

School of Electrical Engineering

Areas of study:

Communications: Communication systems; information theory, algebraic coding, stochastic processes; optical communications systems; sensory communication systems; synchronization systems.

Digital signal processing: Statistical and non-linear signal processing; signal detection and estimation; signal processing in sensory communication systems: speech, biomedical signals; radar signal processing; radar techniques and systems, navigation and detection; biomedical instrumentation: man-machine interfacing; sensory aids for perception defects.

Image Processing and Computer Vision: Enhancement, restoration and compression of visual data. Geometric and variational methods in image analysis. Three-dimensional imaging and photography. Automatic analysis of video streams. Camera arrays. Medical imaging and analysis. Distributed image and video processing.

Machine Learning - Deep learning, Optimization, Learning theory, Statistical methods, online algorithms, tree methods, linear classification, regression methods, generative techniques, unsupervised learning, reinforcement learning, applications.

Control systems: Analog and digital control; real-time control, optimal control and system identification; adaptive control; filtering theory; multivariable control systems theory; fuzzy logic and fuzzy systems.

Computer engineering: VLSI systems; embedded computer systems; distributed processing; algorithms and parallel computing; computer architectures; computer graphics/computer-aided design. Artificial intelligence: neural networks; genetic algorithms; automata theory; fuzzy systems; fuzzy expert systems.

Micro and Nano-electronics: devices and materials: Microelectronic and opto-electronic devices; VLSI; MEMS, MOEMS, BioMEMS and Lab-on-chip; biosensors; electronic materials characterization; ferroelectric materials, thin films and devices; semiconductor sensors and radiation damages; plasma based processes: high-current vacuum arcs and metallurgical depositions; micro-batteries; nano-materials and devices; microelectronics reliability.

Electro-optics: devices and systems: Optical communications, fibers, sensing systems; electro-optics for computing; image recognition; laser optics and frequency stabilization; electro-optic devices; integrated optics; non-linear optics.

Electromagnetic waves: sources and systems: High-power microwave sources; free electron lasers and mazers; electron/material interaction; Electromagnetic systems: microwaves and millimeter waves; antennas; wave propagation and scattering; target identification and inverse scattering; Radar imaging; underwater acoustics.

Electrical energy systems: Power electronics, power processing systems, circuits & systems theory; photovoltaic systems; electrical machines and electronic drives.