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.


**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 election 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.