The Department of Electrical Engineering’s strength and continuing growth cannot be attributed to one single factor. I hope that this document helped you understand some of the many components that are at work. The faculty, the staff, and last, but not least, the students, have all helped build the program to what it is today and, more importantly, are what will drive it to further success in the future. We must also not forget the major role played by others in collaboration with the department, both within the university and in the engineering community, here in Arizona, the U.S., and internationally.

I look forward to continued growth and recognition of the department both at home and abroad.

Peter E. Crouch
Dean, College of Engineering and Applied Sciences
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Dear Friends and Colleagues:

The last academic year saw unprecedented growth in the size of the Electrical Engineering Department. Since Fall 2000, we have hired nine new faculty members, including those starting in Fall 2001, bringing the total number of FTE faculty to 45. We are happy to welcome Rodolfo Diaz, Sayfe Kiaei, Martin Reisslein, Cihan Tepedelenlioglu, and Junshan Zhang in telecommunications, Bruce Kim and Youngjoong Joo in mixed-signal design, Nongjian Tao in the area of nano-molecular electronics, and Raja Ayyanar in power electronics. You can find more details about these outstanding new hires inside this year’s Annual Report.

With the infusion of new faculty in critical technology areas such as wireless communications and mixed-signal design, we have made a concerted effort at modernizing and enhancing our educational programs.

With the infusion of new faculty in critical technology areas such as wireless communications and mixed-signal design, we have made a concerted effort at modernizing and enhancing our educational programs in these and other areas. New courses related to topics such as transceiver design, mixed-signal test, and A/D converters have been introduced, and many more are planned. The enrollment in the Arizona Tri-University Master of Engineering Program has grown, and the first graduates are expected in 2001-2002. We have seen a continuous evolution of our undergraduate curriculum aided by the ABET EC2000 process. As a result, the senior design experience has been expanded from a one-semester to a one-year program while, at the same time, the engineering freshman program has been greatly overhauled in a more flexible form for students. Enrollment itself is holding steady in the undergraduate program whereas the graduate program has experienced a large growth in students.
Research funding reached a record high this year with fiscal year expenditures in excess of $6.7 million. Much of this growth has been attributable to new faculty hired over the past few years, many of whom have been recipients of NSF Career and other notable awards. We foresee continued growth with new initiatives in the telecommunications and information technologies related to wireless circuits and embedded systems in partnership with our industrial partners. Other growth has occurred through collaborative efforts across disciplines in areas such as bioengineering and chemistry.

Finally, our relations with industry both locally and nationally have continued to grow despite the downturn in the economy. New partnerships were forged with Tektronix, IBM, and Raytheon, and consortia have been formed relative to mixed-signal/communication circuits and embedded systems. Scholarship endowments have been established by several companies to attract National Merit Scholars to our program, which has built on the large increase in National Merit students at ASU over the past several years through the Barrett Honors College. We look forward to continued partnerships with industry this year, particularly as we prepare for our upcoming academic program review in 2002 and ABET accreditation visit in 2003.

Sincerely,

Stephen M. Goodnick
Chair, Electrical Engineering
Faculty Honors

Ferry Named Graduate Mentor

David K. Ferry, Regents’ Professor, was named a 2000 Outstanding Graduate Mentor. The award recognizes individual faculty members who place high value on, and excel in, mentoring doctoral students. Ferry was one of two recipients named by the Graduate College and the ASU Foundation.

Rodriguez Honored

Armando A. Rodriguez, professor, was selected as one of six distinguished professors by the ASU Parents Association. The award, which provides a $1,000 cash stipend, was created by the Parents Association in 1991.

Rodriguez also addressed the recipients of the 2000 White House Presidential Excellence Award for Science Mathematics, and Engineering Mentoring in Washington D.C. Rodriguez, who received the award in 1998, spoke about the various ways in which such an award can be leveraged. Ten individual and ten institutional awards are distributed across the fields of science, mathematics, and engineering each year.

Faculty Spin-off Companies

Department of Electrical Engineering faculty members have recently initiated a number of business ventures.

Michael Kozicki, professor and director of the Center for Solid State Electronics Research, founded Axon Technologies Corporation, which specializes in programal metallization cells.

Jeffrey Capone, assistant professor, left the department to concentrate on his company Aligo.com, which develops wireless software.

Yong-Hang Zhang, professor, established Lytek, a company that works on VCSEL and optoelectronics.

Jun Shen, professor, started Microlab, a company that provides micro-electromechanical systems.

Trevor Thornton, professor, launched SJT Micropower, a producer of transistors for ultra-low power applications.
IEEE Fellows

The Department of Electrical Engineering has an impressive number of IEEE Fellows:

- Constantine Balanis
- Peter Crouch
- Samir El-Ghazaly
- Richard Farmer
- David Ferry
- Ravi Gorur
- Gerald Heydt
- George Karady
- Joseph Palais
- Sethuraman Panchanathan
- Dieter Schroder

The IEEE Grade of Fellow is conferred by the Board of Directors upon a person of extraordinary qualifications and experience in IEEE designated fields and who has made important individual contributions to one or more of these fields. A brief citation is issued to new Fellows describing their accomplishments and the total number selected in any one year does not exceed one-tenth percent of the total voting Institute membership.

El-Ghazaly and Panchanathan: IEEE Fellows

Samir El-Ghazaly, professor, was named a 2001 IEEE Fellow for his “contributions to the analysis and simulations of microwave devices and circuits.”

Likewise, Sethuraman Panchanathan, affiliate professor, was elected a 2001 IEEE Fellow for his “contributions to compressed domain processing and indexing in visual computing and communications.”

Panchanathan was also named the Ford Fellow by the College of Engineering and Applied Sciences and the Ford Motor Company. The fellowship encourages new faculty to develop more personal relationships with students, provides a link between students and Ford, and facilitates increased mentoring and professional development.
CURRENT STUDENTS

Eric Langlois and Richard Metzger were among 13 graduate students from ASU named 2001 ARCS Scholars by the Phoenix chapter of the Achievement Rewards for College Scientists Foundation. The program awards $6,000 scholarships to assist graduate research in the sciences.

Stavros Georgakopoulos received the 2000-2001 Herman E. DeMund Scholarship, which provides $2,000 and a tuition waiver. The scholarship is awarded each year to one ASU graduate student.

Jeffrey Foutz received the 2000-2001 Phelps Dodge Foundation Scholarship, which provides $5,000 and a tuition waiver. The scholarship is awarded to two ASU graduate students each year.

ALUMNI

Benson Shen, a 1997 doctoral graduate, has founded Lightel Technologies in Kent, Washington. The company, which manufactures equipment for the fiber-optics industry, hired 50 employees within its first 18 months. Lightel’s products include a fiber-optics coupler, an amplifier, and a cleaning device and are designed to increase the efficiency of fiber-optics systems. In addition, the company is currently designing its own automation system to reduce labor costs. While at ASU, Shen worked with Dr. Palais in the area of fiber optics.

