

CBB Showcase Attendees



KOSTADINKA BIZHEVA

PHYSICS AND ASTRONOMY PROFILE

Professor Bizheva's research centers on developing advanced Optical Coherence Tomography (OCT) imaging technology for diagnostic and therapeutic monitoring in clinical settings. This non-invasive, non-contact technology is used for diagnosing conditions like glaucoma, diabetic retinopathy, macular degeneration, and cancers, as well as monitoring surgeries in areas such as the retina, cornea, heart, and brain.



CATHERINE BURNS

SYSTEMS DESIGN ENGINEERING PROFILE

Catherine M. Burns is the Associate Vice President of Health Initiatives at the University of Waterloo and the founder of the Centre for Bioengineering and Biotechnology. In her current role, she focuses on advancing health and health technology research at the university. Her research interests are human factors engineering, systems engineering, safety, ergonomics, design process, cognitive engineering, human error, decision making, interface design and integration, usability testing and interactive technology, ecological interface design, cognitive work analysis, graphical interface design and visualization.



MELANIE CAMPBELL

PHYSICS AND ASTRONOMY PROFILE

Professor Campbell leads a highly multidisciplinary research group where they study ocular development, eye disease, and linear and non-linear optics of the eye. They investigate the fundamental refractive properties of the eye's components to improve diagnosis and therapy for various ocular conditions. Her research interests are imaging for type 1 diabetes, Alzheimer diagnosis, imaging of the rear of the eye, optical properties of the eye, changes in the eye's optical properties, two photon therapies, clinical imaging, technology and optics, disease detection and modeling and optical systems.



SUE ANN CAMPBELL

APPLIED MATHEMATICS
PROFILE

Professor Campbell's research interests span from biophysical models of single cell neurons and micro-circuits to neural-field models of populations of neurons. She has applied these models to understand the genesis of neural assemblies in inhibitory networks and to study age effects on the occurrence of epileptic seizures. Her research interests are mathematical biology, mathematical neuroscience, delay differential equations and dynamical systems theory.



NAVEEN CHANDRASHEKAR

MECHANICAL AND MECHATRONICS ENGINEERING
PROFILE

Professor Chandrashekar's research focuses on orthopedic biomechanics, biomedical device design, and tissue engineering. His team is studying the anterior cruciate ligament (ACL) using a custom-designed knee simulator to replicate human knee movements and measure ACL damage during athletic activities. A sensor on the simulator's mechanical ligament provides insights into injury mechanisms, including the impact of hip movement. This research is helping to design and evaluate new knee braces.



HELEN CHEN

SCHOOL OF PUBLIC HEALTH SCIENCES
PROFILE

Professor Chen researches medical NLP, real-world evidence (RWE), and public health data. She leads CPHIN, driving initiatives like AI-driven cancer treatments, RWE-based health care decisions, and optimizing lung cancer care. She also researches social media's role in public health, focusing on identifying and addressing infodemics using AI-assisted technology, particularly during pandemics and outbreaks.



KAREN COCHRANE

STRATFORD SCHOOL OF INTERACTION DESIGN AND BUSINESS
PROFILE

Professor Cochrane focuses on Human-Computer Interaction (HCI), creating wearable and tangible tech for mental health support and accessibility. These designs serve a dual purpose: firstly, fostering constructive coping strategies for mental health and overall well-being; secondly, crafting assistive technologies for the disabled community. Her work uses approaches like soma design and design fiction to understand lived experiences, helping to develop better tools for academics and underrepresented communities.



JOHN CORRIGAN

CHEMISTRY
PROFILE

The Corrigan group studies molecular inorganic synthesis, focusing on creating polynuclear metal cluster complexes. They design reagents to build precise clusters with controlled size, shape, and composition, including nanoscale semiconductor structures with specialized surfaces. These clusters have unique properties based on their size and could be used in energy (like solar cells), medicine (such as bio-labels), and catalysis. Their work bridges the gap between molecules, clusters, and nanomaterials.



