KITE Research Institute

International Scientific Advisory Committee

January 2023

kite UHN

KITE is an acronym for
Knowledge, Innovation, Talent, Everywhere.
The research arm of the University Health Network's Toronto Rehab is a world leader in complex rehabilitation Science. KITE seeks solutions for people living with the effects of disability, illness & aging.

127
Scientists

181
Scientific trainees

757
Research Papers
(2022)

56,000
sq.ft. of Research Space

Table of Contents

Description of Cover Page: The cover depicts a body in motion and represents how KITE's research has the potential to impact every corner of the human body. It illustrates our aspiration to support all communities (patients, non-patients, caregivers, vulnerable communities, and those living with disabilities) and symbolizes innovation, forward thinking, advancement, support, hope and independence. The polygonal shapes also represent the six colour-coded buckets we use to categorize our scientists: Aging, Cardiac, Complex Continuing Care & Long-Term Care, Musculoskeletal, Neuroscience and Spinal Cord Injury.

About Us

Our Mission

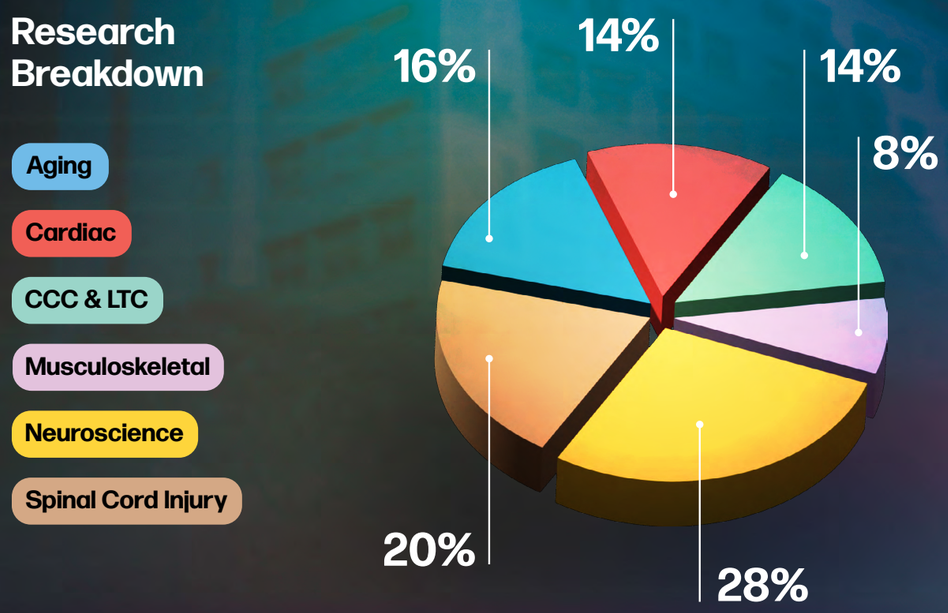
To be a trailblazer in research, education and knowledge translation

The KITE Research Institute is the scientific arm of the Toronto Rehabilitation Institute. KITE is a world leader in complex rehab with more than 100 scientists dedicated to improving the lives of people living with the effects of disability, illness and aging.

KITE's areas of focus include prevention of injury, restoration of function after injury and aging well. Our researchers are actively engaged in developing new treatments, devices and products as well as gathering evidence that guides changes to policy and public opinion.

KITE is one of the principal research enterprises at the University Health Network (UHN), Canada's top medical research hospital with more than $474 million in total annual research expenditures, 1,167 principal investigators and 4,664 publications (2022*).

Research Breakdown



*Source: UHN Research Report 2022 (http://online.flipbuilder.com/ubbi/favn/index.html)

DIRECTOR'S MESSAGE

KITE takes rehab science to new heights

> "Our goal is to build a completely new medical rehabilitation ecosystem that is interconnected, offering the ability to monitor and deliver the best rehab care possible anywhere in the world"

Dear Colleagues,

Thank you for agreeing to participate in the External Scientific Review of the KITE Research Institute at UHN. We encourage and welcome your feedback and perspectives on our research enterprise.

For the purposes of this review, we have organized our scientists into six broad disciplines/categories: Aging, Cardiac, Complex Continuing Care & Long Term Care (CCC/LTC),Musculoskeletal (MSK), Neuro and Spinal Cord Injury (SCI).

Health care providers around the world are expected to face problems delivering services in the years to come as aging populations create increased demand for treatments and other resources. At KITE – where we are committed to improving the lives of people living with the effects of disability, illness and aging – we are uniquely suited to address many of the upcoming health challenges.

The materials contained in this document are designed to serve as a roadmap for your review, providing an overview of our research activities of the last five years, our priorities for the next five years and extensive details about our commitment to prevent disorders, improve access to services, assist in the development of new treatments, technologies and best practices while reducing health care costs and helping people live longer and more active lives.

Our goal is to build a completely new medical rehabilitation ecosystem that is interconnected, offering the ability to monitor and deliver the best rehab care possible anywhere in the world, remotely, while reducing costs to the health care system.

Sincerely,

Milos R. Popovic PhD, PEng
Institute Director

Welcome from UHN Leadership

Kevin Smith

President and CEO,
University Health Network

"It takes bold steps to transform lives. Fortunately, the research teams at UHN's KITE Research Institute are committed to doing just that as they pursue innovative ideas to help those in our communities living with the effects of disability, illness, and injury. KITE's scientists, trainees, and staff have built a reputation for designing creative solutions, products, and technologies that are helping to define the healthcare system of the future.

Together with their clinical partners across UHN, they are helping us achieve our vision of creating A Healthier World.

Bradly Wouters

Executive Vice President,
Science and Research,
University Health Network

"The scope of research underway at KITE is broad in scope and ambition. It includes areas common to other excellent rehab research centres, including cardiac rehab, concussion, chronic pain, and spinal cord injury as well as research that addresses dementia and the unique needs of individuals as they age.

KITE unites all aspects of rehab research, from basic to clinical, and seeks partnership and collaboration opportunities with some of the more than 1,000 other scientists working across UHN. Collectively, these efforts have the potential to transform the lives of millions of people worldwide.

Janet Newton

Clinical Vice President,
Toronto Rehab

"At Toronto Rehab we are committed to working at the intersection of care, research and education. By fostering collaboration between our clinical teams and our scientists at KITE, we are helping to accelerate the discovery and creation of new knowledge that can be rapidly translated into practice and policies to improve the lives of patients and families.

This relationship is key to the future success of Toronto Rehab and we are thrilled to be home to some of the top rehabilitation scientists in the world.

Mark Bayley

Program Medical Director,
Toronto Rehab

Physiatrist-in-Chief,
University Health Network

"Health care providers face many new and unknown challenges in the years to come as the impacts of Covid-19, health human resource shortages and an aging population base create new demands for treatments, service and other resources.

The partnership between Toronto Rehab and KITE has prepared us to be innovative in addressing the challenges ahead. Together we are committed to improving the lives of patients and members of the community and I am certain this research will result in a positive transformation of the health care system.

ISAC Review Committee

Jane Rylett

PhD, FCHAS

Senior Scientist,
Robarts Research Institute,
Western University

London, ON, Canada

Dr. Jane Rylett is a Distinguished University Professor at Western University and Scientist in the Translational Neuroscience Group at Robarts Research Institute. She is past-Chair of the Department of Physiology and Pharmacology at the Schulich School of Medicine & Dentistry. Following a PhD in Pharmacology, she trained in neurophysiology at University College London, England and neurochemistry at the Max-Planck-Institute for Biophysical Chemistry, Germany. She was recruited to Western University as the Rubinoff Scholar in Geriatrics.

Dr. Rylett is a cellular and molecular neurobiologist studying the consequences of age-related changes in brain and neurodegenerative diseases, and recognized internationally for contributions in studies on cholinergic neurobiology and Alzheimer disease. Research in her laboratory focuses on mechanisms regulating chemical communication in the nervous system in health, normal aging and disease and the impact on cognitive function.

Dr. Rylett served as Chair of the Institute Advisory Board for the CIHR Institute of Aging, on Boards of Directors of the Alzheimer Societies of Canada and Ontario, and on taskforces for international endeavours for Alzheimer Disease research. She has been leader of the Canadian Consortium on Neurodegeneration in Aging (CCNA) Theme 1 – Prevention.

Peter Athanasopoulos

Director, Public Policy
Spinal Cord Injury Ontario

Toronto, ON, Canada

Peter Athanasopoulos has invested 22 years in a career supporting people with spinal cord injuries in a variety of roles and positions. He started his career in the role of Provincial Peer Support Manager with the Canadian Paraplegic Association Ontario, then moved on to the role of SCI Network and Service Manager and is currently the Director of Public Policy and Government Relations for Spinal Cord Injury Ontario as well as the Executive Director of the Ontario SCI Alliance.

In addition to his primary roles, Peter has authored a variety of SCI research and policy reports that resulted in sustainable governmental policy innovation for people with disabilities. These research/policy knowledge translation initiatives advanced Public Transportation, Accessibility, Attendant Services, Assistive Devices, and Secondary Complications in SCI. He is currently active in a variety of projects including Neurotrauma Pathways of Care, SCI Implementation, Evaluation & Quality Care Consortium, and chair of the technical committee of Canadian SCI Standards of Rehabilitation with the Health Standards Organization of Accreditation Canada.

Gery Colombo

PhD

Founder and CEO
Hocoma AG

Zurich, Switzerland

Dr. Gery Colombo has a background in Electrical Engineering with a specialization in biomedical engineering. He received his PhD with the research and development of the Lokomat, the worlds first clinically applied gait robot for neurologic patients. He worked for 10 years as the head of research at the spinal cord injury centre of the university of Zurich.

Dr. Colombo has over 25 years of experience in the biomedical industry. His broad background in neurorehabilitation with specific focus on robotic and sensor-based devices for functional movement therapy has led to the successful development of the company Hocoma, which has been listed as one of the most influential public & private companies in the global robotics industry and recognized as one of the most disruptive players in wearable healthcare. Besides the robotic field in neurorehabilitation and the invention of the Lokomat®, a driven gait orthosis, he is interested in wearable technologies. More than 10 years ago he had the idea to create a wearable sensor-based device for the treatment of low back pain which was finally launched in 2014 and has been well recognized in the Wearable Technology Scene.

As a founder, honorary member and former president of the International Industry Society for Advanced Rehabilitatiln Technology (IISART), he also contributed to the global development of rehabilitation technology in different aspects such as education, regulation or promotion. He also was initiator of the RehabWeek, the world's leading conference in rehabilitation technology.

Armin Curt

MD

Medical Director
Balgrist University Hospital

Zurich, Switzerland

Dr. Armin Curt is a Full Professor for Paraplegiology and Medical Director at the Balgrist University Hospital Zurich, Switzerland.

After receiving his Medical Degree at the University of Cologne, and full training in neurology and clinical neurophysiology, he started his specialization in Spinal Cord Injury care and rehabilitation at the University of Zurich in Switzerland. From 2005 – 2008 he was an Associate Professor in Neurology and SCI Research at the University of British Columbia. In 2013 he gave the Sir Ludwig Guttmann Lecture. He is holder of numerous national and international grants and Principal Investigator of the Horizon 2020 project "NISCI – Antibodies against Nogo-A to enhance regeneration and functional recovery after SCI".

His research interests are translational research in human SCI, neuro-rehabilitation, clinical neurophysiology and neuro-imaging in human SCI. He is founder and chair of the European SCI Clinical network (www.emsci.org) and involved in early translational clinical trials. The network focuses on clinical recovery profiles and is establishing prediction models to inform the setup of interventional clinical trials and provide outcome thresholds of clinically meaningful neurological and functional assessments. Dr Curt is scientific advisor and board member of national and international SCI foundations seeking to support preclinical research and fostering the translational path for the development of novel treatment strategies for patients suffering from acute and chronic spinal cord injury.

Janice Eng

PhD, BSc (PT/OT)

Director, Rehabilitation Research Program,
GF Strong Rehab Centre,

Vancouver, BC, Canada

Dr. Janice Eng is a University Killam Professor in the Department of Physical Therapy and Canada Research Chair in Neurological Rehabilitation at the University of British Columbia and Director of the Rehabilitation Research Program at the GF Strong Rehab Centre.

Dr. Eng has clinical training in physical therapy and occupational therapy. She is the co-lead of the CanStroke Recovery Clinical Trials Platform.

She has published over 300 peer-reviewed papers. Two of her stroke exercise programs, GRASP for improving arm and hand function and FAME for improving fitness and mobility, are used in over 50 countries.

Of local relevance, she completed her masters in biomedical engineering at the University of Toronto, and taught many years ago in the University of Toronto Physical Therapy Program.

She completed her doctorate in Kinesiology at the University of Waterloo. Dr. Eng also completed her post-doctoral training in Neurophysiology at Simon Fraser University.

Richard L. Lieber

PhD

Chief Scientific Officer
& Senior Vice President,
Shirley Ryan AbilityLab

Chicago, Illinois, USA

Dr. Rick Lieber is a physiologist who earned his PhD in Biophysics from U.C. Davis developing a theory of light diffraction that was applied to mechanical studies of single muscle cells. He joined the faculty at the University of California, San Diego in 1985 where he spent the first 30+ years of his academic career, achieving the rank of Professor and Vice-Chair of the Department of Orthopaedic Surgery.

He received his MBA in 2013 and is currently Chief Scientific Officer and Senior Vice President at the Shirley Ryan AbilityLab and Professor of Physical Medicine & Rehabilitation and Biomedical Engineering at Northwestern University in Chicago, IL.

Dr. Lieber's work is intentionally translational, applying basic scientific principles to help patients who have experienced spinal cord injury, stroke, musculoskeletal trauma or cerebral palsy. He has published over 300 articles in journals ranging from the very basic such as *Biophysical Journal* and *The Journal of Cell Biology* to clinical journals such as *The Journal of Hand Surgery* and *Clinical Orthopaedics and Related Research*.

Dr. Lieber's research focuses on design and plasticity of skeletal muscle. Currently, he is developing state-of-the-art biological and biophysical approaches to understanding muscle contractures that result from cerebral palsy, stroke and spinal cord injury.

ASSOCIATE DIRECTOR: ACADEMIC

“At KITE we celebrate and showcase the accomplishments of our trainees”

The “T” in KITE stands for Talent and trainee talent is at the heart of KITE research. Our nearly 200 undergraduate students, graduate students and post-doctoral fellows are a highly interdisciplinary group of researchers from fields such as engineering, computer science, public health as well as clinical disciplines that include physiotherapy, occupational therapy, speech-language pathology, nursing and psychology.

KITE trainees are provided access to world class research facilities, interdisciplinary mentors, engagement with clinicians, and connections with stakeholders and knowledge users, including patients, community partners and representatives from government organizations and industry.

We prioritize the professional development and well-being of our trainees through a number of resources, events, and initiatives. These include repositories of uniquely curated materials supporting scientific knowledge, research skills, project management, communication, and mentorship (KITE Trainee Corner). Events include skill-building workshops (scholarship/ grant writing, statistics), networking events (industry and community partners), and wellness activities (mindfulness series and women in science series). We also have a Peer2Peer mentorship program for trainees and a KINSHIP mentorship program for Early Career Scientists.

At KITE we celebrate and showcase the accomplishments of our trainees through stories, announcements, and individualized profiles featured on our website and through social media. Overall, as we witness the important ways that this new generation of researchers and innovators are contributing to science and having real world impact, it is clear that the future of rehabilitation research is bright.

Sincerely,

Jennifer Campos PhD
Associate Director, Academic

ASSOCIATE DIRECTOR: SCIENTIFIC

“We are committed to the continued development, support and success of KITE scientists”

At KITE, more than 40 core scientists conduct research that is focused on addressing the pressing needs of the clinical and aging populations of our society. These scientists work in collaboration with many of our affiliate scientists, graduate students, postdoctoral fellows and support staff. KITE research develops and implements new clinical treatments, products and technologies while supporting and aiding commercialization. It provides evidence to inform best practice guidelines and health policy and innovates “outside the box,” by harnessing knowledge from science, engineering and the arts in the service of rehabilitation.

Despite our many different disciplines and scientific approaches, and the competitive nature of science and knowledge generation, we strive to be a collaborative and inclusive community. The continued development and success of KITE scientists and their research programs is crucial to our success. To achieve this aim, we have in place rigorous, yet transparent, streamlined and supportive processes as well as annual and cyclical performance reviews, which provide developmental feedback to all scientists. Peer review is also central to our review approach, to ensure fairness and diversity.

We have a mentorship program for junior scientists as well as an excellent internal peer review process for grant applications, and partnerships with many universities, ensuring academic opportunities and success for our scientists. Recognition is important and to that end there is an annual KITE recognition award for Leadership and Mentorship, Community Service or Impact and Innovation.

KITE scientists produce excellent, innovative, internationally recognized work. At KITE, we are committed to the continued development, support and success of KITE scientists for the benefit of their research program, the institute, rehabilitation research and society at large.

Sincerely,

Elizabeth Rochon PhD
Associate Director, Scientific

Our Place

KITE is the research arm of Toronto Rehab and one of the principal research enterprises at the University Health Network. We are committed to transforming lives and the communities we serve through excellence in care, discovery and learning, while helping to build A Healthier World. KITE's strategic priorities are closely aligned with those established by UHN, UHN Research, UHN Foundation, and Toronto Rehab.

