and NEMS, Wiley-VCH series. He holds a couple of U.S. patents and was invited to talk at Microsoft Inc. regarding "MEMS Technology for Consumer Electronic Applications."


Selected Publications:


Personal Web site: www.public.asu.edu/~jchae2

Chaitalli Chakrabarti received her B. Tech. in electronics and electrical communication engineering from the Indian Institute of Technology, Kharagpur, India, and her MS and PhD degrees in electrical engineering from the University of Maryland, College Park. She has been at ASU since 1990 where she is now a professor. She is a member of the Center for Low Power Electronics and Connection One and conducts research in various aspects of low-power system design.

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


Selected Publications:


Personal Web site: http://enws155.eas.asu.edu/8001/

Lawrence T. Clark worked at Intel Corporation after receiving his BS in computer science in 1983. Later, Dr. Clark worked at VLSI Technology designing PC chipsets. He received his PhD in 1992 and an MS in 1987 in electrical engineering from Arizona State University. He re-joined Intel in 1992. While at Intel, Dr. Clark also was an adjunct professor at ASU. For the 2003-2004 school year, he was an associate professor at the University of New Mexico. He joined ASU in August 2004.

Prof. Clark has been awarded over 45 patents, and has 15 pending. He has published approximately 30 papers. He has about 15 years of industry experience in various aspects of chipset, CMOS imager, and microprocessor design, test engineering and TCAD. He contributed to the Pentium, Itanium and XScale microprocessor designs. Most recently, he was a principal engineer at Intel where he managed circuit design for XScale microprocessors.

Research Interests: Circuits and architectures for low power and high performance VLSI, radiation hardened circuit design and CAD for VLSI.

Honors and Distinctions: Intel Achievement Award for XScale microprocessor design, senior member of IEEE, Intel Divisional Recognition Awards for cache design tools, drowsy leakage control mode, member of the IEEE Custom Integrated Circuits Conference technical committee, reviewer for IEEE Spectrum, IEEE, JSSC.

Selected Publications:


Douglas Cochran
E-mail: coochran@asu.edu
Phone: (480) 965-5311
Office: GWC 424
Assistant Dean For Research, Associate Professor, PhD, Harvard University

Douglas Cochran joined the ASU faculty in 1989 and now serves as assistant dean for research in the Ira A. Fulton School of Engineering. He holds PhD and SM 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. Professor Cochran has served as program manager for mathematics in the U.S. Defense Advanced Research Projects Agency, as a consultant for the Australian Defence 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 and the 1997 U.S.-Australia Workshop on Defense Signal Processing.

Research Interests: Sensor signal processing, applied harmonic analysis, detection theory.


Selected Recent Publications:

Rodolfo Diaz
E-mail: rudydiaz@asu.edu
Phone: (480) 965-4281
Office: GWC 314
Associate Professor, PhD, UCLA

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 an associate professor in electrical engineering, the associate director of the Consortium for Meteorology of Semiconductor Nanodefects and holds 17 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 M. Duman
E-mail: duman@asu.edu
Phone: (480) 965-7888
Office: GWC 411B
Associate Professor, PhD, Northeastern University

Tolga M. Duman received the BS from Bilkent University, Turkey, in 1993 and the MS and PhD 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. He is currently an associate professor.

Research Interests: Digital communications, wireless and mobile communications, channel coding, turbo codes and turbo-coded modulation systems, sensor and ad-hoc networks, coding for magnetic recording channels, underwater acoustic communications, and coding for wireless communications.


Selected Publications:

Personal Web site: http://www.fulton.asu.edu/~duman
Elbadawy Elsharawy
E-mail: elsharawy@asu.edu
Phone: (480) 965-8591
Office: GWC 424
Associate Professor, PhD, University of Massachusetts

Elbadawy Elsharawy joined ASU in 1989 where he served as 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, anisotropic devices, electronic packaging, and 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:

Richard Farmer
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Phone: (480) 965-4953
Office: ERC 585
Research Professor, MS, Arizona State University

Richard Farmer has over 50 years of electric power industry experience. He has been a teaching associate and adjunct professor at Arizona State University since 1966. He has co-authored a book on the application of series capacitors in power systems and has written over 40 industry papers.