Martin Boonzaayer represented the United States at the 2000 Summer Olympics held in Sydney, Australia, where he competed in the judo heavyweight division. Although Sydney was Boonzaayer’s first Olympic appearance, he is a three-time national champion in the open-weight class and the 2000 national heavyweight champion. While attending ASU, he worked with Dr. Yong-Hang Zhang. Boonzaayer completed his master’s in electrical engineering in 1996 and now resides in Colorado Springs, Colorado, where he works as an electrical engineer for Motorola.

Private Donations Increase

The department continues to build relationships with corporations, foundations, and individuals resulting in another increase in 2001-2002 private funding for electrical engineering scholarships and special projects. Electrical engineering received gifts totaling more than $1.5 million during this past fiscal year.

Major gifts of note include:

$10,000-$49,999
- Arizona Power Authority
- National Scientific Corporation
- Matsushita Electrical Industrial Company
- Joseph and Sandra Palais
- Pinnacle West
- Primarion
- Raytheon Missile Systems
- Gary and Diane Tooker

$50,000-$99,999
- AG Communications Systems
- Semiconductor Research Corporation
- Xilinx

$100,000 or more
- Intel
- Motorola
The Arizona Tri-University Master of Engineering Program, a collaborative effort among Arizona’s three state universities (Arizona State University, Northern Arizona University, and the University of Arizona), continues to grow and offer more courses. The program is intended to meet the needs of Arizona’s practicing engineers by allowing them to take classes at any of the three state universities.

Courses for the master of engineering are offered through a variety of distance-learning methods, including Web-based courses developed by members of the Department of Electrical Engineering. For more information on this program, please visit http://triuniv.engr.arizona.edu.

Courses currently available to students in the program are listed below by campus:

**Arizona State University**
- Linear Algebra I, II, III
- Partial Differential Equations I, II, III
- Civil Engineering Project Management
- Finite Elements I, II, III
- Properties of Concrete
- Semiconductor Material Processing
- Clean room Construction II
- Advanced Fiber Optics
- Advanced MOS Devices
- Advanced Silicon Processing
- Antenna Analysis and Design
- Feedback Systems I, II, III
- Fiber Optics
- Fundamentals of Solid-State Devices
- MATLAB for DSP Applications I, II, III
- Microelectronics
- Model Dynamic System
- Multimedia Signal Processing
- Assessment and Decision Making in Manufacturing
- Object Oriented Information Systems
- Planning for Computer Integrated Manufacturing
- Rapid Prototyping
- Strategic Technology Management
- Indoor Environmental Control

**Northern Arizona University**
- Environmental Protection Today
- Onsite Wastewater Treatment and Dispersal
- Principles of Environmental Transport Processes
- Traffic Studies and Signal Systems
- Urban Transportation Planning
- Wet Weather Flow Management
- Image Processing
- Analog Circuits
- Circuit Simulation Algorithms
- Data Converters
- Radio Frequency Integrated Circuit Design I, II, III
- Wireless Digital Communication I, II, III
- Advanced Applied Mechanics
- Combustion

**University of Arizona**
- Onsite Wastewater Treatment and Dispersal
- Composite Materials
- Computational Multibody Dynamics
- Computer-Aided Analysis and Design of Mechanical Systems
- Conduction and Radiation
- Convection
- Modern Control Theory
- Knowledge Systems Engineering
- Geomechanics with a Virtual Rock Lab
- Materials Science of Polymers
- Introduction to SIE Methods I, II, III
- Operations Research Modeling
- Survey of Optimization Methods
The Department of Electrical Engineering is proud to announce several additions to the faculty roster, particularly because of the expertise that these new faculty members bring to the department.

Junshan Zhang joined the faculty as an assistant professor in July 2001 after receiving his Ph.D. from the University of Minnesota. He recently collaborated on a proposal for the National Science Foundation and submitted a National Science Foundation Career proposal in summer 2001.

Before becoming an assistant professor at ASU, Junshan Zhang was a research assistant at Purdue University where he received his Ph.D. in 2000. He has been active in communications and networking curriculum development and has designed a new course titled “Advanced Topics in Wireless Communications and Networking.”

He recently submitted a Career proposal to the National Science Foundation and has contributed to research on rate-distortion theory, blind multi-user detection, wireless Internet access, and receiver design. He has been an active organizer of conferences and became the chair of the IEEE Communications and Signal Processing Phoenix Chapter in January 2001.

Youngjoong Joo completed his Ph.D. at the Georgia Institute of Technology in 1999 and was hired as an assistant professor in January 2001. Since then, his research has focused on sub-micron CMOS analog and mixed-signal circuit design and on new smart camera systems and high-speed optical transceivers in particular.

His interests also include switched-current circuits, CMOS RF circuits, and bioengineering integrated circuits.

Kiaei is a professor and the director of Telecommunication Research Center. Since coming to the faculty in January 2001, he has created two new courses: “Wireless Transceiver System Design” and “Communication Circuits.” He is currently developing a new research center for the College of Engineering and Applied Sciences.

His research includes wireless communications, transceiver design, RF circuits, and analog/digital circuits. His main role is as director of the Telecommunication Research Center which encompasses over 20 faculty in electrical engineering and computer science.

Martin Reisslein Since becoming an assistant professor in October 2000, Reisslein has developed several applets that illustrate optical networking principles, which he plans to use as the basis for an online course on optical networking.

His research focuses on multimedia streaming in wireless environments, traffic characteristics of encoded video, and Metro WDM networks. In the past year, he has served on the Technical Program Committees of IEEE Infocom, the IEEE Symposium on Computers and Communications, and organized a session of the invitation-only IEEE Computer Communication Workshop.
In 2001, Diaz joined the department as an associate professor after working as a faculty associate for several years. He has 20 years experience in the aerospace industry and holds 10 patents in the areas of broadband radomes and magnetic fields.

His specialties include optical scattering, analytic theory of natural and artificial media, and combined computational mechanics and electromagnetics.

Nongjian Tao joined the faculty as a professor in August 2001 following a number of years at Florida International University. He has over 50 publications and holds two patents in the area of molecular electronics.

His research focuses on integration of soft organic molecules into hard solid-state devices and on development of chemical and biological sensor applications.

Bruce Kim joined the ASU faculty as an associate professor in August 2000 after teaching at Michigan State and Tufts Universities. In 1997, he received the National Science Foundation Career Award. Since coming to ASU, he has developed innovative Web-based modules to supplement his courses, which are accessible through the IEEE CPMT Society Web server for people worldwide. He has published over 25 journal and conference papers.

His research interests include MCM substrate testing, defect simulation of analog circuits, and microsystem development.

Rajapandian Ayyanar became an assistant professor in August 2000 after completing his Ph.D. at the University of Minnesota. Since then, he supervised a senior design project titled “42Vdc to 14Vdc Bi-directional Converter for the Architecture of Future Automobiles,” which won the Fall 2000 Senior Design Prize. In addition, he has successfully developed a power electronics research laboratory for research on power electronic converters of up to ten kilowatts.