University Health Network

UHN is home to four hospitals, six research institutes: KITE, Krembil, TGHRI, Princess Margaret, McEwen and TIER, 11 medical programs, one education institute and two foundations.

Collectively, these institutions share a strategic plan with a common vision, purpose, values, and strategic priorities that we consider as we make important decisions.

UHN's Purpose

Transforming lives and communities through excellence in care, discovery, and learning

UHN Strategic Priorities for 2019-2023:

- Inspire, invent, and deliver tomorrow's care
- Empower and invest in a diverse TeamUHN
- Drive the convergence of care, research and education
- Unleash the power of technology and innovation
- Elevate Canada as a world destination for commercialization and discovery

Toronto Rehab

KITE is the research arm of Toronto Rehab, which introduced its own Strategic Plan in 2022. Toronto Rehab is committed to a vision that nurtures "Innovative Teams, Transforming Lives, in support of A Healthier World."

Toronto Rehab Mission

To develop solutions for people living with the consequences of illness, injury and aging through excellence, innovation and the integration of care, research, and education.

Toronto Rehab Strategic Plan 2022-2025:

- Invest in the wellbeing of our people and the strength of our culture
- Design seamless rehabilitation experiences across the care continuum
- Integrate research and care to co-invent the future of rehab
- Harness the power of technology to revolutionize rehab

UHN Foundation

The amalgamation of the Toronto General and Western Hospital Foundation (TGWHF) and Toronto Rehab Foundation (TRF) led to the establishment of the UHN Foundation in April 2021. The emergence of a new foundation provides an opportunity for KITE to increase funding, while building and strengthening our brand, identity, culture, and research profile.

The UHN Foundation raises funds for research, education and the enhancement of patient care at Toronto General and Toronto Western hospitals, Toronto Rehab and The Michener Institute of Education at UHN.

In addition to rehabilitation, UHN is home to global experts in a wide range of health areas, including cardiovascular, transplant, brain, vision, arthritis, diabetes, surgery and more. UHN is uniquely positioned to find solutions to some of the biggest health challenges of our time.

UHN Research

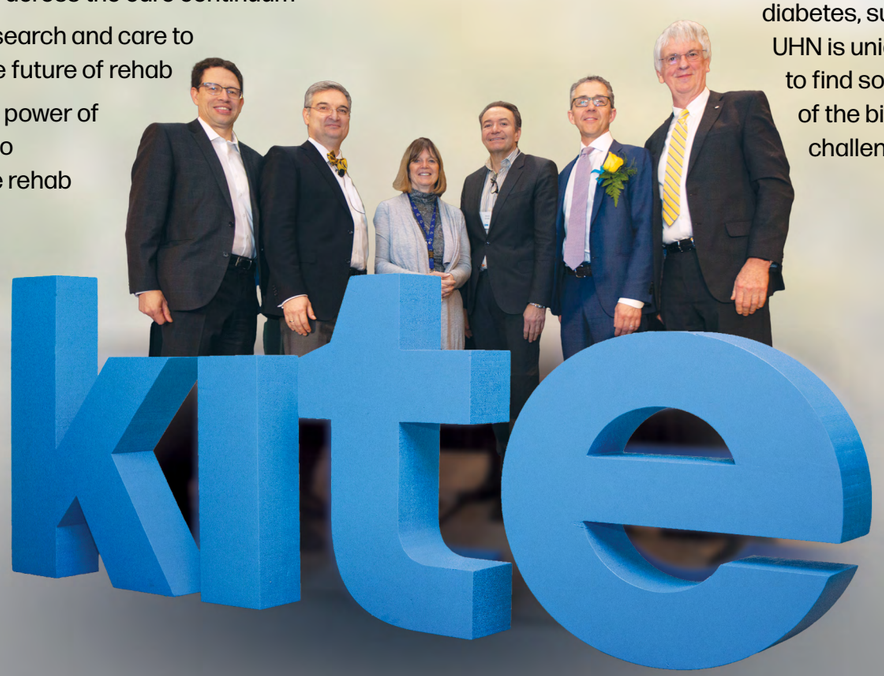
KITE is one of the six research institutes at UHN, all of which pursue clinically relevant programs spanning the spectrum from basic discovery research to translational research to clinical research. Collectively, these institutes are home to more than 1,000 researchers and attract $400 million in annual research funding. UHN Research has developed its own set of shared research priorities.

UHN Research Mission

Together we drive excellence in discovery and innovation to create A Healthier World

Strategic Priorities for 2019-2023:

- Engage every patient to strengthen our learning health system
- Empower research teams and collaboration
- Accelerate the translation of discovery to practice
- Unleash the power of technology and innovation
- Grow research through financially sustainable structures



In attendance for KITE's launch at Research Day 2019 were, left to right, Toronto Rehab Program Medical Director Dr. Mark Bayley, KITE Director Dr. Milos R. Popovic, UHN Public Affairs and Communications Vice-President Gillian Howard, UHN President and CEO Dr. Kevin Smith, UHN Executive Vice-President of Science and Research Dr. Bradly Wouters, and former KITE director Dr. Geoff Fernie.

Our Culture

Our goal is to define, build and nurture an inclusive culture that is open, collaborative, inviting, forward-thinking and safe. This process has led us to identify four key words that personify this effort – Knowledge, Innovation, Talent and Everywhere. Woven together these words form the word KITE, which symbolizes this direction and represents our ability to let our ideas soar to new heights.

Supporting our Teams

The process of redefining our culture has been transformational for the KITE community. It has resulted in our teams implementing a series of operational efficiencies that have optimized our workflows and allowed us to automate processes across the Institute. This includes streamlining communications, introducing new online tools to support output and commercialization, onboarding essential new staff members, building strong relationships with our fundraising teams, establishing peer mentorship programs, constructing a more rewarding review process and providing grant-writing supports.

Telling our Story

We introduced new storytelling campaigns, launched multiple social media accounts, and built relationships with media in an effort to showcase the groundbreaking research and innovative scientific minds we have at KITE. Simultaneously, we leveraged our network of clinical, academic, industry and community partners at the local, national and international levels to provide further research opportunities. This resulted in the introduction of the KITE Clinics, CRANIA and FIBRE and led to new partnerships with firms including Apple, Canada Post, and SONA/VEE Technologies.

Empowering Discovery

Putting in place all of these building blocks has enabled our scientists to be more productive. Our 127 principal investigators (scientists, senior scientists and affiliate scientists) are now amongst the most productive within the UHN Research community. In 2022, our research teams published 757 research papers and we now have the highest number of trainees per scientist. These efforts are directly impacting patients, caregivers, communities and the broader healthcare system.

Strategic Direction

KITE's Strategic Positioning

Following the appointment of Dr. Milos R. Popovic as Institute Director in 2018, KITE sought to refine and update its focus for the next stage of growth and development.

Institute leadership surveyed stakeholders, partners and scientists, staff and trainees in order to develop a Strategic Initiatives Position Paper (2019). This paper articulated the Institute's aspirations, identified the elements that bind KITE within UHN and helped to create a platform to operate within Toronto Rehab and UHN, as well the broader UHN Research Community.

The Pandemic Disruption

In March, 2020, the COVID-19 pandemic fundamentally disrupted our plans and overall work environment on many levels. Within a stretched and fragile healthcare system, new stresses and increased workloads were introduced.

Long-term planning was set aside as we managed a myriad of disruptions to our personal and professional lives. Despite the disruption we accomplished most of the objectives set out in 2019 except for those that become unnecessary or unmanageable due to COVID.

Next Steps: A Revised Plan

In January 2022, KITE undertook additional stakeholder engagement interviews and conducted virtual workshops with scientists, staff and trainees to help inform future decision making.

This resulted in the introduction of a revised set of Strategic Priorities.

These include:

- Secure sustained funding
- Develop a HYBRID return-to-work model
- Material advances in clinical partnerships
- Material advances in commercial partnerships
- Address immediate HR needs
- Evolve Team Structure
- Focus on Staff support & engagement
- Student mentoring & training
- Partnerships/Collaboration within UHN
- Community partnerships
- Employee mental health and well-being

Our Story

1800s-1900s

1874 The Toronto Home for Incurables opens. Renamed to Queen Elizabeth Hospital by mid 1900s.

1886 The Hillcrest Convalescent Home opens.

1900s-2000s

1922 The Toronto Rehabilitation Centre was formed to provide services for World War I veterans.

1945 Lyndhurst was created as a rehabilitation centre for veterans with spinal cord injuries.

1997 The Queen Elizabeth Hospital and Hillcrest Hospital were merged as the Rehabilitation Institute of Toronto.

1998 The Toronto Rehabilitation Institute was created with the amalgamation of Rehabilitation Institute of Toronto, Lyndhurst Spinal Cord Centre, Toronto Rehabilitation Centre.

2000s-2010s

2000 Ontario Ministry of Health and Long Term care announce $15M funding to create a new provincial rehabilitation research program at Toronto Rehab.

2001 The Research Institute at Toronto Rehabilitation Institute is launched. Jack Williams is named its first Research Institute Director.

2003 Geoff Fernie takes over as Research Institute Director, serves in role for 15 years.

2004 The iDAPT (Intelligent Design for Adaptation, Participation and Technology) project officially launches.

2008 Myndtec is founded by Dr. Milos R. Popovic.

BresoTEC is founded by Drs. Douglas Bradley, Hisham Alshaer and Geoff Fernie.

2010-2015

2011 Toronto Rehab joins the University Health Network.

The iDAPT Centre for Rehabilitation opens at Toronto Rehab. This facility is home to more than 13 state-of-the-art labs, workshops and research spaces.

2015 Toronto Rehabilitation Institute hosts the launch of the AGE WELL National Centre of Excellence, a network of researchers, industry and other stakeholders dedicated to helping people live at home longer.

2015-2020

2017 DriverLab, the most advanced driving simulator in Canada, opens at Toronto Rehab.

Schroeder Foundation donates $20M for Brain Innovation and Recovery.

Hygienic Echo is founded by Dr. Geoff Fernie.

2018 Dr. Milos R. Popovic is appointed Institute Director

Research Institute partners with the Krembil Research Institute and University of Toronto to launch CRANIA, the Centre for Advancing Neurological Innovation to Application.

2019 Research Institute is rebranded to KITE (Knowledge, Innovation, Talent, Everywhere).

KITE hosts Rehab Week.

KITE Clinics launches 1st clinic.

Launch of KITE 2019 Strategic Initiatives Positioning Paper.

2020s and beyond

2021 UHN Foundation is established.

Schroeder Foundation donates $7.2M for Schroeder Pain Assessment and Rehabilitation Research Centre (SPARC).

2022 Construction on SPARC begins.

FIBRE launched in 2021.

KITE Clinics launches 2nd and 3rd clinics.

Launch of KITE 2022 Strategic Initiatives Positioning Paper.

Our Scientists

KITE's principal investigators are organized into six buckets that illustrate the scope of their research and desire to deliver rehab solutions to every corner of the human body.

Aging


Arlene Astell


Tilak Dutta


Alex Mihailidis


Atena Roshan-Fekr


Jennifer Campos


Geoff Fernie


Alison Novak

Nancy M. Salbach

Cardiac Care


David Alter


Owen Lyons


Azadeh Yadollahi


Tracey Colella


Susan Marzolini


Sherry Grace


Paul Oh

Complex Continuing Care & Long-Term Care


Jennifer Bethell


Kathy McGilton


Andrea Iaboni


Sarah Munce


Shehroz Khan


Babak Taati


Pia Kontos

Musculoskeletal


Andrea Furlan


Dinesh Kumbhare

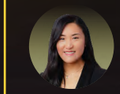

Darlene Reid

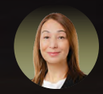

Daniel West

Neuroscience


Mark Bayley


Luka Milosevic


Vincy Chan


Tatyana Mollayeva


Angela Colantonio


Kara Patterson


Robin Green


Milos R. Popovic


Liz Inness


Elizabeth Rochon


Behrang Keshavarz


Catriona Steele


Avril Mansfield


Yana Yunusova

Spinal Cord Injury


Brian Chan


Susan Jaglal


Kei Masani


Cathy Craven


Sukhvinder Kalsi-Ryan


Kristin Musselman


Julio Furlan


Cesar Marquez-Chin


Jose Zariffa

Aging

Canada is aging fast. The population of senior citizens – those age 65 and older – is expected to more than double over the next two decades. This demographic change will place great demands on the continuum of care. It is now more important than ever to devise solutions that can ease pressure on the health system, provide additional services and supports and assist independent living and aging in place.

Arlene Astell

Cross-cutting research opportunities:

A C&L

Research Overview: Dr. Astell leads the Dementia Aging Technology Engagement (DATE) lab, which focuses on co-producing interventions with people living with dementia and those without cognitive impairments. This is largely achieved through creative applications of technology to support maintenance of everyday activities, rehabilitation and engagement with leisure and recreation activities.

Biggest priorities for next five years:

- Continue to develop rehabilitation programs for people living with dementia
- Further collaboration with colleagues in KITE on areas of mutual interest
- Explore potential of AI and neurotechnologies to mitigate cognitive impairment of people living with dementia

Jennifer Campos

Cross-cutting research opportunities:

A C&L MSK N

Research Overview: Dr. Campos' research seeks to understand how sensory systems (visual, auditory, vestibular) support safe mobility as we age (balance, locomotion, driving) and examines how age-related sensory loss and cognitive declines can increase the risk of falls and vehicle collisions (healthy older adults, hearing loss, dementia). She uses VR to examine how sensory inputs are integrated in the brain and to optimize simulation technologies for use as novel rehab assessment and intervention tools.

Biggest priorities for next five years:

- Identify interventions to prevent falls and support safe driving in older adults with age-related hearing loss (e.g., novel hearing aid technologies and cognitive training)
- Develop a deployable multisensory VR system to support communication and well-being in persons with dementia in their homes and communities
- Better understand how basic and complex multisensory processing can provide unique insights into early-stage/ pre-clinical sensory and cognitive declines

Tilak Dutta

Cross-cutting research opportunities:

A C&L C MSK N SCI

Research Overview: The goal of Dr. Dutta's research is to improve the lives of those who are living with disability, as well as their caregivers (paid and unpaid) by: Preventing fall-related injuries for older adults; Supporting the care of older adults and individuals with disabilities; Improving safety and usability of public spaces for older adults and individuals with disabilities.

Biggest priorities for next five years:

- Make recommendations for improving the accessibility of outdoor spaces like National Parks and Provincial Parks
- Make recommendations for improving the safety and usability of sidewalks and street crossings at intersections
- Fabricating and testing a newly patented composite outsole material that that has both improved slip-resistance and improved wear-resistance compared to currently available composite materials used in winter footwear outsoles

Geoff Fernie

Cross-cutting research opportunities:

A C&L N

Research Overview: Dr. Fernie's passion is the search for practical solutions to common problems of daily living for an aging population, people with disabilities and their caregivers. His main research focus is on increasing safe mobility. He reduces falls through improved environmental design and footwear and increases safety for older drivers. He also develops and is commercializing technology to reduce the large numbers of patients who catch infections when in hospital.

Biggest priorities for next five years:

- Advance application of technology to improve hand hygiene and increase number of installations
- Help design and build new type of hospital to reduce wait lists in Ontario applying technology and more efficient management
- Work with colleague Atena Roshan Fekr to grow our AI applied research for virtual care

Alex Mihailidis

Cross-cutting research opportunities:

A, C&L, C, MSK, N, SCI

Research Overview: Dr. Mihailidis' research is focused on the development of new technological approaches to support older adults with a variety of diseases and impairments, with a particular focus on dementia and other cognitive impairments. He has applied advanced techniques including various aspects of AI, advanced sensors, and robotics.

Biggest priorities for next five years:

- Continuation of the AGE-WELL NCE national network once Federal funding ends in 2023/24
- Expansion of research program to have a stronger emphasis on translation and knowledge mobilization
- Continue to implement new national standards for Long-term Care, which he was the chair for with the CSA Group

Alison Novak

Cross-cutting research opportunities:

A

Research Overview: Dr. Novak's primary research area focuses on understanding mobility in challenging environments (such as stairs, ramps, bathrooms) and the impact of aging and environmental factors to reduce the risk of falls and support aging-in-place strategies.

Biggest priorities for next five years:

- Continue development of education material for bathing safety; creating education modules
- Ongoing dissemination of research findings to inform code and standard development for accessible environments

Atena Roshan-Fekr

Cross-cutting research opportunities:

A, C&L, MSK, SCI

Research Overview: Dr. Roshan-Fekr is currently working on three different programs targeting older adults and patients at KITE: 1) Footwear testing program to reduce slips, trips and falls among seniors; 2) Program to Accelerate Technologies for Homecare (PATH) to increase independence among seniors and; 3) Infection control program at Long-Term Care homes.

Biggest priorities for next five years:

- Apply for more grant applications from agencies, such as NSERC and CIHR, in order to bring in more funding to support hiring more HQPs
- Knowledge translation through academic publications and conference presentation in world leading journals and conferences related to her field
- Extend collaboration with industry partners and earn promotion to Associate Professor at University of Toronto

Nancy M. Salbach

Cross-cutting research opportunities:

A, N

Research Overview: Dr. Salbach's research aims to optimize the mobility, exercise participation, and health of older adults with balance and mobility limitations resulting from the effects of stroke and other chronic health conditions. To achieve this goal, Dr. Salbach's research involves developing strategies that foster recommended practices in stroke rehabilitation and accessible community exercise program.