Research Interests: Extra-high voltage (EHV) project planning and interaction of turbine generators with EHV transmission systems.


Selected Publications:

Faculty Books


David K. Ferry

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Phone: (480) 965-2570
Office: ERC 187

Regents’ Professor, PhD, University of Texas

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


Honors and Distinctions: Regents’ Professor at ASU, IEEE Cedro 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:


Stephen Goodnick

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Phone: (480) 965-6798

Professor, PhD, Colorado State University, 1983

Stephen Goodnick is presently interim deputy dean and director of nanotechnology for the Ira A. Fulton School of Engineering. He came to ASU in Fall 1996 as department chair. Prior to that, he was a professor of electrical and computer engineering at Oregon State University 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 165 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 Award in Academia Award, 1998; IEEE Phoenix Section Society Award for Outstanding Service, 2002.

Selected Publications:


Ravi Gorur

E-mail: ravi.gorur@asu.edu
Phone: (480) 965-4894
Office: ERC 515

Professor, PhD, University of Windsor, Canada

Dr. Ravi Gorur joined the faculty at ASU in 1987 as an assistant professor after graduating with a PhD from the University of Windsor, Canada in 1986. Since 1995, he has held the position of professor, and presently he is the associate chair and director of undergraduate programs in the department.

Dr. Gorur is a fellow of the IEEE and the U.S. representative to CIGRE study committee D1 “Materials for Advanced Technologies.” He has authored a textbook on outdoor insulators and more than 150 papers in IEEE journals and conferences on the subject of outdoor insulators for electric power transmission and distribution. He works in other related areas such as liquid dielectrics, dielectrics for aircraft and communications systems. He teaches a short course on the subject of insulators that is offered to industry annually.

Research Interests: Dielectrics and electrical insulating materials, electric field calculations, pulsed power, power electronics, dielectric fluids, HV testing techniques and computer aided design.

Honors and Distinctions: IEEE Fellow, 1999; U.S. representative to CIGRE Study Committee D1 (materials for advanced technologies).

Selected Publications:


Gerald T. Heydt  
E-mail: heydt@asu.edu  
Office: ERC 507  
Regents’ Professor, PhD, Purdue University  

Gerald Thomas Heydt is from Las Vegas, NV. He holds the BSEE degree from the Cooper Union in New York and the MS and PhD degrees from Purdue University. He spent approximately 25 years as a faculty member at Purdue, and in 1994, he took the position of site director of the NSF Center for the Power Systems Research Center at ASU. He has industrial experience with the Commonwealth Edison Company, Chicago, E.G. & G. in Mercury, NV, 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. Dr. Heydt is a Regents’ Professor at ASU, he is a member of the National Academy of Engineering, and a Fellow of the IEEE.

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


Selected Publications:
- Dr. Heydt is the director for the Power Systems Engineering Research Center (PScrc): http://www.pserc.wisc.edu/index_about.html

Keith Holbert  
E-mail: keith.holbert@asu.edu  
Office: ERC 581  
Associate Professor, PhD, University of Tennessee  

Keith Holbert joined the faculty in 1989. He is a registered professional engineer and has published over 60 journal and conference papers.

Research Interests: Process monitoring and diagnostics, sensor fault detection, instrumentation development, fuzzy logic, spacecraft charging, and 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 Hui  
E-mail: jhui@asu.edu  
Office: GWC 411  
ISS Chair Professor, PhD, Massachusetts Institute of Technology  

Joseph Y. Hui joined ASU as ISS Chair Professor in 1999. He received his BS, MS and PhD degrees from MIT. He 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.


Selected Publications:
**ELECTRICAL ENGINEERING**

**Affiliate Professors provide additional support to the 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.

Terry Alford (PhD, Cornell University): Electron materials and characterization

Karamvir Chatha (PhD, University of Cincinnati): VLSI design and CAD, embedded systems design

Sandwip Dey (PhD, Alfred University): Solid-state electronic materials

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

Jiping He (PhD Maryland, College Park): Controls, bioengineering

Ranu Jung (PhD Case Western Reserve): Neuromotor organization, bioengineering

Darryl Morell (PhD Brigham Young University): Engineering applications of probability theory and decision theory

Sethuraman Panchanathan (PhD, University of Ottawa): Computer Science

Daniel Rivera (PhD, California Institute for Technology): Chemical and materials engineering

Sarma Vrudhula (PhD, University of Southern California): VLSI and embedded systems design

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**Bahar Jalali-Farahani**

E-mail: Bahar.Jalali@asu.edu

Phone: (480) 727-7191

Office: GWC 340

Assistant Professor, PhD, Ohio State University

Bahar Jalali-Farahani joined ASU in spring 2006 as an assistant professor. She received her PhD in electrical engineering from The Ohio State University in 2005 and BS and MS degrees in electrical engineering from the University of Tehran, Tehran, Iran in 1996 and 1999 respectively.