His areas of expertise include novel topologies and new control techniques for Switch-mode Power Conversion, especially DC-DC converters. He plans to expand his research to other current applications of power electronics, mainly applications in power systems, distributed generation, and automotive electronics.
YEAR IN REVIEW

ELECTRICAL ENGINEERING

INDUSTRY ADVISORY COUNCIL

**CURRENT MEMBERS:**

- **Tinku Acharya**
  Intel

- **Jack Davis**
  President
  Energy Development & Sales
  Arizona Public Service (APS)

- **Joseph W. Jackson**
  Director, Retrofit Systems Engineering
  Airline and Avionics Products
  Honeywell

- **Ron Jost**
  Vice President, Technical Staff
  Group Chief Engineer
  Satellite Communications Group
  Motorola

- **Wally Meinel**
  Group Manager
  Texas Instruments

- **Gopal Nair**
  Gemtech Systems LLC

- **Kent Olsen**
  Manager
  Instruments Business Unit
  Tektronix

- **Bill Pohlman**
  Chairman and Chief Technical Officer
  Primarion

- **Bill Twardy**
  Research Programs Manager
  Salt River Project

- **Thomas Zipperian**
  Unit Director
  Mesa Microfabrication
  Sandia National Laboratories

- **Ben Adamo**
  Vice President & General Manager
  Standard Analog Business Line
  Philips Semiconductors

- **Gary E. Dillon**
  Sr. Engineer/Manager
  Integrated Storage Microcode
  IBM

- **William Michael Johnson**
  Vice President
  Connectivity Solutions Division
  AMD

- **Eric C. Maas**
  Director, Technology Strategy & Strategic Alliances
  Wireless Systems Subscriber Group
  Motorola

- **Robert Melchor**
  CEO
  Three-Five Systems

- **Paul Narula**
  Vice President, Corporate Relations
  AG Communication Systems

- **Mark Phelps**
  Sr. Product Development Manager
  Medtronics

- **Kevin Stoddard**
  Control Systems Division Manager
  EES Business Units
  Brooks Automation

- **Peter Zdebel**
  Vice President and Chief Technical Officer
  ON Semiconductor
ELECTRICAL ENGINEERING

RESEARCH CENTERS

COLLEGE OF ENGINEERING AND APPLIED SCIENCES
SYSTEMS SCIENCE & ENGINEERING RESEARCH CENTER
DIRECTOR, FRANK C. HOPPENSTEADT

CENTER MISSION

- Build bridges between departments and centers in the College of Liberal Arts and Sciences and College of Engineering and Applied Sciences;
- Foster an intellectual climate for interdisciplinary work at ASU;
- Provide access for undergraduate and graduate students to research activities at ASU;
- Develop and implement new models for strengthening ASU’s contributions to large industry and small business in the greater Phoenix area;
- Become a focal point for attracting international experts to ASU for meetings, workshops, conferences, and recruitment;
- Conduct seminars and workshops that foster development of core funding and provide access for our students and faculty leaders in science, engineering, and industry;
- Instill curiosity, integrity, and a commitment to service through mentoring activities with students and beginning faculty;
- Work toward preparing students for jobs in Arizona.

RESEARCH FOCUS AREAS

SSERC participates in the DARPA project: Advanced Neural Implants and Control, 2000; the NSF IGERT project: Musculoskeletal and Neural Adaptation in Form and Function, 2000; the NSF SCREMS project: Scientific Computing Research Environments for Mathematical, 1999; the DOD/EPRI project: Innovative Technologies for Defense Against Catastrophic Failures of Complex Interactive Networks, 1999; and other ongoing projects supported by external agencies.

CONTROL THEORY: Semiconductor manufacturing control, stochastic models and large databases; FAB scheduling.

NEUROENGINEERING AND NEUROSCIENCE: Sensory motor control, synaptic organization and dynamic properties of networks, dynamical systems in neurosciences, neurocomputation.

MATHEMATICAL BIOLOGY: Biotechnology (chemostats, microbial ecology, pharmaceuticals); population biology (epidemics, demographics, genetics).

COMPUTATIONAL SCIENCE AND ENGINEERING: Modeling, analysis of dynamical systems, simulation of dynamical systems, visualization.

SSERC SPECIAL FACILITIES

VISUALIZATION LABORATORY: The Center for Systems Science and Center for Solid State Electronics Research jointly sponsor the Visualization Lab. In the lab, students can create 2-D and 3-D computer images and incorporate them into presentations, which can be transferred onto videotape. Students can also capture images from video. These tasks are completed with the aid of a Macintosh computer using software such as Macromind Director and Spyglass.

ELECTROMECHANICAL SYSTEMS DESIGN LABORATORY (ESDL): The Center for Systems Science in conjunction with the Department of Mechanical and Aerospace supports ESDL. The laboratory provides students and faculty with a state-of-the-art Modeling, Simulation, Animation, and Real-Time Control (MoSart) capability. By emphasizing research and interactive education in the context of Flexible Autonomous Machines Operating In Uncertain Environments (FAME), the laboratory provides an infrastructure for analyzing and designing advanced electromechanical systems, robotic automation and manufacturing systems, and aerospace systems. The laboratory serves multidisciplinary initiatives involving students and faculty from the following departments: electrical engineering, mechanical and aerospace engineering, chemical and materials engineering, and mathematics.
The Telecommunication Research Center is a multidisciplinary research center that includes researchers from electrical engineering, computer science and engineering, and materials, electronics, and bioengineering. The TRC is an ASU Board-of-Regents-approved center with research focused on information technology; wireless and wireline communications; networking; antennas; radio-frequency, mixed-signal analog/digital electronics; embedded systems; and multimedia and bioinformatics. Under the supervision of newly appointed TRC Director Sayfe Kiaei, the TRC is taking an exciting and innovative approach to the field of telecommunications circuits and systems.

The center is working toward several new projects and research centers, including the development of a new National Science Foundation Industry/University Cooperative Research Center entitled Connection One. This new center’s primary focus is on telecommunications circuits and systems that enable higher integration and smaller communication devices to facilitate Telecommunication System On a Chip. Other TRC research centers include the Advanced Helicopter Electromagnetic Industrial Associates sponsored by several industrial members and the Department of Defense. In addition, the TRC is an active participant in the Embedded System Consortium, a newly established consortium within the College of Engineering and Applied Sciences supported by Intel and Motorola.

