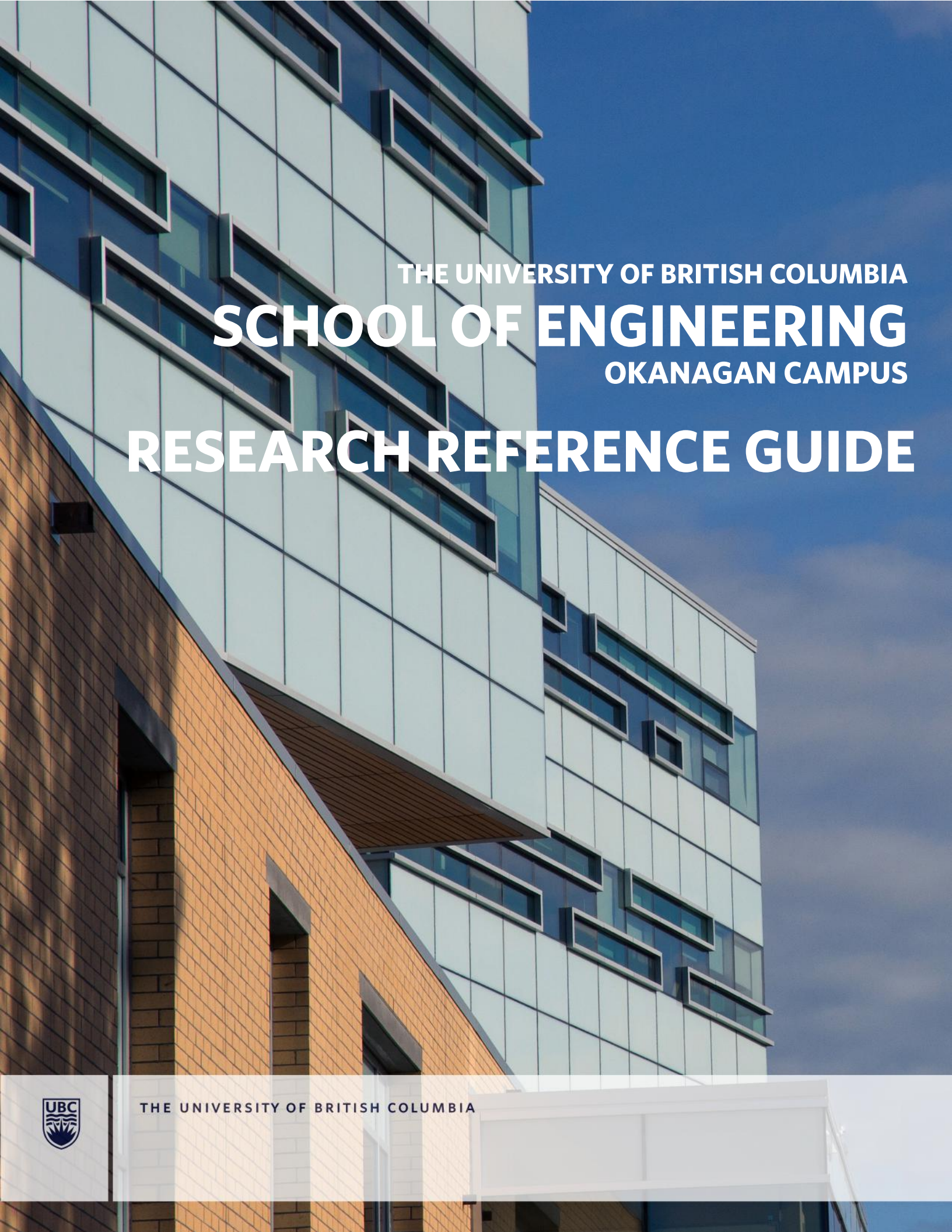


THE UNIVERSITY OF BRITISH COLUMBIA

SCHOOL OF ENGINEERING

OKANAGAN CAMPUS

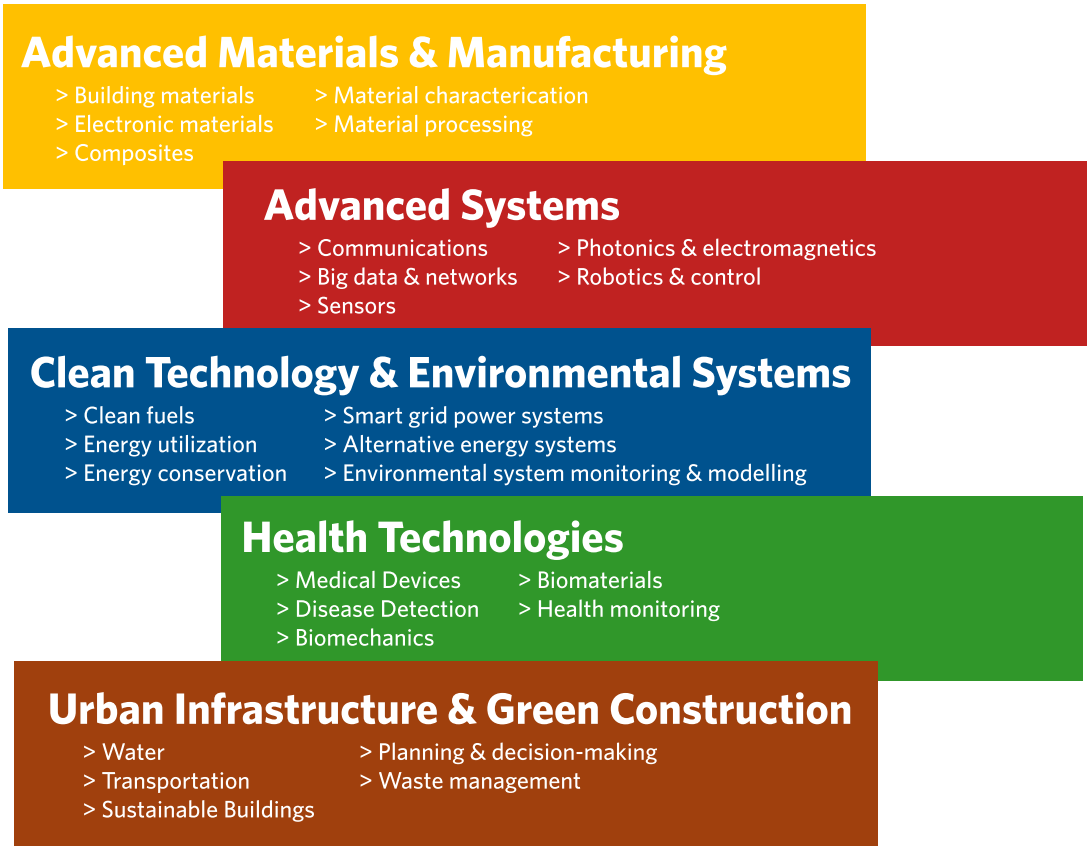
RESEARCH REFERENCE GUIDE

THE UNIVERSITY OF BRITISH COLUMBIA

World-class researchers power industry partnerships at the School of Engineering

Research is the cornerstone of success in business as it is for a successful university. At the School of Engineering on the Okanagan campus of the University of British Columbia, we are motivated by innovation. Our research brings impactful change for our community, our partners and our World.

For over a decade, researchers at the School of Engineering on UBC's Okanagan campus have been building partnerships to innovate in areas as varied as fuel-cell technology, composite materials, wearable devices, wastewater recovery, microfluidics, industry 4.0, intelligent systems, smart materials, transportation and nano-technologies. World-class faculty and facilities enable us to support many stakeholders in the community including students, industry, not-for-profit organizations, and the general public. Our research has been concentrated into five key research clusters:



Researchers on the Okanagan campus of UBC are developing the building blocks for light-speed computing that could revolutionize the notion of what computers can do. Through the latest innovations, our labs are developing biomedical engineering solutions that are changing health care. Our civil engineering research teams are helping communities make better decisions about how and when to replace infrastructure while developing new and innovative materials for their replacement.

UBC has invested millions in state-of-the-art laboratory equipment, and our faculty have been awarded tens of millions for research infrastructure and operation through highly competitive national grants. Our research collaborations with industry have received Collaborative Research and Development grants from the Natural Sciences and Engineering Research Council of Canada (NSERC) that have enabled research, training and technology transfer.

