MTL FACULTY RESEARCH AREAS AND SPECIAL INTERESTS

A.I. Akinwande
Display devices: Flexible large area electronics, organic and inorganic thin film transistors, field emission displays; High Aspect Ratio Gated Microstructure Arrays: field emission devices, electrospray thrusters and gas analyzers.

office: 39-553b
phone: 617-258-7974
email: akinwand@mit.edu

D.A. Antoniadis
Fabrication, measurement, and modeling of silicon- and germanium-based devices for high-speed and low-power integrated circuits.

office: 39-427b
phone: 617-253-4693
email: daa@mtl.mit.edu

M.A. Baldo
Molecular electronics, integration of biological materials and conventional electronics, electrical and exciton transport in organic materials, energy transfer, metal-organic contacts, nanomechanical organic transistors.

office: 13-3053
phone: 617-452-5132
email: baldo@mit.edu

G. Barbastathis
3D optical systems. Spatial 3D and spectral imaging with a single camera and without scanning. MEMS for integrated optics. Nanostructured Origami(TM) 3D fabrication and assembly process for nanomanufacturing.

office: 3-461c
phone: 617-253-1960
email: gbarb@mit.edu

K.K. Berggren
Superconductive nanodevice physics and applications. Nanofabrication methods, processes, and tool-development for application to superconductive quantum computing, photodetection, and reconfigurable devices.

office: 36-219
phone: 617-324-0272
email: berggren@mit.edu

D.S. Boning
Characterization and modeling of variation in semiconductor and MEMS manufacturing, with an emphasis on chemical mechanical polishing (CMP), plasma etch, and advanced interconnect processes. Understanding the impact of process and device variation on circuit performance, and design for manufacturability.

office: 38-435
phone: 617-253-0931
email: boning@mtl.mit.edu

V. Bulovic
Physical properties of organic and organic/inorganic nanocrystal composite thin films and structures, and development of novel optoelectronic nanostructured devices.

office: 13-3138
phone: 617-253-7012
email: bulovic@mit.edu

A.P. Chandrakasan
Design of digital integrated circuits and systems with an emphasis on the energy-efficient implementation of microsensor networks and ultra-wideband systems. Circuits techniques for deep sub-micron technologies and 3D integration.

office: 38-107
phone: 617-258-7619
email: anantha@mtl.mit.edu

G. Chen
Heat transfer and energy conversion at micro- and nanometer scales, including microelectronics, photonics, thermoelectrics, thermionics, and thermophotovoltaics; solid-state micro- energy conversion devices and materials, radiation transport and electromagnetic metamaterials; micro and nanofabrication.

office: 3-158
phone: 617-253-0006
email: gchen2@mit.edu

M.J. Cima
Formation of methods for complex macro and micro devices, using three-dimensional printing. Development of chemically derived epitaxial oxide films for HTSC coated conductors. Implantable MEMS devices for drug delivery and biomedical applications. Devices and processes for high throughput combinatorial screening of complex materials formulations.

office: 12-011
phone: 617-253-6877
email: mjcima@mit.edu

M.L. Culpepper
Macro-, micro-, and nano-scale machines for precision positioning, assembly, and manipulation. Basic and applied research on physical principles, modeling approaches, synthesis/simulation tools, and manufacturing practices. Design and integration of mechanical systems with multi-scale (macro, micro, nano) components. Hands-on education applied to the mechanical design of macro-, micro-, and nano-scale devices.

office: 3-449b
phone: 617-452-2395
email: culpepper@mit.edu

L. Daniel
Model order reduction, parasitic extraction, electromagnetic interference, mixed-signal and analog RF circuit modeling and synthesis, power electronics, MEMs design and modeling.

office: 36-849
phone: 617-253-2631
email: luca@mit.edu

J.L. Dawson
Analog system theory and its applications. RF transceivers, power amplifier linearization, high speed data conversion, problems in nonlinear control.

office: 39-527a
phone: 617-324-5281
email: jldawson@mtl.mit.edu

J.A. del Alamo
Microelectronics device technologies for gigahertz and gigabit-per-second communication systems: physics, modeling, technology and design. Technology and pedagogy of online laboratories for engineering education.

office: 39-415a
phone: 617-253-4764
email: alamo@mit.edu

C.F. Dewey, Jr.
Biological engineering with emphasis on the cardiovascular system and the cells, tissues, and organs relating thereto. Theoretical and experimental investigation of cell mechanics and cell dynamics. Development of novel microdevices for manipulating cells in culture.

