

2021

MIRA and Labarge Annual Report



LABARGE
Optimal Aging
INITIATIVE

Labarge Centre for
Mobility in Aging

MIRA | Dixon Hall
Centre

Institute for
Research on Aging

McMaster
University 



Contents

4 Introduction

6 By the numbers: 2021 in review

12 **PART 1:**
**Labarge Centre for Mobility
in Aging (LCMA)**

14 Researcher support

45 Trainee support

60 **PART 2:**
**Labarge Optimal Aging Initiative
and the Labarge Foundation**

61 Labarge Optimal Aging Initiative

68 Labarge Foundation Grants

71 Other initiatives supported
by Suzanne Labarge

74 **PART 3:**
**McMaster Institute for
Research on Aging (MIRA)**

76 Governance overview

77 Research approach

81 MIRA | Collaborative for Health and Aging

82 Research support

101 Continued response to COVID-19

102 **PART 4:**
MIRA | Dixon Hall Centre

104 **PART 5:**
Capacity building

105 CIHR Institute of Aging Summer
Program in Aging (SPA)

106 MIRA Membership

107 MIRA Trainee Network

110 Educational programming

114 **PART 6:**
Community and stakeholder engagement

115 Age-Friendly University

116 Intergenerational programming

117 The Voice Digital Platform

118 **PART 7:**
Funding and research impact

118 Partnerships

121 Government relations

121 Leveraging MIRA and LCMA funds

122 **PART 8:**
Communications, outreach and events

126 **PART 9:**
**Review of achievements in
2021 and goals for 2022**

128 About us

130 Acronyms and definitions

Introduction

The McMaster Institute for Research on Aging (MIRA) brings diverse groups of people together behind a common and focussed goal; a future in which interdisciplinary research supports and enables people of all ages to live longer, healthier lives. MIRA strives to advance and connect to this vision through all elements of operation, including leading-edge research, education and stakeholder collaborations.

Just over five years ago, MIRA formed to address the complex issues that face aging populations through organized, interdisciplinary research that integrates older adults, families, health-care providers and other key stakeholders in every stage of addressing complex issues. The Institute has been extremely successful in obtaining input from many perspectives and areas of expertise to ensure that research outputs are, from the outset, optimized to create useable, practical, older adult-centred solutions that promote aging in place.

The Labarge Centre for Mobility in Aging (LCMA), MIRA's first focused research centre, launched in 2016 to facilitate and amplify research initiatives that mitigate the risk and consequences of declining mobility with age. Mobility is critical to healthy aging and can affect social and economic independence, along with physical and mental health. The LCMA, which was built on the groundwork of the Labarge Optimal Aging Initiative and the Labarge Foundation, fosters the same interdisciplinary research approach as MIRA. In 2021 the MIRA | Dixon Hall Centre was launched to extend the reach of MIRA and the Optimal Aging Portal, while focusing on the people for whom mobility work can have positive outcomes.

MIRA has continued to grow a network of researchers, stakeholders and partners that share the Institute's vision and goal of developing the next generation of researchers who consider aging an overarching component of human health and well-being. MIRA has continued to support this entire network, including older adults, throughout the pandemic with a variety of initiatives and online services.

The 2021 Annual Report highlights MIRA's current work in aging research, education and community-based projects that support the health and well-being of older adults. Through the development of novel training programs and community and knowledge translation activities, MIRA's research is resulting in outcomes that have a real impact and influence on the well-being of older adults locally and globally.

This work could not have been possible without the support of McMaster University and the generous donations of its former chancellor, Suzanne Labarge.





In another year dominated by the global COVID-19 pandemic, McMaster's researchers have shown themselves to be highly creative, adaptable, and innovative in advancing aging research — supporting and enriching the aging experience through problem-solving and collaboration across all six university Faculties.

McMaster University is ranked among the top 80 universities globally and is Canada's most research-intensive university. With aging across the lifespan as one of our research priorities, McMaster has been a positive influence on the success of aging research in Canada and internationally. As an Age-Friendly University, McMaster is rapidly advancing aging research, as well as education and community initiatives that support older adults.

As a result of their collaborative approach, our researchers have been able to blend scientific expertise and medical advances with social insights, engineering acumen and management skills. This enables the design of innovative solutions intended to support longer, healthier lives and to foster active and healthy populations across the lifespan. Through this interdisciplinary approach McMaster has developed the capacity to address the most pressing aging-related questions facing older adults, caregivers, health professionals and policy makers. This important work has been made possible as a result of the vision and generosity of Suzanne Labarge.

I invite you to read more about the positive impact McMaster is making in this year's report.

Dr. David Farrar
President and Vice-Chancellor



Older adults are living longer, but they also face challenges, including barriers to physical mobility and social and personal support systems. The McMaster Institute for Research on Aging (MIRA) and its centres have shown that they have the capacity to confront the challenges older adults face in their daily lives in a rapidly changing world. I am pleased to champion the Labarge Centre for Mobility in Aging (LCMA) and the MIRA | Dixon Hall Centre, both housed within MIRA.

In another complex year for academic and research institutions across the globe, MIRA continues to advance its vision with significant success and support its researchers, trainees, stakeholders and members of the older adult community. McMaster continues to receive recognition as an international and innovative leader in aging research.

McMaster's recent research activities have focussed on the importance of improving the lives of older adults during an ongoing global pandemic where they are among the most vulnerable. Through MIRA's centres, we are leading the way with the translation of important research findings that will help older adults and their caregivers make the best evidence-based decisions for optimal health and well-being.

The future of aging research at McMaster is bright. Through the generous investments made by Suzanne Labarge, we have been able to set the stage for excellence and develop an aspirational path for McMaster while adapting to our ever-evolving world.

Dr. Susan Denburg
*Executive Vice-Dean and Associate Vice-President, Academic,
Faculty of Health Sciences
University Lead, Labarge Centre for Mobility in Aging, MIRA | Dixon Hall
Centre and McMaster Institute for Research on Aging*

By the numbers: **2021 IN REVIEW**

161

MIRA Faculty
members

142

MIRA
Trainee Network
members

35

AURA undergraduate
members

38

Strategic
partnerships

8 Catalyst Grants funded in 2021

MIRA & LCMA awarded \$310,000 in Catalyst Grant funding in 2021

6 Labarge Catalyst Grants in Mobility in Aging **\$240,000** supporting one award in each of the six Faculties

1 MIRA Biology of Aging Catalyst Grant **\$40,000**

1 MIRA/IPRC Catalyst Grant in Aging and Pain **\$60,000** (MIRA & IPRC \$30,000 each)

Since 2017, MIRA and the LCMA have funded **32 Catalyst Grants**, supporting interdisciplinary aging research accross the University.

3 Major Programs of Research

MacM3
EMBOLDEN
Juravinski Mobility Project

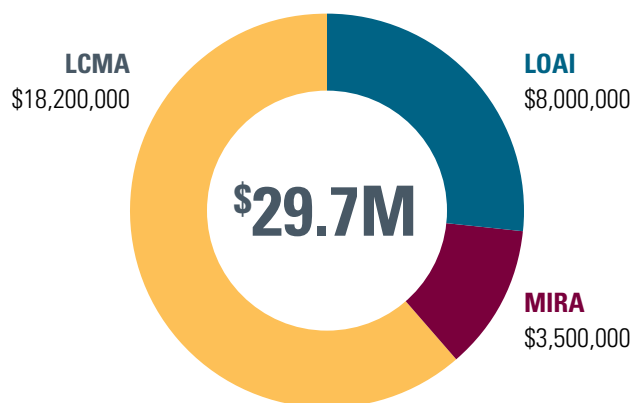
Initial investment: \$2.1 million

\$2.23 million leveraged in external, internal and in-kind research support

39 Highly Qualified Personnel*

11 Community partners

Leveraged Funds as of 2021, MIRA & Labarge funded research projects have cumulatively leveraged a total of \$29.7 million.



* Highly Qualified Personnel include graduate students, undergraduates, postdoctoral fellows, and research staff.

LCMA Labarge Centre for Mobility in Aging
LOAI Labarge Optimal Aging Initiative
MIRA McMaster Institute for Research on Aging

25 Newly funded trainees in 2021

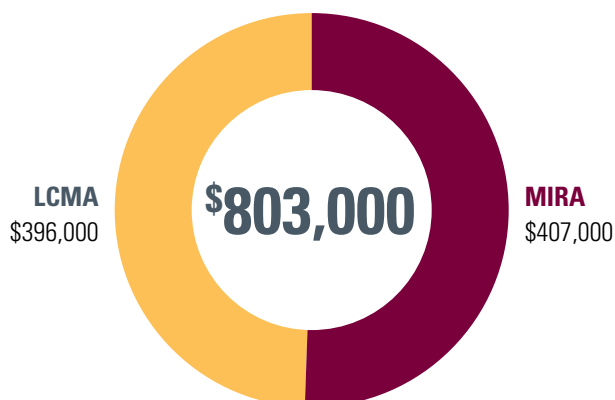
Since 2016, MIRA and the LCMA have funded **78 trainees**.

2	2	1	8	10	2
Labarge Graduate Scholarships	MIRA Graduate Scholarships	Labarge Postdoctoral Fellowship	MIRA Postdoctoral Fellowship	Mira Undergraduate Summer Research Fellows	AGE-WELL/MIRA Co-funded Trainees

\$590,000 in MIRA trainee funding awarded in 2021

\$246,000 in additional support to 2021 trainees from within and beyond the University

Additional support leveraged from MIRA and LCMA scholarships since 2016



Researchers report MIRA/LCMA funding has enabled them to gain an average of:



They also reported

Over 190 private industry and non-profit collaborations

Over 3,300 stakeholders and end-users engaged in research

2021 Community outreach and programming activities

Over 70 participants joined the intergenerational program Meet My Hamilton and indicated it had a positive impact on their knowledge of aging as well as their feelings of belonging during the pandemic

24 practicum students worked with MIRA on Meet My Hamilton, allowing MIRA to support experiential learning opportunities in program development, implementation and leadership skills

MIRA hosted the **CIHR Summer Program in Aging** in May 2021 with **56 participants, 29 speakers** and **13 mentors** involved in intensive learning opportunity on using longitudinal study data in research on aging

To date, **more than 190,000 users** have accessed the Optimal Aging Portal's new e-learning modules on osteoarthritis and brain health

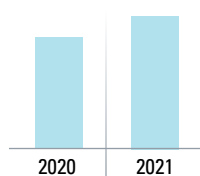
Social media

Twitter followers

2,341

20% INCREASE
from 2020

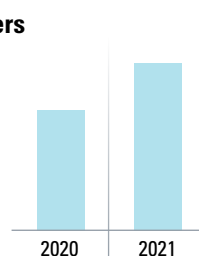
MIRA/LCMA funded researchers and trainees collectively report over 57,819 followers of their own, amplifying our reach



Facebook followers

255

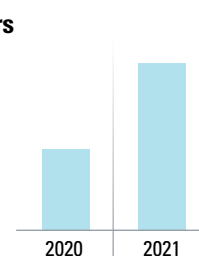
42% INCREASE
from 2020



LinkedIn followers

166

102% INCREASE
from 2020

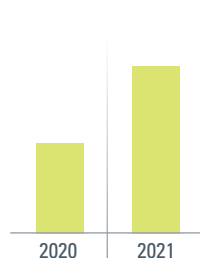


Website engagement

Sessions

40,000

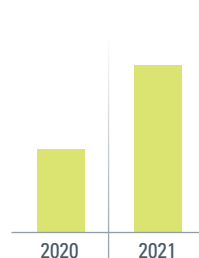
90% INCREASE
from 2020



New users

28,000

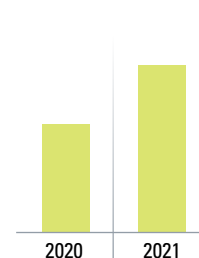
100% INCREASE
from 2020



Pageviews

68,000

55% INCREASE
from 2020

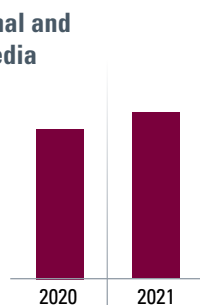


Media activity

Stories in traditional and non-traditional media

134

11% INCREASE
from 2020

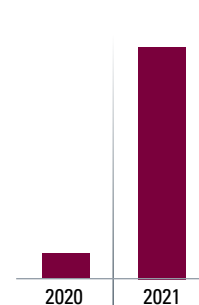


Online readership of all media outlets covering MIRA/LCMA

8,590,000

777% INCREASE
from 2020

In 2021, MIRA members received more coverage from national news sources (such as CBC and the Globe and Mail) and international sources, including the New York Times, accounting for this large increase.



