“WELCOME TO THE FACULTY OF APPLIED SCIENCES, WHERE WE ARE COMMITTED TO EXCELLENCE IN TEACHING, RESEARCH AND INNOVATION. THIS DIRECTORY WILL ASSIST YOU IN UNDERSTANDING THE RESEARCH EXPERTISE OF OUR FACULTY MEMBERS. WE ARE KEEN TO ENGAGE INDUSTRY AND CREATE IMPORTANT PARTNERSHIPS TO PROMOTE INNOVATION, COMMERCIALIZE RESEARCH AND PROVIDE OPPORTUNITIES FOR OUR STUDENTS TO GAIN VALUABLE SKILLS AND JOBS.”

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Dean and Professor
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• Telehealth issues

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• Randomized algorithms
• Analysis of dynamic processes
• Load balancing and resource allocation
• Communication in distribution systems

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• VLSI
• Computer graphics
• Motion planning
• Operations research

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- Computational complexity
- Combinatorics
- Clone theory and universal algebra

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- SIMD and multicore parallelism
- Programming language technology
- Software systems
- Open software technology

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- Blending complex neural systems with clinical work that uses functional imaging to improve the treatment of brain diseases and disorders.

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- Belief change
- Reasoning about action and change
- Nonmonotonic reasoning
- Preference handling

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- Recommender systems
- Opinion mining and information extraction
- Biological network analysis
- Next-gen sequencing

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Research interests
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- Multicore processors: software/hardware interaction
- Improving efficiency of software on multicore systems via better runtime management algorithms and new programming techniques
- Exploring synergistic hardware/software designs of multicore systems

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- Colour constancy
- Colour in medicine
- Colour perception

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• Industrial applications of formal methods
• Security informatics and intelligent systems
• Mathematical and computational modeling

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• Parallel/distributed computing
• Algorithms and computation
• Machine learning
• Computational biology

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Research interests
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• Peer-to-peer systems
• Internet protocols
• Cloud and high-performance computing

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Research interests
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• Complexity of algorithms
• Combinatorialics of networks

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Research interests
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- Pseudorandomness and derandomization
- Circuit lower bounds
- Logic and complexity theory

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Research interests
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Research interests
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- Designing approximation algorithms based on linear programming

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Research interests
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• Multimedia
• Artificial intelligence

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Research interests
• Cloud computing
• Internet architecture and protocols
• Multimedia (video) streaming
• Wireless sensor and ad hoc networks
• Wireless mesh networks, overlay networks and peer to peer networks

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Research interests
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• Computer graphics

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• Machine learning
• Video analysis
• Human activity recognition
• Object recognition

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Research interests
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- Data warehousing and online analytic processing (OLAP)
- Database systems
- Bioinformatics

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Research interests
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- Communication algorithms
- Distributed computation
- Multimedia networking

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Research interests
- How computers can be used to process human language either to make it easier for human beings to interact with computers, or to make it easier for human beings to interact with each other
- Intelligent systems and their applications

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Research interests
• High throughput sequencing applications
• Algorithms for genome sequence analysis
• RNA structure and interaction prediction
• Topological properties of biomolecular networks
• QSAR analysis

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• Computational game theory
• Computational logic

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Research interests
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- Compiler construction
- Program transformations
- Theoretical computer networks
- Computational geometry

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- Multicore memory systems
- Hardware/software interface for improving programming
- Synchronization

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Research interests
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- Concurrency and parallelism
- Program analysis and transformation

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Research interests
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• Creating tools and techniques for designing and simulating populations of robots

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Research interests
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• Mining biological data
• Graph and network data
• Data privacy

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- Evolutionary Computation
- Computational Intelligence and Machine Learning

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- Shape modeling and analysis

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- Multimedia communications
- Computational biology

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- Computational anatomy
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- Shape analysis
- Statistical atlas of anatomical shapes and parallel computing applications to medical image computing

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- Underwater environmental surveys and mapping
- Underwater ambient noise, ship noise reduction and measurement

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Research interests
- Building of Large Area Restructurable Silicon Systems (LARSS)
- Studying techniques for building large area systems
- Design of new classes wafer scale type devices
- Development of new transducers
- Creating new microfabrication/micromachining techniques with lasers
- Application of embedded microprocessor systems

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Research interests
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- Blending complex neural systems with clinical work that uses functional imaging to improve the treatment of brain diseases and disorders.

