Areas of Specialization
Department of Electrical and Computer Engineering
Texas A&M University

Analog & Mixed Signal

1. RF and Based Band Integrated Circuits; Wireless Building Blocks, such as Bluetooth, Broadband and Fiber Optical Communications.
2. Analog to Digital Converters. Macromodeling, Built-in Testing and Design.
3. Analog and Mixed Signal IC Designs - operational amplifiers, operational transconductance amplifiers, multipliers, building blocks, switched-capacitor filters, high frequency filters, using otas and/or current mode techniques, analog memories, automated design of large analog IC's, digitally controlled signal processing, data converters, very low power electronics, neural networks.
4. IC Technologies–GaAs, NMOS, CMOS, bipolar, processing, fabrication, device models, testing.
5. Design for testability and Analog and Mixed Signal Testing.
6. Active Filter Design - high frequency active filters, compensation techniques for filter applications, macromodeling, approximation methods, voltage controlled filter design, OTA design, computer aided analysis and design.
7. High Temperature Circuits, Instrumentation, Operational Amplifier Applications. Electronic system design for instrumentation, measurement, and evaluation of VLSI circuits.
8. Integrated Circuit Design –GaAs, SiGe, CMOS and Bipolar designs, analog circuit design, monolithic filter, switched-capacitor filters, A/D converters, op amp design. Current mode techniques.
9. Optimization - component selection, design centering, performance and yield predictions, statistical analysis optimization using neural networks.
10. Computer Simulation - techniques for analyzing various types of circuits and data converters with computers, switched-capacitor analysis and systems.
11. Measurement Methods and Systems.
12. Modeling and Macromodeling of Analog Devices, ADC and Circuits.
13. Design of Mixed-mode VLSI Circuits.

Entesari, K.	318A WERC	Ph.D., University of Michigan, Ann Arbor, 2005, Assistant Professor
Hoyos, S.	318G WERC	Ph.D., University of Delaware, 2004, Assistant Professor
Karsilayan, A.	318C WERC	Ph.D., Portland State University, 2000, Associate Professor
Nguyen, C.	208B ZEC	Ph.D., University of Central Florida, 1990, Professor
Sanchez-Sinencio, E.	318E WERC	Ph.D., University of Illinois, 1973, Professor & TI J. Kilby Chair Professor
Silva-Martinez, J.	318B WERC	Ph.D, Katholieke University of Leuven, 1983, Associate Professor & TI Analog Professor

Biomedical Imaging and Genomic Signal Processing

1. Theory, Design and Implementation of Instrumentation and Techniques for Biomedical Image Acquisition, ranging from molecular to whole body imaging. Optical tomographic imaging systems for biomedical applications; light sources, imaging techniques and software development for optical imaging of biological tissues. Magnetic resonance imaging and spectroscopy; theory and implementation of radio frequency sensors, and magnetic resonance hardware. Methods for dynamic imaging, thermal imaging, and magnetic resonance microscopy. Theory and application of sensor arrays in medical imaging, including microwave, magnetic resonance, and ultrasound.
2. Biomedical Image Processing and Analysis. Image analysis techniques and algorithms for extracting clinically useful information from medical images including X-ray, MR, nuclear medicine, and ultrasound. The study of various types of filtering, compression, feature extraction, and classification techniques specially designed for medical image data, including DCT, wavelets, morphological analysis and random image models.
3. Genomics and Bioinformatics. Genomic Signal Processing (GSP) is the engineering discipline that studies the processing of genomic signals. Owing to the major role played in genomics by transcriptional signaling and the related pathway modeling, it is only natural that the theory of signal processing should be utilized in both structural and functional understanding. The aim of GSP is to integrate the theory and methods of signal processing with the global understanding of functional genomics, with special emphasis on genomic regulation. Hence, GSP encompasses various methodologies concerning expression profiles: detection, prediction, classification, control and statistical and dynamical modeling of gene networks. GSP is a fundamental discipline that brings to genomics the structural model-based analysis and synthesis that form the basis of mathematically rigorous engineering.