**Research Interests:** Analog integrated circuits especially low power high performance designs, reliability issues in deep submicron technology, calibration techniques for analog to digital converters, and analog design for wireless communication systems.

**Selected Publications:**


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**Youngjoong Joo**

E-mail: yjoo@asu.edu

Phone: (480) 965-2030

Office: GWC 328

Assistant Professor, PhD, Georgia Tech.

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 BS and MS degrees in electrical engineering from Korea University in 1988 and 1990, respectively, and the PhD 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, and UWB transceivers.

**Selected Publications:**


George G. Karady
E-mail: karady@asu.edu
Phone: (480) 965-6569
Office: ERC 589
Professor, PhD, University of Technical Sciences, Budapest

George Karady received his BSEE and PhD degrees in electrical engineering from the Technical University of Budapest. He was appointed as 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 electrical task supervisor for the Tokomak Fusion Test reactor project in Princeton. Dr Karady is an IEEE fellow and he has more than 120 journal and 150 conference publications. He also received an honorary doctor degree from the Technical University of Budapest in 1996.

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

Honors and Distinctions: Fellow of IEEE, chairman of IEEE PES 10 Power Electronics Subcommittee. He chaired the Award Committee of the IEEE PES Chapters and Membership Division between 2000-2005 and was the president of the IEEE Phoenix Section in 2004. In 1996, Dr. Karady received a Honorary Doctoral Degree from the Technical University of Budapest, in 1999 the IEEE Third Millennium Medal, and in 2002 the IEEE Power Engineering Society Working Group Recognition Award as the chair of WG that prepared IEEE Standard 1313-2.

Selected Publications:


Lina J. Karam received her bachelor’s degree in engineering from the American University of Beirut in 1989, and the MS and PhD degrees in electrical engineering from the Georgia Institute of Technology in 1992 and 1995, respectively. She is an associate professor in the Department of Electrical Engineering, and she is also the director of the Image, Video, and Usability (IVU), the Multi-Dimensional DSP and the Real-Time Embedded Signal Processing (RESP) Labs at ASU. Karam is the recipient of a National Science Foundation CAREER Award, and she is currently serving as a member of the organizing committee of the 2008 IEEE International Conference on Image Processing (ICIP 2009).

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


Selected Publications:


S. Kiaei is also an IEEE Fellow.

Research Interests: Wireless transceiver design, RF and 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:


Michael N. Kozicki
E-mail: michael.kozicki@asu.edu
Phone: (480) 965-2572
Office: ERC 107
Professor, PhD, University of Edinburgh

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, and an Honorary Fellow of the University of Edinburgh.

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

Honors and Distinctions: Founder, Axon Technologies Corporation; Founding Member, Globalscot Network; Honorary Fellow, College of Science and Engineering, University of Edinburgh; Scotland; Charter member of the ASU Academic Council; Member of the Board, Arizona technology Council; Chartered Engineer (UK/EC Professional Engineer); Best Paper Award, Non-Volatile Memory Technology Symposium, 2005; 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:


Personal Web site: http://www.fulton.asu.edu/~mkozicki

Ying-Cheng Lai
E-mail: yclai@chaos1.la.asu.edu
Phone: (480) 965-6688
Office: GWC 610
Professor, PhD, University of Maryland at College Park

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 230 papers, including about 200 published in refereed journals. In the past five years, he gave about 50 invited seminars and colloquia worldwide.