Research Impact Highlights

MIRA and Labarge funding have supported **140 researcher and trainee projects**.

As of 2021, these projects have had tremendous impact, including:

137

Publications

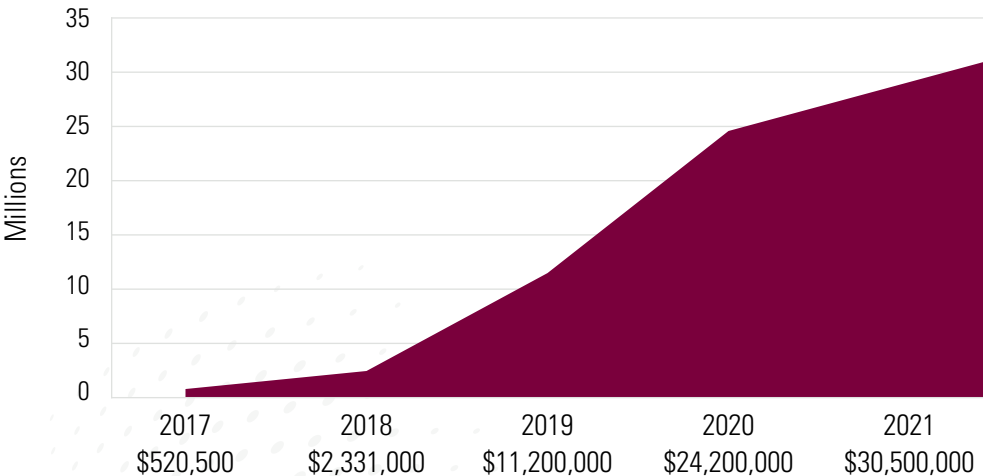
253

Presentations at relevant conferences and special events

128

Knowledge translation products

\$30.5 million in leveraged funds



To date, the \$33.9 million investment from the donor and McMaster has been leveraged by MIRA to bring in an additional \$30.5 million to support aging research at the University.

\$30.5M =

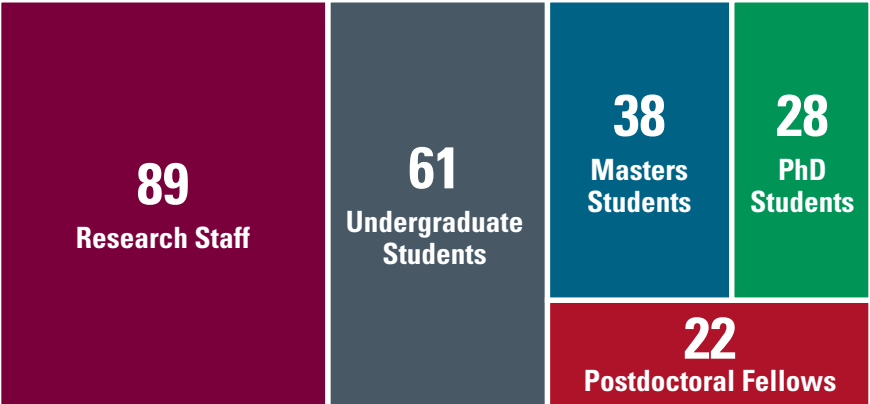
LCMA funds leveraged for a total of \$18.6M

MIRA funds leveraged for a total of \$3.9M

LOAI funds leveraged for a total of \$8.0M

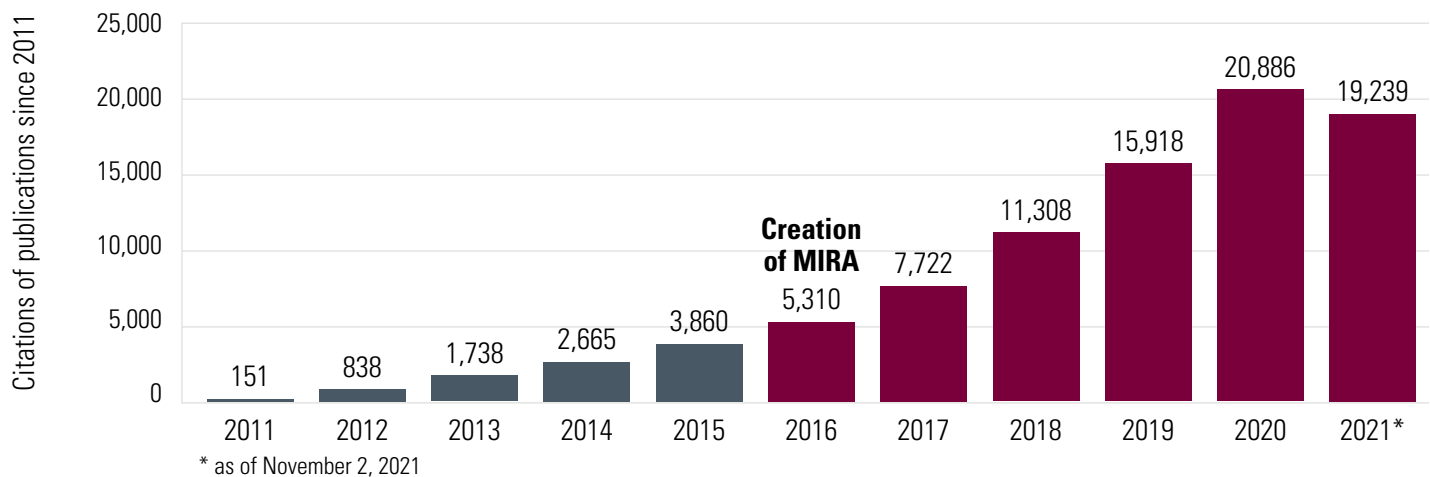
238 HQPs supported by funded projects

(in addition to HQP supported through MIRA/LCMA scholarships)



McMaster publications on aging are increasingly being cited

Number of citations between 2011 and 2021* for publications on aging between 2011 and 2021*



MIRA members' achievements in 2021

- In a 2021 membership survey, over a third of MIRA members reported publishing **5 or more papers in aging in 2021**.
- **Ravi Selvaganapathy** and **Margaret Fahnestock** leveraged their 2019 Labarge Catalyst Grant in Mobility in Aging funded research, winning two New Frontiers in Research Fund Exploration Grants, for a combined **\$500,000**
- MIRA member (and MIRA Scientific Director) **Parminder Raina** received a **\$12 million** research grant to the Canadian Longitudinal Study on Aging (CLSA) from the Weston Family Foundation for the Healthy Brains, Healthy Aging Initiative. As Lead Principal Investigator of the CLSA, Dr. Raina was also awarded **\$52 million** from the Canadian Institutes for Health Research (CIHR) and **\$9.5 million** from the Canada Foundation for Innovation for CLSA to expand to new areas of assessment, continue data collection to 2027 and renew infrastructure.
- MIRA members **Marla Beauchamp**, **Rong Zheng**, **Kathryn Grandfield**, and **Tohid Didar** were among McMaster's newly named Canada Research Chairs.
- MIRA members **Baraa Al-Khazraji**, **Rebecca Ganann**, **Dylan Kobsar**, and **Marla Beauchamp** also captured four of the Ministry of Colleges and Universities Early Researcher awards.
- **Alexandra Papaioannou** received over **\$1.3 million** in funding as principal investigator of several grants, including CIHR Project Grants trialing interventions in frailty and fracture prevention.
- **Hsien Seow** received **\$1.24 million** in funding and the partnership of Indigenous Services Canada, to co-design a palliative care education program for primary care teams in First Nations communities across Ontario.
- **Andrew Costa** published 29 papers in aging research in 2021 and, working with **Dawn Bowdish** led a \$5M project on COVID-19 immunity in long-term care (LTC) which informed the provincial decision to implement a third dose in LTC.
- **Marla Beauchamp**, **Andrew Costa**, **MyLinh Duong** and **Parminder Raina** received \$497,800 from CIHR for a project extending a rapid research platform to support clinical management of COVID-19 'long-haulers.'
- Early career researcher **Nicole Dalmer** is part of a seven year, **\$2.5 million** SSHRC partnership grant Aging in Data, and published 7 papers in aging and a highly viewed story in The Conversation, "Instead of jumping the COVID-19 vaccine queue, try acting your age."
- **Ellen Badone**, established researcher in religious and medical anthropology, pivoted toward aging research in 2021, publishing her first paper in aging. Through MIRA, she connected with fellow MIRA researcher **Pam Baxter**, and together they secured funding through McMaster Provost's Research Excellence Fund to launch a new interdisciplinary collaboration addressing the impact of COVID-19 on nurses in Ontario's long-term care, analysing preliminary data that will support a larger application to SSHRC.
- **Stuart Phillips** was named to the Clarivate top 1% cited researchers list for 2021, publishing 22 aging related papers in 2021 and 341 over the course of his career.

PART 1

Labarge Centre for Mobility in Aging (LCMA)

The **Labarge Centre for Mobility in Aging (LCMA)** launched in 2016 to focus on initiatives that mitigate the risk and consequences of mobility declining with age. Built on groundwork from the **Labarge Foundation** and the **Labarge Optimal Aging Initiative (LOAI)**, as well as the continued generosity of Suzanne Labarge, the LCMA aims to produce tangible outcomes that will improve the lives of older adults in Canada and around the world.

The LCMA fosters multiple cross-Faculty approaches to mobility in aging, including, but not limited to:

- Biological and physiological contributors
- Behavioural, cognitive and psychosocial influences
- Biomedical, clinical and technological innovations
- Availability of prevention, rehabilitation and management strategies for mobility challenges
- Environmental components, such as social, economic, policy and physical/structural factors

The LCMA uses the following mechanisms to conduct research, support community engagement and promote knowledge sharing:

- Facilitating and funding major interdisciplinary research initiatives
- Establishing partnerships to leverage LCMA funds
- Building capacity by supporting students and trainees
- Hosting events and facilitating outreach to enable research collaboration across disciplines

The LCMA's positioning within the McMaster Institute for Research on Aging (MIRA) creates efficiencies by sharing staff, space and governance structures. Together, the LCMA and MIRA are well-positioned to respond to opportunities and enhance the lives of today's aging population.