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Research interests
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- Biomedical microdevices and instrumentation
- High-aspect ratio microfabrication
- Micro total analysis systems
- Polymer microfabrication, magnetic and conductive nanocomposite polymers
- Cell trapping, biosensors, micro q-PCR

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Research interests
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- Motion planning
- Manipulation and geometric reasoning
- 3-D vision for robotic tasks

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- Modulation and detection techniques
- Cooperative transmission
- Space-time coding
- Non-coherent sequence detection
- Channel estimation

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- Buoyancy-based micromachined accelerometers

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CANADA RESEARCH CHAIR, TIER I, WIRELESS SENSOR NETWORKS

Research interests
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• Physiological, behavioral and environmental monitoring
• Design and test of micro-devices, micro-systems and micro-networks, fault-tolerance

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Research interests
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Research interests
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• Three-dimensional MEMS
• Nanogap Pirani pressure sensor
• Micromachined accelerometer based on free convection heat transfer

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Research interests
- Image/video compression
- Multimedia communications
- Information theory
- Machine learning

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CARLO MENON, PH.D., PENG.
ASSOCIATE PROFESSOR, SCHOOL OF MECHATRONIC SYSTEMS ENGINEERING
MICHAEL SMITH FOUNDATION SCHOLAR

Research interests
- Robotics, mechatronics and dynamics
- MEMS, smart materials and structures
- Artificial muscles and design of mechanisms

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ASH M. PARAMESWARAN, PH.D., PENG.
PROFESSOR, SCHOOL OF ENGINEERING SCIENCE
JL WIGHTON PROFESSOR, EXPERIMENTAL LAB STUDIES

Research interests
- Silicon micromachining
- MEMS
- Microfluidics, microphotronics,
  Biomedical microdevices, pathogen detection

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SHAHRAM PAYANDEH, PH.D., PENG.
PROFESSOR, SCHOOL OF ENGINEERING SCIENCE

Research interests
- Robotics, geometrical robotics
- Networked dynamical systems
- Multi-view tracking
- Haptic devices and haptic rendering
- Multi-modal interaction in serious games
- Medical robotics

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NIMAL RAJAPAKSE, PH.D., PENG.
PROFESSOR, SCHOOL OF ENGINEERING SCIENCE
DEAN, FACULTY OF APPLIED SCIENCES

Research interests
- Nanomechanics and multi-scale modeling
- Adaptive (smart) materials and structures
- Fracture mechanics
- Geomechanics

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ANDREW RAWICZ, PH.D., PENG.
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JL WIGHTON PROFESSOR, ENGINEERING DEVELOPMENT

Research interests
- Reliability physics and engineering, particularly strongly correlated functions
- Optical device engineering
- Biomedical engineering
- Medical diagnostic devices
- Rehabilitation and assistive device engineering, independent living systems

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CANADA RESEARCH CHAIR, TIER II

Research interests
• Orthopaedic biomechanics
• Injury prevention
• Rehabilitation engineering
• Balance and postural stability
• Neurophysiology

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PARVANEH SAEEDI, PH.D., P.ENG.
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Research interests
• Computer vision
• Machine learning in computer vision
• Motion/trajectory tracking
• Object recognition using vision
• Structure from motion
• Automatic 3D map generation

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MARINKO V. SARUNIC, PH.D., P.ENG.
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Research interests
• Biomedical imaging, optical coherence tomography (OCT)
• Microscopy, low-coherence interferometry
• Micro-opto-electro-mechanical systems
• BioMEMS

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LESLEY SHANNON, PH.D., P.ENG.
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Research interests
- Computing system design, including reconfigurable computing and application-specific architectures, design methodologies, and programming models
- Operating Systems for asymmetric/heterogeneous multicore systems
- Scalable FPGA Computer Aided Design Tools
- Reconfigurable Digital Microfluidics

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SHAWN STAPLETON, PH.D., P.ENG.
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ASSOCIATE DIRECTOR, SCHOOL OF ENGINEERING SCIENCE

Research interests
- Power amplifier linearization using digital signal processing
- Integrated RF/DSP Applications
- Radio frequency integrated circuits

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MAREK SYrzycki, PH.D., P.ENG.
PROFESSOR, SCHOOL OF ENGINEERING SCIENCE

Research interests
- Analog and mixed-signal CMOS Integrated Circuits
- Integrated sensors and transducers
- Design for Manufacturability (DFM) of CMOS ICs
- Semiconductor radiation detectors

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LJILJANA TRAJKOVIC, PH.D., P.ENG.
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Research interests
• Communication networks
• Nonlinear circuits and systems

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RODNEY VAUGHAN, PH.D., P.ENG.
PROFESSOR, SCHOOL OF ENGINEERING SCIENCE
SIERRA WIRELESS PROFESSORSHIP IN MOBILE COMMUNICATION