The TRC’s major research activities are supported by industrial partners, including Texas Instruments, ON Semiconductors, Philips, Motorola, Intel, Primarion, National Semiconductors, and government agencies, such as the National Science Foundation, DARPA, the Navy, and the Army. The major research activities of the TRC include the following programs:

- Mixed-signal electronics and communication circuits
- Wireless transceiver design
- Radio-frequency and high-frequency wireless system design
- Computational electronics and electromagnetics
- Neurosystems
- Wireless communications and smart antennas
- Multimedia: speech and audio processing, vocoders, image/video processing
- Digital signal processing: adaptive filters, array signal processing, time-frequency representations, detection and estimation, sensors, signal processing for communications
- MEMS
- Embedded systems design

The center has several new faculty in electrical engineering and computer science engineering whose work includes communications and signal processing, wireless transceiver design and radio-frequency integrated circuits, antennas and electromagnetics, wireless networks, computer networks, mobile computing, network security, interconnection networks, ATM switches, processor architecture, parallel and distributed computing and real-time systems.

Executive M.S. Program: The TRC is also developing an executive master of science program in communication circuits and systems to accommodate full-time, industrial employees. This will be a two-and-a-half-year program with a practical focus and options in hardware, software, or a joint program with the business department to combine the MBA with a telecom program for business managers.
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.). Four faculty members at ASU and four faculty members from the University of Arizona together with 20 graduate students carry out this research.
The center’s mission is to conduct research, to develop technology, and to provide educational programs that will engender international leadership in solid-state electronics. This mission is accomplished in several ways:

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

**Center highlights and major accomplishments:**
The center was established at Arizona State University in 1981 as part of the first Engineering Excellence Program. The center provides critical resources and infrastructure for research and education in solid-state electronics in the form of 30 laboratories covering 30,000 square feet, which are administered and maintained by a complement of 12 staff. The center’s 30 active faculty, 10 post-doctoral researchers, and more than 70 graduate students are drawn from various disciplines, including electrical engineering, chemical engineering, bio-engineering, materials science, mechanical engineering, and industrial, management, and systems engineering.

The center’s 4,000 square-foot class M3.5 cleanroom and associated processing facilities contain a wide range of equipment for advanced semiconductor processing. In addition to our five established interdisciplinary microelectronics research areas (nanostructures, MBE and optoelectronics, materials and process fundamentals, low-power electronics, focused ion beam technology), we have significant new thrusts in MEMS, molecular electronics, wide bandgap materials, environmentally benign processing, manufacturing and controls, and biotechnology. In recent years, CSSER researchers have developed a number of significant technologies, including methods for semiconductor substrate and gate oxide characterization, integrated lasers, quantum device structures and simulators, interconnect methods and dielectrics, and low-voltage, non-volatile memory devices.
PSERC is a National Science Foundation Industry/University Cooperative Research Center that is addressing challenges in the new electric power industry as it restructures to a competitive business environment. Finding innovative and efficient solutions to those challenges requires an unprecedented level of expertise, communication, and cooperation between the university and industry. Through collaboration, PSERC

- seeks innovative solutions to challenges in creating a power system with decentralized, market-based decision-making
- stimulates productive interchange of ideas among university and industry professionals
- leverages research funding from universities and industrial members
- facilitates access to highly experienced faculty and superior quality students
- prepares current and future professionals for the new power industry.

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

**Research Stem 1: Markets**
The electric power industry is in transition toward a market-oriented structure with decentralized decision-making by a wide-ranging group of market participants. The research under this stem emphasizes the design and analysis of market mechanisms, computational tools and institutions that facilitate efficient coordination, investment, and operations while recognizing the economic and technical characteristics of power systems.

**Research Stem 2: Transmission and Distribution**
The power delivery infrastructure is critical to achieving efficiency, safety, security and reliability in electricity supply. Improvements in this infrastructure could be achieved through innovations in software, hardware, materials, sensors, communications, and operating strategies. Therefore, a central goal of this research stem is the improvement of transmission and distribution systems through the application of technological advances.

**Research Stem 3: Systems**
Restructuring is leading to large and complex operational entities (such as Independent System Operators or Regional Transmission Organizations) while small-scale, dispersed generation technologies are increasing their penetration in power systems. The challenge is to develop new operations frameworks and approaches that will effectively cope with the growing complexity of a restructured industry. Systems research concentrates on operation of such complex, dynamic systems in general and power systems in particular.

**Leveraged Research Projects**
Industrial members’ support is leveraged into other research initiatives, such as:

- Consortium for Electric Reliability Technology Solutions (CERTS), formed in 1998 to research, develop, and commercialize new methods, tools,
and technologies to protect and enhance the reliability of the U.S. electric power system under the emerging competitive electricity market structure. CERTS is conducting research for the U.S. Department of Energy’s Transmission Reliability Program and for the California Energy Commission’s Public Interest Energy Research program. PSERC faculty are working with researchers at Lawrence Berkeley National Laboratory, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, Sandia National Laboratories, and Southern California Edison.

Complex Interactive Networks/Systems Initiative (CIN/SI), a joint Department of Defense and Electric Power Research Institute program, is for development of a theoretical framework and practical tools for improving the security, performance, reliability and robustness of energy, financial, telecommunications, and transportation networks. The goal of the five-year, $30 million program that began in the Spring of 1999 is to develop new tools and techniques that will enable large, interdependent infrastructures to self-heal in response to threats, material failures, and other destabilizers.

As a National Science Foundation Industry/University Collaborative Research Center, PSERC relies on industry partnerships for identifying research needs and directions and for participating in research efforts. PSERC provides its industrial members:

- opportunities for participation in research projects
- early access to research publications
- collaboration with academic researchers
- online seminars
- workshops and other training opportunities.

An Industrial Advisory Board provides the critical linkage between the industrial members and PSERC. The Board:

- identifies research and training needs
- prioritizes projects and recommends project funding levels
- reviews research results.

Additional information on PSERC is available at http://www.pserc.wisc.edu/index_about.html
Arizona State University’s College of Engineering and Applied Sciences has established a new National Science Foundation Industry/University Cooperative Research Center entitled Connection One. The center’s primary focus is on telecommunications circuits and systems to enable higher integration and smaller communication devices and to facilitate Telecommunication System On a Chip. Center supporters include the National Science Foundation, over 10 industrial members, the State of Arizona Board of Higher Education, and Arizona State University’s College of Engineering and Applied Sciences.