The School of Engineering is an incubator of innovation and research. The School hosts numerous institutes, centres and nodes that stimulate discoveries through collaboration both inter-disciplinary and cross campus. The Materials and Manufacturing Research Institute (MMRI), based on the Okanagan campus, brings together researchers from all disciplines to conduct high-quality, high-impact research at the interface of basic and applied sciences. MMRI hosts the Composite Research Network (CRN) Okanagan node. The CRN boasts over 100 industry partners and experts who investigate develop solutions and address the challenges within the complex world of composites.

The Okanagan campus is also home to a Clean Energy Research Centre node where researchers are uncovering safe, widespread and equitable access to sustainable energy. Together with the Cluster of Research Excellence in Green Infrastructure, the two groups have helped to establish the School of Engineering as a hub for sustainability research in power generation and construction. In collaboration with Okanagan College, UBC has established the Green Construction and Training Partnership that will enhance training and research opportunities across the region.

Part of the Faculty of Applied Science, the School of Engineering at UBC's Okanagan campus is building upon over 100 years of engineering teaching and research excellence at UBC. The School has full accreditation in all four programs: Civil, Electrical, Manufacturing and Mechanical Engineering.

Since its inception in 2005, the School of Engineering has seen momentous growth in research and teaching infrastructure, as well as in its student body that has grown to over 1700 undergraduate and graduate students.

The School's growth — and growing success in research endeavours — would not have been possible without the support of industry. We welcome new collaborations and inquiries about research partnerships.

Rehan Sadiq, Associate Dean
School of Engineering
Faculty of Applied Science
Okanagan campus
EME4242 - 1139 Alumni Avenue

ADVANCED MANUFACTURING & MATERIALS

Building materials, composites, electronic materials, material characterization and material processing

Mohammad Arjmand - Assistant Professor

Processing, molding and characterization of multifunctional polymeric nanocompositeswith a variety of properties including electrical, gas sensing, thermal, mechanical, optical and thermoelectric.

Lukas Bichler - Associate Professor

Development of new materials and processing methods; recycling of manufacturing by-products.

Kevin Golovin - Assistant Professor

Advanced manufacturing related to the aerospace industry including coatings, 3D printing and fibre composites.

Abbas Milani - Professor

Advanced modeling, simulation, and multi-criteria design optimization of composite materials, structures and manufacturing processes.

Homayoun Najjaran - Professor

Advanced manufacturing, industry 4.0, mechatronics and control systems with applications in robotics, industrial automation and unmanned systems.

Dimitry Sediako - Assistant Professor

Advanced modeling, simulation, and multi-criteria design optimization of composite materials, structures and manufacturing processes.

ADVANCED SYSTEMS

Big data and networks, communication networking, photonics and electromagnetics, robotics and controls and sensors.

Anas Chaaban - Assistant Professor

Relaying for interference management specifically network information theory. Researching optical wireless communications, communication theory, relay networks and coding theory.

Kenneth Chau- Associate Professor

At the intersection of nanotechnology and optics, moulding light to create the next generation of light tools. Using smart windows and incorporating nanotechnology and optics to distribute power and communications signals.

Julian Cheng - Professor

Improving optical and digital wireless communications with an emphasis on fundamental research. Orthogonal frequency division multiplexing, spread spectrum communications, statistical signal processing for wireless applications, and optical wireless communications.

Chen Feng - Assistant Professor

Information and coding theory, big data and blockchains. Adapting new ideas and tools from information theory, coding theory, stochastic processes, and optimization to design better networking systems.

Jonathan Holzman - Professor

Integrated Optics including micro- and nano-photonic technologies targeted at a variety of applications, including ultrafast all-optical processing, optical wireless ommunications and terahertz spectroscopy.

Jahangir Hossain - Associate Professor

Contemporary wireless communication systems focused on bandwidth and energy efficient technologies for wireless systems leading to longer battery life and high data rate support.

Mina Hoorfar - Professor

Theoretical and experimental advancements in surface science and microfluidic technologies. Investigating electrochemistry (fuel cells), advanced imaging (microCT), computational modeling, and fabrication of microstructures.

Thomas Johnson - Associate Professor

Solving applied problems in radio frequency and microwave circuits and systems. Investigating RF power sources for wireless and industrial applications, applied electromagnetics and pulse encoders for switch-mode power amplifiers.

