

Dr. Sayfe Kiaei
School of Electrical, Computer and Energy Engineering
Arizona State University, Tempe, AZ 85287
Sayfe@asu.edu

Sayfe Kiaei

Professor, Motorola Endowed Chair Professor

School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ

FIELDS OF SPECIALIZATION

- Analog, Digital and Radio Frequency Integrated Circuits, Power Management IC
- Signal Processing, Digital Signal Processing, Adaptive Signal Processing
- Adaptive Audio Array processing, Audio and Acoustic & Speech processing,
- Communication Systems, Wireless Communications, Wireline Communication System
- Sensors, Bio-electronics, Bio-sensors, Hearing Aid Electronics, Implanted devices electronics

DEGREES

- **Ph.D.**, Electrical and Computer Engineering, Washington State University, 1987
- **M.S.**, Electrical and Computer Engineering, Washington State University, 1984
- **B.S.E.E.**, Electrical Engineering, Northeastern University/WSU, 1982

ACADEMIC POSITIONS

Fall 2001-Present: Professor, Motorola Endowed Chair Professor in Analog and RFIC School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ

- **Professor:** Research and teaching in integrated circuits, RF circuits and systems, Communications, Wireless and Wireline transceiver, mixed-signal and Analog IC, Sensors, Power management IC, Signal processing, Bio-electronics
- **Research Projects:**
 - Analog and digital IC, Power Management IC, Radio Frequency IC, RF transceiver
 - Digital Signal Processing, Audio processing, adaptive signal processing, Array processing, AI
 - Wireless communication system, wireless modems, 1G, 2G GSM, 3G CDMA, 4G LTE, 5G wireless mobile system, LTE, WiFi, Bluetooth, Wireless system standards
 - Wireline Communication system and transceivers, MODEM standards, CABLE MODEM DOCIS, DSL
 - Signal Processing, Digital Signal Processing, Adaptive Signal Processing
 - Adaptive Audio Array processing, Audio and Acoustic & Speech processing,
 - Sensors, Bio-electronics, Bio-sensors, Hearing Aid Electronics, Implanted devices electronics
- Research Funded by NSF, USAID, DARPA, JPL, NASA, Motorola Inc., Intel Inc., Broadcom, Qualcomm, Raytheon, General Dynamics, Texas Instruments, and over 10 other industries. List of Current significant research awards:
 - Partnership Center for Energy systems, USAID, 2015-2020, \$18M. Principle Investigator
 - QESST NSF ERC Center on Solar Energy, NSF, 2010-2020, \$36M, Co-PI, Test-bed Director
 - Solar Energy Development in ME, Private funds and World Bank, \$2M

Samsung v. GUI
IPR2021-00336
Exhibit 1003

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- Connection One NSF Center, Director, 2004-Present, Total funding \$10M, average annual funding over \$750K.

2004-Present, Director and founder of NSF IUCRC Center Connection One, School of Electrical, Computer, and Energy Engineering, Arizona State University, Tempe, AZ; <https://connectionone.org>

- The NSF Connection One Industry/University Cooperative Research Center was established the center in 2002 with focus on communication system, integrated Circuits and Systems, wireless system, RF, sensors, and related areas. The center has five university member with over 30 industrial members. Total funding over \$10M, annually over \$500K. www.connectionone.org

2014-2020, Director, USAID, US-PCASE: Center for Advance Studies in Energy, Funding \$18M. <https://uspcase.asu.edu/>

- **Director and PI:** PCASE - Partnership Center for Energy systems, Energy Center funded by the USAID.
- USIAD Centers for Advanced Studies in Energy program (USPCAS-E) is a partnership between Arizona State University and two leading Pakistani universities: the National University of Science and Technology (NUST) Islamabad and the University of Engineering and Technology in Peshawar (UET).
- PCASE has developed two new Graduate schools of Energy. Within 5 years, the center has over 1000 MS and PHD Students, with 14 new energy degrees in MS and PhD, two new building with 20+ energy labs in the power system, grid, power electronics, renewable energy, PV, Wind, Hydro, bio-fuel, fuel cell, batteries and storage, and thermal areas.