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

Connection One’s mission contains an educational component as well as a research component. With the support of industry, this new center will establish a state-of-the-art educational program in telecommunication mixed-signal integrated circuit design. Because the center is designed as a cooperative research program where each project is sponsored and supported by an industrial member, there is a one-to-one link between the faculty, the students, and the industrial member. The center will strongly support and establish a student fellowship program to allow students to perform their research at ASU for nine months followed by an internship program for three to six months at an industrial site to facilitate technology transfer and to allow students to gain practical experience. Connection One’s list of potential projects includes the following:

- Multistandards transceivers; WBCDMA, GPRS, GSM, 3G
- Multiantenna transceivers; fourth-generation wireless, multi-input/multioutput transceivers, space-time coding for 4G
- Ultrawide band technology, radio-frequency tagging
- CMOS Radio-frequency integrated circuit design
- Data converters, analog to digital and digital to analog
- Optoelectronics, VCSEL
- High-Q radio-frequency MEM resonators for wireless applications
- Mixed-signal test
- Interconnect modeling and packaging
- Communication system design
- Digital signal processing and multimedia for communications

Companies that have shown strong interest in Connection One include Motorola, Primarion, Texas Instruments, Philips, Intel, National, Gain, Sony, ON, Broadcom, and Conexant among others.
James T. Aberle
Office: GWC 426
E-mail: aberle@asu.edu
Phone: 480-965-8588
Ph.D.: University of Massachusetts, Amherst, 1989

James Aberle received the B.S. and M.S. degrees in electrical engineering from Polytechnic Institute of New York (now Polytechnic University) in 1982 and 1985, respectively, and the Ph.D. in electrical engineering from the University of Massachusetts in 1989. From 1982 to 1985, he worked on the development of wide-band, phased-array antennas at Hazeltine Corporation, Greenlawn, New York. He joined the ASU faculty in 1989 and is currently an associate professor.

Research Interests: Computational electromagnetics, smart and advanced antennas, electromagnetic properties of natural and artificial materials, microwave circuits, and radar cross-section analysis and control.

Honors and Distinctions: IEEE Senior Member; NASA-ASEE Summer Faculty Fellow, 1993.

Selected Publications:

Rajapandian Ayyanar joined the ASU faculty as an assistant professor in August 2000. He received the B.E. in electrical engineering from P.S.G. College of Technology, India, in 1989; the M.S. in power electronics from the Indian Institute of Science in 1995; and the Ph.D. in power electronics from the University of Minnesota in 2000. He has published 19 journal and conference papers, is a member of IEEE, and is the co-author of one patent.

Research Interests: Novel topologies and new control techniques for switch-mode power conversion, especially DC-DC converters.

Honors and Distinctions: Dr. Ayyanar directed the senior design project “42VDC to 14VDC Bi-directional converter for the architecture of future automobiles” by Robert A. Chavez, Lawrence Dovala, and Casey O’Dell, which won the Senior Design Prize in Fall 2000.

Selected Publications:


David Allee
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Phone: 480-965-6470
Ph.D.: Stanford University, 1990

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

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

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

Selected Publications:

Rajapandian Ayyanar
Office: ERC 587
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Phone: 480-727-7307
Ph.D.: University of Minnesota, 2000

Rajapandian Ayyanar joined the ASU faculty as an assistant professor in August 2000. He received the B.E. in electrical engineering from P.S.G. College of Technology, India, in 1989; the M.S. in power electronics from the Indian Institute of Science in 1995; and the Ph.D. in power electronics from the University of Minnesota in 2000. He has published 19 journal and conference papers, is a member of IEEE, and is the co-author of one patent.

Research Interests: Novel topologies and new control techniques for switch-mode power conversion, especially DC-DC converters.

Honors and Distinctions: Dr. Ayyanar directed the senior design project “42VDC to 14VDC Bi-directional converter for the architecture of future automobiles” by Robert A. Chavez, Lawrence Dovala, and Casey O’Dell, which won the Senior Design Prize in Fall 2000.

Selected Publications:


Constantine A. Balanis
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Phone:  480-965-3909
Ph.D.:  Ohio State University, 1969

Constantine Balanis joined the ASU faculty in 1983 and is now a Regents’ Professor of Electrical Engineering. He has published nearly 100 journal papers, 150 conference papers, and numerous scientific reports. He also has published two textbooks: one on antennas and the other on advanced engineering electromagnetics.

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

Honors and Distinctions: Regents’ Professor, IEEE Fellow, IEEE Third Millennium Medal, 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:

Jonathan Bird
Office:  ERC 187A
E-mail:  bird@asu.edu
Phone:  480-965-7421
Ph.D.:  University of Sussex, 1990

After obtaining his Ph.D. in 1990, Jonathan Bird spent five years at RIKEN, a Japanese government laboratory, before joining the ASU faculty in 1997. Professor Bird has co-authored more than 120 refereed publications in international journals and his work is widely referenced in the specialist literature.

Research Interests: Fabrication and characterization of semiconductor nanostructures with emphasis on studies of their quantum-transport characteristics.

Honors and Distinctions: Visiting research fellow of the Japan Society for the Promotion of Science, University of Tsukuba, Japan.

Selected Publications:
Chaitali Chakrabarti
Office: GWC 418
E-mail: chaitali@asu.edu
Phone: 480-965-9516
Ph.D.: University of Maryland, 1990

Chaitali Chakrabarti received her B. Tech. in electronics and electrical communication engineering from the Indian Institute of Technology, Kharagpur, India, and her M.S. and Ph.D. degrees in electrical engineering from the University of Maryland, College Park. She has been at ASU since 1990 where she is now an associate professor. She is a member of the Center for Low Power Electronics 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 and compilation; CAD tools for VLSI.


Selected Publications:


Douglas Cochran
Office: GWC 414
E-mail: cochran@asu.edu
Phone: 480-965-8593
Ph.D.: Harvard University, 1990

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

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

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

Selected Publications:


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 ten patents ranging from the design of broadband radomes to the amplification of magnetic fields.

**Research Interests:** Optical scattering of subwavelength objects in complex environments, analytic theory of natural and artificial media, combined computational mechanics and electromagnetics...

**Honors and Distinctions:** 1994 Association of Intermountain Businessmen Award to distinguished Young Executives in the Professional Category for Excellence in Engineering, San Juan, Puerto Rico.

**Selected Publications:**


### Tolga M. Duman

**Ph.D.:** Northeastern University, 1998

**E-mail:** duman@asu.edu

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**Phone:** 480-965-7898

Tolga Duman received the B.S. from Bilkent University, Turkey, in 1993, and the M.S. and Ph.D. degrees from Northeastern University, Boston, in 1995 and 1998, respectively, all in electrical engineering. He has been with the Department of Electrical Engineering of ASU since August 1998 as an assistant professor.

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

**Honors and Distinctions:** Recipient of the NSF Career Award, 2000; IEEE Millennium Medal; co-recipient of the best paper award for the Vehicular Technology Conference paper from IEEE Benelux Chapter, 1999; vice-chair of the IEEE Phoenix Communications and Signal Processing Chapter since fall 1999.

**Selected Publications:**


### Samir El-Ghazaly

**Ph.D.:** University of Texas at Austin, 1988

**E-mail:** sme@asu.edu

**Office:** GWC 420

**Phone:** 480-965-5322

Samir El-Ghazaly joined ASU in 1988 after working at several universities and research centers, including the College of Engineering at Cairo, Egypt and the Centre Hyperfrequences et Semicon-ducteurs at Universit de Lille I in France. He has done research at NASA’s Jet Propulsion Lab in Pasadena, CA, and CST-Motorola, Inc.

**Research Interests:** Microwave circuits, millimeter-wave semiconductor devices and passive components, wireless RF circuits, semiconductor device simulations, analysis of microwave transmission lines, ultra-short pulse propagation, electromagnetics, wave-device interactions, numerical techniques applied to microwave-integrated circuits.