Research Interests: Nonlinear dynamics, solid-state electronics, complex networks, signal processing, and 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:


Personal Web site: http://chaos1.la.asu.edu/~yclai

Gary O’Brien
E-mail: gary.obrien@asu.edu
Phone: (480) 727-7454
Office: GWC 338
Assistant Professor, PhD, University of Michigan, 2004

Gary O’Brien received the BS degree in electrical engineering with honors from the Florida Institute of Technology, Melbourne, FL in 1988. He received his MS degree in electrical engineering from the Georgia Institute of Technology, Atlanta, GA in 1999, and his PhD in electrical engineering from the University of Michigan, Ann Arbor, MI in 2004. Gary joined Motorola’s Sensor Products Division in Tempe, AZ, as a mixed signal circuit design engineer in 1994. From 1994 through 2005, he designed and developed multiple pressure, acceleration, and angular rate (gyroscope) sensor systems for Motorola and its recent spin-off company, Freescale Semiconductor. Dr. O’Brien currently holds eight issued patents in the MEMS area, in addition to having previously generated multiple automotive accelerometer and pressure sensor/ASIC designs with production unit totals exceeding 45 million devices distributed worldwide.

Honors and Distinctions: Lockheed Merit Scholarship, 1984-1988; member of Tau Beta Pi and Eta Kappa Nu, Space Shuttle Challenger Presidential Investigation Committee Significant Contributor Award, Georgia Tech Graduate Research Assistantship, 1992-1993; Motorola PhD Fellowship, 1999-2004; Motorola Six-Sigma Statistical Black Belt Certification.

Selected Publications:


Joseph Palais
Office: ERC 555
E-mail: joseph.palais@asu.edu
Phone: (480) 965-3757
Ph.D.: University of Michigan, 1964
Professor, PhD, University of Michigan

Joseph Palais joined the faculty in 1964 and is the associate chair for Graduate Studies. He is also academic director, Online and Professional Programs for the Ira A. Fulton School of Engineering. He has published a textbook on fiber optics. The book has been translated into Japanese, Chinese, 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, and distance education.

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

Selected Publications:


George Pan
E-mail: george.pan@asu.edu
Phone: (480) 965-1732
Office: GWC 436
Professor, PhD, University of Kansas

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 53 research articles in refereed journals and presented 89 papers at national/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, the Chinese Aerospace Institute, 13th Electric Performance of Electronic Packaging (EPEP). 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, inverse scattering, rough surface scattering.


Selected Publications:


Antonia Papandreou-Suppappola
E-mail: papandreou@asu.edu
Phone: (480) 965-7881
Office: GWC 420
Associate Professor, PhD, University of Rhode Island

Antonia Papandreou-Suppappola joined the ASU faculty as an assistant professor in 1999 and was promoted to associate professor in 2004. 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 eighty refereed journal papers, book chapters and conference papers.


Honors and Distinctions: NSF CAREER Award, 2002; Fulton School of Engineering Teaching Excellence Award, 2005; IEEE Phoenix Section Outstanding Faculty for Research Award, 2003; Treasurer of the Conference Board, IEEE Signal Processing Society.

Selected Publications:


Personal Web site:
http://www.fulton.asu.edu/~apapand
Stephen M. Phillips
E-mail: stephen.phillips@asu.edu
Phone: (480) 965-6410
Professor and Chair, PhD, Stanford University

Stephen M. Phillips received the BS degree in electrical engineering from Cornell University in 1984 and the MS and PhD 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, an industry-university-government collaborative at Case. In 2002, he joined the faculty of Arizona State University as professor of electrical engineering and was appointed department chair in 2005. 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 the state of Ohio.

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

Selected Publications:

Gang Qian
E-mail: Gang.Qian@asu.edu
Phone: (480) 965-3704
Assistant Professor, PhD, University of Maryland

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 Advance Computer Studies. He received the BE degree in electrical engineering from the University of Science and Technology of China (USTC) in 1995, and the MS and PhD degrees in Electrical engineering from the University of Maryland at College Park in 1999 and 2002, respectively.

Research Interests: Human motion analysis, computer vision, statistical learning and inference.

Honors and Distinctions: University Guo-Mo-Ruo Golden Medal, USTC, 1994; Educational Institution Award for Outstanding Research Faculty, IEEE Phoenix Section 2005.