2008-2012: Associate Dean of Research, Ira A. Fulton Schools of Engineering, Arizona State University

Responsible for leading the research infrastructure, promoting and developing research programs with industry and federal agencies, leading large multi-university proposals, investing and providing seed funding to foster new research areas, and promoting graduate program in the college of engineering. Research Enterprise support included:

- Increase College of Engineering research funding from \$50M to over \$80M.
- Working with Vice President for Research, Dean's, and directors on University-wide research initiatives.
- Established the first NSF Engineering Research Center (ERC) at the ASU on Solar Energy QESST. Managed, organized and planned the ERC proposal process. ASU is the lead school partnering with MIT, Georgia Tech, U of Delaware, Cal-Tech, U of New Mexico, and UA.
- Lead several trans-disciplinary 4M research projects (4M: multi-million, multi-investigator, multi-disciplinary, multi-university grants) in energy, security, and related initiatives.
- Oversight of over 20 existing research centers in the college of Engineering.
- Engage with industry and federal government to establish new research collaborations.
- Organized workshops and supported proposals for NSF, NIH, DOE, DOD, DARPA, etc.
- Organized workshops for new assistant professors to apply for NSF CAREER Awards. ASU CAREER awards grew from 3 annual awards in 2008 to over 15 CAREER awards by 2012.
- Research Administration and pre-award proposal administration for the schools. Developed a decentralized research administration and advancement team for the Schools supporting 5 schools, 12 departments, over 220 engineering faculty, with funding over \$70M.
- Annual budget over \$7M for supporting research centers, seed funding for new center, cost sharing, proposal support, equipment and infrastructure support, graduate scholarships, and research administration.
- ADR Staffs included, Director of industrial and government liaison, Director of research administration, and 14 research advancement staff.
- Graduate Programs: Recruiting, Fellowships, marketing, outreach, coordination with departments

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1997-2001, Adjunct Professor, Electrical and Computer Engineering Dept., The University of Texas, Austin, Texas, Taught graduate courses at UT Austin on Introduction to Telecommunication System and Digital Communications. Co-advised two Ph.D. program committees in IC design and Telecomm (while at Motorola)

1987-1993, NSF Center For Digital / Analog IC (CDADIC) Co-Director, NSF IUCRC Center director at Oregon State University. The CDADIC was established the center in 1987 with focus on integrated circuits at WSU, UW, and OSU with over 20 industrial members - <https://cdadic.oregonstate.edu/>

1987-1993, Assistant / Associate Professor (Tenured) Electrical and Computer Engineering Department, Oregon State University, Corvallis, OR

- Research and classes in Electronics, DSP, Communication system and networks, Wireless systems, MODEMS. Graduated 30 MS and Ph.D. students.
- Faculty Chair, Computer Engineering Program, Developed a new Computer Engineering Program at OSU in 1987

INDUSTRIAL POSITIONS

1993-2001: Motorola Inc., Senior Member of Technical Staff, Personal Communication Sector, Austin, Texas - Worked projects related to wireless communications, two way radios, wireless networks, ADSL and MODEM, RF, and related areas.

- **Motorola Cellular Division, Wireless Technology Center (WITC), 1997-2002.** Responsible for development of integrated circuits and systems for wireless handset. Lead number of projects including cellular (2G, 3G, 4G), wireless connectivity (Bluetooth and WIFI transceiver), GPS and location Receiver, wireless networks, 2-way radios and related areas. Worked on the development of various subcomponents including system design, link budget, RF front-end, filtering, analog front-end, power management, and baseband circuits and systems.
- **Motorola Semi-conductor products sector (SPS), Broadband Products Operations, 1995-1997,** Worked on the development of XDSL (ADSL, VDSL, G.lite) systems including OFDM, modulation, synchronization, equalization and the development of a single chip ADSL transceiver (*CopperGoldTM*). The transceiver contained Analog Front End (A/D, D/A, Hybrid), DMT, modulation/demodulation, FFT, IFFT, echo canceler, time domain equalizer, front-end constellation mapping, Trellis code modulation, Viterbi decoder) and an on-chip DSP core.
- **Land Mobile Products Sector LMPS 1993-1995,** Responsible for Wireless digital two-way radios, hot spot wireless network, next generation of digital two-way radios, "*Talk about Radios*", Japanese cellular systems (PHS).
- **Standards,** Represented Motorola in various standards including 2G-4G, GPS, Bluetooth working group, WiFi, 802.11, and DSL standards including T1E1, International Telecommunication Unit (ITU), T1E1, ETSI, 3GPPP, Universal ADSL Working Group (UAWG), Bluetooth working group, G.Lite working group, etc.

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- **University relations**, Responsible for the development of collaborative research programs with several universities. Responsible for funding research in the areas of Wireless Transceiver IC Design, RF, and mixed-signal and baseband system architecture.

1985-87: Member of Research Staff, Boeing Co., Bellevue, Wa, Flight Systems Research and Technology Center, summer. Design Engineer, Hardware and CAD tool development for system control.