Biggest priorities for next five years:

- CIHR-funded 4-site RCT of GO-OUT program: Complete data analysis, reporting
- CIHR-funded 6-site RCT of virtual "TIME™ at Home" exercise program in people with balance/mobility limitations: Launch, complete data collection
- Invited Member, International Stroke Recovery and Rehabilitation Alliance Roundtable on Outcomes of Mobility (PI-Gert Kwakkel): complete consensus process

Cardiac Care

Heart disease is the second leading cause of death in Canada.
At UHN, we are not only a world leader in the diagnosis, care and treatment of patients with both simple and complex cardiac disease, but also in cardiovascular rehabilitation and prevention. Our comprehensive research program seeks to better understand the disease in order to offer better long-term outcomes for patients.

David Alter

Cross-cutting research opportunities:

Research Overview: Dr. Alter's research focuses on cardiovascular prevention health systems and population health outcomes. His research includes the development and evaluation of innovative strategies, including the study of music and rhythmicity to improve exercise adherence among people who have, or those who are at risk for, cardiovascular disease.

Biggest priorities for next five years:

- The development, implementation, and evaluation of hybrid prevention payment models that facilitate risk-stratification for the delivery of enhanced cardiovascular prevention
- The development of a big-data ambulatory care ecosystem for the monitoring and surveillance of health outcomes associated with preventative care initiatives
- Communicate how preventative health learning systems are informed by priorities of equity, diversity, and health-literacy, in Canada and beyond

Tracey Colella

Cross-cutting research opportunities:

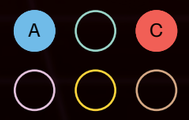
Research Overview: Dr. Colella's research focuses on strategies to facilitate seamless patient and family transitions through the cardiovascular continuum of care. Interests include: 1) defining the needs, preferences, sex and gender differences that impact effective and timely access to community-based cardiac rehab; 2) the development and evaluation of patient-centred interventions; and 3) patient-centred digital health technology to reduce systemic and patient barriers to cardiac rehabilitation enrolment and completion.

Biggest priorities for next five years:

- Secure a research chair position and continue to build the sex and gender-focused aspects of her program in cardiac rehabilitation research
- Continue to build a collaborative, multidisciplinary research program focused on virtual rehabilitation and the use of artificial intelligence in order to promote patient access, engagement and adherence
- Develop further international collaborations targeting sex and gender differences, Women's heart health, including equity, diversity and inclusion in order to ensure cardiac rehabilitation is the standard of care for all eligible patient populations

Sherry Grace

Cross-cutting research opportunities:



Research Overview: Dr. Grace investigates how to optimize post-acute cardiovascular care and outcomes, which chiefly involves improving access to cardiac rehabilitation, given it is the most effective known, yet least-well implemented, strategy to improve survival. Research activities to achieve this include registries, clinical trials, systematic reviews, clinical practice guidelines, policy service as well as development and evaluation of scalable implementation tools.

Biggest priorities for next five years:

- International Cardiac Rehabilitation Registry (ICRR): continue to on-board sites, long-term follow-up of patients (annual until deceased), and leverage to embed RCTs and other sub-studies
- Multi-method study to examine access to heart failure clinics. Recently awarded grant to not only study this in Canada, but also across Eastern Mediterranean Region
- Re-do global audit to find out status of Cardiac Rehab around the world post-pandemic

Owen Lyons

Cross-cutting research opportunities:

C

Research Overview: Dr. Lyons' research interest is in sleep apnea and its interaction with other diseases. His two main areas of focus are chronic kidney disease and atrial fibrillation, but he is also interested in the relationship between sleep apnea and atrial fibrillation.
Dr. Lyons is focused on improving access to sleep apnea diagnosis and treatment through clinical quality improvement initiatives and he is currently conducting a QI project to develop a new clinical pathway for the evaluation and diagnosis of sleep apnea in AF patients.

Biggest priorities for next five years:

- To ensure his research has meaningful impact on patient's disease management through knowledge translation
- Obtain further extra-mural funding to sustain current and future research endeavors
- Continue to attract trainees to his research program at KITE and develop a funded fellowship program

Susan Marzolini

Cross-cutting research opportunities:

A C N

Research Overview: Dr. Marzolini's research examines the dose-response relationship between exercise and health related outcomes in people with stroke and cardiac disease. Using novel exercise training methods, her aim is to determine an exercise treatment aimed at promoting long-term health, repairing the brain and restoring lost mobility after stroke. Dr. Marzolini also examines sex and gender disparities in cardiovascular disease populations

Biggest priorities for next five years:

- Developing exercise models for cardiovascular and chronic disease populations (cardiac, stroke, diabetes mellitus, cancer, brain)
- Continued development of behavioral models for cardiovascular rehabilitation, including patient education
- Development and optimizing use of technology to enable, support, and innovate rehabilitation models of care (Apple, Fibre)

Paul Oh

Cross-cutting research opportunities:

A C&L C MSK N SCI

Research Overview: Dr. Oh's program of research involves the design, implementation and evaluation of exercise and physical activity, alongside behavioural and technological support models for the prevention and management of chronic diseases. He closely integrates research inquiry into clinical program development and policy around rehab interventions on a provincial and national scale.

Biggest priorities for next five years:

- International collaborations – research networks and training of clinical fellows who have implemented our model of cardiac rehab in their countries (e.g., Latin America, Brazil, India, Israel, Saudi Arabia, China, Philippines and USA)
- Technology projects to inform and improve cardiac rehab delivery – especially use of a smartwatch to better understand physical activity patterns, motivate adherence, and predict changes in health
- Patient education platforms – wider dissemination internationally to address significant gaps in heart health literacy on a global basis

Azadeh Yadollahi

Cross-cutting research opportunities:

A C N

Research Overview: Dr. Yadollahi's research aims to improve understanding of the pathophysiology of cardio-respiratory disorders, such as asthma, heart failure and sleep apnea, and to develop novel technologies for improved management of these disorders. She is particularly interested in developing innovative technologies for monitoring of physiological signals at home and implementing equitable and accessible technologies for under-represented individuals with chronic cardio-respiratory disorders.

Biggest priorities for next five years:

- Commercialize a smart shirt to monitor extra fluid in the lungs, in patients with heart failure
- Develop accessible, user-centered wearables to diagnose sleep apnea in the community
- Develop a new treatment for sleep apnea, using smart clothing

Complex Continuing Care & Long-Term Care

As of 2021, there were 2,076 long-term care homes in Canada. About one-third of seniors younger than 80 who've been diagnosed with dementia live in one of these facilities. The proportion increases to 42 per cent for those 80 and older, according to the Canadian Institutes for Health Information. KITE is committed to seeking solutions that support these residents, their families and LTC staff.

Jennifer Bethell

Cross-cutting research opportunities:

C&L

Research Overview: Dr. Bethell is interested in the topic of social connection, including loneliness and social isolation, in Long-Term Care (LTC) homes. Dr. Bethell is interested in using large health administrative and survey datasets for research and reporting on health outcomes. To date, her work in this area has been focused on topics related to mental health, injuries and prescription medication use and how these issues influence health across the life course. She is also interested in patient engagement in research, particularly research related to dementia.

Biggest priorities for next five years:

- Work with the Foundation to find a donor to fund a Chair in Long Term Care
- Project Grant funding from the Canadian Institutes of Health Research, as an early career researcher
- Research and knowledge translation in areas related to LTC, dementia, health administrative data and patient engagement, including by supervising trainees and collaborating with knowledge users (e.g., people with lived experience, community organizations)

Andrea Iaboni

Cross-cutting research opportunities:

A C&L MSK N

Research Overview: Dr. Iaboni's research interests include the development, evaluation, and implementation of technology for improving the safety and quality of dementia care, and the impact of treatments for psychiatric illness on mobility in older adults. At present, Dr. Iaboni's research includes both clinical trials of technology for improving dementia care and pharmacoepidemiological research into psychotropic prescribing practices.

Biggest priorities for next five years:

- Building international collaborations on the uses of Real-Time Location Systems (RTLS) in aged residential care
- Expanding partnerships with industry to move innovations in commercial use and improve implementation practices of RTLS technologies
- Evaluation of environmental design of dementia units using RTLS technologies

Shehroz Khan

Cross-cutting research opportunities:

A C&L C N

Research Overview: Dr. Khan's main research focus is the development of machine learning and deep learning algorithms within the realms of aging, rehabilitation and intelligent assistive living. He recently led a study to detect behaviours of risks in people with dementia living in a Long-Term Care (LTC) homes. His team uses a multimodal wearable device and video data to build predictive models. In another study, they have used an indoor location device to track patients' walking patterns to develop health indices.

Biggest priorities for next five years:

- Develop health indices for dementia patients on agitation and social engagement, assess social and functional decline in community dwelling older adults using multimodal sensors
- Develop AI based virtual cardiac rehab platform for exercise monitoring and detecting patient engagement
- Build a collaborative network for expanding research and grant opportunities

Pia Kontos

Cross-cutting research opportunities:

A C&L N

Research Overview: Dr. Kontos' research primarily focuses on quality of life and care of older adults living in Long-Term Care (LTC) settings with an emphasis on stigma associated with dementia, the development of theories, policies, and practices that support relational caring, and the development and evaluation of arts-based initiatives to reduce stigma and improve quality of care in LTC.

Biggest priorities for next five years:

- Lead culture change in dementia care by:
  - Innovating education;
  - Contributing to the development of informed social policy on care in institutional settings;
  - Supporting relational caring in practice.

Kathy McGilton

Cross-cutting research opportunities:

A C&L MSK

Research Overview: Dr. McGilton's research focuses on improving the lives of older adults in facility-based settings while also studying the staff and the contextual factors that influence their care. Her research has led to innovations in models of care and positive outcomes for older adults, care partners, and staff.

Biggest priorities for next five years:

- Influence policy within Ontario by providing evidence on effective Transitional Care Models to fund going forward. Evidence from her CIHR grant will be relevant to clinical and policy decision makers in Ontario, and offer guidance for those in other provinces and territories contemplating the implementation of similar TCPs
- Advise policy decision makers and LTC administrators on successful Nurse Practitioner/Doctor collaborative models of care for LTCH to ensure Nurse Practitioners are hired into LTCH that will best meet the needs of the residents and staff who care for them
- Continue to influence international practice and policy related to the role of nurse leaders in LTCH

Sarah Munce

Cross-cutting research opportunities:

C&L MSK N SCI

Research Overview: Dr. Munce's program of research relates to the development, implementation and evaluation of transitional care interventions, including peer support, peer navigation, and self-management for individuals with complex needs. To carry out this research, she uses mixed and knowledge synthesis (scoping, systematic reviews) methods.

Biggest priorities for next five years:

- Developing Project CONNECT (Compassionate Online Navigation to Enhance Care Transitions);
- Evaluating CONNECT via a (pilot feasibility) RCT with an embedded qualitative component;
- With colleagues from SickKids and Children's Healthcare Canada, she is leading a CIHR-funded national consensus-building initiative on quality indicators for transition from paediatric to adult care for youth with chronic physical, developmental, and mental health conditions

Babak Taati

Cross-cutting research opportunities:

A C&L

Research Overview: Dr. Taati's research applies computer vision technologies to solve real-world health care challenges in rehabilitation and the management of chronic conditions. He focuses on moving away from the laboratory and contrived situations towards the development and validation of systems that work reliably in natural settings, such as in the home or in long-term care.

Biggest priorities for next five years:

- External validation of our fall risk assessment models (together with Dr. Andrea Iaboni);
- External validation of our pain detection model in live performance (together with Dr. Thomas Hadjistavropoulos);
- The development of an online platform for orofacial assessment (together with Dr. Yana Yunusova)

Musculoskeletal

Diseases of the musculoskeletal system – bones, muscles, tendons, ligaments, joints, cartilage, and other connective tissue – may result in the inability to walk, sit, or even breathe, and have a substantial impact on the health of Canadians. Our scientists are actively seeking treatments that focus on improving the health of the musculoskeletal system in order to maximize the capacity for independent and safe mobility.

Andrea Furlan

Cross-cutting research opportunities:

MSK N

Research Overview: Dr. Andrea Furlan conducts primary research on the safe and effective use of opioids for chronic non-cancer pain. She is also an expert in knowledge synthesis methods, with published guidelines on how to conduct Cochrane Reviews, and she has various projects on guideline implementation and evaluation.

Biggest priorities for next five years:

- Expand project ECHO chronic pain and opioid stewardship to other Canadian provinces
- Promote opioid guideline implementation and conduct evaluation of prescribers using the guideline
- Grow a YouTube channel for patients with chronic pain

Dinesh Kumbhare

Cross-cutting research opportunities:

A MSK N

Research Overview: Dr. Kumbhare conducts primary research to investigate the mechanisms which cause chronic pain with an emphasis on musculoskeletal based-pain syndromes. He uses imaging (ultrasound and MRI), neurophysiology and other physiological measurements (from blood) to develop biomarkers. Dr. Kumbhare is developing a database that combines self-report standardized questionnaires, physical examination with novel measurements. This information will be used to develop composite biomarkers which are clinically feasible and improve outcomes.

Biggest priorities for next five years:

- Improve understanding of key mechanisms that underlie chronic pain disorders, which lead to disability
- Develop clinically feasible methods to objectively evaluate peripheral and central sensitization
- Develop a “big data” based algorithms and composite biomarkers which can assist patients and clinicians to provide personalized medical treatments for chronic pain

Darlene Reid

Cross-cutting research opportunities:

A MSK N

Research Overview: Dr. Reid’s research focuses on how acute and chronic disease affects muscle performance, and its impacts on the ability to perform daily activities. Examining muscle activation, its metabolic capacity and coordination provides insights into the underlying pathophysiology and how it can be improved through rehabilitation.

Biggest priorities for next five years:

- To further investigate how the cognitive load of dyspnea interferes with motor control of respiratory muscles
- To determine if cognitive and physical training compared to physical training has an additive affect to the ability to do daily physical activities, and health related quality of life
- To examine how different interventions (inspiratory muscle training, magnetic stimulation of the phrenic nerves, cross training respiratory muscles) impacts respiratory muscle function/structure and outcomes after major surgery (i.e. lung transplant surgery) and critical care illness

Daniel West

Cross-cutting research opportunities:

A MSK

Research Overview: From basic to clinical science, Dr. West’s research provides an interdisciplinary viewpoint and impact on MSK-related research at KITE. This includes unique-to-KITE expertise in skeletal muscle physiology and atrophy, exercise rehabilitation, protein metabolism, age-related skeletal muscle dysfunction and recovery impairment.

Biggest priorities for next five years:

- Address knowledge gaps related to skeletal muscle physiology, plasticity, biology and regeneration
- Develop bench-to-bedside capability for chronic MSK pain mechanism biomarker research
- Use knowledge and biomarker development capability to develop clinical applications

Neuroscience

It is estimated that one in three Canadians will be affected by a brain disease or disorder in their lifetime. Our scientists are currently investigating on multiple fronts with the goal of devising solutions, treatments, programs and innovative devices that can help these patients and ease the burden on Canada's health care system and economy.

Mark Bayley

Cross-cutting research opportunities:

A, C&L, C, MSK, N, SCI

Research Overview: Dr. Bayley's research focuses on understanding how to speed brain recoveries through exercise, virtual reality, telerehabilitation, and functional electrical stimulation. Importantly, he has bridged the know-do gap by making the best evidence available to clinicians through smartphone apps and Best Practices guidelines in stroke, concussion, multiple sclerosis and Brain Injury. His work has redesigned the stroke and brain injury rehabilitation systems in Canada.

Biggest priorities for next five years:

- To identify medications that can enhance recovery and open the window of neuro plasticity after brain injury
- Continue to advance understanding of concussion and its recovery
- Implement at a national level, the best practices for neurorehabilitation through auditing current state of practice and promoting uptake by Ontario health teams

Vincy Chan

Cross-cutting research opportunities:

A, N

Research Overview: Dr. Chan's research focuses on preventing traumatic brain injury (TBI), integrating mental health in TBI care, and improving long-term health outcomes and quality of life of individuals aging with a TBI. There is particular emphasis on identifying and addressing inequities in health, health service use, and health and system level outcomes experienced by underserved populations with TBI across the lifespan and continuum of healthcare.

Biggest priorities for next five years:

- Assess equity in TBI clinical practice guidelines and co-create accessible, consumer-centred educational materials, resources, and/or tools sensitive to the needs of underserved populations with TBI
- Expand our TBI Birth Cohort, the first of its kind in North America, with innovative data science and analytics to (a) identify opportunities for early intervention of adverse outcomes and targeted prevention of TBI, (b) address gaps in the care continuum for individuals with TBI, (c) inform equitable healthcare planning
- Build capacity for interdisciplinary research teams with an emphasis on integrating sex, gender, and social determinants of health throughout the research and knowledge translation process

Angela Colantonio

Cross-cutting research opportunities:

N

Research Overview: Dr. Colantonio leads an internationally recognized interdisciplinary program of research and training on traumatic brain injury in Underserved Populations through the Acquired Brain Injury Research Lab. Her team members are world leaders in addressing equity considerations, which includes sex/gender and other diversity considerations, such as race/ethnicity. She trains also trains a team of outstanding trainees.

