

Department of Physical Therapy Research Committee

Profiling our Research: Research Platforms

Background

The Department of Physical Therapy recently finalized a Strategic Plan for 2020-2025. To support implementation of the Strategic Plan, the Department of Physical Therapy Research Committee is developing a research strategy, including goals, activities, and benchmarks.. The Research Strategy will align with and complement the strategic priorities, and hallmark initiatives of the Department and Temerty Faculty of Medicine strategic plans.

A strategic priority in the Department of Physical Therapy Strategic Plan is to **strengthen our shared scientific purpose**. To address this priority, we propose two goals:

- 1) To profile our research programs to advance high quality, meaningful research relevant to physical therapy and rehabilitation, and
- 2) To strengthen our multi-stakeholder partnerships with research institutes, universities and communities, locally, nationally and internationally to advance our physical therapy and rehabilitation research.

To help achieve these goals, the research committee has undertaken the activity of describing the research platforms of the department. The term “research platform” refers to a broad area of research being undertaken in the department.

Process

This work directly builds on the foundational work completed in 2012 when a Research Innovation Committee identified research platforms and foci in the Department of Physical Therapy to identify areas of strength and areas that required further development. Using the 2012 research platforms as a foundation, the research committee drafted updated platform descriptions to showcase the strengths and areas of excellence of our faculty in **research and education scholarship** and to identify emerging areas of research priority and leadership. Under each platform, we have included exemplars of grants, projects, and publications with links as applicable to showcase research faculty are undertaking under each platform. We will circulate this document to faculty and present at a Departmental meeting for feedback.

Department of Physical Therapy Research Committee

Research Platforms

University of Toronto Department of Physical Therapy – Vision 2020-2025

The University of Toronto Department of Physical Therapy seeks to advance the teaching, science and practice of physical therapy as an essential part of individual health and inclusive, flourishing communities.

One of our priorities is strengthening our shared scientific purpose. Our goal is to continually strengthen our already exceptional science, while advancing its social impact. We will develop a shared focus for research and knowledge translation in physical therapy that supports function, health, well-being and societal participation, innovative approaches to practice, and models that foster greater access to high quality care.

Department of Physical Therapy Research Platforms

Faculty in the Department of Physical Therapy are engaged in **research and education scholarship** under four integrated Research Platforms. Physiotherapy offers critical tools and methods for preventing, treating, and supporting individuals living with injury, illness, and disability across the lifespan, and improving **function and well-being**. Excellence in research with real-world impact for enhancing the health of Canadians requires high quality and innovative initiatives that respond to the changing needs of populations and produce findings that build our science and inform further **research, education, clinical practice, and policy**.

Research in each platform incorporates:

- **Education scholarship¹** that directly informs the MScPT curriculum and beyond.
- **Integrated and end-of-project knowledge translation** with the aims of increasing the uptake of evidence at the level of the individual, program, policy, and healthcare system to improve the health of individuals and communities.
- **Community-engaged approaches** whereby we collaborate with diverse communities aspects of research development, implementation, and translation.
- Approaches that incorporates **equity, diversity, and inclusion**
- **Local, national, and international collaborations**.

Our research platforms below profile the breadth and depth of faculty expertise in research that spans the continuum from cellular mechanisms to population and community health.

¹Education scholarship includes the description and dissemination of effective and novel teaching methods and strategies in a research presentation or publication. (Glassick CE. Boyer's expanded definition of scholarship, the standards for assessing scholarship and the elusiveness of the scholarship of teaching. Acad Med. 2000;75(9):877-80)

Platform 1: Healthy Development and Aging

The aim of this research platform is to strengthen and increase access to physical therapy, healthcare, and community systems that optimize the health and well-being of people across the lifespan. This aim is addressed by:

- 1) developing tools and approaches to understand populations with complex health and social care needs;
- 2) developing beneficial and cost-effective physical therapy and rehabilitation interventions and community wellness programs that meet the needs of individuals and families;
- 3) understanding how social factors, financing systems, organizational structures and processes, health technologies, and personal behaviors affect implementation of and access to these interventions and programs;
- 4) designing effective strategies to increase the uptake of physical therapy and rehabilitation interventions and community wellness programs; and
- 5) creating innovative education tools and programs to prepare physical therapists for current and emerging roles that advance the health, function, and well-being of individuals, families, and communities.

All research within this platform is conducted in partnership with relevant stakeholder groups in alignment with an integrated knowledge translation approach to ensure the research is meaningful and contextually relevant. Faculty expertise with implementation science means that research findings inform clinical practice including clinical practice guidelines, community programs, health policy, as well as entry-to-practice and post-graduate education in physical therapy. Findings also inform rehabilitation and community programs designed for children, youth, adults, and older adults with a range of health conditions.