Selected Publications:

Personal Web site: http://www.public.asu.edu/~gqian/

Martin Reisslein
E-mail: reisslein@asu.edu
Phone: (480) 965-8593
Assistant Professor, PhD., University of Pennsylvania

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 MS in electrical engineering from the University of Pennsylvania in 1996 and the PhD in systems engineering from the University of Pennsylvania in 1998. He has published over 50 journal articles and over 45 conference papers. He is editor in chief of the IEEE Communications Surveys and Tutorials.

Research Interests: Multimedia streaming in wireless environments, traffic characteristics of encoded video, metro WDM networks, and engineering education.


Selected Publications:

Personal Web site: http://www.fulton.asu.edu/~mre
Armando Rodriguez
E-mail: aar@asu.edu
Phone: (480) 965-3712
Office: GWC 352
Professor, PhD, Massachusetts Institute of Technology

Prior to joining the faculty in 1990, Armando Rodriguez worked at MIT, IBM, AT&T Bell Laboratories and Raytheon Missile Systems. He has also consulted for Elgin Air Force Base, Boeing Defense and Space Systems, Honeywell and NASA. He has published over 120 technical papers in refereed journals and conference proceedings. This includes over 50 invited papers. He has authored three engineering texts. Dr. Rodriguez has given more than 60 invited presentations at international and national forums, conferences and corporations. This includes over 10 plenary talks. He is a Boeing A.D. Welliver Fellow and he received a 1998 Presidential Excellence Award for Excellence in Science, Mathematics and Engineering Mentoring. He is currently the co-director of an NSF-RAESO funded Bridge to the Doctorate Program involving 12 NSF fellows. He also currently serves on the National Academy of Engineering Committee on Engineering Education.

Research Interests: 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), control 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, aerospace, robotic, and low power electronic 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.

Selected Publications:


Ronald Roedel
E-mail: r.roedel@asu.edu
Phone: (480) 965-9261
Office: ECG 102
Associate Dean, Professor, PhD, UCLA

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.

Selected Publications:


Personal Web site: http://www.fulton.asu.edu/~roedel/

Dieter K. Schroder
E-mail: schroder@asu.edu
Phone: (480) 965-6621
Office: ERC 111
Professor, PhD, University of Illinois

Dieter Schroder joined the ASU faculty in 1981 after 13 years at the Westinghouse Research Labs. He has published two books, 155 journal articles, eight book chapters, 141 conference presentations, edited 10 books, holds five patents and has graduated 61 MS students and 30 PhD students.

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


Selected Publications:


Personal Web site: http://www.fulton.asu.edu/~schroder
Jennie Si

E-mail: si@asu.edu
Phone: (480) 965-6133
Office: ERC 109
Professor, PhD, University of Notre Dame

Jenni Si received her BS and MS degrees from Tsinghua University, Beijing, China, and her PhD 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:

Jun Shen

E-mail: jshen@asu.edu
Phone: (480) 965-9517
Office: ERC 109
Professor, PhD, University of Notre Dame

Jun Shen joined the faculty in 1996 after six years of experience with Motorola’s Phoenix Corporate Research Labs. He is the inventor or co-inventor of 31 issued U.S. patents and the recipient of Motorola’s Distinguished Innovator Award. He has published widely in the fields of semiconductor physics and devices.

Research Interests:
Physics or organic LEDs, MEMS, 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:

Personal Web site:
http://www.fulton.asu.edu/~jshen/
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 120 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 more than 45 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, as the general co-chair of the 1999 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-99) and as vice-president for the IEEE Signal Processing Society. He and former PhD 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 also the recipient of the 2005 IEEE Signal Processing Society Meritorious Service Award. In addition, Professor Spanias was appointed IEEE Distinguished Lecturer in 2004 and elected as IEEE Fellow in 2003. He is currently associate director of the ASU Arts, Media and Engineering (AME) program, co-director of the FSE SenSip Cluster, chair of the Systems Area, PI of a multi-university NSF program and co-PI in a major NSF IGERT program. He is an elected member at large of the IEEE Signal Processing society board of governors.

**Research Interests:** Digital signal processing, multimedia signal processing, speech and audio coding, adaptive filters, real-time processing of sensor data, signal processing for the arts.