Biggest priorities for next five years:

- Continue to address practice gaps, such as brain injury in intimate partner violence
- Collaboratively support practice changes with new protocols/practice guides
- Continue leading world leading Rehabilitation Sciences Institute training the next generation of rehabilitation scientists

Robin Green

Cross-cutting research opportunities:

A, N

Research Overview: Dr. Green's program of research addresses brain and behavioural mechanisms of recovery from moderate-severe traumatic brain injury (TBI). Her lab has re-conceptualized TBI as a chronic and possibly neurodegenerative disease process; this novel conception is needed in order to identify parallels with other forms of neurodegeneration, which will offer new avenues of treatment. Dr. Green is currently engaged in the development of interventions to mitigate the accelerated aging that is observed in the later stages of TBI by targeting modifiable mechanisms.

Biggest priorities for next five years:

- Revisioning the next 5 years of our Telerehab Centre for ABI. Over the next five years we plan to increase our visits at least tenfold.
- Fifteen-year follow-up study of moderate-severe TBI cohort.. We made a series of discoveries about recovery and impediments to recovery. This cohort of patients is unique in the world, and the discoveries set us up to establish our rehabilitation centre and the development of novel treatments to improve recovery.
- We will now embark on a ~15 year follow-up of these patients in order to understand the long-term effects of their injuries, and how the brain ages.

Liz Inness

Cross-cutting research opportunities:

A, C, N, SCI

Research Overview: Dr. Inness leads the KITE Innovation & Rehabilitation Clinics and is a physical therapist with expertise in neurorehabilitation. Dr. Inness' work has a strong focus on knowledge translation with an aim to optimize assessment and training of balance and mobility and to promote engagement in exercise and physical activity after stroke and brain injury.

Biggest priorities for next five years:

- In alignment with Toronto Rehab's strategic plan, support the development of sustainable models and strategies to support clinical-research integration
- Finalize the Stroke Aerobic Exercise Implementation Toolkit (START) and make it publicly available with on-line resources on the KITE website
- Contribute to the update of the Toronto Rehab Telerehab Toolkit 2nd edition with on-line resources

Behrang Keshavarz

Cross-cutting research opportunities:

C, N

Research Overview: Dr. Keshavarz's research focuses on human factors in virtual environments. He investigates the (neuro) physiological, sensory, and cognitive mechanisms underlying human perception and performance in virtual reality (VR). This relates to the optimization of VR applications (VR sickness, vection), as well as addressing real-world challenges with modern simulation technologies (e.g., drowsiness while driving).

Biggest priorities for next five years:

- Continue with the line of research: (1) developing and testing behavioral countermeasures against VR sickness; (2) identify early physiological markers that can predict the onset of VR sickness; (3) optimizing VR technologies by using a multisensory approach with neurophysiological measures to study vection in VR
- Further strengthen relationship with industry partners (two industry funded projects in the last 2 years), specifically with the automotive sector
- Continue growth of my research team (currently 10 members): support students establishing successful academic careers (e.g.. mentoring, networking, supervision) and add expertise to the research team (e.g., postdocs)

Avril Mansfield

Cross-cutting research opportunities:

A, N

Research Overview: Dr. Mansfield's research aims to improve safe independent mobility for people with physical limitations. Specifically, she develops, evaluates, and works toward implementing effective interventions to improve balance and mobility, prevent falls, and increase participation in planned exercise and physical activity. A lot of her current research focuses on the mobility challenges faced by people with stroke, but she has also collaborated on projects involving people with other neurological conditions, including spinal cord injury, Parkinson's disease and multiple sclerosis.

Biggest priorities for next five years:

- While reactive balance training has shown promise for reducing falls in daily life, our work also shows that therapists have a number of questions regarding how best to implement it into practice. Specifically, therapists are unsure of the optimal dose and method of training, and how to implement training with competing rehabilitation priorities
- To help address these questions, our future work will determine:
  - Methods to define the intensity of balance training in order to conduct future investigation of the optimal training intensity;
  - The minimum number of training sessions required to make lasting changes in reactive balance control; and
  - If internal or external perturbations are superior for reactive balance training

Luka Milosevic

Cross-cutting research opportunities:

A, N

Research Overview: Dr. Milosevic's research is focused on the development and optimization of neuromodulation therapies (i.e., deep brain stimulation) in various disorders including Parkinson's disease, dystonia, essential tremor and depression, as well as the elucidation of neurophysiological patterns of activity that underlie symptoms of the aforementioned disorders.

Biggest priorities for next five years:

- Development of closed-loop deep brain stimulation applications in various disorders; funded by NSERC Discovery, NFRF Exploration, Brain Canada, and Banting Foundation grants
- Establishing an animal laboratory for optogenetics and DBS research using funds from successful CFI grant
- Wearable technologies to be used for neuro feedback control of DBS devices

Tatyana Mollayeva

Cross-cutting research opportunities:

A, C&L, C, MSK, N, SCI

Research Overview: Dr. Mollayeva's research to date has confirmed known risk factors of dementia, including cardiovascular disease, diabetes, vascular pathology, depression, smoking, sensory impairment, and hearing loss. Her work has also identified new dementia risks such as sleep disorders and traumatic brain injury, which was noted to differentially affect male and female patients' neurorehabilitation and cognitive outcomes, alone and with comorbid spinal cord injury.

Biggest priorities for next five years:

- Prevention - Primary Prevention, Secondary Prevention, and Tertiary Prevention of neurological disorders and injuries

Milos R. Popovic

Cross-cutting research opportunities:

A, N, SCI

Research Overview: Ninety per cent of Dr. Popovic's research focuses on developing neuromodulation technologies. In the past, he has developed neuromodulation systems for improving reaching, grasping, sitting, standing and walking. The most recent efforts of his team are focused on developing new functional electrical stimulation (FES) technologies and textile-based solutions for FES.

Biggest priorities for next five years:

- To run a randomized control trial with the FES system for depression
- File a patent for dry stimulation electrode and develop the commercial grade solution for the dry stimulation electrode
- Develop the first garment-based FES systems

Kara Patterson

Cross-cutting research opportunities:

A, MSK, N

Research Overview: Dr. Patterson's research program fits mostly in the neuro category. She leads the RELEARN lab, which strives to advance neurorehabilitation practice in order to improve mobility outcomes for people living with neurological conditions, and in particular stroke. Her work has three main themes: understanding how motor learning occurs and contributes to recovery after stroke; understanding changes to gait pattern after neurologic injury; developing and testing novel strategies including rhythm-, music- and dance-based interventions.

Biggest priorities for next five years:

- Develop a new branch of her research program that investigates the perception and self-evaluation of timing of gait events. This area has received little attention in the gait rehabilitation field and will have an impact on how feedback-based interventions are designed
- Continue to develop and test her mode of the mechanisms of dance interventions
- Continue to develop a relatively new branch of research that investigates secondary musculoskeletal issues that develop after stroke. This is important because multimorbidity (like stroke and osteoarthritis) has a negative impact on independence and quality of life

Elizabeth Rochon

Cross-cutting research opportunities:

A, C&L, N

Research Overview: Dr. Rochon's research is focused on communication difficulties in neurological populations, specifically in individuals with: aphasia due to stroke, primary progressive aphasia, a neurodegenerative condition, and other dementias. Research projects investigate the behavioral and neural changes in the brain with recovery, as well as the feasibility and efficacy of new intervention approaches.

Biggest priorities for next five years:

- With a group of multidisciplinary investigators, establish feasible and effective intervention(s) for individuals with primary progressive aphasia, a neurodegenerative condition, based upon over a decade of research from her group on the underlying nature and course of the condition
- Contribute to research the benefits of choirs as a member of the Executive committee of the newly awarded SSHRC grant (PI F. Russo) *Group singing to support social wellbeing and communication in adults with communication disorders: A knowledge generation and mobilization partnership.* Partnership Grants Social Sciences and Humanities Research Council of Canada (SSHRC)
- Continue to investigate the possibilities and limits of neuroplasticity subsequent to combined and/or adjuvant therapies in neurological populations

Catriona Steele

Cross-cutting research opportunities:

A C&L C MSK N SCI

Research Overview: Dr. Steele's research focuses on helping people who lose the ability to swallow – something we all take for granted. This includes studying how foods and liquids move through the throat, establishing international definitions for food and liquid consistency in diets for people with swallowing difficulty, and developing exercise-based therapy that helps people return to normal eating and drinking.

Biggest priorities for next five years:

- To complete a new study to validate the initial ASPEKT Method Reference Values for healthy swallowing and to identify patterns of pathophysiology in ASPEKT measures of swallowing people with 6 different medical conditions involving dysphagia
- To develop and launch standardized training for clinicians and other researchers in using the ASPEKT Method to quantify swallowing physiology
- To further develop and validate a novel method for the clinical evaluation of food oral processing and choking risk

Yana Yunusova

Cross-cutting research opportunities:

N

Research Overview: Dr. Yunusova's research deals with improving understanding of the effect of neurological diseases on speech production/ communication. It also focuses on the development of novel technologies and methods for the assessment and treatment of speech disorders in patients with amyotrophic lateral sclerosis (ALS), Parkinson's disease, or post-stroke.

Biggest priorities for next five years:

- Continue record of publications documenting our research progress and funding to support the research outlines above
- Continue record of graduate student and postdoctoral education and training
- Continue development and commercialization of a software tool for speech assessment (VirtualSLP)

Spinal Cord Injury

Between 250,000 and 500,000 people suffer a spinal cord injury (SCI) each year, according to the World Health Organization.
The diagnosis can be overwhelming and life-changing for patients and their families. That's why the SCI research teams based at Toronto Rehab's Lyndhurst Centre are working relentlessly and aggressively to accelerate the translation of research into best practice.

Brian Chan

Cross-cutting research opportunities:

A, C&L, C, MSK, N, SCI

Research Overview: Dr. Chan's research area of focus is health care utilization and economic evaluations in spinal cord injury and related health complications. The knowledge gained from his research helps decision-makers understand the economic burden of this injury and its common secondary complications and to evaluate new technologies to help those suffering from this condition.

Biggest priorities for next five years:

- Grow the lab so it is capable of training multiple trainees with diverse backgrounds each year
- Sustain funding to help achieve the aims of the lab
- Building better data infrastructure at Toronto Rehab to facilitate research to improve the care that the clientele receive

Cathy Craven

Cross-cutting research opportunities:

SCI

Research Overview: Dr. Craven's research redefines patients' experiences with health conditions after spinal cord injury, helping to avoid or better manage heart disease and fracture. She leads the Spinal Cord Injury-Implementation and Evaluation Quality Care Consortium by supporting nationwide best practices implementation and reporting indicators of quality care.

Biggest priorities for next five years:

- Identifying and mentoring the next generation of SCI scientists in Physical Medicine and Rehabilitation
- Delivering novel therapies and technologies (1:1 and group programming) to address muscle-bone health among individuals with lived experience affiliated with Lyndhurst Centre
- Assuring the sustainability of Spinal Cord Injury Implementation and Evaluation Quality Care Consortium and the Canadian SCI Rehabilitation Association

Julio Furlan

Cross-cutting research opportunities:

A, SCI

Research Overview: Dr. Furlan's research is focused on outcome measures (including clinical assessments, neuroimaging analysis, and neurophysiological assessments) and predictors of outcome (including age, sex and secondary medical conditions, such as sleep apnea and cardiovascular dysfunction) after traumatic and non-traumatic spinal cord injury. In addition, he has interest and expertise in health economics and epidemiology.

Biggest priorities for next five years:

- To develop and implement a service for early diagnosis and timely management of sleep disorders in individuals with spinal cord injury (SCI)
- To lead a policy change in Ontario to enhance access to healthcare services on diagnosis and management of sleep disorders for individuals with SCI
- To establish an international working group with focus on developing the first guidelines on management of sleep apnea in the SCI population

Susan Jaglal

Cross-cutting research opportunities:

SCI

Research Overview: Dr. Jaglal's research interests include osteoporosis, spinal cord injury and rehabilitation health services with emphasis on utilization, appropriateness, self-management and knowledge translation. Dr. Jaglal made important contributions to two areas of health services research in spinal cord injury: determining the epidemiology of non-traumatic spinal cord disorders and development and implementation of a self-management program for SCI.

Biggest priorities for next five years:

- Complete pilot RCT and disseminate findings
- Expand SCI&U health coaching program to newly injured transitioning from inpatient rehab to community – submit new grant proposal
- Develop version of SCI&U for low resource countries with ISCoS

Sukhvinder Kalsi-Ryan

Cross-cutting research opportunities:

A · N · SCI

Research Overview: Dr. Kalsi-Ryan's research is primarily based in the traumatic and non-traumatic SCI population and other neuro groups. She has a special interest in upper limb assessment, recovery, and neurorestoration and spine pathology. Dr. Kalsi-Ryan is the Scientific/ Clinician Lead at the KITE Innovations and Rehabilitation Clinics.

Biggest priorities for next five years:

- Accelerate use of discovery into patient care
- Develop supportive environment for new scientists to commercialize discovery
- Build further industry partnerships to fulfil sustainability goals of KITE Clinics and expand

Kei Masani

Cross-cutting research opportunities:

A · N · SCI

Research Overview: Dr. Masani's research aims to improve the mobility of people who experience neurological impairment. His approach to investigating human movement is undertaken from a neuromechanical perspective, such as the union of neurophysiology and physics. With this in mind, Dr. Masani focuses specifically on developing accurate assessments and therapeutic tools using functional electrical stimulation for standing, walking and adapted exercise.

Biggest priorities for next five years:

- To develop novel therapies using electrical stimulation on spinal cord and motor cortex, which can improve motor function in lower limbs for people with spinal cord injury
- These novel therapies will help patients imrpove standing balance which could improve the quality of life in the long run

Cesar Marquez-Chin

Cross-cutting research opportunities:

N · SCI

Research Overview: Dr. Marquez-Chin creates neurotechnology that is designed to promote the recovery of movement after paralysis resulting from spinal cord injury. The development of this technology is informed by his previous clinical experience and close collaboration with physiatrists and therapists, resulting in clinically viable systems.

Biggest priorities for next five years:

- Verify observed efficacy through increased testing of the developed EEG-triggered functional electrical stimulation therapy
- Characterize the neurophysiological effects of the intervention through electrophysiological and imaging testing
- Explore commercialization of technology through collaboration with industry partners

Kristin Musselman

Cross-cutting research opportunities:

A · N · SCI

Research Overview: The overarching aim of Dr. Musselman's research is to develop innovative, clinically feasible approaches to restore movement, function and participation for individuals living with complex neurological disease, with a focus on spinal cord injury. Her team develops and implements assessments, technologies and interventions that emphasize individualization, self-efficacy and the principles of neuroplasticity.

Biggest priorities for next five years:

- Increase the use of activity-based therapy and functional electrical stimulation in Canadian neurorehabilitation practice through education, mentorship and research
- Education and training of clinician-scientists who can address research to practice gaps
- Generation of new strategies and training programs focused on fall prevention and balance recovery

Jose Zariffa

Cross-cutting research opportunities:

N SCI

Research Overview: Upper limb function is a key priority for recovery after injuries to the nervous system. Dr. Zariffa's team develops technologies for upper limb neurorehabilitation, ranging from wearable technology for measuring hand function at home to neuroprosthetic systems for restoring function after paralysis.