Research undertaken within this platform has yielded new methods of physical therapy education, assessment, and treatment. Faculty have created innovative community-based exercise, dance, and self-management programs incorporating new roles for health professionals and evidence-based strategies to promote health, function, and well-being across the lifespan. Diverse research methodologies, including qualitative, quantitative, mixed method, and multi-method research, are used within this platform. Faculty have expertise with knowledge synthesis, health record reviews, surveys, development and evaluation of complex interventions using time series and (cluster) randomized controlled trials, advanced statistical modeling, behaviour change theories, and clinical practice guideline development.

Exemplars of this research led by our faculty in this platform include:

- Evaluating the implementation of a community-based exercise intervention with adults living with HIV: an interrupted time series study ([Kelly O'Brien](#))
- A theory-based, task-oriented, outdoor walking programme for older adults with difficulty walking outdoors: protocol for the Getting Older Adults Outdoors (GO-OUT) randomised controlled trial ([Nancy Salbach](#))
- A dance program to improve gait and balance in individuals with chronic stroke: a feasibility study (Kara Patterson)

- Health and Community-Based Services for Individuals with Neurological Conditions (Susan Jaglal)
- Development of Child and Family-Centered Engagement Guidelines for Clinical Administration of the Challenge to Measure Advanced Gross Motor Skills: A Qualitative Study (Barbara Gibson)
- The standing and walking assessment tool for individuals with spinal cord injury: a qualitative study of validity and clinical use (Kristin Musselman)
- Aerobic and breathing exercises improve dyspnea, exercise capacity and quality of life in idiopathic pulmonary fibrosis patients: systematic review and meta-analysis (Darlene Reid)
- The role of theory to develop and evaluate a toolkit to increase clinical measurement and interpretation of walking speed and distance in adults post-stroke ([Nancy Salbach](#))
- Physical therapy interventions in the management of chronic pain ([Judith Hunter](#))
- Evidence of Reliability, Validity and Practicality for the Canadian Physiotherapy Assessment of Clinical Performance (Brenda Mori)
- The Knowledge, Attitudes, and Practices of Canadian Master of Physical Therapy Students Regarding Peer Mentorship (Martine Quesnel)
- Clinical instructors' perceptions of internationally educated physical therapists' readiness to practice during supervised clinical internships in a bridging programme (Sharon Switzer-McIntyre)
- Validity of a new assessment rubric for a short-answer test of clinical reasoning (Euson Yeung)
- Developing and Assessing the Properties of a New Short-Form HIV Disability Questionnaire (SF-HDQ) with Adults Living with HIV in Canada, Ireland, UK and United States ([Kelly O'Brien](#))

Platform 2: Assessing Body Structure and Function

The aim of research in this platform is to determine the physiological and biomechanical mechanisms underlying impaired mobility and function associated with acute and chronic health conditions affecting children and adults. This aim is addressed by:

- 1) developing innovative technology-assisted approaches for assessing structures and functions of the neuromuscular, musculoskeletal, and cardiorespiratory systems and interactions with the environment;
- 2) determining physiological and biomechanical function of healthy individuals; and
- 3) determining physiological and biomechanical impairment and compensatory change in people with acute and chronic health conditions.

Research in this platform incorporates laboratory-based testing, clinical research, and evaluation of real-time person-environment interactions. Findings inform assessment and treatment approaches for physical therapy and rehabilitation with children, youth, and adults with a range of acute and chronic health conditions including idiopathic scoliosis, cerebral palsy, brain injury, spinal cord injury, stroke, chronic lung disease, critical illness, and solid organ transplantation. Faculty expertise includes implementation science such that research findings inform clinical practice, community programs, and health policy.

Exemplars of this research led by our faculty in this platform includes:

- Development of a new model of biomechanical assessment to explore the structure, function, and mobility of the spine in children and youth with idiopathic scoliosis (Karl Zabjek)
- Investigating the structure, function, and mobility of the spine in children and youth living with a Paediatric Spinal Deformity (Karl Zabjek)
- Changes in oxyhemoglobin concentration in the prefrontal cortex during cognitive-motor dual tasks in people with chronic obstructive pulmonary disease ([Darlene Reid](#))
- The effects of hypoxia on muscle deoxygenation and recruitment in the flexor digitorum superficialis during submaximal intermittent handgrip exercise ([Darlene Reid](#))
- Lower limb muscle activity underlying temporal gait asymmetry post-stroke ([Kara Patterson](#))
- An Initial Investigation of the Responsiveness of Temporal Gait Asymmetry to Rhythmic Auditory Stimulation and the Relationship to Rhythm Ability Following Stroke ([Kara Patterson](#))
- Validating accelerometry as a measure of arm movement for children with hemiplegic cerebral palsy ([Kristin Musselman](#))
- Quantitative ultrasound imaging over the ischial tuberosity: An exploratory study to inform tissue health (Sharon Gabison)

Platform 3: Social, Political, Ethical & Cultural (SPEC) Dimensions of Health and Disability

The aim of this platform is to investigate and address the social, political, ethical and cultural forces that shape how health, disease, and disability are understood and addressed in healthcare and rehabilitation and in various communities and societies. This aim is addressed through *critical* social science approaches that investigate:

- 1) How health, disease, and disability is conceptualized and addressed in health care, communities and at the societal levels and the effects on disabled people;
- 2) how systems of oppression shape healthcare and contribute to social and health inequities; and
- 3) how core assumptions, concepts and values underpinning physical therapy and healthcare influence education, practice, delivery, policy, and/or research.