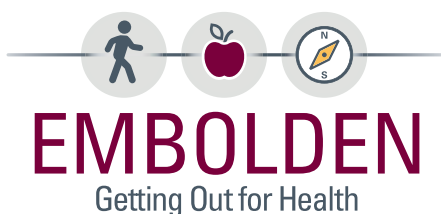


Research support

Major Programs of Research

In 2017, MIRA and the LCMA launched a process to support interdisciplinary teams working towards understanding, developing, and evaluating critical issues in aging and mobility. Through an iterative design-thinking process, facilitated by MIRA, several programs of research were developed. Proposals were reviewed by MIRA's International Scientific Advisory Committee (ISAC) and external reviewers with relevant expertise. Three major projects of research were funded in mid-2019.

In 2021, MIRA and the LCMA began developing a second cohort of Major Programs of Research. The current themes for this round of programs include: intergenerational approaches to aging and mobility; complex interventions for frailty; and aging, technology and digital equity.



INVESTIGATORS

Rebecca Ganann
Stuart Phillips
Courtney Kennedy
Bruce Newbold
Elizabeth Alvarez
Sarah Neil-Sztramko
Ruta Valaitis
Ayse Kuspinar
Diana Sherifali
James Gillett
Marla Beauchamp
Julia Abelson
Parminder Raina
Lehana Thabane
Terry Flynn
Gina Agarwal
Maureen Markle-Reid
Meridith Griffin
George Ioannidis
Pasqualina Santaguida
Chris Verschoor
Gillian Mulvale
Carol Bassim

PROJECT | The EMBOLDEN trial:
Enhancing physical and community
MoBility in OLDEr adults with health
inequities using commuNity co-design
of a complex intervention incorporating
exercise, nutrition, social participation
and system navigation

Physical mobility and social participation can help older adults 55 years of age and older maintain independence and quality of life. Community programs designed to support these activities may be highly effective, but many older adults face barriers accessing them. Mobility barriers can lead to social isolation, poor physical and mental health and poor quality of life. The EMBOLDEN research program aims to enhance the mobility of older adults who experience difficulties participating in community programs and who reside in communities of high health inequity.

Co-design is an approach that engages target populations and other stakeholders as research partners. Building on existing best practices and local evidence, researchers, together with local older adults and community service providers, are co-designing an innovative community-based program to promote mobility among community-dwelling older adults. EMBOLDEN's co-design approach supports a feasible and acceptable service delivery model to address existing service gaps, community needs and health inequities, leverage assets and foster uptake — ultimately improving outcomes for older adults. Evidence of program feasibility, acceptability and effectiveness will provide a foundation to assess scalability and sustainability.

This project is being completed through the following phases:

- Phase 1: Environmental scan, systematic reviews, experience-based intervention co-design; and
- Phase 2: Pragmatic randomized controlled trial (RCT) to explore implementation and effects in priority neighbourhoods.



The completed environmental scan and evidence reviews for interventions — involving group-based physical activity (completed), group-based healthy eating (completed) and system navigation (near completion) — have informed the intervention codesign.

Qualitative interviews were conducted to explore experiences of 18 older adults and 16 service providers engaging with community-based health promotion programming. The findings helped identify priority intervention features and design specifications. Concurrently, a Strategic Guiding Council (SGC) comprised of diverse local health/social service providers and older adults will partner with researchers to co-design the intervention. Recruitment for Phase 2 will begin in late 2021; data collection at the pilot site (Strathcona neighbourhood) will launch in January 2022. The program is being developed such that it can later be implemented throughout Hamilton and adapted to other Canadian communities.

Impact of the COVID-19 pandemic: The study mandate has not changed, but the intervention features, mode of delivery, recruitment and data collection approaches, and community engagement strategies will need to proceed differently than originally envisioned (i.e., virtually versus in-person). Understandably, there have been continuing challenges engaging service providers redeployed for COVID-19, yet we have engaged monthly with our SGC with excellent turnout and timely real-world insights. There have also been additional challenges with a small number of older adult citizens who do not have access to, or feel comfortable, engaging virtually or over the telephone. All members of the SGC are regularly updated on study progress through detailed meeting minutes and provided the option for one-on-one phone calls for those who preferred this method of contact.

Phase 1 recruitment was more challenging as the study pivoted to virtual recruitment and data collection for the co-design qualitative interviews. However, the target sample size was successfully reached for both older adult and service provider participants. The RCT will be delivered virtually, at least initially, shifting to in-person when public health measures support in-person community-based research and intervention delivery, and when ethics approval is obtained. Provisional approval has been received (pending final) for virtual delivery of the intervention. For the engagement process and for the

EMBOLDEN intervention, digital inequity is an important barrier to consider, with cost of access, capability and desire to use technology reoccurring as a common barrier to participation in online approaches.

RESEARCH IMPACT: To date, this research has resulted in three publications, 13 conference presentations, two knowledge translation activities, two media reports, 28 new collaborators, the support of 22 trainees/research personnel and has leveraged an additional \$150,000 (Ontario Ministry of Research, Innovation and Science Early Researcher Award), and a portion of \$100,000 of external funding from a CIHR Patient-Oriented Research grant.

“Older adult participants will benefit from EMBOLDEN through improvements in physical and community mobility, health-related quality of life and access to services they need. EMBOLDEN partners with older adults and established community organizations to strengthen research-community partnerships, participant-centred design and impact. EMBOLDEN’s engagement strategy fosters knowledge exchange amongst all partners and enhances collective impact to create age-friendly and health-equitable communities. When contributing to the nutrition intervention systematic review, a Strategic Guiding Council member stated: ‘When I am out of COVID work and back in my home position, I want to act on the recommendations you made...to help older adults in Hamilton!’”

Rebecca Ganann



INVESTIGATORS

Marla Beauchamp
Qiyin Fang
Paula Gardner
Ayse Kuspinar
Paul McNicholas
Bruce Newbold
Julie Richardson
Darren Scott
Brenda Vrkljan
Manaf Zargoush
Fei Chiang
Jamal Deen
Rebecca Ganann
Saiedeh Razavi
Ann Fudge Schormans
Ravi Selvaganapathy
Jinhui Ma
Pasqualina Santaguida
Norm Archer
Vanina Dal Bel Io-Haas
Meridith Griffin
Lori Letts
Julia Abelson
Nigar Sekercioglu
Rong Zheng
Reza Samavi
Stuart Phillips
Evelyne Durocher
Thomas Doyle
Sarrah Lal

PROJECT | Monitoring My Mobility (MacM3): Technological approaches for advancing the assessment of early mobility limitation in older Canadians

Mobility limitations, such as difficulty walking or transferring to and from a car, are a common and costly problem affecting older adults with a range of chronic health conditions. This research program focuses on using recent advancements in technology to understand early changes in older people's mobility and who will benefit from further health-care follow-up and early preventative treatment.

Four interrelated research projects will address issues specific to early mobility limitation in older community-dwelling Canadians. The first project will focus on understanding the impact of changes in mobility on an older persons' level of functioning, including consensus on how to define best and measure early mobility problems. The second will apply machine learning techniques to the Canadian Longitudinal Study on Aging (CLSA) data to identify the most relevant predictors of early mobility problems. In the third project, a smartwatch will monitor everyday mobility in the home and community of 2,000 older Canadian adults. For this purpose, a smartwatch (TicWatch S2) was recently validated in a group of adults, 55 years and older, using two gold-standard devices involving measures of physical activity and body posture (ActiGraph) and GPS Data (Qstarz BT-Q1000X).

Based on these results, the MacM3 prospective cohort study was submitted for ethics approval and data collection from 2,000 older Canadians will commence in October 2021. Findings from these three projects will be used in the final project, where a prototype will be developed for a tool that will help older adults and their caregivers self-monitor their mobility (the monitoring my mobility – M3 tool). This tool will be used to assess and depict an individual's trajectory and risk for mobility decline based on key indicators. Ultimately, this tool will help older people, their families, health-care professionals and policymakers to prevent or delay late-life mobility problems through early detection.



Impact of the COVID-19 pandemic: Although social distancing is no longer required in research labs at McMaster University, study protocol will continue to adhere to the Amended Phase 2 of McMaster's return to research activity for participant-based research activity. The investigator team remains committed to upholding the major aims and goals of MacM3 and limiting the disease burden for the intended participants, staff, and students.

The proposed revisions to address some of the challenges presented by the pandemic include the development of virtual pop-up recruitment and data collection sites; changes to the design of the qualitative study to include telephone and videoconference for one-to-one interviews and focus groups and the addition of COVID-19-related questions to probe mental health and changes to mobility.

Assessments for the MacM3 cohort study data collection, starting this coming October, will be conducted via phone calls, virtually or in-person visits (following the Amended Phase 2 recommendations), and through activity monitoring devices being mailed out to participants' homes at regular intervals. The number of data collection time points has been limited. To boost recruitment efforts, and minimize the effects of a possible lockdown, the number of days (10) that the participants will be using the smartwatch has been extended.

It is anticipated that this study will contribute to advancements in the use of remote assessments to measure mobility in community-dwelling older adults. The updated cohort protocol and corresponding results will be viewed through a pandemic lens while remaining committed to the original objective to improve the identification and assessment of early mobility limitation at the individual, home and community level.

RESEARCH IMPACT: To date, this research has garnered two media items, five publications, four conference presentations, seven knowledge translation activities, one reference in the media and 26 new collaborators. It has supported 14 students and leveraged an additional \$501,357 in internal funding and \$930,000 in external funding. Principle investigator Marla Beauchamp holds a Tier 2 Canada Research Chair in Mobility, Aging and Chronic Disease, enabling her to focus 75 per cent of her time on research activities and ensure the MacM3 program of research is successful. This work has attracted additional funds to further mobility research as well as fund a mobility lab within MIRA's office space.

"One of the novel aspects of this research program is that we will have data on three different aspects of mobility: hypothetical mobility from the perspective of older adults via self-report, experimental mobility via traditional lab-based tests and observed enacted performance — what people actually do in their day-to-day lives in and outside of the home measured directly with accelerometry and GPS. We will have a rich data set to better understand early mobility limitations and the differences in mobility trajectories of older adults with different levels of functioning. Based on this information, we will develop a mobility self-monitoring tool that is both useful and intuitive for older adults and caregivers."

Marla Beauchamp



**MyLinh
Duong**

INVESTIGATORS

MyLinh Duong
Lauren Griffith
Rong Zheng
Nick Miller
Manaf Zargoush
Marla Beauchamp
Paul McNicholas
Jennifer Kodis
Samir Raza
Ameen Patel
Jinhui Ma
Kathryn Fisher
Parminder Raina

PROJECT | Developing wearable sensing technologies to promote early mobility in hospitalized older medical patients

Older adults hospitalized for acute medical problems are at risk of significant functional and mobility decline during hospitalization, which can lead to an increase in hospital stays, readmission rates and post-discharge institutionalized care. Early Mobility Programs (EMP), which encourage early mobilization and scheduled physical activity while in hospital, are showing some benefits with shorter hospital length of stays and better functional outcomes. However, these findings are not consistent across studies, suggesting that a more tailored approach is needed. The objectives of this Phase I study are to:

- validate the mobility data collected using sensing device and activity-recognition machine-learning algorithms in older hospitalized adults;
- assess feasibility, acceptability and user experience of the device during hospitalization; and
- conduct a preliminary assessment of the effectiveness of EMP on mobility activity collected by the wearable device and how this may relate to functional, social and clinical outcomes.

These findings will set the stage for the development of a customized wearable device, which integrates mobility sensing technology with onboard machine learning algorithms to provide a point-of-care assessment tool for mobility limitation and management.