Research interests
• Signal processing theory
• Antenna theory and design
• Wave propagation measurement and modeling

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SIAMAK ARZANPOUR, PH.D., P.ENG.
ASSOCIATE PROFESSOR, SCHOOL OF MECHATRONIC SYSTEMS ENGINEERING

Research interests
- Vibration control, nonlinear systems
- Smart materials and structures
- Energy harvesting, vehicle efficiency
- Dental haptics, haptic devices and interfaces

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MAJID BAHRAMI, PH.D., P.ENG.
ASSOCIATE PROFESSOR, SCHOOL OF MECHATRONIC SYSTEMS ENGINEERING
CANADA RESEARCH CHAIR, TIER II

Research interests
- Sustainable energy storage and management
- Thermal management of hybrid electric vehicles and emerging batteries
- Transport phenomena in microstructured porous media application in PEM fuel cell and refrigeration technologies
- Microelectronics cooling
- Heat transfer and fluid flow in microchannels

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BEHRAAD BAHREYNI, PH.D., P.ENG.
ASSISTANT PROFESSOR, SCHOOL OF MECHATRONIC SYSTEMS ENGINEERING

Research interests
- Microelectromechanical systems (MEMS)
- Micro- and nano-sensors
- Micro- and nano-fabrication technologies
- Sensor signal processing
- Analog circuit design

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FARID GOLNARAGHI, PH.D., P.ENG.
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BURNABY MOUNTAIN CHAIR

Research interests
- Application of Intelligent Sensor Systems to: Biomedical Systems, Automotive Systems, Condition Monitoring and Diagnostics
- Smart Materials and Actuators
- Vibration and control

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WOO SOO KIM, PH.D., P.ENG.
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Research interests
- Nano materials and novel printing research for printed electronics
- Transparent photovoltaic research
- Ultra-sensitive pressure sensor for artificial skin
- 3-D plasmonic sensor applications
- Self-assembly of functional polymers

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ERIK KJEANG, PH.D., P.ENG.
ASSISTANT PROFESSOR, SCHOOL OF MECHATRONIC SYSTEMS ENGINEERING

Research interests
- Sustainable energy systems
- Polymer electrolyte membrane (PEM) fuel cell technology
- Microfluidic and nanofluidic energy conversion devices
- Innovative fuel cell architectures and materials
- Modeling and simulation of transport phenomena in porous media

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MEHRDAD MOALLEM, PH.D., P.ENG.
PROFESSOR, SCHOOL OF MECHATRONIC SYSTEMS ENGINEERING

Research interests
• Control and power electronics for sustainable energy systems: photovoltaic energy conversion, wave energy conversion, building energy efficiency, energy harvesting
• Control of mechatronic systems: robotics, vibration/flexure control, smart transducers (PZT, SMA)
• Real-time and embedded computer control

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EDWARD JUNG WOOK PARK, PH.D., P.ENG.
ASSOCIATE PROFESSOR, SCHOOL OF MECHATRONIC SYSTEMS ENGINEERING
ASSOCIATE DEAN, FACULTY OF APPLIED SCIENCES

Research interests
• Mechatronics
• Biomechatronics
• Biomedical technologies
• Cell and tissue engineering
• Biomedical technologies

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AHMAD RAD, PH.D., P.ENG.
PROFESSOR, SCHOOL OF MECHATRONIC SYSTEMS ENGINEERING
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Research interests
• Intelligent and Autonomous Control
• Soft computing
• Applications of system modeling to process control
• Identification of time delay systems

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CAROLYN SPARREY, PH.D., PENG.
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Research interests
• Mechanical characterization of neurological tissues
• Phenomenological constitutive models of tissues
• Patient specific technologies
• Modeling and simulation of human injury and disease
• Accident reconstruction and injury analysis
• Design and evaluation of injury prevention devices

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KRISHNA VIJAYARAGHAVAN, PH.D., PENG.
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Research interests
• Green (Renewable) Energy Technology
• Energy Harvesting, Battery-less Sensing
• Flow Modelling, Nonlinear Control, Design

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GARY WANG, PH.D., PENG.
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Research interests
• Design optimization
• Hybrid electrical vehicles
• Automotive systems and production
• Design theories and methodologies
• Lean health care

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JIACHENG (JASON) WANG, PH.D.
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Research interests
- Power Converter Topologies, Modulation, and Control
- Industrial Drives
- Alternative Energy Conversion and Integration
- Plug-in Electric Vehicle Charging

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