Research in this theme is directed towards critical inquiry, has explicit anti-oppression aims oriented to transformative and emancipatory systemic changes to healthcare and society more broadly. Aligned with the growing field of critical rehabilitation studies, SPEC research is explicitly transdisciplinary, drawing on diverse knowledges, and critical scholarships (critical disability studies, critical race theory, anti-colonial studies, Indigenous studies, childhood studies, feminist studies, and posthumanism). The platform also promotes diverse methodologies, such as narrative, discourse analysis, oral history and arts based approaches.

Exemplars of this research led by our faculty in this platform include:

- Critical Disability Studies scholarship investigating the lived experience of disability and how disability is understood, addressed in physiotherapy, healthcare and society ([Yoshida et al](#))
- Investigations and critiques of the philosophical foundations of rehabilitation and healthcare [[Barbara Gibson](#)]

- How systems of oppression shape health research, education and practice, and the role of people in positions of unearned advantage in disrupting these harmful patterns ([Stephanie Nixon](#))
- The intersecting effects of gender, disability, and life stage on young men with progressive muscular dystrophies. [[Barbara Gibson](#)]
- The micro-politics of person-centered rehabilitation [[Barbara Gibson](#)]
- Ethical and practical implications of incorporating emerging digital technologies and artificial intelligence in health care delivery [[James Shaw](#)]
- Values and Principles of Teaching Critical Disability Studies in a Physical Therapy Curriculum: Reflections from a 25-Year Journey-Part 1: Critical Disability Studies Value Framework ([Karen Yoshida](#))
- Values in Action: A Consumer-based Practice Model of Rehabilitation ([Karen Yoshida](#))
- The Perspectives of Racialized Physiotherapists in Canada Regarding their Experiences with Racism within the Physiotherapy Profession ([Stephanie Nixon](#), [Meredith Smith](#))
- Build Insight, Change Thinking, Inform Action: Opportunities for Increasing the Number of Indigenous Students in Canadian Physical Therapy Programs ([Stephanie Nixon](#))

Platform 4: Digital Physical Therapy and Rehabilitation

The aim of this platform is to establish and translate evidence involving innovative virtual rehabilitation approaches for advancing education and implementation of rehabilitation assessment and interventions for people living with chronic conditions. This aim is addressed by:

- 1) developing mobile health solutions and technologies to advance implementation of recommended rehabilitation assessments and treatments, patient education, and healthy living;
- 2) developing effective approaches for the virtual delivery of rehabilitation, community-based exercise, and physical activity interventions;
- 3) validating electronically administered patient-reported outcome measures (PROMs) and virtually administered performance-based rehabilitation assessment tools; and
- 4) developing and evaluating virtually delivered physical therapy education.

This platform encompasses emerging advances in virtual approaches to **clinical practice, education, and research**. The COVID-19 pandemic has led faculty to address the urgent need for innovative approaches to virtual physical therapy education, assessment, and treatment, and community-based exercise programming in Canada. This platform includes using implementation science approaches to assess the accessibility, acceptability, effect, fidelity, adoption, feasibility, and sustainability of virtually delivered interventions. Findings are of benefit to physical therapy learners and practitioners, and people with HIV, spinal cord injury, stroke, and other chronic health conditions.

Exemplars of this platform led by our faculty include:

- Assessing the implementation of online community-engaged self-management interventions to enhance health outcomes for people living with spinal cord injury (Susan Jaglal)
- Examining the implementation of an online (tele-coaching) community-based exercise intervention among adults living with HIV (Kelly O'Brien)

- Establishing a virtual Community of Practice to enhance integrated knowledge translation, capacity building, and partnerships in physical activity among people with chronic conditions ([Kelly O'Brien](#))
- Evaluating the effectiveness of TIME at Home, a task-oriented community based exercise program for people with balance and mobility limitations (Nancy Salbach)
- iWalkAssess, a mobile application designed to help physical therapists to administer and interpret performance on functional walk tests in people with stroke (Nancy Salbach)
- A mobile application to educate people with skin ulcers (Sharon Gabison)
- Validating virtual administration of performance-based tests of physical function in older adults with balance and mobility limitations (Nancy Salbach)
- Use of virtual platforms to promote education of learners in physiotherapy scholarly practice (Sharon Switzer-McIntyre, Martine Quesnel, Euson Yeung).
- Lessons learned from experiences of Ontario physiotherapists on the delivery of telehealth physiotherapy for outpatient/community physiotherapy services during the 2020 COVID-19 pandemic (Sharon Gabison, Molly Verrier, Alison Bonnyman)