**Honors and Distinctions:** Fellow of IEEE, chairman of the U.S. National Committee of URSI-Commission A, member of Tau Beta Pi, Sigma Xi, and Eta Kappa Nu, chairman of the Chapter Activities Committee of the IEEE MTT Society, general chairman of the IEEE MTT 2001 International Microwave Symposium, editor-in-chief of IEEE Microwave and Wireless Components Letters, member of the Administrative Committee of IEEE Microwave Theory and Techniques Society, Teaching Excellence Award from ASU College of Engineering.

**Selected Publications:**

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

Research Interests: Microwave circuits, applied electromagnetics, anistrophic 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 G. Farmer has over 48 years of electric power industry experience. He has been an adjunct professor at Arizona State University since 1996. He has co-authored a book on the application of series capacitors in power systems and has written over 35 industry papers.

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

Honors and Distinctions: IEEE Fellow, NSPE Arizona Engineer of the Year, IEEE Power System Engineering Distinguished Service Award.

Selected Publications:

Richard Farmer also has two important patents where he is currently an associate professor.

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

Honors and Distinctions: Regents’ Professor at ASU; IEEE Cledo Brunetti Award, 1999; fellow of both the American Physical Society and IEEE; ASU Graduate Mentor Award, 2000; IEEE Engineer of the Year, 1990, Phoenix Section; outstanding research awards at Texas Tech University and Colorado State University.

Selected Publications:
Stephen Goodnick
Office: ERC 552
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Phone: 480-965-3837
Ph.D.: Colorado State University, 1983

Stephen Goodnick came to ASU in Fall 1996 as Department Chair. Prior to that, he was a professor of electrical engineering 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 at the Walter Schottky Institute, Munich, Germany; the University of Modena, Italy; the University of Notre Dame; and Osaka University, Japan. Dr. Goodnick has published over 120 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: Alexander von Humboldt Research Fellow, Germany, 1986; Senior Member, IEEE, 1990; College of Engineering Research Award, Oregon State University, 1996; Colorado State University College of Engineering Achievement in Academia Award, 1998.

Selected Publications:

Ravi Gorur
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Phone: 480-965-4894
Ph.D.: University of Windsor, Ontario, Canada, 1986

Ravi Gorur joined the ASU faculty in 1987. He teaches in the areas of electric power engineering, high-voltage engineering, and power electronics.

Research Interests: Insulating materials and systems for outdoor applications, non-ceramic insulators, electric field calculations, underground cable systems, dielectric fluids, high-voltage testing techniques and computer-aided design.

Honors and Distinctions: IEEE Fellow, 1999; U.S. representative to CIGRE Study Committee 15-Insulating Materials, 1995-present.

Selected Publications:

Edwin Greeneich
Office: ERC 159
E-Mail: greeneich@asu.edu
Phone: 480-965-4455
Ph.D.: University of California-Berkeley, 1972

Edwin Greeneich joined the faculty in 1982 after spending 11 years in industry. He is the author of Analog Integrated Circuits, a co-author of Ultra Large Scale Integrated Microelectronics, and a contributing author to The Circuits and Filters Handbook and the Encyclopedia of Physics. He has also published dozens of articles in technical journals.

Research Interests: Low-power, high-frequency analog integrated circuits using bipolar and MOSFET technologies.

Honors and Distinctions: Senior Member of IEEE, Phi Beta Kappa, Tau Beta Pi,Eta Kappa Nu, Who’s Who in Technology Today.

Selected Publications:
Robert Grondin
Office: GWC 422
Email: bob.grondin@asu.edu
Phone: 480-965-5954
Ph.D.: University of Michigan, 1982

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

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

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

Selected Publications:

Gerald Thomas Heydt
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Phone: 480.965.8307
Ph.D.: Purdue University, 1970

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

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


Selected Publications:

Walter T. Higgins
Office: GWC 616
E-mail: wth@asu.edu
Phone: 480.965.6576
Ph.D.: University of Arizona, 1966

Walter Higgins joined the faculty in 1967. His primary background was in the area of control systems with experience in the aerospace industry, i.e., guidance, control, and navigation systems. He teaches in the areas of controls, circuits, microprocessors, and digital design.

Research Interests: Digital control and simulation, computer-aided control systems design, microprocessor applications, and real-time computing with graphical programming languages such as LabVIEW, computers in education.

Honors and Distinctions: Eta Kappa Nu, AIAA Senior Member.

Selected Publications:


Keith E. Holbert
Office: ERC 555
E-mail: holbert@asu.edu
Phone: 480-965-8594
Ph.D.: University of Tennessee, 1989

Keith Holbert is the Associate Chair for Undergraduate Studies and is a registered professional engineer. He joined the faculty in 1989. He has authored or co-authored over 30 journal and conference papers.

Research Interests: Process monitoring and diagnostics, signal processing, noise analysis, sensor validation, instrumentation development, fuzzy logic, process modeling, spacecraft charging, and radiations effects on electronics.

Honors and Distinctions: Tau Beta Pi, Teaching Excellence Award from ASU College of Engineering.

Selected Publications:


Frank Hoppensteadt
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E-mail: fchoppen@asu.edu
Phone: 480-965-8002
Ph.D.: Mathematics, University of Wisconsin, 1965

Frank Hoppensteadt joined the faculty at ASU in 1995 as Director of the System Sciences and Engineering Research Center. He is also a professor of mathematics. His general areas of specialization are in random perturbation methods and mathematics in biomedicine.

Research Interests: Modeling brain structures using electronic circuits, stochastic dynamical systems.

Honors and Distinctions: Visiting fellow, St. Catherine’s College, Oxford; invited speaker, International Congress of Mathematicians, Berlin, 1998; National Research Council Committee on Mathematics and Sciences; ASU Alumni Association Faculty Achievement Award, 2002.

Selected Publications:


George G. Karady received his B.S.E.E. and Ph.D. degrees in electrical engineering from 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.

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

Honors and Distinctions: Fellow of IEEE, chairmain of IEEE WG on Non-Ceramic Insulators, WG on Insulation Coordination, WG on Power Electronics, WG on Power Electronic Equipment. He also chairs the Award Committee of the IEEE PES Chapters and Membership Division and is serving as a secretary of the IEEE Phoenix Section. In 1996, Dr. Karady received an Honorary Doctoral Degree from Technical University of Budapest.

Selected Publications:


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

Research Interests: Digital filter design, multi-dimensional digital signal processing, image processing and compression, and human perception.

