

I. Nano- and Micro-Electromechanical Systems, Nano- and Microsystems, Nanoarchitectronics

- Synthesis, design, analysis, and optimization of novel NEMS, MEMS, nano- and microsystems
- Intelligent large-scale Microsystems
- Motion micro- and nanodevices, smart micro- and nanostructures
- Biomimetics and bionanoarchitectronics with application to nano- and microsystems
- Nanocomputers and their components: Reconfigurable defect-tolerant nanocomputer architectures and three-dimensional nanoarchitectronics
- Fabrication, applications, and implementation of NEMS, MEMS, nano- and Microsystems

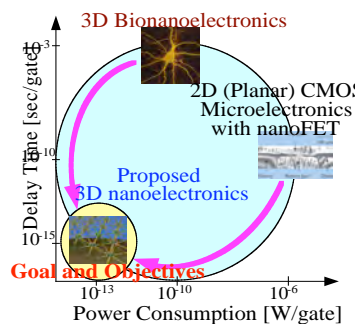
II. Systems Theory, Systems Intelligence, Informatics, and Optimization

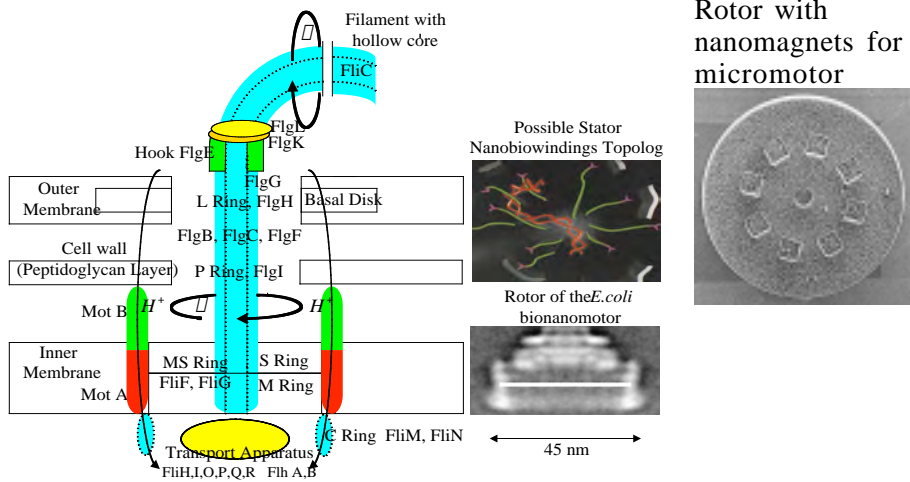
- Systems and information theories with applications
- Design, diagnostics, analysis, optimization, and modeling of complex large-scale systems
- Control and analysis of nano- and microsystems, NEMS, MEMS and electromechanical systems

Future Strategic Research Emphasis and Milestones: Nanotechnology, Advance theories and frontiers of micro- and nanosystems, Nanocomputers, NanoICs and Nanoelectronics, Intelligent and expert hierarchical distributed large-scale nano- and microsystems

Research Milestones:

1. **Three-Dimensional Nanoelectronics, NanoICs and Nanoarchitectronics for NanoICs and Nanocomputers** (three-dimensional multi-layered high-density nanoIC assemblies with crossbar switching, logic and memory arrays became a reality. Figures illustrate: Moor's first law, evolution of nanoelectronics and nanoICs, three-dimensional nanoICs and doped fullerenes structure);
2. **Nano- and Micromachines and Motion Nanodevices: Approaching Reality** (fundamental physics and biomimetics: nanomachines exist in nature in enormous variety and sophistication. Figure illustrates *E.coli* nanobiomotor, nanobiomotor – coupling – flagella complex with different proteins and rings, rotor image, micromotor, and possible applications).





Application-Specific Research: underwater and flight microvehicles with MEMS