Impact of the COVID-19 pandemic: COVID-19 restrictions on visitation and research staff have barred access to patients and the ward. Therefore, the study has been on hold since March 2020.

RESEARCH IMPACT: This research supports two students and has engaged 50 end users, of which six are consultants on the project; yielded seven new collaborators; and leveraged an additional \$450,000 of internal in-kind funds.

“This work will be transformative in the way we care for older patients admitted into hospital. This will bring to light the importance of mobility not only on physical health but its contribution to healing, recovery and wellness even during the acute stages of medical illness. This technology and approach will have a significant impact on equitable access to physiotherapy assessment and intervention by providing remote monitoring, screening and intervention for mobility impairment in our frail and vulnerable populations.”

MyLinh Duong

Labarge Catalyst Grants in Mobility in Aging

MIRA and the LCMA continue to support research collaborations focused on mobility in aging, working with each of McMaster's six Faculties to identify new interdisciplinary projects that align with both LCMA and Faculty objectives. To date, 25 Labarge Catalyst Grants in Mobility in Aging projects have been funded by the LCMA, leveraging an additional \$2,030,722 in internal and \$2,447,119 in external funding, driving 148 new collaborations from outside researchers' own disciplines, and yielding 35 publications and 73 presentations. These projects have also supported 129 Highly Qualified Personnel (HQP) — including research staff and trainees.

Restrictions placed on research due to the global COVID-19 pandemic resulted in the cancellation of Catalyst Grant funding for 2020. Instead, funds were directed to a one-time COVID-19 grant, designed to investigate the promotion of healthy aging through the lens of mobility within the context of the COVID-19 pandemic. The Catalyst Grant program resumed in 2021, with the caveat that newly funded projects were designed to be executed safely with an at-risk population if COVID-19 restrictions are still in place when the research commences.



**Jim Dunn &
Michelle
Wyndham-West**



2021 | Designing new futures: co-creating housing and support pathways for “aging in community” to reduce premature long-term care intake

Ontario's long-term care (LTC) system is overburdened and not an appropriate home for those with minimal care needs. This project seeks to co-design the system, housing and supports needed to create a publicly funded “middle ground” which may be the answer between completely independent living and LTC. To this end the project will work with diverse older adults to understand how and where they would like to live and to understand the current gaps. To identify areas of greatest need, a spatial analysis will be conducted to identify the geographic patterns of where older adults currently reside, car-dependent areas, low-income households and affordable housing. Based on these findings a system will be co-designed that meets older adults' needs and aspirations in the Greater Golden Horseshoe and will be scaled to other regions in future through additional external funding opportunities.

“The research will benefit structurally vulnerable older adults lacking affordable housing and supports and moderate to middle income older adults residing in car-dependent suburban environments, where the built form is not designed to support mobility in aging and provides challenging landscapes for delivering supports. We will unearth the disparity between how and where older adults are aging and what their self-identified optimal pathways would be. We will co-design the system, housing and supports needed to meet their needs. Results will be presented in accessible formats for older adults and will potentially empower them in articulating their own needs and desires.”

Jim Dunn & Michelle Wyndham-West

INVESTIGATORS

Jim Dunn
Michelle Wyndham-West
Gina Agarwal
Antonio Paez



**Kai
Huang**

INVESTIGATORS

Kai Huang
Manaf Zargoush
Andrew Costa
Bruce Newbold

2021 | Long-term care network capacity planning with considerations of equity, diversity and inclusion

Long-term care (LTC) refers to various medical and non-medical services for people, particularly older adults, with disabilities or chronic diseases. The LTC facility network in Canada faces several critical issues including bed shortages, with existing facilities having insufficient capacity to meet the demand for their services. Moreover, equity, diversity and inclusion (EDI) should play an important role in LTC facility capacity planning and allocation. With the focus on the current LTC system in Canada, this study will utilize advanced prescriptive analytics models to inform the timing and location of new LTC facilities, the capacity (human resources, beds) of each facility at each time point and the admission and assignment of patients based on their demand, region, gender, language and age group to facilities over short-, medium- and long-term planning horizons.

"This project will assist key stakeholders in Canada, in general, and in Ontario particularly, by tackling the crucial issues within the LTC network as it faces surging demand, language considerations and challenges as it relates to efficient capacity planning. This research will also assist by providing guidance to help patients experience a better quality of life by assigning them to the nearest facilities and reducing their sense of loneliness by ensuring a minimum number of patients from each gender and language in every facility and period."

Kai Huang



**Carmela
Laganse**

2021 | Enhancing digital literacy and online mobility for under-represented older adults: A pilot project with Arabic-speaking communities in Hamilton

Through relationship building, collaboration and design through a lens of inclusivity, this project will address the digital literacy needs of older adults from culturally diverse Arabic-speaking communities in the Hamilton area by creating and testing an accessible Digital Literacy Kit/Resource. Enhancing older adults' capacities to use online technology is a pressing matter given the COVID-19 pandemic's impacts on access to services and social mobility. Building on an earlier project funded by the federal program New Horizons for Seniors, the research team will refine its approach to supporting older adults' digital literacy and online mobility through collaboration with Arabic-speaking community members, immigrants and newcomers. Together we will explore effective ways to communicate digital literacy information that is both culturally and linguistically relevant and engaging for under-represented groups of older adults from marginalized Arabic-speaking communities.

INVESTIGATORS

Carmela Laganse

Tara LaRose

Brian Detlor

"In addition to the potential impact of providing Arabic speaking older adults and communities with digital literacy resources and social mobility, as researchers we will build on an involved practice of inclusion. The ideas of "Nothing About Us Without Us" within the discourse of disability justice is a transferable practice that impacts all facets of our community. This project will facilitate a space where under-represented and marginalized people will inform our community. The access to digital literacy has the potential to facilitate representation, communication, visibility, knowledge sharing, social mobility and community engagement which are all vital for the physical and mental well-being of older adults and our society."

Carmela Laganse



**Stuart
Phillips**

INVESTIGATORS

Stuart Phillips
Ada Tang
Meridith Griffin
James McKendry
Everson Nunes
Giulia Coletta
Kenny Noguchi

2021 | Improving physical and mental health via live online physical activity for older persons: A pilot randomized control trial

Older individuals are at a much greater risk for COVID-19-related morbidity and mortality, a risk which is even higher in older adults with comorbidities, and undoubtedly exacerbated by physical inactivity. Mitigating the risk for infection by avoiding in-person contact is critical to keeping older individuals safe but may result in reduced physical activity. Protracted periods of reduced physical activity drastically increase the risk of older individuals experiencing a stark decline in mental and physical health, progressing towards developing frailty and becoming dependent. This pilot randomized control trial of a live online physical activity program is designed to assess the feasibility and acceptability of this intervention. Such data is relevant to target future funding opportunities necessary for running a larger clinical trial, in a larger population, with a potential for inclusion of people with co-morbid conditions (diabetes, dementia, cardiovascular disease).

"What will happen when the pandemic ends? We are of course all hoping for a return to normal and our lives as they were before COVID. The problem is that the physical deconditioning that older people will have experienced during this pandemic will have, we believe, a profound impact. These impacts will, we propose, be mitigated by older people participating in online exercise classes in a "group" environment, and that the impacts will be mental as well as physical. When the pandemic ends, older people should all be physically and mentally ready to rejoin society."

Stuart Phillips



**Harsha
Shanthanna**

2021 | Studying aging, mobility and chronic low back pain in older adults using remote monitoring

Chronic low back pain is a very common clinical condition in older adults. Many structural changes resulting from aging predispose an individual to chronic low back pain. Continuing pain and changes to core muscle strength further impact mobility and physical activity in these individuals. Although exercises are commonly prescribed, patients are often unable to perform them due to pain.

Pain related to movement is functionally important. Traditional methods of pain assessment do not efficiently capture this burden. The first study phase will validate a wearable device to capture bio-mechanical signals indicative of gait and activity (type and amount). The second phase will use this device in 20 older adults with chronic low back pain to integrate the information from the device with real time recording of pain symptoms and contextual information. Additionally, neurophysiological measurements will be collected to understand exercise and physical activity induced changes within the nervous system, to better understand movement related pain in chronic low back pain patients.

"This project will help us to understand the relationship of physical activity and exercise with chronic low back pain in older adults. Such ecological momentary assessment of activity and its context allows us to study the pain burden in real world settings in older adults. The integration of machine learning and predictive modelling allows the possibility of personalized care based on potentially contradictory outcomes of benefits or intolerance of physical activity in subgroups of participants. Potentially, this technology can also be used to monitor patients after specific treatments for chronic low back pain."

Harsha Shanthanna

INVESTIGATORS

Harsha Shanthanna
Aimee Nelson
Jamal Deen
Ravi Selvaganapathy
Luciana Macedo
Lisa Carlesso
Lehana Thabane
Mohit Bhandari
Kim Madden
Moin Khan



Rong
Zheng

INVESTIGATORS

Rong Zheng
Paula Gardner
Brenda Vrkljan
Lisa Carlesso

2021 | Annotating virtual Tai Chi sessions to improve learning and health outcomes for older adults

Tai Chi is often described as “meditation in motion” due to its low impact and slow motion. There is growing evidence that as a mind-body practice, originating from Chinese martial art, it has value in treating or preventing many health problems among older adults. During the pandemic, like other forms of group exercise, Tai Chi sessions had to be offered online. In Tai Chi, correct body postures, hand gestures and foot placement are complex and important information is required for participants to ensure that they get the full benefits of the exercise. Such information is difficult to convey through traditional video-recorded sessions due to occlusion of the instructor’s body from the video camera and lack of real-time feedback. This project aims to develop a computer vision-based, video annotation tool to extract information about key joint movements, palm facing, hand position and indication of weight bearing legs in real-time, and overlay such information onto one’s video screen to guide participants during online Tai Chi sessions. The occlusion issue of a single camera can be overcome through human kinematic modelling. A human-centered approach will be taken in the design of a graphic user interface layout and elements. A focus group study will be carried out online amongst older adults to understand their diverse needs and preferences in an online Tai Chi session.

“The project aims to improve the learning experiences and health outcomes for virtual Tai Chi sessions. We also anticipate that advanced tool development and understanding gained through the study will be beneficial to tele-therapy for rural communities and in-home exercise programs for older adults who have difficulty attending in-person classes, etc.”

Rong Zheng

2020 Labarge Centre for Mobility in Aging COVID-19 Grants

In response to the COVID-19 pandemic, and its disproportionate impact on older adults, MIRA introduced the Labarge Centre for Mobility in Aging COVID-19 Grant in April 2020. The three funded projects are investigating the promotion of healthy aging through the lens of mobility within the context of the COVID-19 pandemic.



**Marla
Beauchamp**

PROJECT | The IMPACT Hamilton Study – Investigating Mobility and Participation among Older Hamiltonians during COVID-19: A Longitudinal Tele-Survey

The emergence of COVID-19 caused a pandemic with enormous economic, health and social challenges world-wide. The group most vulnerable to COVID-19 are older adults and those with chronic underlying health conditions. As older people tend to live alone and may engage less often in social gatherings, it is important to recognize that they may be disproportionately affected by the social distancing requirements due to the COVID-19 pandemic. In March 2020, the WHO reminded governments to support interventions to ensure older people have what they need in this pandemic to maintain their well-being. Such interventions should consider ways to maintain social connectivity with families and friends, how to get help for everyday needs and recommendations on how to maintain mental and physical health during the isolation period. Thus, a survey was developed to understand the short- and medium-term impact of COVID-19 and social and physical distancing on the mobility and participation of community-dwelling older adults. Originally the project was a longitudinal tele-survey, however when the pandemic continued, additional data collection points at 3-, 6-, 9- and 12-months follow-up were added, to capture data across the pandemic. A tele-survey was administered to a random sample of older adults living in Hamilton, Ontario, identified from census dissemination areas. A total of 272 participants were recruited and the final 12-month follow-up will be completed by the end of October 2021.