**Honors and Distinctions:** IEEE Fellow, IEEE Distinguished Lecturer, Donald G. Fink Prize for paper titled “Perceptual Coding of Digital Audio,” 2002; Intel Advanced Personal Communications Division-Central Logic Engineering Award, 1997; Intel Research Council: Natural Data Types Committee Award, 1996; Intel Corporation Award for Leadership and Contributions to the 60172 Processor Architecture, 1993. Author of J-DSP software (http://jdsp.asu.edu) ISBN 0-9724984-0-0 that ranked in the top three educational resources in 2003 by the UC-Berkeley NEEDS panel.

**Selected Publications:**

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

**Honors and Distinctions:** Alexander von Humboldt Research Award, Hellmuth Fisher Medal, Excellence in Research Award (2000), Florida International University, AzTE Innovator of the Year (2006), Molecular Imaging Young Microscopist.

**Selected Publications:**

**Personal Web site:** http://www.public.asu.edu/~ntao1
Cihan Tepedelenlioglu
E-mail: cihan@asu.edu
Phone: (480) 965-6623
Office: GWC 434
Assistant professor, PhD, University of Minnesota

Cihan Tepedelenlioglu joined the ASU faculty as an assistant professor in July 2001. He received the BS from the Florida Institute of Technology in 1995, the MS from the University of Virginia in 1998 and the PhD 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, spacetime coding, ultrawideband communications.

Honors and Distinctions: NSF CAREER Award, 2001.

Selected Publications:

Personal Web site: http://www.fulton.asu.edu/~cihan

Harvey Thornburg
E-mail: Harvey.Thornburg@asu.edu
Phone: (480) 544-0166
Office: BYE 394/GWC 456
Assistant Professor, PhD, Stanford University

Harvey Thornburg joined the ASU faculty in 2005 with a joint appointment in Arts, Media and Engineering and Electrical Engineering. Current research activities involve audio sensing and content analysis, as well as multimodal data fusion. In a broader sense, his research addresses the representation of contextual knowledge emerging from flexible and uncertain structural forms (for instance: those arising from the syntax of music and dance) and the fusion of this knowledge with raw sensory information to improve detection and estimation capabilities.

Research Interests: Audio signal processing and content analysis, music information retrieval, human motion analysis and gesture segmentation, statistical dynamic pattern recognition, distributed networked inference, and asynchronous multimodal data fusion.

Selected Publications:

Personal Web site: http://www.fulton.asu.edu/~thornton

Trevor Thornton
E-mail: t.thornton@asu.edu
Phone: (480) 965-3808
Office: ERC 181
Professor, PhD, Cambridge University

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, and the micropower applications of silicon-on-insulator MESFETs.

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

Selected Publications:

Personal Web site: http://www.fulton.asu.edu/~tthornton
Konstantinos Tsakalis

E-mail: tsakalis@asu.edu
Phone: (480) 965-1467
Office: GWC 358
Professor, PhD, University of Southern California

Konstantinos Tsakalis joined the ASU faculty in 1988 and is now a professor. He received the MS in chemical engineering in 1984, the MS in electrical engineering in 1985, and the PhD 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, and prediction and control of epileptic seizures.

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

Selected Publications:


Personal Web site: http://www.fulton.asu.edu/~tsakalis/

Daniel Tylavsky

E-mail: tylavsky@asu.edu
Phone: (480) 965-3460
Office: ERC 517
Associate Professor, PhD, Pennsylvania State University

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, applying social optimization to power system markets, 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.

Selected Publications:


Dr. Tylavsky is a member of the Power Systems Engineering Research Center (PScer):
http://www.pserc.wisc.edu/index_about.html

Dragica Vasileska

E-mail: vasilesk@imap2.asu.edu
Phone: (480) 965-6651
Office: ERC 565
Associate Professor, PhD, Arizona State University

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 1990.