Braga-Neto, U	219C ZEC	Ph.D., The Johns Hopkins University, 2002, Assistant Professor
Chan, A. K.	208C ZEC	Ph.D., University of Washington, 1971, Professor
Datta, A.	216N ZEC	Ph.D., University of Southern California, 1991, Professor
Dougherty, E.	216L ZEC	Ph.D., Rutgers University, 1974, Professor
Han, A.	235G WERC	Ph.D. Georgia Institute of Technology, Assistant Professor
Hemmer, P.	216H ZEC	Ph.D., MIT, 1984, Professor
Ji, J.,	236B WERC	Ph.D., University of Illinois, 2003, Assistant Professor
Righetti, R	235B WERC	Ph. D., University of Houston, 2005, Assistant Professor
Su, C. B.	312F ZEC	Ph.D., Brandies University, 1979, Professor
Wright, S. M.	236A WERC	Ph.D., University of Illinois, 1984, Professor
Xiong, Z.	244C WERC	Ph.D., University of Illinois, 1996, Professor
Yoon, B-J	216G ZEC	Ph.D., California Institute of Technology, 2007, Assistant Professor
Zourntos, T .	235A WERC	Ph.D., University of Toronto, 2002, Assistant Professor

Department of Electrical & Computer Engineering at Texas A&M University

Computer Engineering

1. Computer Networks; multimedia systems, multimedia networking, multicast, network protocols, performance and security criteria.
2. CAD Systems for VLSI Custom, Standard Cell, and Gate Array Design; Logic Design, Design Verification and Validation, Extraction of Physical Design Data, Automated placement and Routing with Performance coustraints, Testing and Design for Testability.
3. Parallel processing; computer architectures, parallel algorithms, distributing computing, computer arithmetic and computational geometry.
4. VLSI Systems Design and Verification; Reconfigurable and Fault-Tolerant Computing; High-Speed/Low-power Custom Design Approaches; Spaceborne Systems Design and Radiation Testing.

Cantrell, P. E.	119 Teague	Ph.D., Georgia Tech, 1981, Associate Professor/Associate Provost
Choi, G. S.	333G WERC	Ph.D., University of Illinois, 1994, Associate Professor
Hu, J.	333L WERC	Ph.D., University of Minnesota, 2001, Assistant Professor
Khatri, S.	333F WERC	Ph.D., University of California, Berkeley, 1999, Assistant Professor
Li, P.	333M WERC	Ph.D. Carnegie Mellon University, 2003, Assistant Professor
Lu, M.	332E WERC	Ph.D., Rice University, 1987, Professor
Reddy, A. L. N.	333J WERC	Ph.D., University of Illinois, 1990, Professor
Shakkottai, S	332C WERC	Ph.D., University of Illinois, 2007, Assistant Professor
Shi, W.	333K WERC	Ph.D. , University of Illinois, 1992, Professor
Sprintson, A.	333D WERC	Ph.D. Israel Institute of Technology, Assistant Professor
Watson, K.	104 ACADEM	Ph.D., Texas Tech, 1982, Professor, Associate Provost & Dean of Faculties
Zhang, X.,	333N WERC	Ph.D., University of Michigan, 2002, Assistant Professor

Control Systems

1. Multivariable Linear Control Systems - fundamental studies of the control law synthesis problem using geometric and operator theoretic approaches.
2. Adaptive Control Systems - development of design techniques that can alter controller structure in response to changes in process parameters so as to maintain satisfactory performance.
3. Nonlinear Control Design - investigations of conditions for ensuring stability of classes of nonlinear dynamic systems, linearization methods, stability boundaries, stability margin and robustness.
4. Stochastic Control Systems - application of dynamic programming; Markov decision theory and other techniques to the synthesis of control for uncertain dynamic processes.
5. Robust Control Systems - the development of control systems that offer acceptable performance over a wide range of system parameter variations.
6. Optimization and Control of Large Systems – decomposition methods, distributed and decentralized control, data exchange issues, nonlinear programming, dynamic programming, Kuhn-Tucker theorems for large system optimizations.
7. Control Design for Large Power Systems and Computer Networks- distributed, decentralized and hierarchical control issues.

Bhattacharyya, S. P.	216R ZEC	Ph.D., Rice University, 1971, Professor
Datta, A.	216N ZEC	Ph.D., University of Southern California, 1991, Professor
Howze, J. W.	204 ZEC	Ph.D., Rice University, 1970, Professor, Associate Dean & Ford Professor
Huang, G. M.	320E WERC	Ph.D., Washington University, 1980, Professor
Zourntos, T .	235A WERC	Ph.D., University of Toronto, 2002, Assistant Professor

Electric Power and Power Electronics

1. Modeling and Analysis of Power Systems Networks Under Steady-State and Transient Conditions.
2. Computational Methods and Algorithms for Large-Scale Systems; parallel and interactive computation.
3. Modeling and Assessment of the Reliability and Economic Performance of Terrestrial and Aerospace Power Systems.
4. Monitoring, Management, and Control of Electric Power Systems.
5. Electric Power System Automation and Protection; computer-based relaying; detection of high-impedance faults; knowledge-based protection systems.
6. The Above Topics for Deregulated Power Industry.
7. Electrical Machines and Drive Systems; modeling and analysis; control and optimization of machines and drives; development of advanced drive technologies.
8. Power Electronics: Development, Analysis and Control of Power Converters and Frequency Changers; simulation of power electronic circuits; development and analysis of solid-state power switching devices.
9. Superconductivity Applications in Power Systems; alternative power system architectures.