Richard Klukas - Associate Professor

Using optical, ultrawideband, and WiFi signals and sensors for indoor positioning and navigation. Improving methods for integrating various indoor positioning technologies and vehicle-to-vehicle ranging systems.

Sunny Li - Associate Professor

Advancing liquid / air cooling technologies, thermal / fluid sciences in sustainable energy systems and thermalfluidics in micro devices and systems.

Zheng Liu - Associate Professor

IoT-based sensing, intelligent systems, machine learning and data analytics, computer vision and pattern recognition, information fusion.

Loïc Markley - Assistant Professor

Electromagnetic wave engineering, with an emphasis on metamaterials and metamaterialrelated devices to further the design of high-frequency electronic circuits and antennas.

Homayoun Najjaran - Professor

Advanced manufacturing, industry 4.0, mechatronics and control systems with applications in robotics, industrial automation and unmanned systems.

Stephen O'Leary - Professor

Wide-band gap III-V and disordered semiconductors related to optical response of materials, novel electron devices, solar cells, x-ray image detectors and large-area electronics.

Rudolf Seethaler – Associate Professor

Mechatronics for automobiles including development of high-speed and large displacement actuation devices, electromagnetic valve trains, distributed control sensor fusion and power distribution systems.

Mohammad Zarifi – Assistant Professor

Development of microwave resonator sensors, high-speed and lower power analog to digital converters, microelectromechanical Sensors.

CLEAN TECHNOLOGY & ENVIRONMENTAL SYSTEMS

Clean fuels, smart grid power systems, energy utilization, alternative energy systems, energy conservation and environmental system monitoring and modelling.sensors.

Morad Abdelaziz - Assistant Professor

Smart grids, renewable energy, distributed generation, HPC applications for power systems and the integration of an electrified transport systems within electrical grids.

Joshua Brinkerhoff – Assistant Professor

Understanding flow dynamics and turbulence to improve performance and efficiency in aerospace, nuclear, and gas industries.

Wilson Eberle – Associate Professor

Enabling technology for advanced energy applications through power electronics. Developing power conversion and smart-grid technologies for advanced industrial energy applications.

Cigdem Eskicioglu – Professor

Development of waste reduction and resource recovery methods through advanced bioprocesses and micropollutant removal.

Mahmudur Fatmi – Assistant Professor

Transportation engineering & planning including travel behaviour analysis, land use interaction, activity-based modelling, econometric methods & agent-based microsimulation.

Kevin Golovin – Assistant Professor

Drag reduction in turbulent flow, sustainable material solutions, water purification, and interfacial coatings enabling green and sustainable development.

Kasun Hewage – Professor

Life cycle thinking in built environment including water-energy-carbon nexus, energy efficient buildings, construction waste management, and life cycle assessment and costing in engineering products and processes.

Mina Hoorfar – Professor

Developing and integrating sensors into gas and water systems. Using a sensitive metal oxide semiconductor coupled with selective microfluidic diffusion channel, the sensors can sample, filter and analyze.

Sina Kheirkhah – Assistant Professor

Through design improvements, technology, tools and knowledge helping large-scale power generation industries mitigate combustion instabilities. Building next generation combustion engines.

Jian Liu – Assistant Professor

Advanced nanofabrication, atomic/molecular layer deposition, renewable energy storage and conversion, Li-ion and next-generation batteries (Li-S, Na-ion, all-solid-state) for transportation and stationary applications.

Gordon Lovegrove – Associate Professor

Inter-disciplinary policy, infrastructure and vehicle research to sustain global community quality of life, including new tools for active transport, safety planning, Hydrail retrofits, and SMARTer growth development patterns.

Sepideh Pakpour – Assistant Professor

Foundations of healthy buildings: ventilation, indoor air quality (IAQ), dust & pests, moisture; indirectly related to thermal health, safety & security, water quality, noise, lighting and views.

Deborah Roberts – Professor

Anaerobic biological treatment of industrial wastewater, microbial fuel cells for conversion of waste to energy agricultural systems, and sulphur oxidizing microbes and their effects on the environment.

Rehan Sadiq – Professor

Drinking water quality modelling, environmental risk assessment, lifecycle thinking and decision-making.

Alexander Uhl – Assistant Professor

Developing printed photovoltaics, tandem solar cells, and photoelectrochemical devices (PECs) for clean electricity and solar fuels.

