



Research Highlights

Currently, ten faculty members are affiliated with the Center:

Drs. H. Arslan, S. Bhanja, S. Bhansali, T. Weller, K. J. Christensen, R. D. Gitlin, V. K. Jain, N. Ranganathan, R. Sankar, A. D. Snider, and M. Varanasi.

Research is underway in several areas: Wireless communications and signal processing. High-speed network design and analysis; performance evaluation of computer networks. Signal processing and neural network techniques for speech, communication, and biomedical applications. 2D and 3D imaging and video: algorithms, architectures, and VLSI design. Power efficient layout-aware CAD and testing. Architectures and VLSI implementation of encryption/decryption algorithms. Analog VLSI, and RF ICs. Heterogeneous system on a chip: opto-electronics, MEMS/NEMS, sensors, digital, and analog. More details are provided below.

Dr. Arslan's research in wireless communications includes ultrawideband, orthogonal Frequency Division Multiplexing (OFDM)-based WLANs and multi-carrier modulation, multiple antenna transmit and multiple antenna receiver (MIMO) systems, and cellular mobile radio systems.

Dr. Bhanja's research includes Modeling Switching in Sequential Circuits, Probabilistic Modeling of Delay and Correlation for Power Estimation, Fault Detection Probability Assessment, Test Pattern Generation Using Bayesian Networks, and Unified Probabilistic Inference for Behavioral and RT Level Power.

Dr. S. Bhansali's research includes Micro- Electro- Mechanical Systems (MEMS), including bio and chemical MEMS, and sensors and actuators and system integration. Dr. S. Bhansali is the Principal Investigator of an NSF IGERT grant entitled, "Sensory Knowledge based Interface Science," \$3,078,000, Dec '02 - Nov '07.

Dr. Christensen is the lead investigator on a project entitled "The Energy Efficient Internet Project". In the past, he worked on an NSF CAREER grant project on new switch architectures for high-speed networks.



Research Highlights continued

Dr. T. Weller's research interests include Numerical electromagnetics, microwave and millimeter-wave circuit/system design, and the use of micromachining to develop advanced technologies for passive components, antenna arrays, packaging and 3-D circuit integration.

Dr. Gitlin's research interests include Wireless signal processing, communications, and networking (4G, cognitive systems, heterogeneous systems, ad-hoc systems, and cross-layer design). Broadband networking (quality of service, restoration and reliability, Terabit networks).

Communications and networking for biomedical applications.

Dr. Jain's research includes heterogeneous system on a chip, ultra-high bit rate wireless communication systems, reconfigurable J-platform based VLSI, hierarchical on-chip interconnection networks, and biomedical image processing.

Dr. Ranganathan's research includes VLSI system design, design issues, power estimation and optimization, high level synthesis, physical design issues, logic synthesis, application specific IC design. Also, signal image and video processing, for VLSI systems. Dr. Ranganathan serves as the Editor-in-Chief of the IEEE Transactions on Very Large Scale (VLSI) Systems.

Dr. Sankar's research includes resource and mobility management for networks, protocols for wireless ad hoc and sensor networks, image coding/compression and quality assessment algorithms, and biomedical signal processing and networking architecture for telemedicine.

Dr. Snider's research includes antijamming procedures for GPS signals, RF filter design using pade-tchebyshev techniques, accurate, spur-free resampling algorithms, implementation of significance-based calculation of elementary functions in nonclocked logic.

Dr. Varanasi's research includes coding theory, and architectures and VLSI implementation of encryption/decryption algorithms.