Butler-Purry, K.	323E WERC	Ph.D., Howard University, 1994, Professor, Associate Dept. Head, Director EPPEI
Ehsani, M.	216F ZEC	Ph.D., University of Wisconsin, 1981, Professor
Enjeti, P.	216K ZEC	Ph.D., Concordia University of Canada, 1987, Professor, Assoc. Dean-TAMUQ
Huang,G. M.	216Q ZEC	Ph.D., Washington University, 1980, Professor
Kezunovic, M.	323C WERC	Ph.D., University of Kansas, 1980, Eugene Webb Professor
Russell, B. D.	238 WERC	Ph.D., University of Oklahoma, 1975, Professor & J.W. Runyon Jr.'35 Professor I
Singh, C.	320C WERC	Ph.D., Univ. of Saskatchewan, 1972, Regents Prof. & Irma Runyon Chair Professor
Toliyat, H.	216Q ZEC	Ph.D., University of Wisconsin, 1991, Professor

Electromagnetics and Microwaves

1. Microwave and millimeter-wave circuits and devices. Microwave and millimeter-wave integrated circuits and power combining techniques. Circuit modeling of microwave devices such as amplifiers, active arrays, oscillators, resonators, coupled lines, phase shifters, mixers and filters. Field analysis of transmission line discontinuities. New transmission line development.
2. Electromagnetic Wave Propagation and Scattering; from low frequency to microwave and optical frequencies, applications in optical wave guides, optical diagnostic techniques, geophysical probing, and electrical well logging.
3. Numerical and Analytical Methods in Electromagnetics Including FDTD method and Method of Moments. Microwave and millimeter wave device analysis. Aperture, traveling wave and microstrip antenna analysis and design. Scattering and radiation by objects of arbitrary shape in free space and in complex environments.
4. Microwave and millimeter-wave antennas, antenna arrays, and phased arrays.
5. Microwave and millimeter-wave wireless communication systems, radar systems, sensors, wireless power transmission systems and ultra-wideband components and systems.

Chan, A. K.	208C ZEC	Ph.D., University of Washington, 1971, Professor
Chang, K.	208D ZEC	Ph.D., University of Michigan, 1976, Professor & TI Endowed Analog Chair Professor
Huff, G.	208A ZEC	Ph.D., University of Illinois, Urbana, 2006, Assistant Professor
Michalski, K. A.	208G ZEC	Ph.D., University of Kentucky, 1981, Associate Professor
Nevels, R. D.	208F ZEC	Ph.D., University of Mississippi, 1978, Professor
Nguyen, C.	208B ZEC	Ph.D., University of Central Florida, 1990, Professor
Wright, S. M.	236A WERC	Ph.D., University of Illinois, 1984, Professor

Solid State Electronics, Photonics and Nano-Engineering

1. Optoelectronics-semiconductor devices; lasers, light-emitting diodes and photodetectors; development and application of novel light sources.
2. Integrated Optics-novel electrooptic: low-voltage modulators and switches, high frequency modulators, linear modulators and rapidly tunable add/drop multiplexors.
3. Optical Fiber Devices-fiber sensors, filters for communications.
4. Application of noise measurements-for chemical sensing and monitoring device aging/degradation. Noise, dissipation and stochastic resonance at biological signal transfer and in nanostructures.
5. Quantum and Optical Computing-solid-state quantum logic elements, memories/processors based on spectral hole-burning, slow-light and holography and single-molecule sensors.
6. High Resolution Lithography- next generation lithography, lithography modeling and resolution enhancement techniques, photo-resistance characterization and modeling.