Biggest priorities for next five years:

- Integrate the use of egocentric video (wearable cameras) into research and clinical care for assessing and improving upper limb function after spinal cord injury or stroke
- Demonstrate neural implants that can extract information from peripheral nerve signals in a stable manner over periods of several weeks
- Promote personalized rehabilitation by developing methods to predict responsiveness to neuromodulation therapies after spinal cord injury

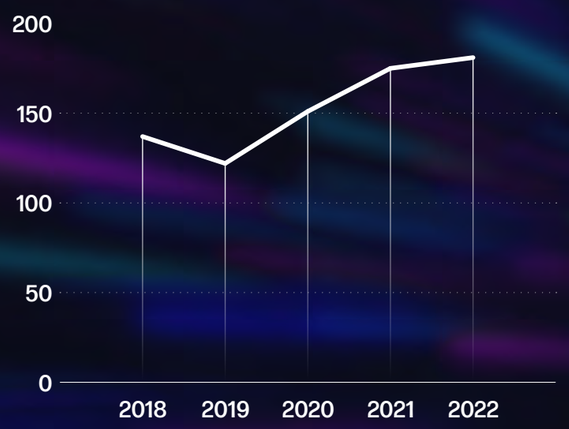
Research Metrics

KITE scientists continue to report success on many fronts

Talent

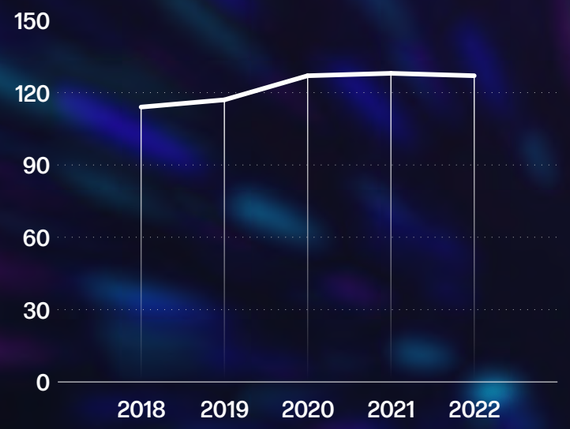
Trainees

32% ↑
2018-2022



Scientists

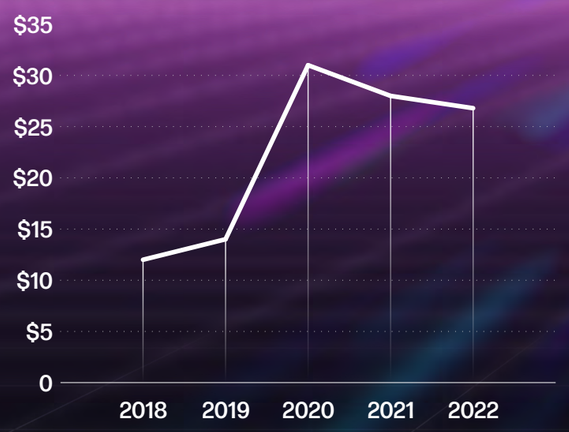
11% ↑
2018-2022



Output

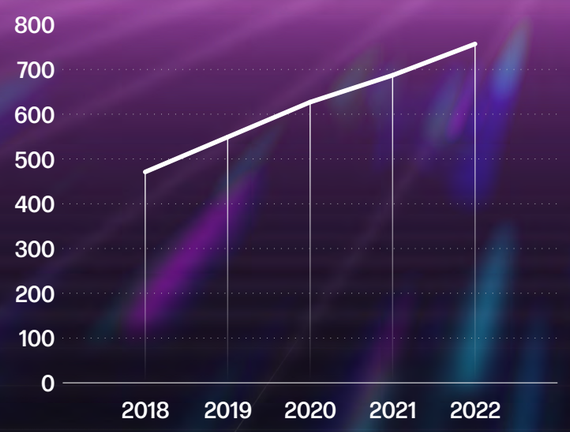
External Funding (x $million)

133% ↑
2018-2022



Journal Papers

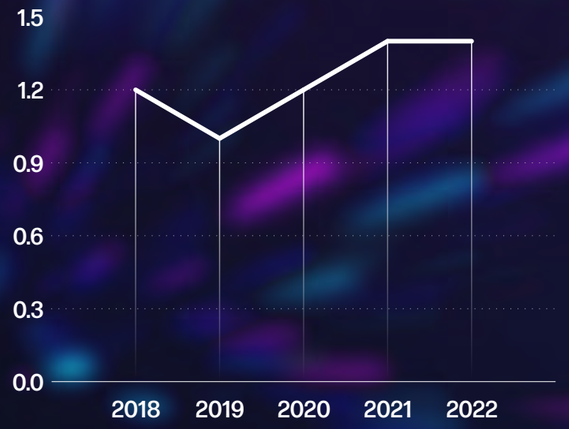
61% ↑
2018-2022



Productivity

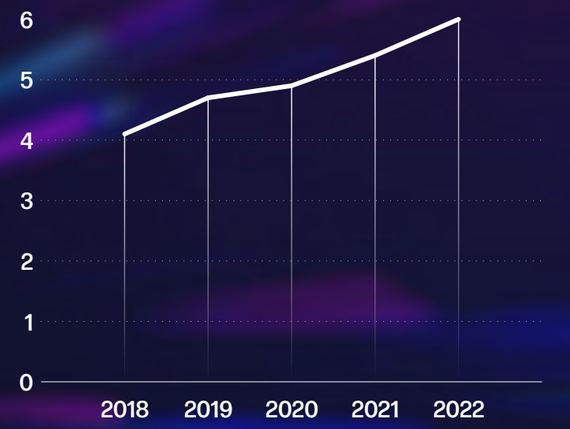
1.4
Trainees per scientist in 2022

19% ↑
2018-2022



6.0
Journal papers per scientist in 2022

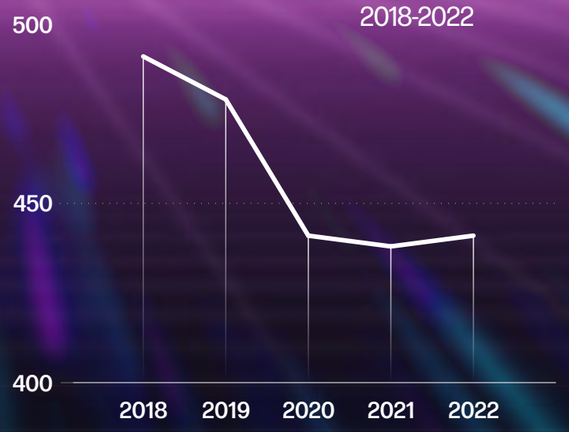
44% ↑
2018-2022



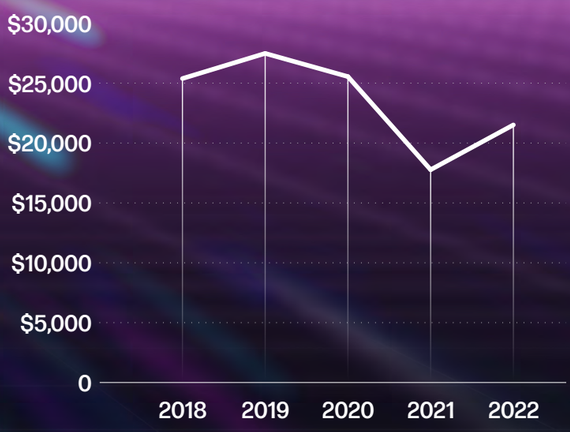
Efficiencies

441 sq.ft.
Space per scientist in 2022

10% ↑
Space Utilization Efficiency 2018-2022



$23,000
Average Direct Cost Per Journal Paper



Research Chairs

Existing Chairs

Alex Mihailidis

PhD, PEng

Barbara G Stymiest Research Chair in Rehabilitation Technology

Cathy Craven

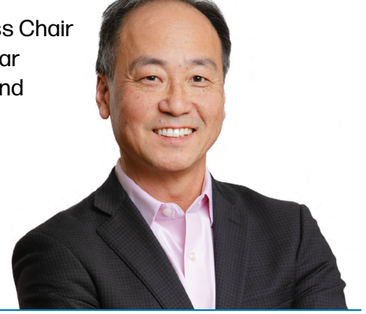
BA, MD, FRCPC. MSc, FASIA, FCAHS

Toronto Rehab Chair in Spinal Cord Injury Research

Paul Oh

MD

GoodLife Fitness Chair in Cardiovascular Rehabilitation and Prevention



Nancy Salbach

BSc, BScPT, MSc, PhD (new appointee)

Toronto Rehabilitation Institute Chair at the University of Toronto

University Chair

Robin Green

PhD, CPsych

Saunderson Chair in Acquired Brain Injury

Angela Colantonio

PhD, OT. Reg. (Ont.)

Canada Research Chair in Traumatic Brain Injury in Underserved Populations

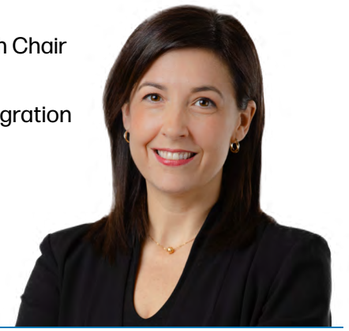
New Chairs Since last review

Jennifer Campos

PhD

Canada Research Chair (Tier 2)

Multisensory Integration and Aging



Azadeh Yadollahi

PhD

Canada Research Chair (Tier 2)

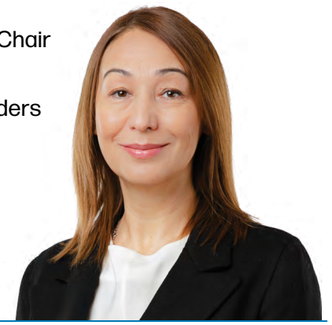
Cardiorespiratory Engineering

Tatyana Mollyeva

MD, PhD

Canada Research Chair (Tier 2)

Neurological Disorders and Brain Health



Catriona Steele

PhD, CCC-SLP, S-LP(C), Reg. CASLPO, ASHA Fellow

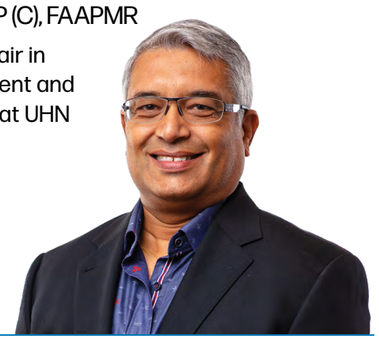
Canada Research Chair (Tier 1)

Swallowing and Food Oral Processing

Dinesh Kumbhare

MD, PhD, FRCP (C), FAAPMR

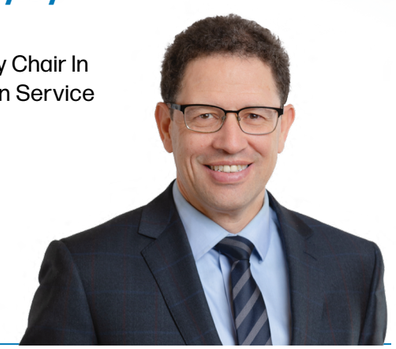
Schroeder Chair in Pain Assessment and Rehabilitation at UHN



Mark Bayley

MD, FRCPC

Coriat Family Chair In Rehabilitation Service Innovation



Driving Operational Efficiency

At KITE our efforts to achieve operational efficiency are driven in large part by people, processes and technology. Over the last five years we have made the following changes to expedite this process.

Essential People

Key functional gaps have been addressed with the addition of the following Team KITE members:

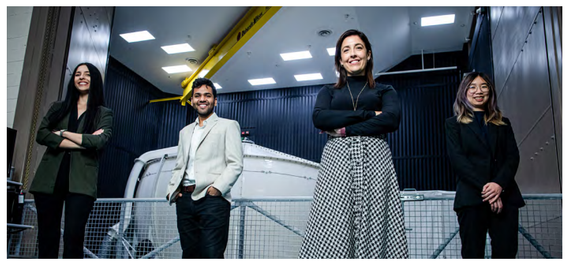
- In 2020, UHN Research launched the Inclusion, Diversity, Equity and Accessibility (IDEA) committee, which is chaired by KITE Scientist Dr. Azadeh Yadollahi
- In 2018, Andrew Loh joined KITE as legal advisor to help alleviate agreement and contract management processing times.
- In 2018, Derek Song joined the team to address business analytics, including financial management.
- In 2019, the UHN Research Ethics Board Panel on Rehabilitation Medicine and Neuromodulation was reinstated and chaired by Dr. Paul Oh and co-chaired by Dr. Catriona Steele
- In 2020, Vera Zivanovic joined the team as Manager of the KITE Clinical Research Unit to assist KITE scientists and trainees with REB applications from conceptualization to institutional approval.
- In 2020, Andrew Turner joined the KITE team to oversee the maintenance, operations and utilization of the KITE Facilities
- In 2020, the UHN Quality Improvement Review Committee was formed with Dr. Catriona Steele as chair
- Andrew Turner, Sophia Li and Stephanie Iwasa lead the Industry Relations Project Management team
- Jarrett Churchill headed up the team to streamline strategic communications for KITE

New Supports for KITE Scientists

Elizabeth Rochon, Associate Director, Scientific, leads scientific initiatives and annual performance reviews of all scientists. The following key initiatives have been put in place to support KITE scientists:

- Avril Mansfield and Alison Novak provide CIHR Grant Writing support to help KITE scientists increase success rates on applications
- Monthly Scientist Meetings are held to provide general updates and address scientist concerns
- Quarterly Research Advisory Committee meetings are held with scientific leadership and the KITE Directorate to discuss strategic initiatives to support KITE Scientists
- Sarah Munce and Tracey Colella launched KINSHIP, the KITE Early Career Researcher Peer Mentorship Program, which pairs early career researchers with senior scientists to support career development
- Elizabeth Rochon leads the KITE Scientist Awards Committee, which has introduced three awards to recognize the outstanding achievements of KITE Scientists. Recipients are chosen from among nominations received from members of the Annual Activity Report committee, a group of peers who have reviewed all KITE Scientists' activities for a given year. Shehroz Khan leads the Awards Nomination team to support the recognition of KITE scientists

A Foundation for KITE Trainees Success



Dr. Jennifer Campos, Associate Director, Academic, leads the academic programming and professional development for KITE trainees. Dr. Campos uses the Individual Development Plan (IDP) framework, which includes the following foci: scientific knowledge; research skills; communication; professionalism; management and leadership; responsible conduct of research; career advancement; wellness and wellbeing; and social connectedness.

Key initiatives include:

- Weekly mental health, well-being, mindful meditation series; Scholarship application development workshops and peer review programs (e.g., for Ontario Graduate Scholarships, CIHR Doctoral Awards); Annual new trainee orientation day and provision of a new trainee handbook; Financial literacy workshops; International student meet and greet; KITE 3 Minute Thesis Competition; Annual Holiday Parties and socials (e.g., trivia nights, Halloween bingo night); Statistics workshop series; Women in Science meet-ups; and Peer-to-peer mentorship program
- Internal job opportunities for trainees were created for skills development
- International Student Resources
- KITE Trainee Corner website contains external-facing content to provide visibility and recognition to KITE trainees, as well as internally-facing resources compiled to support the professional development and wellbeing of trainees. Online features include: customized profiles of every KITE trainee; specially curated list of resources supporting all IDP categories; archived recordings of lecture series and hosted events; international student resources; news featuring KITE trainees; and calendar of events
- Internal Funding Opportunities are awarded to KITE trainees for development and support. Awards include Mark Rochon Leadership Award, the Geoff Fernie Impact Award, the KITE Graduate Merit Bursary (financial need award), TD Scholarships for Graduate Students with Disabilities and trainee conference travel/participation awards
- Internal Communications and Connections: We recognize the importance of providing opportunities for KITE trainees to learn about institute activities, connect with KITE researchers, and voice their ideas and concerns. For these purposes we host regular events including KITE Trainee Town Halls (previously monthly, now quarterly), virtual coffee chats with members of the Director's office and KITE Scientists, and during the pandemic regularly scheduled drop-in virtual office hours with the Institute Director and separately, the Associate Director, Academic.
- KITE Trainee Executive Committee (KITEC) was launched to provide trainees with leadership opportunities and promote trainee-related initiatives

Driving Operational Efficiency

Recognizing KITE Staff

The KITE leadership team office understands that our success in large part is dependent on our dedicated staff whose contributions are critical to the success of our Institute. Here is what we are doing to support these essentials members of our team:

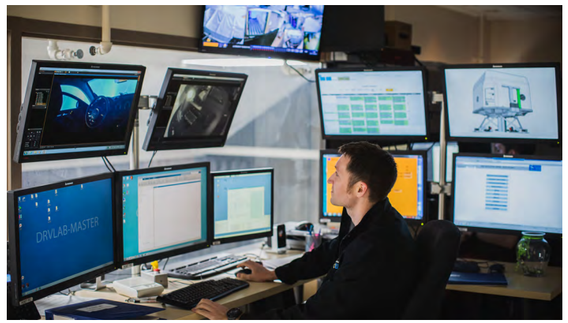
- KITE Staff Town Halls are held quarterly for staff to learn about institute initiatives, connect with the KITE Director's office and voice ideas and concerns
- KITE Unsung Hero Staff Award is a once-in-a-year opportunity to recognize those indispensable members of the KITE community who go above and beyond each day to help with our success. The Unsung Hero award is bestowed annually on an individual or group who assists in nurturing a positive corporate culture and helps our research teams operate more effectively
- Leadership Training and Career Growth Opportunities through KITE-related strategic projects (ie. ICAIR, Innovation Gallery, FIBRE, etc.) , UHN-wide initiatives (ie. OHA's Youth DiverSTEAM Symposium) and UHN Programs (ie. Emerging Leaders), UHN's Emerging Leaders program as well as opportunities to lead KITE-related initiatives

Processes

Communications efforts across the Institute have been streamlined to ensure the KITE Community is aware of current events and future initiatives. Some of the changes include:

- Production of high-level communications materials, including podcasts, sizzle videos and a digital and animated media kit. Ownership and Utilization of space: All space under the KITE umbrella is owned and managed by the Institute and is available for KITE members to utilize. In the post-COVID era of hybrid work the utilization of KITE space has been optimized with the introduction of the hoteling of workstations and offices
- KITE Director's Messages from Dr. Milos Popovic used to inform the KITE Community of key updates
- KITE Weekly is a collection of current and future events
- KITE Content Campaigns have been launched to promote the culture and raise awareness within and external to KITE, including "I AM KITE" campaign, "The Game Changers", "KITE Works" and "COVID-19 Stories"
- The KITE SOP Committee reviews and creates standard operating procedures to support the operational aspects of KITE
- KITE Facilities Tours are now available in-person and virtually
- KITE's payroll and on-boarding process has been streamlined

Technology



The spirit of innovation is embedded into everything we do at KITE. It is for this reason that we are not only early adopters of new technology, we are also building and designing new tools, software and programs that help our scientist, trainees and staff operate more efficiently. Here are a few innovations designed to drive the success of Team KITE:

