Graduate Studies

Department of Engineering Physics

Research area highlights

(more details can be found at http://engphys.mcmaster.ca/research/research.htm)

Engineering Physics is about understanding and designing with microscopic objects, whose behaviour is based on advanced concepts such as quantum mechanics, electromagnetism, nuclear transitions and electronic band gaps.

Faculty and students in Engineering Physics study diverse technologies used in electronics, optical and wireless communications, sensors, lasers, solar energy and nuclear power systems.

McMaster faculty members and graduate students work with colleagues across Canada on innovations in photonics, or the science of using light in telecommunications, information technology, environmental monitoring and biomedical sciences.

Dr. J. Bradley bradljd@mcmaster.ca

Research focuses on novel active photonic materials, micro/nanostructures, and devices, such as on-chip lasers, with applications in microsystems for communications, life sciences and sensing.

Dr. A. Buijs buijsa@mcmaster.ca

The physics of nuclear reactor cores, in particular of heavy-water moderated pressure-tube reactors (CANDU); physics of advanced reactor designs and fuel cycles; experimentation at the McMaster Nuclear Reactor; numerical methods in reactor analysis.

Dr. D. T. Cassidy cassidy@mcmaster.ca

Designs, fabricates and characterizes III-V semiconductor-based diode lasers and LEDs for operation over a broad spectral range, and analysis of materials by degree of polarization of luminescence.

Dr. Q. Fang qfang@mcmaster.ca

General area of biophotonics: specific interests in minimally-invasive optical biopsy instruments for early cancer diagnosis and in-vivo tumour margin detection; implantable diagnostic micro-/nano-devices; and advanced microscopic imaging.

Dr. H. K. Haugen haugenh@mcmaster.ca

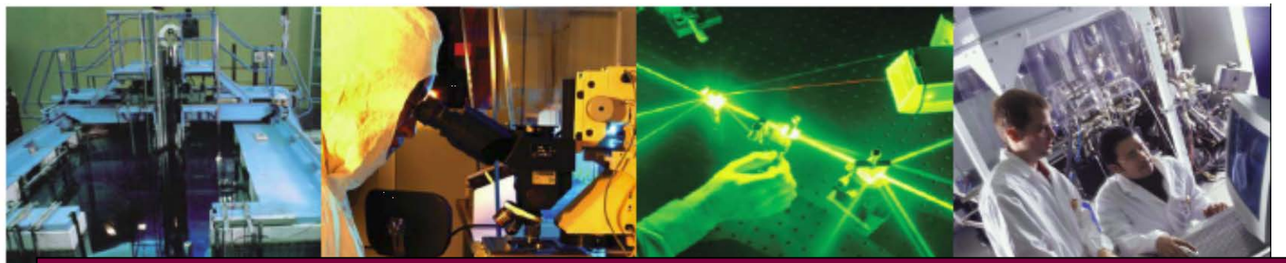
Materials ablation and micro-processing using femtosecond laser pulses. Physics and applications of ultrashort-pulse diode laser sources and doped fiber amplifiers. Generation of THz optical pulses. Solid state studies using THz beams. Ultrafast pump-probe investigations of materials.

Dr. A. H. Kitai kitaia@mcmaster.ca

Studies a range of luminescent materials and devices for improving optical display technologies; examples include relationship between point defects and luminescence, flexible light emitters and intense full color displays.

Dr. R. N. Kleiman kleiman@mcmaster.ca

MicroElectroMechanical Systems (MEMS) for sensing, actuation and microrobotics; Integrated microfluidics and photonics for Lab-on-a-chip systems; Characterization of photovoltaic materials/devices and development of advanced device designs for high efficiency solar cells.



Dr. A. Knights aknight@mcmaster.ca

Investigates silicon technology for application to optoelectronics. In particular, the interaction of light with silicon to develop chips combining electrical and optical functionality.

Dr. R. R. LaPierre lapierr@mcmaster.ca

Research focuses on controlling and manipulating the structure of III-V semiconductor surfaces on the atomic scale for nano-structure, biomedical and optoelectronic device applications.

Dr. J. C. Luxat luxatj@mcmaster.ca

Research interests include nuclear safety analysis methodology, experimental studies and theoretical modeling in nuclear safety thermalhydraulics.

Dr. P. Mascher mascher@mcmaster.ca

Main research areas: Plasma enhanced chemical vapor deposition (PECVD) of thin films and nanostructures; silicon photonics; optical coatings; II-VI semiconductor technology; positron annihilation spectroscopy.

Dr. D. Novog novog@mcmaster.ca

Studies nuclear reactor safety and analysis of nuclear power plant safety systems, experimental thermalhydraulics, and next generation fission/fusion power plant cooling.

Dr. S. Nagasaki nagasas@mcmaster.ca

Safety and security of used nuclear fuel and high-level radioactive waste management, Actinide and radionuclide chemistry, and ethics of nuclear fuel cycle engineering in 21st century's society.

Dr. J. S. Preston prestonj@mcmaster.ca

Uses laser-based techniques to produce novel materials by pulsed laser ablation and studies their electronic and optical properties- a particular area of interest is the use of ultrashort pulses to probe transient electronic states.

Dr. L. Soleymani soleyml@mcmaster.ca

General areas of biosensing and nanofabrication: specific interests in developing in-vivo and in-vitro diagnostic platforms for early disease detection, modeling nano- and micro-scale sensors, fabricating hierarchical and hybrid materials using chemical deposition methods with nanometer resolution, and studying materials growth using in-situ techniques.

Dr. A. Turak turaka@mcmaster.ca

Interfacial chemical and structural engineering for improved device performance in organic optoelectronic devices (opvs, oleds), and order-disorder transitions in granular media. Her recent interests are in producing high stability organic/inorganic interfaces for organic solar cells.

Dr. C. Q. Xu cqxu@mcmaster.ca

Optoelectronics, non-linear optics, photonic devices based on dielectric materials, semiconductors and fibers for telecommunication and biomedical applications, passive and active optical devices, optical sensors.