ECE Faculty Research

Communications

- **Brian Kelley, Ph.D.**
  - Open-source software for E2E 5G/6G Cellular
  - Private 5G/6G Networks and Smart Campus Networks
  - 5G/6G Core Networks and Security
  - 5G/6G Network Slicing
  - Open-Radio Access Networks (CU, DU, RU)
  - Physical Layer Security for 6G
  - AI/ML For Communications
  - Wireless, Smart Antennas, MIMO, Massive MIMO
  - Communication Signal processing
  - Software Defined Radios (SDRs)

- **David Akopian, Ph.D.**
  - Human-Machine interfaces, dialog systems
  - mHealth, Human Activity Data Collection
  - Mobile Computing
  - Wireless Sensing
  - Location Technologies, GPS/GNSS, WLAN-based
  - GPS Spoofing mitigation
  - Software-Defined-Radio (SDR)

- **Mehdi Shadaram, Ph.D.**
  - Optical fiber communications
  - Broadband communications
  - Photonic generation of millimeter waves
  - Photoacoustic imaging
  - Fiber optic sensing
  - Engineering Education

- **Nikolaos Gatsis, Ph.D.**
  - Power system optimization and control
  - Electric power distribution system modeling and analysis
  - Stochastic and robust optimization for power systems with renewable energy sources
  - Protection of power systems with inverter-based resources
  - Optimal and secure operation of water distribution systems
  - Anomaly detection in critical infrastructures, including Global Navigation Satellite Systems

Computer Engineering

- **Chen Pan, Ph.D.**
  - Sustainable and Intelligent Air-Ground IoT
  - Tiny Machine Learning
  - Intelligent Sparce Sensing
  - Transient Computing and Communication
  - Emerging Non-Volatile Memory

- **Dharanidhar Dang, Ph.D.**
  - AI Accelerator
  - Computer Architecture
  - Silicon Photonics
  - Healthcare AI
  - Emerging Technologies

- **Dhireesha Kudithipudi, Ph.D.**
  - Neuromorphic AI systems and architectures
  - AI Algorithms (eg: brain-inspired)
  - Emerging Computing Substrates
  - Energy efficient machine learning
  - Lifelong learning
  - Spiking and rate based models

- **Eugene John, Ph.D.**
  - Energy Efficient Computing
  - AI/ML
  - Neuro-Symbolic AI
  - AI Hardware
  - AI/ML Workload Analysis and Characterization
  - Computer Architecture and Performance Evaluation
  - Low Power VLSI Design
  - Power-Aware and Secure Systems

- **Gabriela Ciocarlie, Ph.D.**
  - Cyber-physical systems security with a focus on manufacturing systems
  - Anomaly detection, network- and application-level security
  - Trustworthy AI

- **John Jeff Prevost, Ph.D.**
  - Cloud Computing
  - virtual resource placement optimization
  - auto-deploy and configure domain specific cloud resources
  - quantum computation
  - quantum key security

- **Guenevere (Qian) Chen, Ph.D.**
  - SCADA and Security
  - Internet of Things Security
  - Digital Health and Medical Device Security
  - Cybersecurity for AI

- **Ram Krishnan, Ph.D.**
  - Cyber Security
  - Security, Trust, and Privacy in Machine Learning/Artificial Intelligence
  - Security and Privacy in Cloud Computing
  - Security and Privacy in Mobile Computing

- **Wei-Ming Lin, Ph.D.**
  - High-Performance Computing
  - Computer Architecture
  - Parallel Processing
  - Autonomous Performance Optimization
  - Computer Network
  - Digital System Design

- **Yanmin Gong, Ph.D.**
  - Security and privacy in big data
  - machine learning
  - Internet of things
  - cyber-physical systems
  - mobile computing
  - wireless networks

Signal Processing and Machine Learning

- **Artyom Grigoryan, Ph.D.**
  - Quantum Signal/Image Representation and Processing
  - DIP and Fast Algorithms in Quantum Computing
  - Methods of Computed Tomography
  - Quaternion Color Image Processing
  - Fast Fourier Transforms
  - Inverse Problems