Liwei Wang – Assistant Professor

Power system analysis, electrical machine and drives, power electronic converter design, control and topology, utility power electronics applications, HVDC and FACTS, renewable energy sources, and distributed generation.

HEALTH TECHNOLOGY

Biomaterials, biomechanics, disease detection, health monitoring and medical devices.

Ian Foulds – Assistant Professor

Microelectromechanical systems (MEMS), microfluidics and microfabrication to discover new ways to increase outputs through parallel packaging of MEMS. Wirelessly powered / controlled implantable drug delivery system.

Chen Feng – Assistant Professor

Information and coding theory, big data and blockchains. Adapting new ideas and tools from information theory, coding theory, stochastic processes, and optimization to design better networking systems

Mina Hoorfar – Professor

Drug and disease detection, lab-on-chip devices and proton exchange membrane methanol fuel cells. Rapid cancer cell detection. Biosensor for detection of biomarkers on lab-on-chip platforms.

Thomas Johnson – Associate Professor

Non-invasive blood pressure measurement sensing methods and wireless power circuits for embedded sensors. focus on solving applied problems in the area of radio frequency (RF) and microwave circuits and systems.

Keekyoung Kim – Assistant Professor

bioMEMS, lab-on-chip, biomechanics, biomaterials, and regenerative medicine/tissue engineering. Microscale tissues fortreatment of degenerative diseases.

Zheng Liu – Associate Professor

Flexible sensing for eHealth system, electronic health record systems, signal processing and information fusion for health monitoring and diagnosis.

Hadi Mohammadi – Assistant Professor

Cardiovascular engineering / technology, and cellular / molecular biomechanics. Next generation of cardiovascular devices (prosthetic heart valves, etc).

Homayoun Najjaran – Professor

MEMS particularly wearable and microfluidic devices for prognostics and diagnostics. Precision control of microfluidic systems for lab-on-a-chip and point-of-care-testing technologies.

Sepideh Pakpour – Assistant Professor

Foundations of healthy buildings: ventilation, indoor air quality (IAQ), dust & pests, moisture; indirectly related to thermal health, safety & security, water quality, noise, lighting and views.

URBAN INFRASTRUCTURE & GREEN CONSTRUCTION

Planning and decision-making, sustainable buildings, transportation, waste management and water systems.

Shahria Alam – Associate Professor

Smart materials and their structural applications such as seismic rehabilitation of deteriorated structures, performance-based design of reinforced concrete, prestressed concrete and masonry structures.

Joshua Brinkerhoff – Assistant Professor

Simulation of multiphase turbulent flows for compressed and liquefied gas systems and dispersion of atmospheric pollutants in urban and industrial environments.

Kasun Hewage – Professor

Life cycle thinking in built environment including water-energy-carbon nexus, energy efficient buildings, construction waste management, and life cycle assessment and costing in engineering products and processes.

Zheng Liu – Associate Professor

Data-driven decision making, predictive maintenance of civil infrastructure, aircraft, and complex machine.

Nicholas Miguel Peleato – Assistant Professor

Advanced characterization of organic matter for evaluation of drinking water treatment processes and assessment of source water quality. Development of low-cost pre-treatment methods to effectively mitigate membrane fouling.

Ahmad Rteil – Assistant Professor

Design, evaluation and repair of infrastructure systems including reinforced / prestressed concrete structures.

Rehan Sadiq – Professor

Asset management of civil infrastructure systems, water supply systems and reliability engineering.

Sumi Siddiqua – Associate Professor

Nuclear waste repositories, energy pipelines, chemical stabilization of road subgrade materials, soil nano-particles, soil-water chemistry and the reuse of industry by-products.

Dwayne Tannant – Professor

Geotechnical engineering and engineering geology applied to surface and underground excavations in rock, terrain analysis, geohazard identification and evaluation, rock support design, blasting, rock mass characterization, and geotechnical engineering of earth dams.

Solomon Tesfamariam – Professor

Timber-based hybrid building design, infrastructure management, seismic risk assessment of civil infrastructure systems, risk-based decision making, multi-hazard resiliency framework.

COLLABORATIVE RESEARCH OPPORTUNITES

Research Beyond Disciplines

For information about research opportunities and collaboration contact Colin Wilson at 250-317-7688 or visit http://support.ok.ubc.ca/