AWARDS

- IEEE Fellow 2004-Present
- IEEE Fellows CAS Committee Chair, 2009-2012
- Global Standards Award, For contributions in the International Telecommunication Unit (ITU) for Asymmetric Digital Subscriber Line (ADSL) G.Lite Standards. Motorola Inc., 1999.
- 10X Cycle Reduction Award, for development of new IC design process from DSP algorithm to IC layout, Motorola Inc., 1995.
- IEEE Darlington best paper Award, IEEE Circuits and Systems Society Best Paper Award, 1995. For “Characterization and Comparison of CMOS FSCL Circuits with Conventional CMOS for mixed-signal ICs,” Published at: *IEEE Trans. on Circuits and Systems II*, Sept. 93.
- Carter Best Teaching Award, College of Engineering Best Teacher Award, Oregon State University, 1992. For “*outstanding and inspirational teaching in the College of Engineering*”. Award is selected by the confidential vote of all of the undergraduate students in the College of Engineering among over 125 professors in the College.
- Industrial University Fellowship (IUF) Award, *National Science Foundation*, 1993.
- Research Initiation Award, *National Science Foundation*, 1990-93.
- Outstanding Graduate Student Scholarship, *Azur-Data Inc.* WSU, 1984

RESEARCH PROJECTS

Partial list of Research Awards:

- USAID, PCASE – Center for Energy systems, 2015-2020, \$18M. PI and Director
- NSF, QESST NSF ERC Center on Solar Energy, 2010-2020, \$36M, Kiaei, Co-PI, Testbed Director,
- Private Donors, \$1.5M, 2012-2015, Solar Energy Development
- NSF IUCRC Center, Connection One 2002-present, Over \$10M as PI, over \$0.5M annual center awards
- NSF, Micro-Power Multi-Phase MEMS Hearing Aid, 2007-2011, \$500K
- NSF - Design for Implantable Bio-Sensors, 2007-2009, \$480K
- Science Foundation of AZ, PEPER- Photovoltaic Environmental Performance and Reliability for the Arizona-Wide Electric Grid, 2009-2013, \$1.2M
- SRC –Self Characterization for Calibration and Process Feedback of MEMS Devices, 2011-2014, \$300K

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- NSF- Cognitive MIMO Communications for Dynamic-Spectrum Wireless Networks – 2012-2014, \$150K
- NSF, Autonomous Self-Healing Sensor Network Radio, 2010-2014, \$250K
- DARPA, Neural-Enabled Prostheses with Sensorimotor Integration, \$500K
- NSF, Microwave Sensors for Vital Signs Monitoring Device Design, 2011-2013, \$250K
- NSF, Various REU funds, 8/31/12-8/31/13, \$400K
- DARPA, Nano-Mechanical RF Band pass resonator for 2GHz RF Applications, with JPL, \$2.2 M, 2002-2005,
- Qualcomm, Connection One Center, Various projects in 3G-5G, WiFi (802.11), GPS, and Bluetooth , 2005-Present, \$1.2M
- Texas Instruments, Various projects in Power management and RFIC, 2005-20012, \$1.5M
- *Motorola Inc.*, Various projects in Power management and RFIC Various projects 2002-2010, \$1.2M.
- *SIRF Technologies*, GPS Transceiver, 2005, \$300K.
- *Ridgetop Inc.*, RF Harsh Environment, \$200K
- Freescale Semiconductor, PWM Power Management, 2006, \$150K
- State of Arizona, *WINTECH- Wireless Integrated Nano Technology Center Support* (2005-2009), Ranging from 450K annually from 2005-2009.
- BAE Systems; “New Techniques for Time Measurement Circuits LiDAR; 2005-2008; \$650K
- SRC (Semi-conductors research Corp), Ultra-Wideband Transceivers for cellular and WiFi 802.11, \$225K, 2001-2003
- Intel Corporation, Design of Multi-Standard RF Front-End Circuits for Cellular and WiFi, \$300K, 2002-2005
- *National Science Foundation*, Adaptive Compensation of Analog circuits imperfections using DSP methods, \$150K, 1996 (tie project with UC San Diego NSF center), 2010-2011
- Center for the Design of Analog/Digital IC’s (CDADIC) 1987-1995, At Oregon State, \$1.5M
- Low Power IF processing for Direct Digital Transceivers, *Motorola Inc*, \$100K, 93.
- Hewlett-Packard Faculty Chair position in Mixed-Signal IC, HP, 1995-97, \$500K
- *National Science Foundation, Motorola Inc.* Faculty Industry Fellowship, \$250K, 93-94.
- *National Science Foundation, Research Initiation Award (RIA) (same as current CAREER Award)*, Synthesis and Automatic Derivation of Multi-Rate VLSI Arrays for DSP Algorithms, , 90-93. \$320K.
- CDADIC, various projects on Low-Noise Source Coupled Logic (SCL), Mixed-Mode IC's, *CDADIC* \$350K, 1988-1992.
- Decimation Filters for A/D Noise Enhancements, Tektronix, Inc., \$100K, 1988.
- Various grants for IC Fabrication (DARPA/MOSIS, VLSI), testing equipment (Tek, HP), DSP system development (TI, Motorola), ranging in various amounts up to \$200K/year. At Oregon State, 1988-1997.

PROFESSIONAL RECOGNITION

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