JAMES DANCKERT

PSYCHOLOGY
PROFILE

Professor Danckert's lab has two separate research programs. One studies boredom through behavioral tasks, neuroimaging (fMRI, tDCS), and genetic research to uncover its causes and mechanisms. The other investigates mental model updating, focusing on how the brain builds and adapts to changing patterns. This research, inspired by neglect syndrome studies, explores attention, memory, and temporal perception issues using stroke patient data, fMRI, and computational models.



CLARK DICKERSON

KINESIOLOGY AND HEALTH SCIENCES
PROFILE

Professor Dickerson's research goal is to produce new information to improve both working and general quality of life, with a particular focus on shoulder health and performance. His research program aims to generate new knowledge in four major areas: fundamental shoulder function and dysfunction; creation and validation of mathematical models to predict shoulder demands, applications of shoulder biomechanics to workplace injury prevention and rehabilitative and preventative strategies for ensuring shoulder health.



BERNARD DUNCKER

BIOLOGY
PROFILE

Professor Duncker's lab uses budding yeast (*Saccharomyces cerevisiae*) to study cell cycle processes related to cancer, focusing on proteins that control the initiation of DNA replication. Their research investigates pre-replicative complex (pre-RC) assembly, kinase complexes (Clb/Cdc28 and Dbf4/Cdc7), and novel origin-associated proteins. These studies aim to understand replication regulation, checkpoint responses, and potential diagnostic markers for cell proliferation in cancer.



FATIH SAFA ERENAY

MANAGEMENT SCIENCE AND ENGINEERING PROFILE

Professor Erenay conducts research in multiple areas. One area involves stochastic modelling and optimization, with a focus on markov decision processes, partially observable markov decision processes, dynamic programming, and simulation models. Health care is another area Professor Erenay conducts research, in which he studies medical decision making, organ transplantation, cancer screening and health care delivery. Professor Erenay's research also involves production planning with an emphasis on multi-criteria screening.



LORA GIANGREGORIO

KINESIOLOGY AND HEALTH SCIENCES PROFILE

The aim of Professor Giangregorio's research team is to reduce the burden of osteoporotic fractures. They use medical imaging technologies to explore bone and muscle responses to activity or neurologic impairment, and evaluate new methods for image analysis. They conduct epidemiologic studies to inform fracture risk assessment algorithms, as well as conduct clinical trials to investigate the effects of exercise interventions for reducing fracture risk in high risk individuals. They lead knowledge dissemination and translation activities, and implementation studies to move research on exercise for older adults into practice.



MAUD GORBET

SYSTEMS DESIGN ENGINEERING PROFILE

Professor Gorbet's research focuses on biocompatibility, particularly how innate immune cells and material-induced inflammation affect ocular and cardiovascular systems. Her lab studies interactions between biomaterials and biological systems to reduce complications like clotting, infections, or inflammation. They develop advanced in vitro models to assess biocompatibility, investigate blood-material interactions, and explore neutrophil roles on the ocular surface to improve biomedical device safety and performance.



KELLY GRINDROD

SCHOOL OF PHARMACY PROFILE

Dr. Grindrod's research focuses on using digital technologies to improve how we manage medications. She is currently examining how patients, physicians and pharmacists share medication information. She is also interested in how digital technologies can be used to change clinician practice.



YUE HU

MECHANICAL AND MECHATRONICS ENGINEERING PROFILE

Professor Hu is the director of the Active & Interactive Robotics Lab. Her research interests include physical-social human-robot interaction, collaborative robots, humanoid robots, and optimal control.



JENNIFER HUNTER

OPTOMETRY & VISION SCIENCE PROFILE

Professor Hunter has two areas of research: enhance two-photon excited fluorescence imaging capabilities for living animal eyes, and developing objective measures of human outer retinal function in health and disease. Her lab developed custom adaptive optics scanning light ophthalmoscopes (AOSLO) to observe the ganglion cell mosaic and image retinal function in living eyes. They use these instruments to measure fluorescence lifetimes in both animal models and humans, aiming to identify early retinal changes and biomarkers for aging and disease.