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

Selected Publications:


Sayfe Kiaei
Office: GWC 411
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Ph.D.: Washington State University, 1987

Dr. Kiaei has been with ASU since January 2001. He is currently a professor and the director of the Telecommunications Research Center. From 1993 to 2001, he was a senior member of technical staff with the Wireless Technology Center and Broadband Operations at Motorola where he was responsible for the development of wireless transceiver ICs, and Digital Subscriber Lines (DSL) transceivers. Before joining Motorola, Dr. Kiaei was an associate professor at Oregon State University from 1987 to 1993 where he taught courses and performed research in digital communications, VLSI system design, advanced CMOS IC design, and wireless systems. Dr. Kiaei assisted in the establishment of the industry-university Center for the Design of Analog/Digital ICs (CDADIC) and served as its co-director for 10 years. He has published over 50 journal and conference papers and holds several patents. He is an IEEE fellow and a member of the IEEE Circuits and Systems Society, the IEEE Solid State Circuits Society, and the IEEE Communication Society. Dr. Kiaei is the general chairman of the RFIC 2002 Symposium and the technical program chair for the International Symposium on Circuits and Systems.

Research Interests: Wireless transceiver design, RF and Mixed-Signal ICs.

Selected Publications:

Bruce Kim
Office: ERC 563
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Ph.D.: Georgia Institute of Technology, 1996

Bruce Kim joined the ASU faculty as an associate professor in August 2000 after teaching at Michigan State and Tufts Universities. He received the B.S. from the University of California-Irvine in 1981 and the M.S. from the University of Arizona in 1985, both in electrical engineering. He completed the Ph.D. in electrical and computer engineering at the Georgia Institute of Technology in 1996. He has published over 25 journal and conference papers and holds one patent.

Research Interests: MCM substrate testing, defect simulation of analog circuits, and microsystem development.


Selected Publications:

Michael N. Kozicki
Phone: 480-965-2572
Ph.D.: University of Edinburgh, UK, 1985

Professor Kozicki joined ASU in 1985 and is currently the Director of the Center for Solid State Electronics Research (CSSER). 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 Corp., an Arizona Technology Incubator company involved in the development and licensing of solid-state device technologies.

Research Interests: Silicon integrated-circuit processing, nanoelectrics (including nanopatterning, ultra-thin silicides, and single electron transistors/memory devices), interconnect systems and non-volatile memories using ion-conducting glasses, integrated field emission devices in silicon on insulator (SOI) substrates, bio-hybrid (whole-cell) and biophotonic integrated systems.

Honors and Distinctions: Lemelson-MIT Prize for Invention and Innovation nominee, College of Extended Education Outstanding Faculty Award, Semiconductor International Editor’s Choice Award, Golden Key National Honor Society Outstanding Professor Award, College of Engineering and Applied Sciences Teaching Excellence Award.

Selected Publications:
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 approximately 150 papers, including over 120 published in or accepted by refereed journals. In the past five years, he has given over 50 invited seminars and colloquia worldwide.

Research Interests: Applied chaotic dynamics, nonlinear optics, control theory, and computational biology.

Honors and Distinctions: Fellow of the American Physical Society since 1999; AFOSR/White House Presidential Faculty Fellow, 1997; NSF Faculty Fellow, 1997; Undergraduate Teaching Award in Physics, University of Kansas, 1998; Institute for Plasma Research Fellowship, University of Maryland, 1982; Ralph D. Myers Award for Outstanding Academic Achievement, University of Maryland College Park, 1988.

Selected Publications:

Darryl Morrell joined the ASU faculty in 1988. His research has concentrated on engineering applications of probability theory and particularly decision theory. Darryl's research areas include development and application of Bayesian networks containing both discrete and continuous random variables, channel optimized vector quantization, pattern recognition, and epistemic utility decision theory. He has also been actively involved in curriculum development at the undergraduate level and implementing the new EC2000 accreditation.

Research Interests: Estimation and detection, stochastic decision theory, filtering, pattern recognition.

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

Selected Publications:

Joseph Palais joined the faculty in 1964 and is now the Associate Chair for Graduate Studies. He has published a book on fiber optics, contributed chapters to seven books, written over 38 research articles in refereed journals, and presented many papers at scientific meetings. He has presented over 150 short courses on fiber optics.

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

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

Selected Publications:
George Pan joined the faculty in 1995 as a professor and the director of the Electronic Packaging Laboratory. He has written three book chapters, published over 36 research articles in refereed journals, and presented 62 papers at international conferences. He has presented short courses on wavelets in electromagnetics at Moscow State University, the University of Canterbury, CSIRO in Sydney, IEEE Microwave Symposium ’96, Beijing University, and the Chinese Aerospace Institute.

Research Interests: Computational electromagnetics, high-speed electronics packaging, cardiac output instrumentation, rough surface scattering.

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

Selected Publications:


Antonia Papandreou-Suppappola joined the ASU faculty as an assistant professor in August 1999. Before that, she held a Navy-supported research faculty position at the Department of Electrical and Computer Engineering at the University of Rhode Island. She has published over 50 refereed journal papers, book chapters, and conference papers, and she is the editor of an upcoming book on applications in time-frequency signal processing.

Research Interests: Signal processing for wireless communications, integrated sensor processing, time-frequency signal and system analysis, and detection and estimation theory.

Honors and Distinctions: National Science Foundation Career Award; co-chair of the IEEE Phoenix Communications and Signal Processing Chapter; Teaching Fellow of the Instructional Development Program at the University of Rhode Island.

Selected Publications:


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

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


Selected Publications:


Armando Antonio Rodriguez
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Phone: 480-965-3712
Ph.D.: Massachusetts Institute of Technology, 1990

Prior to joining the faculty in 1990, Armando Rodriguez worked at MIT, IBM, AT&T Bell Laboratories, and Raytheon Missile Systems. He has also worked at Elgin Air Force Base and Boeing Defense and Space Systems. He has published more than 90 technical papers in refereed journals and at conferences. Dr. Rodriguez has given over 30 invited presentations at international and national forums, conferences, and corporations. He currently serves as an associate editor on the IEEE Control Systems Society Conference Editorial Board.

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

Honors and Distinctions: AT&T Bell Laboratories Fellowship; Boeing A.D. Welliver Fellowship; CEAS Teaching Excellence Award, 1993; IEEE International Student Branch Web Site Bronze Award, White House Presidential Excellence Award for Science.

Recent Publications:


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

Professor Roedel joined the faculty in 1981 and is now Associate Dean of the College of Engineering and Applied Sciences. He has always striven for balance between research and teaching activities. 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. He is a member of ASEE, IEEE, and the Electrochemical Society.

Research Interests: Semiconductor materials and devices with a special interest in material growth and defects. Dr. Roedel also works in the area of epitaxial growth of Column IV materials.

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

Selected Publications:


Dieter K. Schroder
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Phone: 480-965-6621
Ph.D.: University of Illinois, 1968

Dieter Schroder joined the ASU faculty in 1981 after 13 years at the Westinghouse Research Labs. He has published two books, 136 journal articles, eight book chapters, 128 conference presentations, edited eight books, holds five patents, and has graduated 55 M.S. students and 24 Ph.D. students.