RESEARCH IMPACT: This research has supported 14 HQP, resulted in four conference presentations and two media pieces.

“Labarge funding has made it possible for this important project to be completed. Our project is providing insight into how older adults have been coping with social distancing and how it has affected them over time. The results from our survey study are important to inform recommendations on how older adults can stay healthy and mobile while remaining home. The funds have allowed us to hire students to assist with recruitment and completing research interviews. We have the ability to offer participants gift cards as a thank-you for their time which has helped with participant retention.”

Marla Beauchamp

INVESTIGATORS

Marla Beauchamp
Brenda Vrkljan
Paula Gardner
Heather Keller
Luciana Macedo
Bruce Newbold
Darren Scott
Nazmul Sohel
Elisabeth Vesnaver
Janie Wilson



**Victor
Kuperman**

INVESTIGATORS

Victor Kuperman
James Gillett
Ranil Sonnadara
Aki-Juhani Kyröläinen

PROJECT | Relieving social isolation and loneliness through storytelling at the time of a pandemic

This study addresses the pandemic-related threat to social mobility through two online projects. The first project aims to identify changes in social mobility in the aging population (55+) caused by the pandemic. Online standard instruments for evaluating loneliness and social isolation were administered and participants were invited to contribute free-form narratives about their current experience and outlook on the future. This project builds a pre-pandemic database of narratives. Data was collected during the pandemic, after lockdown was lifted and several months after the lockdown had ended. The time-series nature of the data collected in this study, assisted in the identification of linguistic and psychosocial factors that influence psychological resilience and adaptation mechanisms in older individuals. To date, over 1500 participants have contributed written stories and demographic information to the Cognitive and Social Well-being (CoSoWell) database that were collected throughout the pandemic. This data, along with the measurements of loneliness and social isolation, enabled the monitoring of pandemic-related changes in well-being and cognitive functioning of older adults. The estimated scope of emotional reserve (ability for resilience in the face of adverse conditions) in older adults four months after the global lockdown indicated that their level of optimism dropped and level of loneliness increased.

The second project, WritLarge, harnesses a technological solution that facilitates social mobility through storytelling and story-sharing and translates story writing into a tool of social engagement. In times of social distancing, the demand for tools promoting online interactions has increased. The overall output of this research will help to identify demographic and psychosocial factors that contribute the most to perceived social isolation and loneliness in older individuals and track the dynamics of these social factors. Specifically, this study will focus on the impact of the physical isolation imposed due to COVID-19 on perceived loneliness among older adults before and after the period of physical isolation. This, in turn, provides opportunities for knowledge translation that can enable mental health workers and social workers to allocate their limited capacities to more vulnerable demographics in a timely and targeted manner. The WritLarge app will be customized for a community outreach online writing program targeting older tenants of 27 assisted living buildings in the Niagara region.

RESEARCH IMPACT: This research has resulted in three conference presentations, four media pieces, one knowledge translation activity and supported six trainees.

“This research enabled monitoring of the emotional well-being and loneliness in older adults throughout the pandemic and provided tangible tools for relieving social isolation and loneliness through social and creative engagement across generations. These outcomes led to multiple scholarly publications, informed the public awareness of these issues through traditional and social media, formed new partnerships with stake-holders and contributed to policy-making decisions at the federal level.”

Victor Kuperman



Hsien
Seow

PROJECT | #Caremongering: A community-led social movement to address health and social needs during COVID-19

Early in the pandemic, Facebook #Caremongering groups sprung up across Canada to pool resources, share information and offer help with groceries, supplies and prescription deliveries, to support vulnerable individuals in their communities. Thousands offered help to those who are at risk and vulnerable during the pandemic, including older adults, many of whom are immunocompromised, sick or caring for someone who needs their support and, therefore, unable to leave their house. This study examined the rate at which #Caremongering grew across Canada, the main ways the groups were used and differences in use by membership size and activity. Facebook groups were searched using the term “Caremongering” combined with the names of the largest population centres in every province and territory in Canada. Available Facebook analytics were extracted on all the groups found, restricted to public groups that operated in English. The search of Facebook groups across 185 cities yielded 130 unique groups, including groups from all 13 provinces and territories in Canada. Total membership across all groups as of May 4, 2020, was 194,879. The vast majority were formed within days of the global pandemic announcement, two months prior. There were four major themes identified: personal protective equipment, offer, need and information. Few differences were found between how large and small groups were being used. The #Caremongering Facebook groups spread across the entire nation in a matter of days, engaging hundreds of thousands of Canadians. Social media appears to be a useful tool for spreading community-led solutions to address health and social needs, including for older adults. This summer 16 semi-structured interviews with Facebook moderators were conducted via Zoom. Convening for a shared purpose over social media is a powerful means by which communities can address complex problems that cannot be resolved without shared responsibility with individual citizens and joint action. Social movements, fueled by social media, can be an important public health tool to support the health of vulnerable populations in the community. Future directions include planning for a virtual event with stakeholders to co-design solutions that are helpful for people facing isolation (including caregivers and older adults).

RESEARCH IMPACT: This research has resulted in one publication, two media pieces, supported six HQP and resulted in six new collaborators.

“This grant focuses on adapting the #Caremongering solution to be effective and sustainable. The benefits for older adults include:

- 1. Advancement of a novel social media-driven solution to combat social isolation in older adults.*
- 2. Generating knowledge about how to sustain the benefits during COVID-19 and in the longer term of the #Caremongering solution.*
- 3. Spreading the innovation to support more older adults who face social isolation (i.e., #Caremongering participants, older adults and decision-makers) for older adults during COVID-19 or another pandemic. Co-designed solutions are more meaningful, acceptable, scalable and sustainable because they engage the influencers and decision-makers from the beginning.*
- 4. Activating more community members to be involved in supporting older adults impacted by COVID-19. By understanding #Caremongering and adapting it for older adults, it can be utilized as a powerful solution to reduce social isolation during COVID-19 or another pandemic and increase positive outcomes for older adults.”*

Hsien Seow

INVESTIGATORS

Hsien Seow
Teresa Chan
Paula Gardner
Allison Williams
Sandra Moll
Julia Abelson
Harvey Chochinov
Barbara Pesut
Madelyn Law
Sara Urowitz
Shelly Cory
Susan Macaulay



Goran
Calic

INVESTIGATORS

Goran Calic
Bruce Newbold
Byron Spencer
James Gillett

2019 | Addressing trends in social connectedness and well-being of older adults: Social isolation, loneliness, and the interplay of digital technologies

There is a concern that social isolation and loneliness will affect many older Canadians and have negative consequences on physical and mental health. While there may be a “digital divide” in the older population, some studies have unveiled promising evidence for the impact of digital technologies on promoting increased social connectedness and improving older adults’ well-being. In the context of COVID-19, the non-tech-savvy older adult population may experience diminished social connectedness compared with tech-savvy older adults. This project aimed to examine the general trends of social isolation and loneliness and the extent to which digital technologies could alleviate social isolation and loneliness among older adults, using data from the Canadian Longitudinal Study on Aging (CLSA).

Response to COVID-19: The project’s empirical design originally depended on collecting primary data from older adult participants, in the form of focus groups with various interventions in the form of presentations related to topics on entrepreneurship. The project started in April 2020, amid the pandemic lockdown and pivoted to a secondary analysis of CLSA data.

RESEARCH IMPACT: This research yielded one presentation, 20 new collaborators, supported one trainee and has leveraged \$6,000 in internal funding and \$10,000 in additional internal in-kind funding.

“This funding has offered the support of the hired postdoctoral fellow to expand and improve his scholarly critical thinking on contemporary critical social issues related to research on aging and mobility. It provided him with the opportunity to explore and identify specific research questions on the aging phenomenon and to study and use new theoretical lenses to investigate aging, technology, and entrepreneurship.”

Goran Calic



**Victor
Kuperman**

2019 | Writing of age: Linguistic markers of cognitive, emotional, and social well-being among older adults

Social isolation and loneliness have been linked to decreased physical and mental well-being, but this is challenging to recognize. The ability to share life experiences with others provides a unique opportunity for increased social interaction among older adults, even when physical mobility is limited. Through the prism of language and a large-scale online effort to collect written life stories, this study will enable older adults to both share and tap into the experiences of others, boosting their social network and providing professionals with tools for identifying individuals at risk of social isolation. A large-scale online effort to collect written life-stories yielded over 1500 participants. Analyses of these stories enabled identification of linguistic markers of loneliness and social isolation. Next steps include training computational models to predict loneliness solely based on written texts. As language is the vehicle of social interaction, the ability to share life experiences with others provides a unique opportunity for increased social interactions among older adults even when physical mobility is limited. Linguistic features of written texts enable a fairly accurate (~75%) prediction of a person's subjective loneliness. Since text writing is non-invasive, this may serve as an aid for gerontologists to identify individuals at risk. This suite of applications enabled older adults to share their life-stories and tap into the experiences of others, through intergenerational writing projects, which will be expanded.

Response to COVID-19: The outreach component of this project was strongly affected by COVID-19. However, given the risk imposed by COVID-19 to older adults, the in-person focus group was postponed and focus groups were implemented online. This research was pivoted towards studying feelings of loneliness and social isolation throughout the COVID-19 pandemic, with a pre-pandemic control, and was additionally supported by a LCMA COVID-19 grant.

RESEARCH IMPACT: This research has resulted in the development of the WritLarge online application allowing people to access written life stories with 1,500 end users engaged as participants. This work has also supported eight trainees and yielded two publications, three conference presentations, one knowledge translation activity, four media items and 10 collaborators, including a new collaboration with the Department of Applied Linguistics at Brock University and an intergenerational writing project with the YMCA in Spokane, WA. Dr. Kuperman also shared these study findings with the Canadian House of Commons Standing Committee on Human Resources, Skills and Social Development and The Status of Persons with Disabilities.

"This research enabled monitoring of the emotional well-being and loneliness in older adults throughout the pandemic and provided tangible tools for relieving social isolation and loneliness through social and creative engagement across generations. These outcomes led to multiple scholarly publications; informed the public awareness of these issues through traditional and social media; and contributed to policy-making decisions at the federal level."

Victor Kuperman

INVESTIGATORS

Victor Kuperman
James Gillett
Ranil Sonnadara
Aki-Juhani Kyröläinen



Michel
Grignon

INVESTIGATORS

Michel Grignon
Niko Yiannakoulis
Emmanuel Guindon
Tara Marshall
Jean-Éric Tarride
Mohamed Hussein

2019 | How can we improve mobility through alternative transportation modes for seniors? Measuring what works and what does not work in road safety improvements for pedestrians and cyclists

Hamilton was designed for cars and drivers. Its streets are not always safe or pleasurable for pedestrians and cyclists and these active transportation modes are not used as often as they should be. This results in reduced use of active transportation modes. Older adults are more likely to be the victims of collisions as pedestrians. Older adults residing in safer environments are much more likely to walk and reach a level of healthy activity. This project will measure the effectiveness of various interventions that will allow the City of Hamilton to implement the most cost-effective traffic-calming measures to improve safety for pedestrians and cyclists. To better understand how traffic-calming measures can be evaluated, this study will examine the reliability of data on collisions involving cyclists and pedestrians collected by the police or emergency departments and what can be learned from this data; learn how traffic-calming measures are documented in public records; and identify how older adults value safety versus time to completion when navigating a map and having to go from point A to point B.