- **Mario Flores, Ph.D.**
  - Computational Biology
  - Omics analysis
  - Deep Learning

- **Michelle Zhang, Ph.D.**
  - Signal processing for bioinformatics and biomedical applications
  - information theory and applications in genomics
  - wireless communications

- **Panagiotis (Panos) Markopoulos, Ph.D.**
  - Machine Learning
  - Signal Processing
  - Data Analysis
  - Artificial Intelligence
  - Fundamental research with applications in multiple areas including communications, computer vision, remote sensing, biomedical

Electronic Materials and Devices

- **Amar Bhalla, Ph.D.**
  - Electronic and optoelectronic materials and devices
  - Nanomaterials and Nano-systems, Size effects
  - Structure: Property Relationship in Electronic Materials
  - Multifunctional, Ferroic and Multiferroic Materials; Bio-ferroics
  - Advanced Sensors and Integration issues

- **Robert Tyler Sutherland, PhD.**
  - Quantum technology
  - quantum computing
  - quantum optics
  - quantum simulation
  - AMO physics

- **Ruyan Guo, Ph.D.**
  - Crystal chemistry and structure-composition-property relationships
  - Ferroelectric, piezoelectric, and pyroelectric oxides
  - Low loss and frequency agile microwave dielectrics and devices
  - Photonic, Electrooptic, and nonlinear optical crystals and devices
  - Nanomaterials and hybrid 3D fabrications
  - Wide bandgap semiconductors and microelectronics
  - Multifunctional composites for sensors, actuators, modulators, and energy conversion

Power and Energy

- **Bin Wang, Ph.D.**
  - Power system analysis
  - Power system small-signal stability, transient stability and voltage stability
  - Transient stability simulation and electromagnetic transient (EMT) simulation
  - Renewable energy integration
  - Power system oscillation analysis

- **Miltos Alamaniotis, Ph.D.**
  - Nuclear Security
  - AI for Nuclear Power Systems
  - Hybrid Energy Systems
  - Applied Artificial Intelligence
  - Smart Electric Power Systems and Smart Grids
  - Machine Learning in National Security Applications
  - Intelligent Control Methods in Power Systems
  - Intelligent Systems for Signal Processing, and Detection Algorithms
  - Machine Learning Applications
  - Smart Cities

- **Nikolaos Gatsis, Ph.D.**
  - Power system optimization and control
  - Electric power distribution system modeling and analysis
  - Stochastic and robust optimization for power systems with renewable energy sources
  - Protection of power systems with inverter-based resources
  - Optimal and secure operation of water distribution systems
  - Anomaly detection in critical infrastructures, including Global Navigation Satellite Systems

- **Sara Ahmed, Ph.D.**
  - Modeling, simulation and analysis of power electronics systems with a focus on stability, fault analysis, and integration of renewables
  - Design and control of three phase converters and AC drives

Systems, Control And Robotics

- **Chunjiang Qian, Ph.D.**
  - Robust and adaptive control of nonlinear systems
  - Homogeneous systems theory
  - Observer design and output feedback control
  - Mathematical foundation of deep learning
  - Intelligent control systems
  - Reinforcement learning
  - Robotics

- **Claire Walton, Ph.D.**
  - Computational optimal control
  - Robust control of nonlinear systems
  - Parameter uncertainty
  - Machine learning in real-time control applications
  - empirical observability
  - real-time optimization
  - Scalable swarm tactics
  - Autonomous vehicle path planning for mobile sensors
  - optimal search
  - and energy-efficient path planning for endurance flight

- **Yongcan Cao, Ph.D.**
  - Autonomy
  - Distributed Multi-agent Systems
  - Cooperative Control
  - Data Analytics
  - Human-Robot Teaming
  - Machine Learning; Reinforcement Learning
  - Smart Sensing and Perception
  - Testing and Evaluation
  - Unmanned Systems

- **Yufang Jin, Ph.D.**
  - Systems biology
  - Bioinformatics
  - Application of artificial intelligence on multi-omics data analysis
  - Modeling and analysis of nonlinear systems
  - Network-based modeling and control
  - Intelligent transportation system
  - Autonomous driving