- KITE's Annual Activity Report (AAR) is an online tool for annual scientist performance reviews. The tool facilitates the annual process for scientists to input information that is used to evaluate their performance across four equally weighed categories: Grants and Publications, Innovation and Impact, Community Service and Mentorship. Features of the tool include academic appointments, mentors, summary of research program, pandemic impact, grants, publications, student and post-doctoral fellow mentorship, thesis committee/defense examinar membership, formal teaching, community service, awards and honours, challenges, goals for upcoming year and automated review. All of this historical and current information is readily available for leadership to identify trends, gaps, strengths and opportunities that will inform on how best to support the scientist
- The KITE Website has been transformed into an online communications tools providing a one-stop shop of information and resources for the KITE Community
- The KITE Space Booking App was developed to manage the utilization of meeting rooms, workstations and offices. KITE members use the app to reserve and schedule when the space will be used. The application is also being used by UHN's RSS team. Reports can be generated to assess how space is being utilized
- The Return-to-Work (RTW) App was implemented during the pandemic to automate the day-to-day tracking of on-site activities including the number of personnel, approved clinical research studies and study participants. The automation significantly saved administration time of two staff members
- The KITE Lab Booking online tool facilitates the management and utilization of all KITE Facilities. The application enables the Community to schedule the use of KITE facilities and capture all active research studies (including finance and approvals). The KITE Facilities Operations team use the tool to track the users, monitor lab costs, review project details, schedule site tours, schedule maintenance and generate reports. The tool saved time for 3 operational staff and for scientists and their teams
- The online IT Knowledge Base was established as a repository of general IT-related inquiries/answers that is readily available for the KITE Community to independently get answers on their own. As a result, time was saved for KITE's IT personnel

KITE Organization Chart

Scientist Activity Reviews, Appointments, Promotions — Elizabeth Rochon

KITEC, Resources & Learning Materials/ Events for Trainees & Early Career Researchers/Scientists — Jennifer Campos

Milos R. Popovic

Anthony Palma

- **KITE Clinics** — Dinesh Kumbhare; Sukhvinder Kalsi-Ryan; Maggie Szeto; Tharshini Chandra
- **Conferences, Outreach**
- **UHN & UHNF Relations**
- **FIBRE**
- **Planning, Projects, Programs** — Janitha Shanmugarajan; Polina Andrievskaia; Sharmini Atputharaj
- **CRANIA** — Yasser Karimzad
- **REB** — Vera Zivanovic

Majid Janidarmian

- **KITE Directorate, Space, IG** — Mary Lam; Chelsea Tanchip; Jenan Bouakkar; Juliana Nunes daSilva; Aisha Raji; Vjura Senthilnathan; Seyyedehdelaram Sadatamin
- **HR, Research Operations** — Lois Ward; Tess Del Mundo; Shoshana Teitelman; Esther Oostdyk
- **Finance, Contracts, Analytics, IPs** — Derek Song; Mohsen Gharakhanlou; Betty Chan
- **Facilities, Lab Business Development** — Andrew Turner; Susan Gorski; Colin Stoddart; Bruce Haycock; Sanja Hulec; Abdolazim Rashidi; Sophia Li; Roger Montgomery; Andy Whitmell; Stephanie Iwasa; Ruben Jonathan
- **Initiatives, Projects** — Rachel Cohen; Fatemeh Shomal Zadeh
- **Design and Visual Studio** — Tim Fraser; Jose Ongpin; Sebastian Gonzalez Pardo
- **Information Technology** — Dariusz Wojtowicz
- **Web, Applications** — Simon Rustin; Aniket Dhamgunde
- **Public Relations, Communications** — Jarrett Churchill; Inna Levchuk; Michael Grace-Dacosta
- **Patient Engagement, Central Recruitment and Research Volunteer Pool** — Cathy Craven; Louise Brisbois; Andrea Brown; Suban Kangatharan

Director's Office

KITE Facilities

CareLab

kite-uhn.com/lab/carelab

CareLab is a simulated care environment based on a typical hospital single patient room.

The lab is used to develop and test products that will reduce caregiver and patient injuries, improve patient outcomes, and to reduce the transmission of hospital-acquired infections.

Scientists who used this lab recently:
Dr. Geoff Fernie, Dr. Atena Roshan-Fekr, Dr. Sharon Gabison, Dr. Tilak Dutta, Dr. Douglas Bradley

ClimateLab

kite-uhn.com/lab/climatelab

Climatelab is a controlled environment where temperatures can be set between -20°C to +35°C in order to simulate a wide range of conditions to test clothing, footwear and assistive technology for people with diverse ages and abilities.

Scientists who used this lab recently:
Dr. Atena Roshan-Fekr, Dr. Tilak Dutta, Dr. Sophia Li, Dr. Catriona Steele

DriverLab

kite-uhn.com/lab/driverlab

Driverlab is a state-of-the-art driving simulator that is used to develop tests and recommendations for driver safety and investigates the effects of health and medications on driving.

DriverLab reproduces the sights, sounds, and physical motions of driving to allow evaluation of driving abilities in challenging conditions (low visibility, poor weather, in-car distractions) in a controlled manner.

Scientists who used this lab recently:
Dr. Jennifer Campos, Dr. Bruce Haycock, Dr. Alex Mihailidis, Dr. Behrang Keshavarz, Dr. Azadeh Yadollahi, Dr. Andrea Furlan

FallsLab

kite-uhn.com/lab/fallslab

FallsLab is a two-degree-of-freedom motion platform used to study stability and balance control during gait and stance.

The objective of the lab is to understand balance and gait; develop therapies for people with conditions that increase the risk of falls; and to design and test technologies that prevent or mitigate falls and/or balance loss related injuries.

Scientists who used this lab recently:
Dr. Avril Mansfield, Dr. Steve Perry, Dr. Robert Chen, Dr. Geoff Fernie

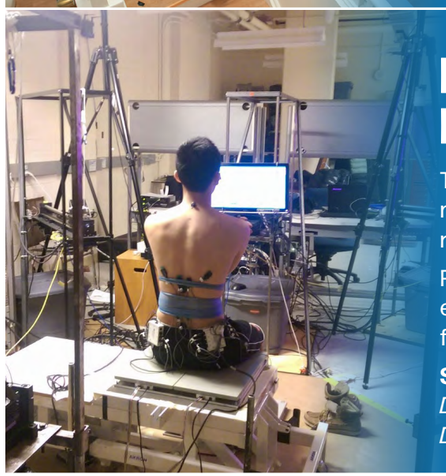
HomeLab

kite-uhn.com/lab/homelab

HomeLab is a 'home within a lab' where researchers can invent and test new products to help older people and those with disabilities stay at home longer and more safely.

The lab resembles a typical single-storey dwelling with functional plumbing and wiring. Study subjects can occupy the living space and test innovations in a real-life setting, while researchers can observe all studies from an overhead catwalk.

Scientists who used this lab recently:
Dr. Geoff Fernie, Dr. Atena Roshan-Fekr, Dr. Alex Mihailidis, Dr. Arlene Astell, Dr. Jose Zariffa



Rehabilitation Engineering Laboratory

kite-uhn.com/lab/rel

The Rehabilitation Engineering Laboratory (REL) is a multidisciplinary facility devoted to developing solutions for restoring function after neurological injuries and disease.

REL has made pioneering advances in functional electrical stimulation (FES) therapy to help restore function after spinal cord injury or stroke.

Scientists who used this lab recently:
Dr. Sukhvinder Kalsi-Ryan, Dr. Jose Zariffa, Dr. Kei Masani, Dr. Milos R. Popovic, Dr. Cesar Marquez-Chin, Dr. Julio Furlan

KITE Facilities

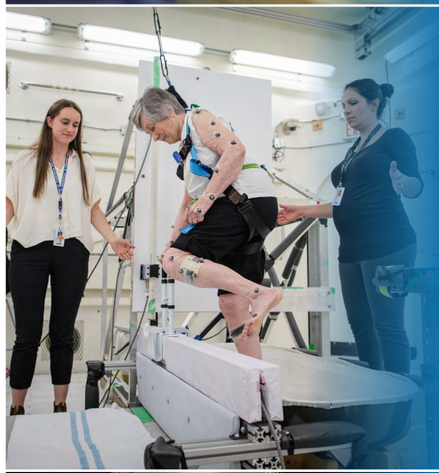
SleepdB

kite-uhn.com/lab/sleepdB

SleepdB is a sound-proof laboratory that examines sleep-disordered breathing by leveraging novel and non-invasive acoustic monitoring technologies.

SleepdB is one of the few laboratories in the world dedicated to understanding the intricate interplay between sleep, body fluid shifts and respiratory disease, including but not limited to obstructive sleep apnea, asthma, and chronic obstructive pulmonary disease (COPD).

Scientists who used this lab recently:
Dr. Azadeh Yadollahi



StairLab

kite-uhn.com/lab/stairlab

StairLab is a modular research space where scientists can study and precisely measure how the human body moves and interacts with environments, such as stairs, ramps, and bathrooms.

The lab's goal is to help scientists improve independence and prevent injury through gait and balance research in aging and disability, resulting in more informed clinical recommendations, better building codes, and enhanced safety standards.

Scientists who used this lab recently:
Dr. Alison Novak, Dr. Jennifer Campos, Dr. Atena Roshan-Fekr, Dr. Geoff Fernie

StreetLab

kite-uhn.com/lab/streetlab

StreetLab is a multi-sensory immersive lab that allows scientists to present people with realistic scenarios as they safely navigate the sensory and cognitive challenges associated with everyday life.

Scientists in this lab research developing new screening tools (e.g., targeting cognitive decline), interventions to facilitate mobility (e.g., optimizing visual and hearing aids), and better design of the built environment (e.g., accessible pedestrian street crossings).

Scientists who used this lab recently:
Dr. Jennifer Campos, Dr. Behrang Keshavarz

WinterLab

kite-uhn.com/lab/winterlab

WinterLab is research space where scientists can recreate icy and snowy conditions in order to study how they impact mobility and safety without exposing study participants to the risks these conditions pose in the real world.

Scientists use this lab to develop and test new winter footwear and improvements to mobility aids such as mobility scooters and crutches, so that they perform better on inclined and winter icy and snow-covered surfaces.

Scientists who used this lab recently:
Dr. Sophia Li, Dr. Atena Roshan-Fekr, Dr. Tilak Dutta

Movement Evaluation Lab

kite-uhn.com/lab/movementevaluationlab

The Movement Evaluation Lab allows researchers to develop and evaluate new diagnostic techniques and therapies aimed at improving the control of movement and mobility.

These include treatments that focus on improving the health of the brain, cardiorespiratory and musculoskeletal systems in order to maximize the capacity for independent and safe mobility.

Scientists who used this lab recently:
Dr. Avril Mansfield, Dr. Elizabeth Inness, Dr. Catriona Steele, Dr. Robin Green, Dr. Mark Bayley

PerceptionLab

kite-uhn.com/lab/perceptionlab

PerceptionLab is a temperate controlled laboratory that uses stereoscopic projection display, multi-screen setup, virtual reality (VR) headsets as well as (neuro)physiological equipment for the study of human perception and performance when engaging with visual devices and virtual environments.

Perception Lab seeks to identify the underlying mechanisms of visually induced motion sickness and effective mitigation strategies, as well as investigating the illusion of self-motion or the feeling of presence in VR.

Scientists who used this lab recently:
Dr. Jennifer Campos, Dr. Behrang Keshavarz

Bringing Research to the Masses

KITE has succeeded in connecting with important stakeholders in our community through marketing, communications, business development, commercialization and partnerships. Here are some ways our teams are engaging with those at KITE and beyond.

More info: bit.ly/3V1HlxK

For Awareness

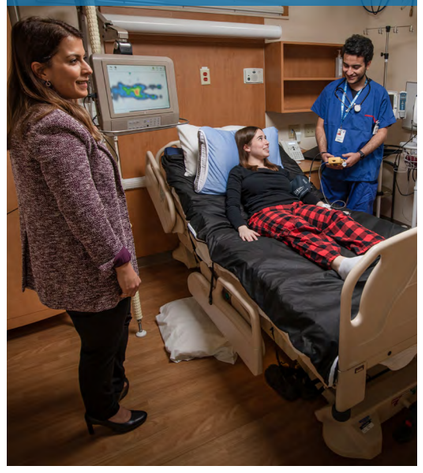
- KITE's branding and marketing efforts have created awareness through storytelling, content generation, web development and social media engagement.
- We launched a partnership with Centennial College called the KITEWorks that widely shares our research success stories.
- In the middle of the COVID pandemic we introduced the "I AM KITE" Campaign to showcase the diversity of our research and people.
- In March 2022 we introduced The Game Changers storytelling campaign to highlight our people and groundbreaking. The series earned two Gold awards from the Healthcare Digital Marketing Award in December 2022.

More info: bit.ly/3V2CS3B

For Patients

- We continue to emphasize the importance of commercialization with the success of MyndTec, Neural Outcomes and other entrepreneurial ventures.
- We introduced the KITE Innovations and Rehabilitation Clinics (KITE Clinics), a self-sustaining enterprise that is both a research and clinical environment. KITE Clinics provides services patients need while ensuring there's enough staff working on important clinical research studies.
- The Schroeder Pain Assessment and Rehabilitation Research Centre (SPARC), which will operate under the KITE Clinics banner, is expected to open its doors at TR-University Centre later this year. SPARC will offer comprehensive rehabilitative care for people suffering from chronic pain.

More info: bit.ly/3PtjNq2



For Patients and Non-Patients

- KITE start-up Hygienic Echo is successfully marketing the Buddy Badge system, a wearable device that helps helping reduce incidence of hospital-acquired infection by prompting health care workers to wash their hands,
- We developed the RateMyTreads program to help consumers make informed footwear choices about winter footwear. Wearing the proper footwear can reduce the risk of slipping and falling on ice in harsh winter conditions and our footwear slip resistance test is unique in the world.
- KITE Studio is a creative services social enterprise providing a full range of photography, graphic design, and videography services.

More info: bit.ly/3FAr7LQ

A Growing Network of Partners

- KITE continues to expand its network of partners and collaborators at UHN, at a variety of local universities and colleges, among major industries, and in the community.
- KITE's Industry Partnership team supports the administration of agreements and partnerships with industry.
- We maintain strong ties to AGE-WELL, Canada's Technology and Aging Network. AGE-WELL is a unique Canadian network that develops technologies and services for healthy aging, trains the next generation of innovators and is helping make Canada a world leader in technologies that help aging populations everywhere.

Bringing Research to the Masses Our Reach

Market Sectors

- Automotive & Transportation
- Textiles & Fashion
- Art & Entertainment
- Construction
- Health & Safety
- Big Tech
- Postal Services
- Parks Canada
- Law Firms & Insurance Companies
- Gaming
- Wearables
- Internet Of Things
- Footwear
- Education
- Sports
- Pharmaceuticals
- Kids

Industry

Community

- Vulnerable Communities
- Patient Advocacy Groups
- Retirement Homes
- Long-Term Care

Academia

- Universities
- Colleges
- Hospitals

Clinical

Toronto Rehab Clinical Programs

- Geriatric
- Cardiovascular
- Complex Continuing Care
  - Low Tolerance Duration Rehab
  - Transitional Care
- Musculoskeletal & multi-system (multiple sclerosis, transplant, cancer)
- Brain
- Spinal Cord

Toronto Western Hospital Clinical Programs & Krembil Research Institute

- Krembil Brain Institute
- Schroeder Arthritis Institute
- Donald K. Johnson Eye Institute
- Surgery & Critical Care

Toronto General Hospital Clinical Programs & Research Institute

- General Internal Medicine & Geriatrics
- Psychiatry
- Ajmera Transplant Centre
- Surgery & Critical Care
- Peter Munk Cardiac Centre
- Diabetes
- McEwen Stem Cell Institute