office: 3-254
phone: 617-253-2235
email: cfdewey@mit.edu

C.G. Fonstad, Jr.
Compound semiconductor heterostructure devices and physics. Optoelectronics: laser diodes, photodiodes, quantum effect devices, and OEICs. Monolithic heterogeneous integration. Microscale thermophotovoltaics.

office: 13-3050
phone: 617-253-4634
email: fonstad@mit.edu

J. Han
Nanofluidic / Microfluidic technologies for advanced biomolecule analysis and sample preparation: novel nanofluidic phenomena, nanofluidic biomolecule separation and pre-concentration, molecular transport in nano-confined space.

office: 36-841
phone: 617-253-2290
email: jyhan@mit.edu

J.L. Hoyt
Novel processes, materials, and device concepts for silicon technology. Device physics and epitaxial growth of silicon-based heterostructures and nanostructures. Strained Si MOSFETs, heterojunction bipolar transistors, CMOS front-end processing, and silicon-germanium photodetectors.

office: 39-427A
phone: 617-452-2873
email: jlhoyt@mtl.mit.edu

Q. Hu
Physics and applications of millimeter-wave, terahertz, and infrared devices.

office: 36-465
phone: 617-253-1573
email: qhu@mit.edu

K.F. Jensen
Design, fabrication, testing, and integration of microsystems for chemical and biological discovery, synthesis, and processing. Microsystems for energy applications, including microcombustors, micro-reformers, thermophotovoltaic, and solid oxide fuel cells. Chemical kinetics and transport phenomena related to processing of materials for biomedical, electronic, and optical applications.

office: 66-566
phone: 617-253-4589
email: kfjensen@mit.edu

MTL FACULTY RESEARCH AREAS AND SPECIAL INTERESTS continued

S.G. Kim
Nanomanufacturing, tunable optical MEMS devices, self-cleaning RF switches, piezoelectric energy harvesting, and carbon nanotube transplanting and assembly.

office: 1-310
phone: 617-452-2472
email: sangkim@mit.edu

L.A. Kolodziejski
Research in integrated photonic devices and optoelectronic components. Design and fabrication of photonic crystals and III-V semiconductor devices. Electronic materials growth and characterization.

office: 36-287
phone: 617-253-6868
email: leskolo@mit.edu

J. Kong
Synthesis and characterization of carbon nanotubes. Applications of nanotube electrical devices.

office: 13-3065
phone: 617-324-4068
email: jingkong@mit.edu

J.H. Lang
Analysis, design, and control of electromechanical systems. Application to traditional electromagnetic actuators, micron scale actuators and sensors, and flexible structures.

office: 10-176
phone: 617-253-4687
email: lang@mit.edu

H.-S. Lee
Analog and mixed-signal integrated circuits in CMOS Technologies. Subsystems and circuits including analog-to-digital and digital-to-analog converters, operational amplifiers, and signal processing circuits. Applications include communication systems, portable electronics, and multimedia.

office: 39-553
phone: 617-253-5174
email: hslee@mtl.mit.edu

C. Livermore
MicroElectroMechanical Systems (MEMS). Design and fabrication of high power microsystems. Self-assembly techniques for nano- and micro-scale manufacturing.

office: 3-449C
phone: 617-253-6761
email: livermor@mit.edu

S.R. Manalis
Microdevices for biomolecular detection and their application to systems biology and medicine.

office: E15-422
phone: 617-253-5039
email: scottm@media.mit.edu

I. Masaki
VLSI architecture. Emphasis on interrelationship among applications, systems, algorithms, and chip architectures. Major application fields include intelligent transportation systems, video, and multimedia.

office: 38-107
phone: 617-253-8532
email: Imasaki@aol.com

T.P. Orlando
Superconductivity. Quantum computation with superconductors. Nonlinear dynamics of arrays of Joesephson junctions.

office: 13-3006
phone: 617-253-5888
email: orlando@mit.edu

M.H. Perrott
Circuit and architecture design for high speed mixed-signal circuits such as phase-locked loops and A/D converters: circuit topologies, architectural approaches, design methodologies, modeling, and simulation techniques. Communication system simulation software and tutorials for engineering education.

office: 38-344b
phone: 617-452-2889
email: perrott@mit.edu

R. Reif
Microelectronics and technologies for three-dimensional integrated circuits: design, modeling, and technology development. Carbon nanotubes technology development for microelectronic applications

office: 3-208
phone: 617-253-4500
email: reif@mit.edu

C.A. Ross
Fabrication, properties, and applications of magnetic films and nanostructures. Self assembly.