Selected Publications:


Personal Web site: http://www.fulton.asu.edu/~vasilesk
Vijay Vittal
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Professor, Ira A. Fulton Chair in Electrical Engineering, PhD, Iowa State University

Vijay Vittal joined the ASU faculty in 2005. He received his PhD in electrical engineering from Iowa State University in 1982 and his MT in electrical engineering from the Indian Institute of Technology in 1979. Prior to ASU, he was an Anston Marston Distinguished Professor at the Iowa State University, Electrical and Computer Engineering Department. In addition, Dr. Vittal was a Murray and Ruth Harpole Professor and director of the university’s Electric Power Research Center and site director of the National Science Foundation IUCRC Power System Engineering Research Center. He also served as the program director of power systems for the National Science Foundation Division of Electrical and Communication Systems in Washington, D.C., from 1993 to 1994. He currently is the director of the National Science Foundation IUCRC Power System Engineering Research Center. He is the editor-in-chief of the IEEE Transactions on Power Systems. He has published 87 articles in refereed journals, 84 refereed conference proceeding articles, six books and book chapters and 13 research and technical reports.

Research Interests: Electric power, power system dynamics and controls, nonlinear systems, computer applications in power, sustainable energy, modeling and simulation of complex systems.

Honors and Distinctions: Member, National Academy of Engineering, 2004; Iowa State University College of Engineering Anson Marston Distinguished Professor, 2004; Iowa State University Foundation Award for Outstanding Achievement in Research, 2003; Institute of Electrical and Electronics Engineers, Power Engineering Society Technical Council Committee of the Year Award, 2000-2001; Outstanding Power Engineering Educator Award, Power Engineering Society, Institute of Electrical and Electronics Engineers, 2000; Warren B. Boast Undergraduate Teaching Award, 2000.

Selected Publications:

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

Research Interests: Nanostructure and nano device fabrication and characterization, transport in nanostructures and molecules, quantum size effect in metallic and semiconducting nanostructures, surface and interface physics and chemistry.

Honors and Distinctions: Graduate Research Award, American Vacuum Society, 2001.

Selected Publications:

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Frederic Zenhausern has a joint faculty appointment as full professor with both the Department of Electrical Engineering and the School of Materials. He is the founder, director and professor at the Center for Applied Nanobioscience at the Biodesign Institute. He is investigator and international development director at the Center for Flexible Display and chief technology officer at MacroTechnology Works. Zenhausern received his BS in biochemistry from the University of Geneva, his MBA in finance from Rutgers University and his PhD in applied physics from the Department of Condensed Physics Matter at the University of Geneva. He has co-authored over 70 scientific publications and has published more than a dozen U.S. patents.

Honors and Distinctions: Patent Committee, Solid State Res. Ctr., Motorola Labs, 1999-2002; Received 3 Patent Silver Quill Awards from Mototola Labs; Scientific Advisor Molecular Profiling Institute; Recipient of the Award of the Life Sciences Startup of the Year 2005 from the Arizona Bioindustry Association; Finalist of the 2004 Governor’s Celebration of Innovation Award (Innovator of the Year: Academia); Received 3 IBM Patent Awards, 1 Outstanding Achievement Award, 1993-1996; Finalist, Symposium of Emerging Opportunities, IBM Academy of Technology, 1995; Student Fellowship, Swiss National Science Foundation, 1990-1993; Student Fellowship, Marc Birkgigt Foundation, Switzerland, 1990, 1992.

Selected Publications:
Junshan Zhang joined the ASU faculty as an assistant professor in August 2000. He received the BS in electrical engineering from HUST, China in July 1993, the MS in statistics from the University of Georgia in December 1996 and the PhD in electrical engineering from Purdue University in 2000. He is the recipient of a 2003 NSF CAREER Award and a 2005 ONR YIP 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. He has been on the technical program committees of INFOCOM, GLOBECOM, ICC, MOBIHOC and SPIE ICTOM, and served as TPC co-chair for IPCCC 2006 and TPC vice chair for ICCCN 2006. He will be general chair for IEEE Communication Theory Workshop 2007. He has served as an associate editor for IEEE Transactions on Wireless Communications since 2004.

Research Interests: Wireless networks and information theory, including cross-layer optimization of wireless networks, ad-hoc/sensor networks, network information theory, stochastic analysis.

Honors and Distinctions: Member of IEEE and ASEE, 2003 NSF CAREER award, 2005 ONR YIP award.

Selected Publications:

Personal Web site: http://www.fulton.asu.edu/~junshan

Yong-Hang Zhang joined the faculty in 1996 from Hughes Research Laboratories. He has published over 70 research articles and a book chapter, three issued U.S. patents and has 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:

Personal Web site: http://asumbe.eas.asu.edu/yhzhang/index.htm