DEBBIE JONES

OPTOMETRY & VISION SCIENCE PROFILE

Professor Jones' main area of clinical focus is in pediatric optometry and her main area of research activity is in the area of myopia control. She has a keen interest in the eyecare needs of indigenous peoples and has provided eyecare to a remote community in Northern Ontario on a number of occasions. Professor Jones' other research interests include pediatric vision and public education.



KARIM KARIM

ELECTRICAL AND COMPUTER ENGINEERING PROFILE

Professor Karim is a founder and Chief Technology Officer of KA Imaging, a University of Waterloo spinoff company that makes innovative X-ray detectors and systems for medical, veterinary, scientific and industrial markets. One of his "color" X-ray innovations is now starting to replace black and white medical X-ray globally, while another is used in ultrasonic fingerprint sensors in mobile phones and tablets. His research interests include medical imaging, large area electronics and semiconductor devices and fabrication.



KRISTA KELLY

OPTOMETRY & VISION SCIENCE PROFILE

Professor Kelly is interested in how the developing brain is affected by atypical experiences early in life, such as visual deprivation. Her current research investigates the underlying causes of slow reading and motor impairments in children with common pediatric eye conditions, including amblyopia, strabismus, and cataract. Her research findings will guide the development of more effective screening and interventions to prevent or improve reading and motor issues in children with pediatric eye conditions.



ELLEN MACEACHEN

SCHOOL OF PUBLIC HEALTH SCIENCES PROFILE

Professor MacEachen's research examines the design and performance of work and health systems to identify how they can be improved and adapted to fast changing economic, social and technological environments of our global economy. She is particularly interested in international work disability policy and the health risks and opportunities of new forms of work (such as "sharing economy" gigs). Professor MacEachen specializes in qualitative and evaluation research methods and her research is informed by a sociological lens.



DALE MARTIN

BIOLOGY PROFILE

Professor Martin's Lab focuses on identifying and characterizing therapeutics that reduce levels of mutant huntingtin, the causative agent of the neurodegenerative disease Huntington disease (HD), by repairing the protein clearance pathway of autophagy and gene silencing. Their approach is highly collaborative and multi-faceted involving the identification of human SNPs, population genetics, protein characterization, chemical biology and high-resolution microscopy. Various aspects of these studies are performed in yeast, cell culture or mice.



JAMES TUNG

MECHANICAL AND MECHATRONICS ENGINEERING PROFILE

Professor Tung's primary research is focused on developing new sensor technologies to prevent injuries, improve diagnostic capabilities, and optimize treatment for individuals with chronic conditions. His research interests include assistive technology, rehabilitation engineering, connectivity and internet of things, robotics, neuromotor control, IoT devices, biomedical engineering and bioengineering.



THOMAS WILLETT

SYSTEMS DESIGN ENGINEERING PROFILE

Professor Willett's research interests concern the mechanics and engineering of skeletal biomaterials and tissues. He specializes in: Bone Tissue Mechanics - developing improved understanding of the mechanisms that determine the mechanical behaviour and failure of bone and how collagen modifications due to ageing, disease, irradiation, and other causes alter these mechanisms and the mechanical behaviour of the tissue.

Engineering of bone-inspired materials for skeletal reconstruction



STAN WOO

SCHOOL OF OPTOMETRY & VISION SCIENCE PROFILE

Professor Woo's research interests include vision rehabilitation and systems for optimizing patient care outcomes.



EVELYN YIM

CHEMICAL ENGINEERING PROFILE

Experienced with nanofabrication technologies and stem cell culture, Professor Yim and her Regenerative Nanomedicine Lab group are interested in applying the knowledge biomaterial-stem cell interaction to direct stem cell differentiation and tissue regeneration for neural, vascular and corneal tissue engineering. Professor Yim is one of the pioneers in studying stem cell-topography interactions and related applications in tissue engineering. She is one of the leading researchers studying the use of synthetic materials for altering stem cell behavior and differentiation.



ALFRED YU

ELECTRICAL AND COMPUTER ENGINEERING PROFILE

Professor Yu's research interests are:

- Ultrasound imaging: Advanced imaging algorithms; High-performance beamforming platforms; Flow phantom design.

AND

- Therapeutic ultrasound: Cellular dynamics studies; Wave-matter interactions; Nanotechnology.