Michener Institute of Education

- The Institute for Education Research

Princess Margaret Cancer Centre Clinical Programs & Research Institute

- Cancer

UHN Foundation

Princess Margaret Cancer Foundation

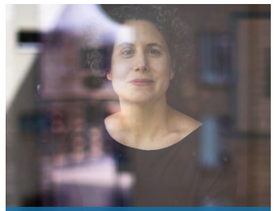
KITE Impact

Here is what KITE is doing to make a difference in the communities we serve while helping to build A Healthier World:


bit.ly/3Wf6ITJ

Vital Clinic Rethink at KITE

KITE Innovations and Rehab Clinics is making access to novel therapies possible by simultaneously groundbreaking research and patient care


bit.ly/3hA0UoT

Dementia Isolation Toolkit

KITE's knowledge and talent pool key to development and deployment of the Dementia Isolation Toolkit in long-term care homes in the pandemic


bit.ly/3uXO8DT

Rehab at the Ready

When COVID-19 hit, KITE launched a tele-rehab program within weeks. It's now helping other institutions connect with their own patients virtually


bit.ly/3VeDu66

The Healing Power of a Smile

KITE team working to treat patients with major depressive disorder by using a therapeutic method called Functional Electrical Stimulation


bit.ly/3G2R3kB

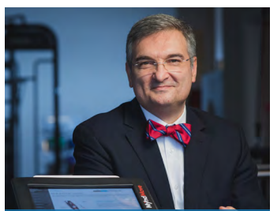
Accessible National Parks

A game-changing research project from KITE hopes to make Canada's national parks easier to navigate for people with disabilities


bit.ly/3WorMqo

Helping Seniors to Age in Place

Researchers at KITE are developing cutting edge technology designed to help aging Canadians live in their homes as long as they want


bit.ly/3hzKwVe

Brain breakthrough helps patients

Startup Myndtec takes the burden off patients, caregivers and the health system while improving quality of life for stroke and spinal cord patients


bit.ly/3YyCZGU

When a doctor becomes a patient

Dr. Eugene Chang blazing a path in the field of cancer rehab following his own battle with the disease


bit.ly/3VafukF

Robo-surgery has arrived

A state-of-the-art robot funded by CRANIA makes complex brain surgery easier for neurosurgeons and provides relief for epilepsy patients


bit.ly/3G6jdeR

Gender and concussions

Concussions impact everyone, but women take longer to recover than men. KITE researchers want to find out why


bit.ly/3WbJ0HU

Rewards of Cardiac Rehab

Many patients seem to have trouble committing to cardiac rehab programs. Here's what KITE is doing to help people get the post-surgery help they need


bit.ly/3PHM3nv

Dementia in New Light

Digital learning tool uses immersive learning experience to educate audiences about the challenges faced by people living with dementia


bit.ly/3MzuAvU

Canada's Highest Honours

KITE's former Institute Director Geoff Fernie reflects on his induction into both the Order of Ontario and the Order of Canada


bit.ly/3v3RFAc

Driving Research Into Practice

KITE team launched the national network of community partners and stakeholders to accelerate the translation of research into best practice


bit.ly/3j8puNP

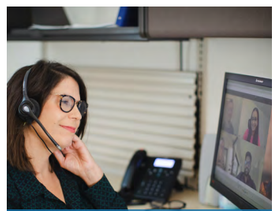
The Spinal Cord Road to Recovery

KITE and Toronto Rehab are helping spinal cord patients like shooting victim Danielle Kane regain control over their lives


bit.ly/3BNPnJv

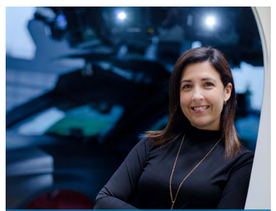
Meet the Hero Glove

KITE team gives stroke survivors a helping hand with introduction of HERO glove a robotic exoskeleton that improves function after injury


bit.ly/3Bl36Bh

The Future with Virtual Care

KITE teams responded when the pandemic forced clinicians around the world to rethink the ways they treat patients in every area


bit.ly/3acNefq

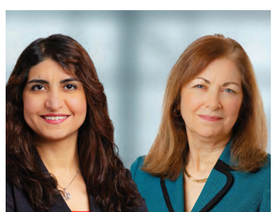
Impacting the Next Generation

Dr. Jennifer Campos recognized with NSERC Award for Science Promotion for work supporting science education, youth outreach and advocacy for equity-deserving groups in STEM


bit.ly/3PLgWsz

Buddy Badge Slows Infection

KITE startup's wearable device helping reduce hospital-acquired infections by prompting health care workers to wash their hands

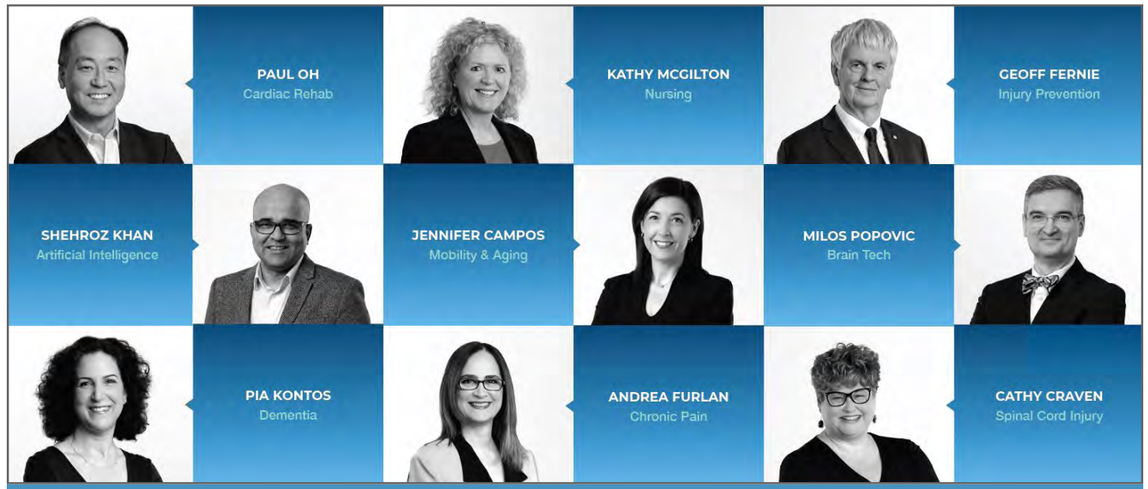

bit.ly/3VpbGfD

Research chairs share passion

Pair of new Research Chairs at KITE share passion for creativity and supporting underserved communities

Communications & Brand

Unconventional Communications Style



See the video - youtu.be/3lVFwkEufBE

“We showcase and promote from a diverse talent pool that is drawn from across the globe”

KITE’s communication is unconventional, yet consistent. We showcase and promote from our diverse pool of talent that is drawn from across the globe, providing an equal level of support to all researchers regardless of whether they are senior scientists, early career scientists or somewhere in-between.

A large part of KITE’s early success can be attributed to a focus on participating in local and international events, the pursuit of media coverage, an emphasis on strategic digital and content marketing efforts, the development of specialized social media campaigns and the pursuit of academic, commercial and scientific partnerships.

In an effort to capitalize on our strong relationships and position within UHN, the KITE Public Affairs and Communications team introduced a five-year Strategic Communication Plan in June 2021 and has since embarked on a series of initiatives to strengthen our brand. These initiatives include enhanced media outreach, including the introduction of a KITE Media kit for journalists, continuing to create digital content that is optimized across multiple platforms, redesigning the physical KITE space, helping bridge the gap between our sales, commercialization and communications teams, and establishing a strong presence at international conferences, events and trade shows.

New Brand and Visual Identity

See the video - youtu.be/5FliPq9VIBw

“A new visual identity... helped the leadership team set the Institute’s strategic priorities”

In January, 2019, UHN established the KITE Research Institute to formally consolidate the research team members, including scientists, trainees and staff, operating at the former Toronto Rehab Research Institute. While recognizing the many accomplishments of the past, this change was designed to cement the Institute’s place as one of the top rehabilitation science research facility in the world and chart a new path forward for current and future researchers, scientists and students.

The rebranded research operation included a new visual identity that helped the leadership team set the Institute’s strategic priorities, align and deploy resources and set the vision and direction of KITE.

KITE is an acronym for “Knowledge, Innovation, Talent, Everywhere,” These core values are embedded into everything we do. They help fuel our purpose, which is to improve the lives of people living with the effects of disability, illness and aging and they inspire our diverse roster of scientists, trainees and support staff, who work together to ensure we achieve and exceed this goal. As a world leader in complex rehabilitation science, at KITE we aim to redefine rehab.

Website & Social Media
An Online Showcase for KITE

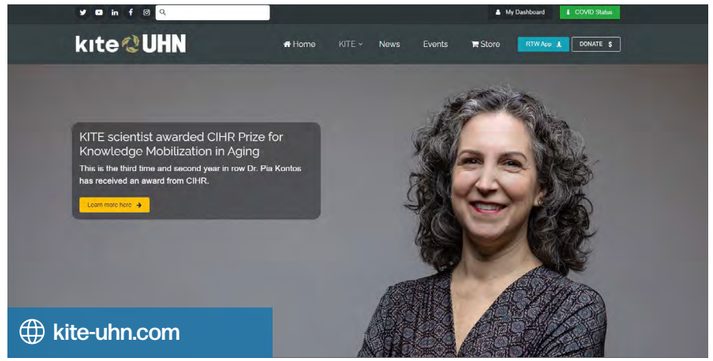
KITE has a visually appealing website that is updated every day with news about our people, teams, research, accomplishments, discoveries and programs. The site is also home to a repository of data about the Institute, including information about our scientists, laboratories, services, products, tours and events.

The most visited pages on the website are Rate My Treads, Patient Engagement and Trainee Corner.

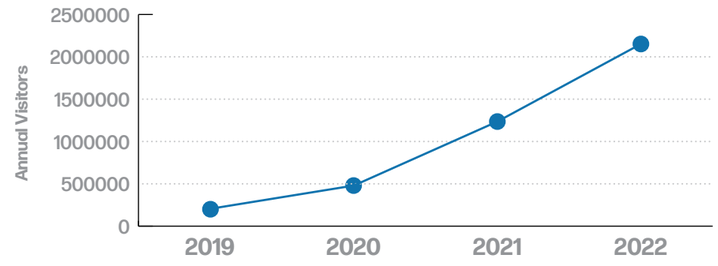
KITE's website has experienced explosive growth since its launch in 2019. The number of visits to the site has jumped from a total of 205,017 in 2019 to 2,151,481 in 2022, which amounts to an impressive increase of 949 per cent over that time period.

The most significant year-over-year increase in readership occurred between 2020 and 2021 when the total number of visitors climbed from 479,454 (2020) to 1,235,354 (2021) for an increase of 157 per cent.

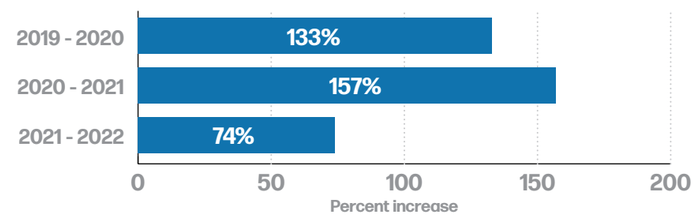
KITE has achieved these gains by making key investments in high-level custom content that focuses on the impact of its research and its one-of-a-kind facilities; leveraging the use of its connection to UHN to spread its messaging across established channels, such as UHN's website and social media accounts; and creating a unique visual aesthetic that reinforces its brand identity and ideals.



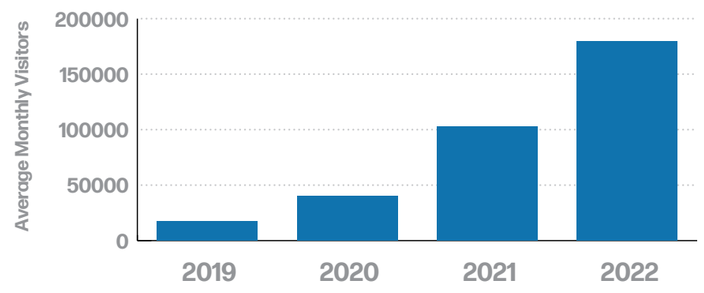
Total annual number of visitors to www.kite-uhn.com:



Total year-over-year increase in page views:



Average Monthly Visitors



Our Social Networks

KITE is active on many social media platforms, including Twitter, Facebook, LinkedIn, Instagram and YouTube. Our followers include clinicians, researchers, scientists, journalists, students, rehab organizations/associations and members of the general public who are interested in all aspects of rehabilitation medicine and science.

We've successfully attracted and continue to build a following interested in our diverse areas of practice (artificial intelligence, aging, dementia, stroke, cardiovascular health, musculoskeletal, pain, spinal cord injury, biomedical engineering, aging, neuroscience, complex continuing care, etc.)

KITE launched in January, 2019 with 1,300 followers on Twitter and in three years, the account has grown by 285% and now reports 5,000 followers, making it our fastest growing and most active platform. Since January 2019, our tweets have received over 5 million impressions and earned more than 24,000 clicks.

Our most popular tweets over the years

2019 — bit.ly/3HRRgsh

KITE Research Institute @KITE_UHN

Toronto Mayor John Tory welcomes #RehabWeek2019 delegates to #Toronto, Canada's healthcare capital, and acknowledges the importance of #Rehab on improving people's quality of life.

14,690 impressions **129** engagements

2021 — bit.ly/3Plbc2l

KITE Research Institute @KITE_UHN

(1) Happy 20-year work anniversary to KITE research director Dr. Milos R. Popovic @UofT and @UHN. To this day, he's published more than 200 journal papers, helped eight families of patients, received a total of $27 million in peer-reviewed grants and $21 million in donations.

35,727 impressions **911** engagements

2020 — bit.ly/3WzZCJq

KITE Research Institute @KITE_UHN

We are so excited to announce the launch of these virtual, 360 degree tours of our Challenging Environment Assessment Lab. Take a behind the scenes look at the 'Rehab NASA' space which put us on the map as the top rehab research institute in Canada. ➡️ kite-uhn.com/tours/virtual

18,653 impressions **473** engagements

2022 — bit.ly/3YF9pzx

KITE Research Institute @KITE_UHN

Introducing The Game Changers, a new series about innovations @KITE_UHN and @UHN.

Today we visit the OR at @KBI_UHN where a surgical robot from the @C_R_A_N_I_A program is helping neurosurgeons perform complex brain surgery.

49,607 impressions **1,241** engagements

We have almost doubled the amount of followers on LinkedIn:

we re-launched the page combining both the Toronto Rehab and KITE brands in January 2019 with **6,500** followers

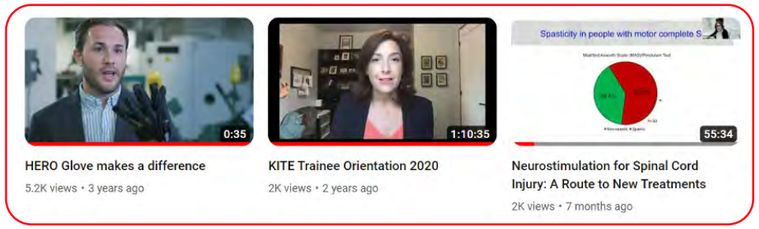
and, as of November 2022, have grown the account to **11,548** followers **77%** growth

The KITE YouTube channel launched in December 2018:

Since then, the channel has over **25,700** views

The channel has a current subscriber **202**

Some of our most popular videos are:



Our Instagram account currently has more than **1,347** followers

Our Facebook account currently has **292** followers

KITE in the Media

The KITE communications team has established relationships with local media outlets and journalists who are engaged with our content and are interested in covering our top stories. The team has built a growing list of media contacts at various outlets.

Our discoveries have been featured in the following media outlets:

CBC Marketplace

5 out of 6 winter boots fail slip test on ice, Marketplace finds

bit.ly/3HNTfy2

Globe Drive

Toronto's DriverLab addresses real-world safety issues through simulated driving

bit.ly/3Vbk0PV

The National

KITE's Winterlab uses science to help prevent slips and falls

bit.ly/3BKlmKk

BBC

KITE scientist featured in documentary about the future of 5G technology

bit.ly/3FDx7DO

Globe and Mail

Toronto researchers test new rehabilitation method for paralyzed patients

bit.ly/3WwHOyv

Zoomer TV

Dr. Shehroz Khan discusses how technology transforming health, aging, and longevity

bit.ly/3hxcYHv

The Agenda

Milos Popovic: Regaining Movement, Restoring Dignity

bit.ly/3WpMV3G

Cottage Life

Consider these accessibility features to welcome every body to your cottage

bit.ly/3FlpT10

The Nature of Things

David Suzuki takes viewers on a journey to live better and age well Suzuki Style

bit.ly/3YL5rpg

Report on Business

Health startups see surge in interest amid coronavirus crisis

bit.ly/3W87O3r

The New York Times

KITE's Dr. Avril Mansfield helps readers pass the 10-Second Balance Test

bit.ly/3V7YATO

The Conversation

KITE scientists the danger of AI discriminating based on race, gender and age

bit.ly/3Wse06b

The New York Times

Winterlab teaches NYT writer how to walk safely in the snow, ice and slush

bit.ly/3PCCWFQ

Cityline

5 popular jacket brands that can actually withstand a Canadian winter

bit.ly/3BOiwEd

Kotaku

Why Games Give Some People Motion Sickness And What You Can Do About It

bit.ly/3V3EB8E

White Coat, Black Art

Dr. Brian Goldman visits KITE's FallsLab to understand how it's working to prevent falls

bit.ly/3vl7frD

The Future of Rehab at KITE

bit.ly/3BN6cnF

KITE is uniquely suited to address many of the upcoming challenges that hospitals and other health care providers will face in the years to come. We believe that our current and future research activities, all of which are focussed on either the prevention of injury, the restoration of function or the development of independent living opportunities, will result in a positive transformation of the health care system.

Over the next 5 years, our teams are committed to the following:

- Enhance engagement and continue to support the well-being of scientists, trainees and staff
- Continue our commitment of optimizing research operations
- Advance the reputation of the KITE Clinics and the Schroeder Pain Assessment and Rehabilitation Research Centre (SPARC) as innovative models of healthcare delivery

- Advance partnerships with the UHN Foundation, as well as our clinical partners, academia, industry and the wider KITE community
- Achieve financial sustainability for the research institute
- Evolve KITE's CRANIA, FIBRE and Virtual Care research initiatives, and establish each as world-leading centres of excellence

CRANIA

bit.ly/3YylYvm

The Center for Advancing Neurotechnological Innovation to Application (CRANIA) launched in 2018 to bring together researchers, clinicians and academics from across UHN, the University of Toronto and elsewhere.

CRANIA is co-led by research teams at KITE and the Krembil Brain all of which are engaged in the research and development of Neuromodulation, Neural Implants and Brain Tech activities.

This work has the portential to provide solutions for the four million Canadians, and many more worldwide, living with brain diseases and disorders, such as concussion, spinal cord injury, stroke, Alzheimer's disease, Parkinson's disease, epilepsy and chronic pain.