Cheng, M.	216P ZEC	Ph.D., University of California, Berkley, 2001, Assistant Professor
Cheng, X.	312B ZEC	Ph. D., University of Michigan, 2004, Assistant Professor
Eknoyan, O.	314 ZEC	Ph.D., Columbia University, 1975, Professor
Harris, H. R.	724 JEB	Ph.D. Texas Tech University, 2003, Assistant Professor
Hemmer, P.	216H ZEC	Ph.D., MIT, 1984, Professor
Kameoka, J.	312E ZEC	Ph.D. Cornell University, 2003, Assistant Professor
Kish, L.B.	312A ZEC	Doc.; Attila Jozsef University 1984, Professor
Madsen, C.	728 JEB	Ph.D., Rutgers University, 1996, Professor
Su, C. B.	312F ZEC	Ph.D., Brandies University, 1979, Professor
Wang, H.	723 JEB	Ph.D., North Carolina State University, 2002, Assistant Professor
Weichold, M. H.	TAMUQ	Ph.D., Texas A&M University, 1984, Professor, CEO TAMUQ
Zou, J.	216M ZEC	Ph.D. University of Illinois, Urbana-Champagne, 2002, Assistant Professor

Telecommunications and Signal Processing

1. Digital Signaling Techniques: signaling over multipath/fading channels, efficient signaling over bandlimited channels, multicarrier modulation techniques, orthogonal frequency-division multiplexing (OFDM).
2. Coding Theory: combined modulation and coding, trellis-coded modulation (TCM), turbo coding, iterative decoding techniques, space-time coding, soft-decision decoding of block codes, low-density parity check codes (LDPC's).
3. Source Coding: joint source and channel coding, audio, video and image compression, distributed source coding.
4. Network security, Steganography, digital water-marking, data-hiding.
5. Synchronization techniques (carrier, symbol), equalization, turbo equalization, channel estimation.
6. Multiple Access Techniques: Code-division multiple access (CDMA), multi-user detection techniques, interference rejection techniques.
7. Analysis and Modeling of Data Communication Networks - optimal routing for integrated service networks, dynamic routing, network topology planning packet radio networks, queuing theory.
8. Application of lattice filters to adaptive estimation and signal processing, array processing techniques.
9. Optical Communication Systems - direct-detection systems, heterodyne detection systems.
10. Estimation theory, robust signal detection and estimation, distributed detection, parameter estimation, non-linear filtering, genomic prediction, stochastic processes.
11. Application and Simulations of Laser Radar Signal Processing for segmentation and recognition of unknown military targets.
12. Signal processing techniques: Statistical signal processing, real-time DSP implementations, Wavelets, multi-rate filter banks and fast algorithms, array processing, signal processing for wireless communication/ networks, spectral analysis, spectral estimation, Fourier imaging and time-frequency analysis.
13. Image processing, image recovery, image printing and display, digital watermarking and content-based retrieval, morphological image processing.
14. Analysis and Modeling of Gene Expression Data from cDNA Microarrays.

Chamberland, J-F.	244F WERC	Ph.D., Ph.D. University of Illinois, Urbana-Champagne, 2003, Assistant Professor
Chan, A.	208C ZEC	Ph.D., University of Washington, 1971, Professor
Choi, G. S.	333G WERC	Ph.D., University of Illinois, 1994, Associate Professor
Cui, S.	235C WERC	Ph.D. Stanford University, 2005, Assistant Professor
Georghiades, C.	216B ZEC	D.Sc., Washington University, 1985, Professor & Delbert A. Whitaker Chair, Dept. Head
Halverson, D. R.	217B ZEC	Ph.D., University of Texas, 1979, Associate Professor
Huang, G. M.	216Q ZEC	D.Sc., Washington University, 1980, Professor
Ji, J.,	236B WERC	Ph.D., University of Illinois, 2003, Assistant Professor
Kundur, D.,	237D WERC	Ph.D., University of Toronto, 1999, Associate Professor
Liu, T.	244B WERC	Ph.D., University of Illinois, Urbana, 2006, Assistant Professor
Miller, S.	241E WERC	Ph.D., University of California, San Diego, 1988, Professor, Group Leader, Grad. Advisor
Narayanan, K.	241D WERC	Ph.D., Georgia Tech, 1998, Associate Professor
Pfister, H.	235A WERC	Ph.D., University of California, San Diego, 2003, Assistant Professor
Savari, S.	235E WERC	Ph.D., Massachussetts Institute of Technology, 1996, Associate Professor
Serpedin, E.	237C WERC	Ph.D., University of Virginia, 1999, Associate Professor
Sprintson, A.	333D WERC	Ph.D. Israel Institute of Technology, Assistant Professor
Xiong, Z.	244C WERC	Ph.D., University of Illinois, 1996, Associate Professor