Response to COVID-19: Access to data from St Joseph's Hospital and Hamilton Health Sciences has been delayed due to COVID-19 and community engagement has been difficult to resume as in-person meetings are still not recommended.

RESEARCH IMPACT: This research has yielded one conference presentation, four knowledge translation activities, eight new collaborators, engagement with nine stakeholder groups and leveraged an additional \$1,000 in internal funding.

"This study will help researchers better assess traffic-calming measures by developing a method based on observational data. This, in turn, will help policy-makers implement more effective measures that will allow older adults to walk or bike and be more active."

Michel Grignon



**P. Ravi
Selvaganapathy**

2019 | Bioprinted 3D in-vitro models to determine mechanisms of cognitive benefits of exercise in the elderly

Exercise can delay or prevent age-related cognitive decline through the release of certain hormones from skeletal muscles, bone and liver into the circulation that are taken up in the brain, and by extending neuroprotective effects. In-vitro models that could reliably recreate the complex interactions that occur so that these new mechanisms that confer cognitive benefits could be studied and understood, do not exist. This research program will study the hormones released and their immediate effect on neighbouring neurons. Understanding which released hormones promote neuronal health and connectivity will allow the design of exercise protocols suitable for older adults that maximize the release of the most efficacious hormones. This project aims to develop a 3D co-culture system for the growth of skeletal muscle cells, bone cells (osteoblasts) and liver cells with neurons in an environment similar to that in-vivo. Electrical stimulation mimicking exercise will allow the study of the hormones released as well as their immediate effect on neighbouring neurons in culture. This will then be applied to measuring these hormones in the blood of elderly exercised participants and those with Alzheimer's disease. This will also allow for the design of pharmaceuticals to provide the same neuroprotective effects for those who cannot exercise, due to frailty, disease or injury.

Response to COVID-19: Due to the pandemic, research on this project was interrupted from March 2020 through August 2020. Collaborating effectively as a group has been challenging as cross-lab participation in experiments was not possible even though this provides a critical step in the identification of potential issues with translating technology into an assay. Thus, experimental cycles were delayed and the vitality of the collaboration was diminished.

RESEARCH IMPACT: This research has resulted in three publications, three conference presentations, one knowledge translation activity, three new collaborators, supported two trainees and has leveraged \$510,000 in external funding (Both Drs. Selvaganapathy and Fahnestock each received \$250,000 from the Social Sciences and Humanities Research Council (SSHRC) New Frontiers in Research Fund (NFRF) and a Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Grant, \$10,000), and leveraged an additional \$10,000 in internal funding.

"The funding has been critical in establishing the collaboration with Dr. Fahnestock's and Dr. Nelson's group. We have built on this seed funding and received two NFRF grants based on this research theme and with an expanded team of international investigators. The seed funding has established aging related research as a core vector in my research portfolio."

P. Ravi Selvaganapathy

INVESTIGATORS

P. Ravi Selvaganapathy

Margaret Fahnestock

Aimee Nelson

Christopher Patterson



From left to right:
**Dobromir Dotov,
Laurel Trainor,
Marla Beauchamp**

INVESTIGATORS

Laurel Trainor
Dobromir Dotov
Marla Beauchamp
Tara Packham
Janie Wilson
Qiyin Fang
Matthew Woolhouse

2019 | Movement sonification for testing mobility in the context of interacting with complex environments

The ability to predict fall risk in older adults is important. While effective interventions exist, clinical screening tests for balance are inadequate. Simple, lab-based tests may not fully capture abilities to perform sensory-motor interactions with everyday complex and dynamically changing environments. This research examined participants' postural control responses to perturbations in concurrent activities. Participants' ability to coordinate or de-couple two simultaneous levels of motor control will be used as a potential predictor of other established variables linked to risk of falling. Thus far, open-source software has been developed, programmed and tested and achieved satisfactory results in combining speed and fidelity in a real-time task. Data collected from young adult participants has confirmed the association between postural fluctuations and performance of a supra-postural task. Literature has indicated an association between hearing ability and risk of falling but it is not clear if this reveals a functional role of hearing in balance and activities of daily living. Thus, this topic of research continues to have implications both for basic human movement science and diagnostic features of balance in a more realistic and complex context.

Response to COVID-19: Although the pandemic derailed original plans and prevented the investigation of the main goal of the project, great progress was made in improving the usability of the apparatus and testing its relevance. Efforts were thus pivoted to advancing self- and remote-testing by optimizing the task, apparatus and interface so that participants can use it on their own without the presence of the experimenter. Whether the necessary level of usability for older adults has been achieved has not yet been examined.

RESEARCH IMPACT: This research has resulted in four conference presentations, four new collaborators, supported seven HQP and fostered the development of new open-source software for combining speed and fidelity in a real-time task.

"Our goal is to create entertaining musical games that test older adults' gross and fine motor skill. Evaluating fall risk requires the development of novel tasks that emphasize complex sensory-motor interactions and unpredictable environments. To further expand the potential of such tasks, older adults should be able to access them at home without specialized equipment. Finally, the role of auditory information in supporting our basic motor skills is not well understood. Our approach is unique because it satisfies these three objectives with both theoretical and practical implications."

Laurel Trainor



**David
Harris Smith**

2018 | Managing pain in older adults: A virtual learning environment for understanding the physiology of acute pain and its impact on mobility in older adults

The team has conducted several preliminary interviews, observations and consultations with physicians, physiotherapists and anaesthesiologists at Sunnybrook Holland Centre. The insights gained in understanding and managing acute pain in the older adult have been incorporated into the design, development and learning outcomes of an online Virtual Learning Environment for understanding acute pain.

Response to COVID-19: Due to the COVID-19 pandemic remote-user testing capabilities have been built into the program.

"Labarge funding allows us to access and combine the expert knowledge of health-care providers with state-of-the-art simulation environments for improving clinician training outcomes in the critical area of understanding and managing acute pain in older adults."

David Harris Smith

INVESTIGATORS

David Harris Smith
Vickie Galea
Norm Buckley
Milena Head
Ada Tang
Matthew Woolhouse



Andrea Gonzalez

INVESTIGATORS

Andrea Gonzalez
Parminder Raina
Marla Beauchamp
Terry Bennett
John Connolly
Andrew Costa
James Gillett
Jeremiah Hurley
Nick Kates
Melissa Kimber
Lauren Griffith
James MacKillop
Harriet MacMillan
Margaret McKinnon
Katherine Morrison
Stuart Phillips
Ravi Selvaganapathy
Gregory Steinberg
Brenda Vrkljan

2018 | An intergenerational and life course program of research InHamilton

Behaviors; lifestyle factors; social and economic mobility; and health problems are evident across multiple generations within families. Few studies have examined how relationships between biology, the environment and lifestyles may interact across time and generations and their effects on aging. This project will track a longitudinal, intergenerational cohort in Hamilton, and enable multi-disciplinary teams to investigate interrelationships among biological, physical, social, lifestyle, psychological and behavioural domains, influencing health across the life course and generations. In response to the COVID-19 pandemic, a COVID-19 questionnaire was added to the study protocol. Researchers worked closely with the McMaster University Human Resources Department, the City of Hamilton, Mohawk College, McMaster University Office of Community Engagement and Dixon Hall Neighbourhood Services to design the questionnaire and to recruit participants in the Hamilton and Toronto areas. Data analysis is currently underway.

Response to COVID-19: Due to COVID-19 this program pivoted to collect measures examining the impact of COVID-19 on individuals as well as on physical and mental health and family composition and functioning. Multi-generational households are at greater risk for contracting and spreading COVID-19. Keeping with the original objective of the study - recruitment of an intergenerational cohort - consent was requested to contact participants regarding another research project opportunity – the intergenerational study. To ensure the safety of participants and research staff, data collection will be conducted online and/or via mail and/or over the phone.

RESEARCH IMPACT: This study has resulted in one publication, two presentations, 25 new collaborators, supported four HQP and has leveraged an additional \$69,000 (CIHR CLSA Catalyst Grant) in external funding.

"For the first time in history we have up to four generations living at the same time, providing an unprecedented opportunity to investigate the multifactorial impact across generations and life course to understand how these factors impact the functional changes including physical and social mobility, mental well-being and social participation. Further, COVID has brought to light the importance of family networks and support systems and when there is a global crisis where these systems are affected, we see how individuals are impacted; our intergenerational study will further our understanding of how it contributes to health and well-being of older generations."

Andrea Gonzalez



From left to right:
Reza Samavi,
Manaf Zargoush

2018 | Addressing alternate level of care issues facing older Canadians: A co-designed comprehensive data analytics approach

Canadian older adults wait too long in hospitals after receiving the required care for which they have been hospitalized. Such Alternate Level of Care (ALC) patients stay on acute and post-acute care beds until transfer to a more appropriate level of care. The delayed discharge of frail geriatric patients leads to a rapid deterioration of their overall health and ALC wait times lead to significant costs and inefficiencies in the health-care system. To provide analytical solutions for smooth transition of ALC patients, this project utilized advanced data analytics and optimization techniques, and design thinking principles, to provide a comprehensive and updated understanding of this challenge. The outcomes from this project will provide policymakers with enhanced insights regarding older patient mobility through the health-care system focusing on ALC challenges and their associated implications. This will, in turn, contribute to the well-being of those patients designated as ALC. Given these insights the ALC issue may be better managed and appropriate resources can be accessed by relevant stakeholders to ensure that older patients receive the right care at the right place and right time.

Response to COVID-19: Access to an advanced data analytics platform through ICES has been delayed significantly due to COVID-19.

RESEARCH IMPACT: This research has yielded three new collaborators, supported seven HQP and leveraged an additional \$7,500 in the form of a MacData PhD Fellowship Award and an NSERC Discovery Grant of \$160,525.

"This funding helped me to become more established in research on aging, start a new area of research on Alternate Level of Care, which has perfect alignments with my technical/theoretical expertise, obtain access to a rich dataset, which is vital to my research and develop novel methods for combining predictive and prescriptive modeling."

Manaf Zargoush

INVESTIGATORS

Manaf Zargoush
Alexandra Papaioannou
Reza Samavi



James Gillett

INVESTIGATORS

James Gillett
Meridith Griffin
Gavin Andrews
Marla Beauchamp
Rong Zheng
Nancy Bouchier
Maryam Ghasemaghaei
Manaf Zargoush
Jennifer Heisz

2018 | Aging and mobility in nature: A McMaster and Royal Botanical Gardens collaboration

This project has created a closer research relationship between the Royal Botanical Gardens Dobromir Dotov, Laurel Trainor, Marla Beauchamp and McMaster researchers around nature and mobility. It has yielded several projects, including studies of the significance of being in nature for well-being among older adults, the history of involvement in nature-based activities from the perspective of older adults and the significance of volunteering at the gardens in creating opportunities for intergenerational engagement. Future directions include extending this research to include international botanical gardens.

RESEARCH IMPACT: This project has resulted in eight new collaborators, supported seven HQP and leveraged an additional \$5,000 in internal funding.

"This funding is impactful on several levels: It further advanced research collaborations between RBG and McMaster; it helped generate further funding through advancement in studies of nature and mobility; it led to new forms of collaboration among faculty across disciplines (social science, humanities and science) resulting in the development of SSHRC partnership grants and insight grants; and it raised the importance of looking at new theoretical perspectives in understanding aging and well-being."