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


Selected Publications:


Jun Shen joined the faculty in 1996 after six years of experience with Motorola’s Phoenix Corporate Research Labs. He is the author or co-author of over 50 refereed articles and many other conference publications. He is also the inventor or co-inventor of 25 issued U.S. patents.

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:


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

Research Interests: Learning algorithms and adaptive systems; management and optimization of semiconductor manufacturing processes; cortical information processing and modeling in animal brains.

Honors and awards: Listed in many Marquis Who’s Who publications; NSF/White House Presidential Faculty Fellow, 1995; Motorola Excellence Award, 1995; NSF Research Institute Award, 1993; past Associate Editor of IEEE Transactions on Automatic Control; Associate Editor of IEEE Transactions on Semiconductor Manufacturing and Neural Networks; one of the ten students who received the highest honor at Tsinghua University in Beijing, China, 1994.

Selected Publications:


Brian Skromme joined the ASU faculty in 1990 where he is presently an associate professor in solid-state electronics. Prior to this, he was a member of the technical staff, Bellcore from 1985 to 1989. He has written over 90 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 School Year; and Golden Key National Honor Society Outstanding Professor Award, 1991.

Selected Publications:


Andreas Spanias joined the ASU faculty in 1988. He has published 34 journal and 78 conference papers. He has also contributed three book chapters in speech and audio processing. He has served as associate editor of the IEEE Transactions on Signal Processing and as the General Co-chair of the 1999 International Conference on Acoustics, Speech and Signal Processing (ICASSP-99). He is currently the vice president for the IEEE Signal Processing Society. He and his former Ph.D. student Ted Painter received the prestigious 2002 IEEE Donald G. Fink Prize Paper Award for their IEEE Proceedings paper entitled “Perceptual Coding of Digital Audio.”

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

Honors and Distinctions: 2002 IEEE Donald G. Fink Prize Paper Award from the IEEE Board of Directors for the IEEE Proceedings paper “Perceptual Coding of Digital Audio,” IEEE Senior Member; Intel Advanced Personal Communications Division—Central Logic Engineering Award, 1997; Natural Data Types Committee Award, 1996; Intel Corporation Award for Leadership and Contributions, 1993.

Selected Publications:

Nongjian Tao joined the ASU faculty as a professor of electrical engineering and an adjunct professor of chemistry and biochemistry in August 2001. Prior to that, he worked as an assistant and associate professor at Florida International University. He received the B.S. in physics from Anhui University in 1984 and the Ph.D. in condensed matter physics from Arizona State University in 1988. He holds two patents, has published over 90 refereed journal articles and book chapters, and a number of conference papers.

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: Member of the American Chemical Society, the American Physical Society, and the Electrochemical Society; Excellence in Research Award, Florida International University, 2000; Excellence in Research Award, Florida International University, 1996.

Selected Publications:
Trevor Thornton
Office: ERC 181
E-mail: t.thornton@asu.edu
Ph.D.: Cambridge University, 1987

Trevor Thornton joined the faculty in 1998 having spent eight years at Imperial College in London and two years as a member of 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.

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

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

Selected Publications:

Konstantinos S. Tsakalis
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Phone: 480-965-1467
Ph.D.: University of Southern California, 1988

Konstantinos Tsakalis joined the ASU faculty in 1988 and is now an associate professor. He received the M.S. in chemical engineering in 1984, the M.S. in electrical engineering in 1985, and the Ph.D. in electrical engineering in 1988, all from the University of Southern California. He holds several patents and has published over 50 journal and conference papers.

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

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

Selected Publications:

Daniel J. Tylavsky
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Ph.D.: Pennsylvania State University, 1982

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 dollars in research funding for both technical and educational research projects. He is a member of several honor societies and has received numerous awards for his technical work as well as for work with student research.

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

Honors and Distinctions: Senior Member of IEEE, IEEE-PES Certificate for Outstanding Student Research Supervision (three times), six awards for outstanding research from the IEEE-IAS Mining Engineering Committee.

Selected Publications:
Dragica Vasileska joined the ASU faculty in August 1997. She has published 52 articles in refereed journals (seven more are in press), three book articles, and 25 articles in conference proceedings in the areas of solid-state electronics, transport in semiconductors, and semiconductor device modeling. She has also given several 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.

**Honors and Distinctions:** Recipient of the NSF CAREER Award for the year 1999; University Cyril and Methodius, Skopje, Republic of Macedonia, College of Engineering Award for Best Achievement in One Year, 1981 to 1985; University Cyril and Methodius, Skopje, Republic of Macedonia, Award for Best Student from the College of Engineering in 1985 and in 1990.

**Selected Publications:**


Junshan Zhang joined the ASU faculty as an assistant professor in August 2000. He received the B.S. in electrical engineering from HUST, China, in 1993; the M.S. in statistics from the University of Georgia in 1996; and the Ph.D. in electrical engineering from Purdue University in 2000. He is active as a journal referee and has published a dozen journal and conference papers. He has been the chair of the IEEE Communications and Signal Processing Phoenix Chapter since January 2001.

**Research Interests:** Various topics in communications and networking, including cross-layer design of wireless systems, CDMA, wireless communication theory, multiuser detection, radio resource allocation, and wireless Internet access.

**Honors and Distinctions:** Member of IEEE and ASEE.

**Selected Publications:**


I. Kontoyiannis and J. Zhang, “Arbitrary Source Models and Bayesian Codebooks in Rate-Distortion Theory,” IEEE Transactions on Information Theory, accepted for publication.


Yong-Hang Zhang joined the faculty in 1996 from Hughes Research Laboratories. He has over 60 research articles in refereed journals, a book chapter, and one U.S. patent. He has presented more than 60 invited and contributed papers at various international scientific conferences. The research expenditure of his research group has been over $5 million in the past six years. Four Ph.D. and three M.S. students have graduated under his supervision between 1996 and 2001. He has also supervised more than 10 postdocs and faculty research associates.

**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 numerous international conferences.

**Selected Publications:**


Yong-Hang Zhang joined the faculty in 1996 from Hughes Research Laboratories. He has over 60 research articles in refereed journals, a book chapter, and one U.S. patent. He has presented more than 60 invited and contributed papers at various international scientific conferences. The research expenditure of his research group has been over $5 million in the past six years. Four Ph.D. and three M.S. students have graduated under his supervision between 1996 and 2001. He has also supervised more than 10 postdocs and faculty research associates.

**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 numerous international conferences.

**Selected Publications:**


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The Department of Electrical Engineering’s strength and continuing growth cannot be attributed to one single factor. I hope that this document helped you understand some of the many components that are at work. The faculty, the staff, and last, but not least, the students, have all helped build the program to what it is today and, more importantly, are what will drive it to further success in the future. We must also not forget the major role played by others in collaboration with the department, both within the university and in the engineering community, here in Arizona, the U.S., and internationally.

I look forward to continued growth and recognition of the department both at home and abroad.

Peter E. Crouch
Dean, College of Engineering and Applied Sciences