Our goal is to advance the field of understanding and commercialize technological inventions and successfully link technology and brain activity using brain-machine interface.

We believe that our neuromodulation research activities will help alter brain, spinal cord and nerve function for millions of patients, reduce symptoms of brain disease and disorders and address underlying causes.

The CRANIA leadership team will recruit and train the next generation of neuroscientists specializing in the field.

We expect to be able to deliver fully integrated and first-to-clinic neuromodulation therapies in the next 5 years and establish CRANIA as a leading neuromodulation centre.

Virtual Care

bit.ly/3uXO8DT

Therapists and researchers at KITE and Toronto Rehab treat and provide remote care to patients with a range of conditions. This care is delivered through video conferencing to multiple patients at once and allows for the collection of research data.

These teams provide rehabilitation solutions to patients living with cognitive and mood issues, depression and anxiety, cancer, dementia, brain injury, chronic pain, cardiac and other conditions.

Our teams will expand these programs and develop a larger platform that provides the ability to deliver care to a larger number of clients, at even large distances, and at reduced costs.

In addition to delivering treatments remotely, clinicians and researchers will recruit patients for clinical trials and develop novel and experimental therapies designed to deliver care to patients and research subjects in the comfort of their own homes.

The longer-term goal is to create a self-directed care model that helps the health care system remain sustainable for years to come.

Virtual care will allow us to also provide psychological support and counselling assistance to family members and caregivers remotely.

FIBRE

bit.ly/3hzaqZs

Research teams at the Fabric Based Research Platform (FIBRE) are developing the first generation of textile-based technologies to help monitor patients living with a variety of conditions.

These new wearable devices will ultimately make caring for patients easier, more effective and more affordable.

While many wearable devices already exist, they have not proven accurate enough to meet current clinical and scientific standards, so we have recruited a multidisciplinary group of partners from eight local academic institutions.

Together we will develop and commercialize smart garments that can measure human vital signs (breathing, heart rate, blood pressure and body temperature) and send information to cloud processing units for analysis. This will allow for better and timely assessments and diagnoses, as well as improved treatments that are tailored to patients' individual needs.

Wearable garments, such as socks, undergarments and T-shirts, can also be used as a vehicle for treatment while larger suits can be programmed to deliver Functional Electrical Stimulation (FES) and other treatments remotely. Garments can also be used for medication delivery. Electrical circuits woven into the garments have the ability to push pharmaceuticals through the skin into the tissues and blood stream.

Appendix
KITE Achievements 2018-2022

Aging

- Identification of benefits and barriers to the use of automated vehicle technologies by older adults and persons with dementia.
- Publication of a field study with personal support workers which showed that footwear that performed well in WinterLab in real-world use could reduce slips by 63.4% and falls by 80.3%.
- Development of Hygienic Echo, an innovative and informed approach that can significantly reduce the incidence of hospital-acquired infection by doubling hand hygiene.
- Establishment and continuation of the AGE-WELL NCE national network, based out of KITE/UHN.
- Co-founding of Braze Mobility, which develops and commercializes technology to adapt any type of wheelchair into an intelligent chair.
- Informing policy changes in Canada, with research-based recommendations for improved stair, handrail and bathroom design incorporated into National Building Code of Canada and Canadian Accessibility Standards (CSA B651).
- Development of GO-OUT (Getting Older Adults Outdoors), a park-based, task-oriented program training balance and mobility in older adults.
- Development and evaluation of an mHealth App (Pressure Ulcer Target) for pressure injury prevention and management.

Cardiac

- "Women with Heart" Cardiac Rehabilitation Program initiative and virtual education/ seminar series that focuses on bringing evidence-based knowledge to end users as well as developing a women-specific curriculum.
- Leadership, through the International Council of Cardiovascular Prevention and Rehabilitation (ICCPR), of global audits of cardiac rehab. This for the first time characterized where the greatest cardiac rehabilitation need exists globally.
- Establishment through ICCPR of an international cardiac rehabilitation registry with corresponding program certification to promote quality.
- Integration of research, patient education, and patient-centred care in developing the Health e-University virtual institute, a pioneering education platform that offers an adapted cardiac rehab model that is a global leader and influencer used in more than 10 countries and translated to 10 languages.
- Recognition of our research: Three of our scientists were recently recognized as being in the top 10 productive authors globally in cardiac rehabilitation and related research publications over the last 20 years.
- Demonstration that sleep apnea worsens asthma by increasing fluid in the lungs during sleep.
- Development of dry electrodes to monitor lung fluid, especially in patients with heart failure, and launch of an associated startup.

Cardiac

- The development and implementation of a "catch-and-modify" digital health platform, which is designed to engage the behaviourally disengaged, by using real-time patient data to monitor and dynamically intervene upon those most likely to disengage from exercise and lifestyle modification.
- Validation of key performance indicators for evaluating the implementation and responsiveness of preventative health strategies.

Complex Continuing Care & Long-Term Care

- The Dementia Isolation Toolkit (DIT), developed during the first wave of the pandemic, is designed to support best practices in dementia care along with infection control and prevention, and to support the moral resilience of LTC staff.
- Development of technologies to detect agitation in people with dementia using multimodal devices and videos.
- Creation of an international group of dementia activists (700+ members from 29 different countries) that is already becoming a key international influence in research and advocacy.
- Creation of a one-of-a-kind digital learning experience about stigma in dementia and relational caring.

Complex Continuing Care & Long-Term Care

- Input to the Ontario Long Term Care commission in November 2020 to present research on the role of nurse practitioners in LTC homes, which was cited in the final report.
- The development of an intelligent ambient fall risk assessment system for older adults with dementia.
- The release of multiple open access datasets to help research in the area of AI and aging and tackling age-based bias in AI models.

Musculoskeletal

- One of our scientists is the chair of ECHO Ontario Chronic Pain and Opioid Stewardship, a program that has trained more than 600 healthcare professionals in Ontario.
- One of our scientists has a YouTube channel with over 455K followers. The channel focuses on chronic pain conditions, treatments and prevention.
- KITE is leading the creation of the Schroeder Pain Assessment and Rehabilitation Research Centre, an interdisciplinary clinical-research platform for the investigation of pain disorders involving research in biomedical engineering, physical medicine and rehabilitation, clinical epidemiology, and kinesiology. The clinic is believed to be the first such facility in Canada to provide these opportunities for patients, clinicians and researchers.

Appendix
KITE Achievements 2018-2022

Neuroscience

- Leadership of the Canadian Stroke recovery trials platform, which encompasses 10 sites that research interventions to enhance recovery including medications combined with exercise, robotics, telerehabilitation and enhanced intensity of rehab.
- Development of the Hull-Ellis Concussion Research Clinic that is networked with the Ontario Brain Institute connect network that studies recovery from concussion.
- Defining the best practices in neuro rehabilitation following stroke, neurotrauma (traumatic brain injury and spinal cord injury), childhood acquired neurological disorders and multiple sclerosis. These activities have resulted in the development of best practice guidelines, ideal care pathways, smart phone apps, telerehabilitation toolkit and calculators that help clinicians and health system leaders implement the ideal practices.
- Leadership and contributions to knowledge translation tools to support implementation of new practices including, the Stroke Aerobic Exercise Implementation Toolkit (START), the Toronto Rehab Telerehab Toolkit, and the Toronto Rehab – KITE Research Reactive Balance Training toolkit (REBAL).
- Leadership and contributions to the development of best practice guidelines including the Canadian Stroke Community-based Exercise Recommendations 2020 and the Canadian Stroke Best Practice Recommendations: Virtual Stroke Rehabilitation Update 2020.

Neuroscience

- Publication of two clinical trials demonstrating that a novel intervention developed by the KITE team (reactive balance training) can improve reactive balance control and reduce falls in daily life in people with stroke. Development of a clinical toolkit to aid other rehabilitation professionals in implementing reactive balance training in their settings.
- Development of the first painless dry stimulation electrode for functional electrical stimulation applications.
- Contribution to predictors of treatment recovery in aphasia. Through a collaborative, international research effort representing data from more than 60 researchers and 23 countries, provided conclusive evidence on predictors of recovery from aphasia post-stroke according to different language domains.
- Development of standard operating procedures for rigorous quantitative analysis of swallowing physiology from videofluoroscopic swallowing studies (ASPEKT Method) and an accompanying clinical version of this method (ASPEKT-C Method).
- Creation of a software tool for speech assessment (VirtualSLP).
- Creation of the Telerehab Centre for Acquired Brain Injury to fill a treatment gap in Ontario in cognitive and mental health interventions for people in the chronic stages of neurological disorders, such as moderate-severe traumatic brain injury, concussion, stroke and multiple sclerosis.

Spinal Cord Injury

- Guideline development and contributions to national and international practice standards to advance the medical rehabilitation of sublesional osteoporosis.
- Leadership of the Spinal Cord Injury Implementation & Evaluation Quality Care Consortium with $1.6M support from the Ministry of Health.
- Development, usability testing and pilot randomized control trial of an online self-management program for SCI (SCI&U) using peer health coaches.
- Establishment of KITE Innovations and Rehabilitation Clinics.
- Creation of the only EEG-triggered functional electrical stimulation therapy for restoration of reaching and grasping.
- Development of a novel therapy using electrical stimulation for people with incomplete spinal cord injury to train their standing balance.
- Development of a novel method to reduce muscle fatigue during electrical stimulation, which can extend rehabilitation period using electrical stimulation.
- Demonstration that video from wearable cameras can be analyzed using artificial intelligence to provide valid measures of hand use at home, as well as to detect for the first time the use of compensatory grasping postures.

Appendix
Reports and Strategic Plans

UHN Research Report 2018

bit.ly/2oQn3zC

UHN Strategic Plan 2019-2023

bit.ly/2CtgZUw

UHN Research Report 2019

bit.ly/30qxsE2

UHN Strategic Research Plan

bit.ly/3XtJ1rR

UHN Research Report 2020

online.flipbuilder.com/ubbi/idyl/

Toronto Rehab Strategic Plan

bit.ly/3V3qFMT

UHN Research Report 2021

bit.ly/3EDWiFA

UHN Report to Our Community

bit.ly/3i9ByhB

Appendix
Toronto Rehab Clinical Overview

KITE is the research arm of the Toronto Rehabilitation Institute at UHN. KITE scientists work closely with the interdisciplinary teams at Toronto Rehab that are dedicated to helping patients recover from injury, illness, or age-related conditions, to regain strength, resiliency and independence in their daily lives.

By the numbers (yearly)

- **2,900** inpatient visits per year
- **94,500** outpatient visits per year
- **5** sites
- **657** learners
- **476** inpatient beds
- **46** outpatient clinics
- **2,049** staff
- **115** physicians

TR Programs

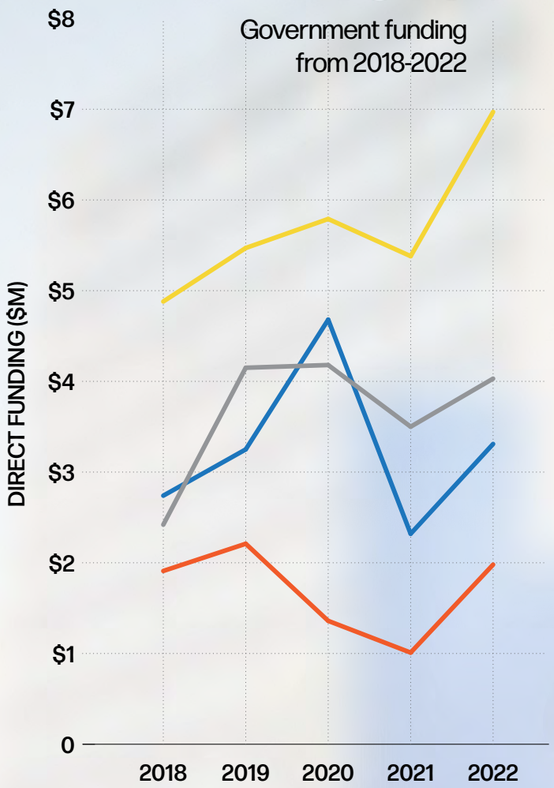
- **Brain Rehabilitation Program**
- **Spinal Cord Rehabilitation Program**
- **Cardiovascular& Rehabilitation Program**
- **Complex Continuing Care/Low Tolerance Long Duration Rehab Program/Transitional Care Program**
- **Musculoskeletal Rehabilitation and Multi-System Program**
- **Geriatric Rehabilitation Program**

Appendix
Additional Metrics

Direct Funding

45%↑

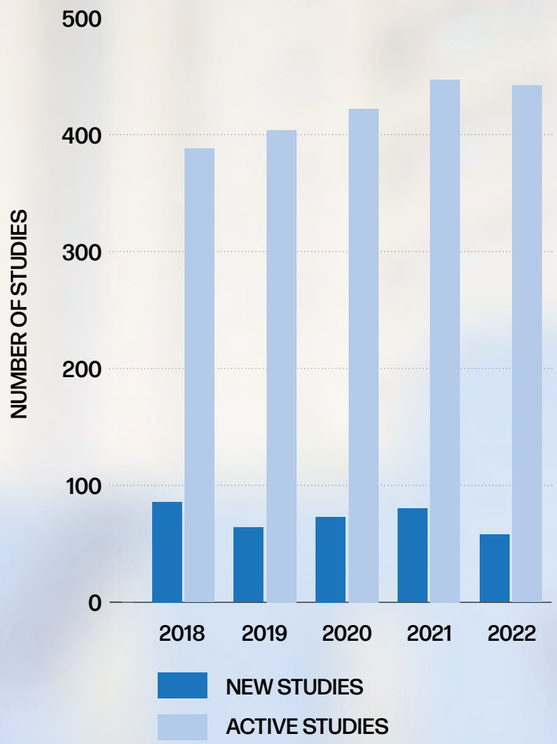
Government funding from 2018-2022



Clinical Research Study Activity – Overall

92%

Of KITE Scientists Conduct Clinical Research



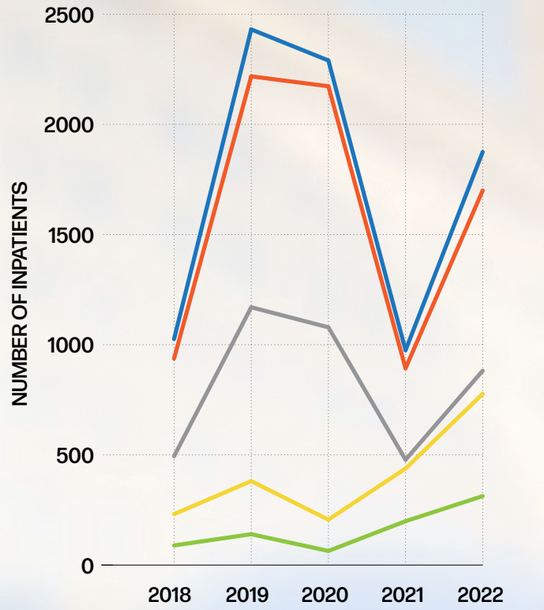
5-Year Average

72
New Studies per Year

5,856
Anticipated Participants for New Studies per Year

421
Active Studies per Year

Clinical Research Study Activity – Central Recruitment



- **# OF INPATIENTS** *(NEW ADMISSIONS)*
- **# OF INPATIENTS** *(INTERESTED IN PARTICIPATING IN FUTURE RESEARCH STUDIES)*
- **# OF INPATIENTS** *(CONSENTED TO BE CONTACTED FOR PARTICIPATION IN FUTURE RESEARCH STUDIES)*
- **# OF INPATIENTS** *(ELIGIBLE FOR A STUDY)*
- **# OF INPATIENTS** *(CONSENTED FOR A STUDY)*

5-Year Inpatient Average

1,719
New Admissions

407
Eligible for study

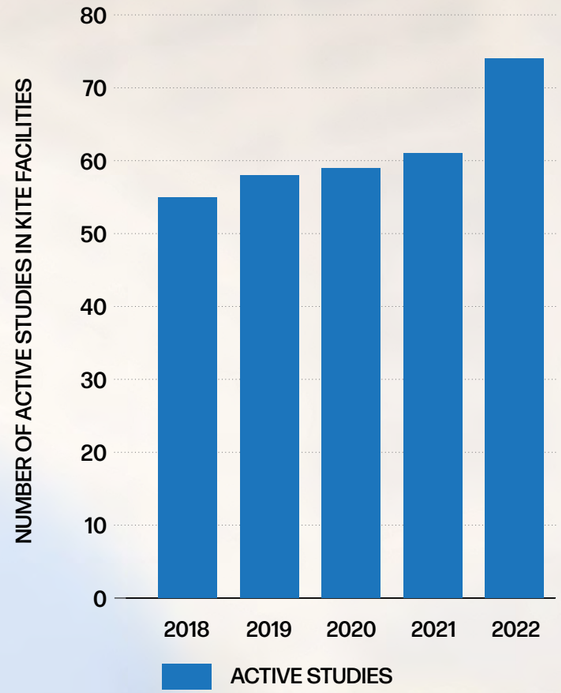
161
Consented for study

12
Active Studies (annually)

Clinical Research Study Activity – KITE Facilities

35%↑

Active Studies from 2018-2022



5-Year KITE Facilities Average

61
Active Studies

15%
of Total Active Studies at KITE

kite UHN

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