James Gillett



Completed Catalyst Grants



The development of a wearable, easy-to-use multi-sensor-based smart knee monitoring system to record and assess mobility-related parameters from the knee joints and the development of a database to develop a classification model to classify knee joint and gait characteristics by sex, body-mass index and knee/leg health condition

Jamal Deen



The assessment of the cognitive and chronological age barriers to using wearable activity monitors in older persons

Maryam Ghasemaghaei

"In this project, I cooperated with researchers from information systems and other disciplines. This collaboration allowed me to increase my connections and will allow me to engage in further collaborative efforts in the future. Furthermore, I was introduced to other connections working with seniors in community centers and at McMaster. This will facilitate any future research involving seniors. I have also published several papers using the outcomes of this project."

Maryam Ghasemaghaei



An examination of the ultrastructure of osteoporotic bone, its medical implications in aging populations and the development of a new method of diagnostic imaging to measure nanoscale biomarkers for disease in osteoporosis to track disease progression and therapy efficacy

Kathryn Grandfield



An examination of different definitions of mobility and immobility in an aging population

Meredith Griffin & Amanda Grenier



The development of a comprehensive framework for the conceptualization of physical mobility to be used in the assessment and treatment of older adults

Ayse Kuspinar & Chris Verschoor

"Through the generous donation of Suzanne Labarge, Dr. Verschoor and I have had the opportunity to expand current interests while forging new research areas in epidemiology and mobility research."

Ayse Kuspinar



The creation of a co-designed arts-based rehabilitation program (ABLE) to enhance physical health and mood in older adults

Paula Gardner

Research impact from ten completed Labarge Catalyst Grants in Mobility in Aging projects:

108

New collaborations

(including 68 outside of the grant holder's own discipline)

28

Peer-reviewed publications

55

Invited talks or conference presentations

2

Knowledge translation events

Labarge Catalyst Grants in Mobility in Aging have provided seed funding for the collection of pilot data on several important aging research initiatives, including:



A study of the implications of driving cessation among Canada's older adults living in rural and small urban communities
Bruce Newbold



Examining the efficacy of supplementation with omega-3 polyunsaturated fatty acid-enriched fish oil to mitigate skeletal muscle-disuse atrophy in older women
Stuart Phillips

"Labarge funding enabled us to analyze muscle mass using magnetic resonance imaging (MRI), the gold standard for measuring muscle mass. In addition, this funding enabled us to utilize gas chromatographic/mass spectrometric techniques to measure integrated rates of muscle protein synthesis."
– **Stuart Phillips**



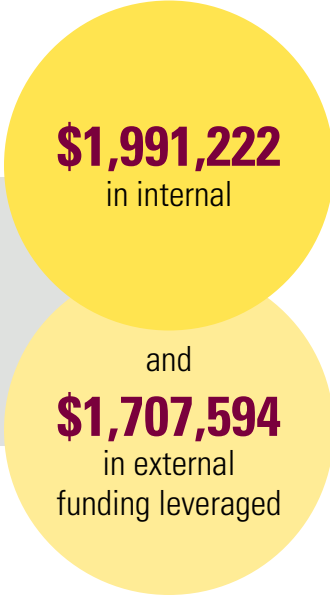
An analysis of the transition from driving to driving cessation in older Canadians
Saiedeh Razavi

"The Catalyst Grant that was received in 2018 was instrumental in helping to define new research directions for myself and the McMaster Institute for Transportation and Logistics (which I direct). We are quite focused on how mobility outside the home for older adults can benefit from new and emerging transportation technologies and the Catalyst Grant has been an important enabler of our progress to date."
– **Saiedeh Razavi**



The investigation of a multidisciplinary approach to addressing mobility limitations after orthopaedic joint replacement surgery
Janie Wilson

"The Labarge funding has been instrumental in bringing together our multidisciplinary group of investigators necessary to tackle the challenge of optimizing mobility outcomes for patients after joint replacement surgery. Our research program is focused on taking a more patient-specific approach to the treatment of end stage osteoarthritis in an effort to improve mobility outcomes and offer increased quality of life. I was a new researcher at McMaster University when I was awarded the Labarge Catalyst Grant, and it provided a significant boost in my ability to connect with collaborators across campus and quickly put ideas into action for a productive research program in this area."
Janie Wilson



Co-funded projects and initiatives

Over the last six years, MIRA has strengthened its interdisciplinary research through co-funded research initiatives aimed at leveraging LCMA funds. This has resulted in a greater reach in nurturing and deepening interdisciplinary connections across a wide range of stakeholders.

Labarge Centre for Mobility in Aging (LCMA) & Michael G. DeGroote Institute for Pain Research and Care (IPRC) Catalyst Grants

In 2022 MIRA will be in its fourth cycle of supporting a Labarge Centre for Mobility in Aging Catalyst (LCMA) Grant in collaboration with the Michael G. DeGroote Institute for Pain Research and Care (IPRC). These grants support projects that stimulate new collaborations and allow for the collection of preliminary data on research that considers pain and aging as central themes. The grant is valued at \$60,000 and requires a matching contribution of at least \$10,000 (minimum \$5,000 cash, up to \$5,000 may be in-kind).



"Pain is one of the main factors that can limit a person's mobility. For many people, the two cannot be looked at independently. MIRA and the IPRC are working together to help us better understand the connection between pain and older adult mobility."

Parminder Raina



**Maura
Marcucci**

2021 | Persistent post-surgical pain, postoperative cognitive dysfunction, and resilience in older people undergoing elective knee surgery: A mixed method project to explore associations and underlying mechanisms

Brain damage and memory loss are main concerns of people undergoing surgery. In fact, many older people undergoing different types of non-cardiac surgeries (including orthopedic surgeries) present a significant decline in their cognition (i.e., the way we use our brain to think, take action, make decisions and remember) one year after surgery. This is called postoperative cognitive dysfunction (POCD) and is significantly more frequent (as many as 30% of patients aged 65 or older) than what would be expected in non-surgical patients with similar age and comorbidities. Causes and mechanisms of POCD are poorly understood. Pain after surgery is also very frequent and can persist for a long time (i.e., persistent postsurgical pain, PPSP), requiring chronic medications including narcotics. Knee surgery is more often offered as a treatment in older patients with osteoarthritis, who often come to surgery after a long history of pain and impaired mobility and who often experience PPSP. This study will examine 200 people 55 years old or older undergoing elective knee surgery, to evaluate the association between PPSP (and its treatment) and POCD. This study will also explore how cognition can interfere with resilience (coping strategies and expectations), which is also thought to influence the persistence of pain, satisfaction and functional recovery after surgery. Patients will be examined before surgery and followed over time to collect data on their social and clinical characteristics; measure coping/expectations before and after surgery; and assess pain and pain medications; satisfaction and functional recovery; and cognitive performance. The study will also explore hypotheses of possible mechanisms underlying the association between PPSP and POCD and will include interviews with a subset of the participants to explore lived experiences of pain, mobility and aging, including resilience, expectations and satisfaction with surgery.

INVESTIGATORS

Maura Marcucci
Harsha Shanthanna
Kim Madden
Suzanna Becker
Margaret Fahnestock
Meridith Griffin

"Anesthetic-related mortality has decreased 100-fold over the last 100 years. However, when asked about their fears related to undergoing major surgery, people, across different ages, indicate 'brain damage' and 'memory loss' as main concerns, much more frequently than perioperative death. Our study will provide preliminary data on the role of chronic postsurgical pain and chronic pain medications, in the impact of surgery on older people's cognitive abilities and suggest possible underlying mechanisms. It will inform larger confirmatory studies and the design of interventions to enhance the benefits of surgery for older people's lives."

Maura Marcucci



Pasqualina
Santaguida

INVESTIGATORS

Pasqualina Santaguida

Qiyin Fang

Stuart Phillips

Patricia Baker

2020 | Feasibility study to assess the added value of Integrated Musculoskeletal BioFeedback Device (IMBED) combined with neuromuscular exercise and education (GLA-D™) to decrease chronic pain in older adults with osteoarthritis: A user-centered approach to develop a pre-surgical rehabilitation program for patients with lumbar spinal stenosis

This research project will evaluate the feasibility and added value of a new technology called Integrated Musculoskeletal BioFeedback Device (IMBED). When IMBED is combined with a specialized neuromuscular exercise and education program called Good Living with Arthritis in Denmark (GLA-D™), it is postulated that these combined programs will result in decreased chronic pain in older adults with lower extremity osteoarthritis. As part of this grant, a new integrated device has been developed that adapts and combines digital mapping of chronic pain (i.e., phone and iPad type screens), monitors muscle activity (i.e., electromyography biofeedback) and senses body motion (accelerometers). The IMBED technology designed to track pain and body movements in a training and home setting during normal daily activities will be piloted at the McMaster Physical Activity Centre of Excellence (PACE).

Response to COVID-19: COVID-19 had minimal impact on the development of the IMBED sensor. There may be limitations in recruiting participants for user testing. Research ethics board approval for conducting the GLA-D™ in PACE has been received and testing will commence depending on research restrictions in place in January 2022.

RESEARCH IMPACT: This research has resulted in the development of a new integrated device that adapts and combines digital mapping of chronic pain, monitors muscle activity and senses body motion (accelerometers), four new collaborators and supported two trainees.

"We believe that when IMBED is combined with a specialized neuromuscular exercise and education program called Good Living with Arthritis in Denmark (GLA-D™), we will see better results that will decrease chronic pain in older adults with lower extremity osteoarthritis. The IMBED is being developed to provide feedback during training to the participants and the health-care provider. Data during training can be stored and compared from the start and end of the training program."

Pasqualina Santaguida



**Luciana
Macedo**

2019 | A user-centered approach to develop a pre-surgical rehabilitation program for patients with lumbar spinal stenosis

Lumbar Spinal Stenosis (LSS) is a condition with a degenerative aetiology in which narrowing of the spinal canal results in entrapment of neurovascular structures. The prevalence of LSS is higher in adults aged 55 or older and is the most common diagnosis associated with spinal surgery in adults over 65 years of age. Unfortunately, many patients who have surgery for LSS continue to have pain and disability after surgery and are likely to continue to be long term opioid users. Pre-surgical rehabilitation (prehab) has been found to improve surgical results in other surgeries such as knee replacement for osteoarthritis. To develop an LSS prehab program, qualitative interviews were completed with participants pre-surgery and 1-year post surgery to explore their experiences and satisfaction with current pre-surgical practices. Primary findings indicated the diverse social backgrounds of older adults receiving this surgery, and that patients had concerns about potential risks of back surgery, and about access to resources to improve care pathway, expectations of surgical interventions were also a concern as was information about the decision-making process used for back surgery (stigma). Analysis of data from the Canadian Spine Outcomes Registry Network including data from 18 Canadian surgical sites and 1800 participants, identified important predictors of post-surgery outcomes including: depression, narcotic medication use, poor expectations, longer symptoms duration, being older and having poorer outcomes (pain and disability) at baseline. Based on the results of these studies a prehab program for LSS was developed and funding was secured to pilot the intervention and study protocol.

Response to COVID-19: The pandemic initially impacted recruitment for the qualitative study given elective surgical procedures were canceled due to the pandemic. Once scheduling of elective surgeries resumed, recruitment commenced. Quantitative data analysis was delayed given the challenges of investigators working from home with no childcare available due to COVID-19 restrictions.