office: 13-4005
phone: 617-258-0223
email: caross@mit.edu

R. Sarpeshkar
Bioelectronics: bio-inspired and biomedical electronics.

office: 38-294
phone: 617-258-6599
email: rahuls@mit.edu

M.L. Schattenburg
Advanced lithography, including X-ray, electron-beam, ion-beam, and optical. Nanotechnology and nanofabrication. Precision engineering and nano-accuracy dimensional metrology. Advanced interference lithography technology for super-accurate patterning of general grating and grid patterns. Micro and nanometer fabrication technology applied to advanced astronomical and laboratory instrumentation. Silicon micromachined structures applied to high-precision optical assembly. X-ray optics and instrumentation.

office: 37-487
phone: 617-253-3180
email: marks@space.mit.edu

M.A. Schmidt
MicroElectroMechanical Systems (MEMS) Microfabrication technologies for integrated circuits, sensors, and actuators; design of micromechanical sensor and actuator systems; mechanical properties of microelectronic materials, with emphasis on silicon wafer bonding technology; integrated microsensors; and microfluidic devices. Novel applications of MEMS and nanotechnologies to a variety of fields, including miniature gas turbines, miniature chemical reactors, microswitches, biological applications and sensors monolithically integrated with electronics.

office: 39-521
phone: 617-253-7817
email: schmidt@mtl.mit.edu

A.H. Slocum
Precision machines and mechanisms from macro to nanoscale.

office: 3-445
phone: 617-253-0012
email: slocum@mit.edu

C.G. Sodini
Design of technology intensive microsystems emphasizing integrated circuit design at the device level, including low power wireless cameras and displays, high data rate wireless LANs, and low data rate wireless sensor systems.

office: 39-527b
phone: 617-253-4938
email: sodini@mit.edu

Z.S. Spakovszky
Micro-scale gas bearing dynamics, aero-acoustics, internal flows in turbomachinery, compressor aerodynamics and stability, and dynamic system modeling of aircraft gas turbine engines.

office: 31-268
phone: 617-253-2196
email: zolti@mit.edu

V. Stojanovic
Modeling of noise and dynamics in circuits and systems. Application of convex optimization to digital communications, analog and VLSI circuits. Communications and signal processing architectures. High-speed electrical and optical links, on-chip signaling, clock generation and distribution. High-speed digital and mixed-signal IC design.

office: 38-260
phone: 617-324-4913
email: vlada@mit.edu

N.P. Suh
Axiomatic Design Theory, Complexity Theory, Tribology. Application of Axiomatic Design to complex systems. Reduction/elimination of functional complexity by intelligent design.

office: 35-235
phone: 617-253-2225
email: npsuh@mit.edu

E.L. Thomas
Polymer physics and engineering, optical properties of block copolymers and liquid crystalline polymers, effect of processing on polymer microstructure and mechanical properties, application of electron, X-ray diffraction to solid state and materials characterization problems.

office: NE47-415
phone: 617-253-5931
email: elt@mit.edu

T. Thorsen
Microfluidics and applications pertaining to systems biology and biological systems: medical diagnostic devices, artificial organs, and high-throughput molecular screening systems.

office: 3-248
phone: 617-253-9379
email: thorsen@mit.edu

MTL FACULTY RESEARCH AREAS AND SPECIAL INTERESTS continued

J. Voldman

Microtechnology for basic and applied cell biology; Electrostatics at the microscale, especially dielectrophoresis.

office: 36-824
phone: 617-253-2094
email: voldman@mit.edu

B.L. Wardle

MEMS Power Devices and Energy Harvesting; Nanocomposites; Advanced Composite Materials and Systems; Structural Health Monitoring (SHM); Fracture, Fatigue, and Damage Mechanics; Durability Modeling/Testing; Finite-Element Modeling; Structural Response and Testing; Buckling Mechanics; Project Design and Management; Business Strategy and Growth; Cost Modeling.

office: 33-314
phone: 617-252-1539
email: wardle@mit.edu

J. White

Using engineering design applications to drive research in simulation and optimization algorithms and software. Focus on fundamentals of nonlinear and parameterized model-order reduction, matrix-implicit methods, and fast techniques for solving integral equations. Applications under investigation include design tools for integrated circuit interconnect, IC inspection, bio-micromachined devices, aircraft, nanophotonics, biomolecule design, and systems biology.

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