RESEARCH IMPACT: This study has yielded one publication, two conference presentations, one knowledge translation event, 26 new collaborators, supported seven trainees/research staff, engaged 12 end users and stakeholders and leveraged \$50,000 in external funding to pilot the use of the LSS prehab protocol (Alberta Spine Foundation, \$20,000; Medtronic External Research Program, \$30,000).

INVESTIGATORS

Luciana Macedo
Lisa Carlesso
James Gillett
Liz Hassan
Janie Wilson
Brian Drew
Douglas Gross
Raja Rampersaud

"This grant has allowed us to understand the experience of Canadian older adults that undergo spine surgery. The findings of this study not only have allowed us to develop a patient-centered intervention to improve outcomes but may also be used to improve the patient's experience before, during and after their spine surgery. As an early career investigator, this grant was crucial to kick start my research program. It has allowed me to build a large number of local and national collaborators including researchers from different disciplines, as well as clinicians, patients and health-care administrators. This grant was crucial for the development of a network of collaborators across the country that have been successful in obtaining additional funding including scholarships for my graduate students."

Luciana Macedo



Qiyin
Fang

2019 | Continuous medication and mobility monitoring of older adults living with cancer

INVESTIGATOR

Qiyin Fang

Among patients undergoing active cancer treatments, mobility, degree of daily activities and medication adherence are important markers for their prognosis. If oncologists are unaware of changing conditions and medication compliance, this can lead to an increase in the incidence of emergency admission to hospitals. Poorly managed chronic conditions can lead to pain and other symptoms, which are closely associated with poor quality of life, psychological distress and increased health-care costs. This research program will develop a tool for predictive management of older cancer patients based on longitudinal multimodality data. An interdisciplinary team have assembled to develop low cost, non-intrusive sensing technologies to monitor a patient's indoor location and track the timing and type(s) of medication intake. This study will yield strategies for optimal design and usage protocol for continuous monitoring technologies in a home setting for older adults living with chronic diseases.

Response to COVID-19: Progress on this research has been significantly affected by the COVID-19 research restrictions imposed in March 2020.

RESEARCH IMPACT: Researchers have developed a revised indoor positioning system that does not require an in-person visit and can be set up by older adults on their own. To date, this research has also yielded five publications; one conference presentation; eight new collaborators, including two new industry partners; supported 25 students; engaged with 15 stakeholders; and contributed to the development of a new fourth-year engineering course, a new graduate course in mobility technologies and three new projects.

"This study led to a new indoor activity monitoring technology that older adults can setup and use on their own. It forms a framework for automatically generated context which will allow practical use of indoor activity information for long term mobility change monitoring."

Qiyin Fang

Trainee support

Labarge Mobility Scholarships

Established in 2017 by the Labarge Centre for Mobility in Aging (LCMA), the Labarge Mobility Scholarship is intended to stimulate interdisciplinary collaboration in aging research on the broad topic of mobility. Since its launch, 10 students have received a Labarge Mobility Scholarship.





PhD
Scholarship
Augustine Okoh
Family Medicine



PhD
Scholarship
Matthew Ruder
Kinesiology

2021 | A transdisciplinary approach to older adults' care in a Canadian primary healthcare setting: Exploring the possibility in an interprofessional education program

SUPERVISOR

Lawrence Grierson
Family Medicine

MENTOR

Ellen Badone
Religious Studies

Older adults often have multiple health concerns, spanning both physical and psychosocial domains. Team-based health-care approaches are widely recognized as the best strategy for managing the varied and complex challenges that this creates. It improves quality of life, reduces adverse events, mortality and the length of stay in the hospital and increases older adults' satisfaction with service provision. Team-based health-care delivery has been imagined in several ways with transdisciplinary approaches conceptualized as the most effective. Transdisciplinary care encompasses shared knowledge, skills and decision-making, encouraging patient-centered care, joint assessment, role release and a unified comprehensive care framework. While transdisciplinary care for older adults has been theorized, its practical application is still evolving and remains under-researched. This doctoral research explores the transdisciplinary care approach and the necessary health profession's education antecedents in the context of Ontario's Family Health Teams and aims to develop knowledge that will support the optimized care of older adults.

2021 | Assessing validity and sensitivity of remotely collected wearable sensor data in patients

SUPERVISOR

Dylan Kobsar
Kinesiology

MENTOR

Rong Zheng
Computing and Software

Knee osteoarthritis affects more than five million Canadians, often leading to compensatory changes in walking gait. Recently, wearable inertial sensors have begun to offer a more affordable and more broadly deployable option for both researchers and clinicians to conduct gait analysis. Not only are these devices more accessible, but they offer the ability to collect data in real-world settings over longer periods of time, which provide critically important information regarding disease progression and the efficacy of different interventions, such as physical therapy or corticosteroid injections. However, most gait analysis research only utilizes these sensors within highly controlled settings, which ultimately lack real-world relevance. This project will fulfill a need to better understand not only the quality of data, but the sensitivity to changes that can be expected in remote collections as compared to in-person collections, to lead research out of the lab and into the real world.



Master's
Scholarship
Michelle Mei
Kinesiology

2020 | Examining cardiovascular risk metrics in osteoarthritic and non-osteoarthritic populations using CLSA data

Osteoarthritis (OA), a progressive joint disease involving breakdown of cartilage and bone, has become the most prevalent cause of physical disability in older adults. There is a greater risk of cardiovascular disease (CVD; e.g., ischemic heart disease, heart failure), stroke and dementia with osteoarthritis. A physiological surrogate of cardiovascular health is the carotid intima-media thickness (cIMT) which has been shown to be predictive of future cardio- and cerebrovascular events. Different CVD risk scores have been developed, such as the Framingham Risk Score (FRS). Modifiable factors not considered in the FRS such as physical activity, diet and stress are encompassed by the recently developed InterHeart risk score (IHS). Used together, cIMT and CVD risk scores may provide a comprehensive account of CVD risk which may improve early detection of CVD in OA. This study will employ cIMT as a subclinical marker of CVD risk and the FRS and IHS values in relation to CVD risk to compare the accuracy of predicting CVD outcome in adults with OA and healthy age- and sex-matched cohort without OA based out of the longitudinal cohort tracked by the CLSA. Through machine learning approaches, this work will identify potentially overlapping mechanisms between these age-associated diseases. This information will aid in managing the onset and progression of these conditions that affect mobility, independence and, subsequently, quality of life in the Canadian aging population.

RESEARCH IMPACT: This research has yielded two conference presentations, four knowledge translation activities and two new collaborators.

"Osteoarthritis (OA) is associated with higher incidence of cardiovascular disease, making it of great interest for clinicians and patients alike to take early measures towards preserving health and furthering the understanding of disease onset and progression. Using carotid intima-media thickness in addition to cardiovascular disease risk prediction scores can aid in early detection of cardiovascular disease in those with osteoarthritis and inform preventative measures for cardiovascular disease onset in an at-risk population like osteoarthritis which has historically been treated as a 'joint-centric' condition."

Michelle Mei

SUPERVISOR

Baraa Al-Khazraji
Kinesiology

MENTOR

Ada Tang,
Rehabilitation Science



PhD
Scholarship
Ali Ammar
Biomedical Engineering

SUPERVISOR

Cheryl Quenneville
Mechanical Engineering

MENTOR

Janie Wilson
Surgery

2020 | Development of clinical tools to guide diagnosis and treatment of osteoporosis in older adults

Osteoporosis, a disease commonly associated with age that reduces bone mass and strength, is a major contributor to hip fractures and one of the leading causes of mortality in older adults. It affects about 1.4 million Canadians including one in three women and one in 12 men over the age of 50 years old. Current tools for identifying osteoporosis (and corresponding hip fracture risk) have limited predictive capability and are poorly correlated with actual fracture risk. This study will use machine learning and image processing techniques to improve the prediction of fracture risk, while still using standard bone density images. As bone response is highly dependent on sex, age, ethnicity, smoking, exercise level and alcohol use, it will be important to understand how each of those factors influence the progression and treatments of osteoporosis by developing a multivariate model. The development of a more accurate clinical tool to guide diagnosis and treatment of osteoporosis in older adults will facilitate independence and improve quality of life for older adults by facilitating improved diagnosis of osteoporosis and by informing development of more accurate individualized treatment plans to prevent osteoporotic-related injuries.

RESEARCH IMPACT: This research yielded one conference presentation and two new collaborators.

"Many efforts have been made in the field of image processing, logistic regression and machine learning to enhance our ability to identify patients at greatest risk of sustaining an osteoporotic fracture. This clearly indicates that there is a driving need for better tools to diagnose and information to guide individualized treatment plans. The present proposal will integrate all three methods, using techniques that have been proven to dramatically exceed those currently available to clinicians, addressing a significant gap in the health-care system. The impact of this research will be the use of informed, targeted interventions such as energy attenuating floors, hip protectors and medication and supplement programs for older adults, to reduce the incidence of these devastating injuries."

Ali Ammar



Labarge
Postdoctoral Fellowship
in Mobility
Isabel Rodrigues
Medicine

2021 | Building on what we know:
Using design thinking to tailor routine
assessments and interventions for fall
and fracture prevention in long-term
care

Osteoporotic fractures can lead to a decline in physical function and early mortality in older adults living in long-term care. Management strategies such as exercise, diet and supplements, and medications may reduce the risk of falls and improve muscle strength and bone health among older adults with osteoporosis. Despite ample research to support such management options, older adults in their eighth and ninth decade of life are less likely to be treated for osteoporosis. The PREVENT model is an approach that embeds fracture assessment and treatment options in long-term care with the goal of preventing osteoporotic fractures. Before the PREVENT model can be implemented in practice (i.e., long-term care), it will be necessary to identify barriers to and facilitators of implementing the PREVENT model. After identifying barriers to and facilitators of implementing the PREVENT model, it can be adapted to create meaningful change in the prevention of osteoporotic fractures in long-term care settings.

“The results from this study will be used to enhance the applicability of the PREVENT model in long-term care.”

Isabel Rodrigues

SUPERVISOR

Alexandra Papaioannou
Medicine

MENTORS

Manaf Zargoush
Health Policy and Management

Rong Zheng
Computing and Software



Labarge
Postdoctoral Fellowship
in Mobility
Patricia Hewston
Medicine

SUPERVISOR

Alexandra Papaioannou
Medicine

MENTORS

Amanda Grenier
Social Work

Steven Bray
Kinesiology

2018 | Can dance reduce falls risk in older adults with cognitive impairment?

Older adults at increased falls-risk walk slower with less rhythm and reduced coordination. We explored the effect of GERAS DANCE on gait speed, rhythmicity and coordination in older adults with early cognitive or mobility impairments. Participants completed the 12-week GERAS DANCE program (two one-hour classes + one-hour homework weekly) for a total dose of 36 hours. Gait was assessed at baseline and 12-weeks with the ProtoKinetics Zeno Walkway under two experimental conditions: normal walking (no-SS3) or dual-task walking while performing serial subtraction task. After a 12-week pilot study of GERAS DANCE, participants walked faster with improved rhythmicity and coordination, indicative of reduced falls risk.

RESEARCH IMPACT: This research has resulted in seven publications, 10 conference or invited presentations, 20 knowledge translation activities, 22 media items, one copyright and trademark of the GERAS DANCE program, seven new collaborators and leveraged an additional \$10,000 in internal funding and an additional \$50,000 in external funding (CFN Fellowship, declined).

“GERAS DANCE is an innovative, evidence-based program that is an excellent example of moving evidence into practice to build healthier communities across Canada. The GERAS DANCE program of research has grown from an idea to a well-known program with 30 certified instructors and 500+ older adults dancing across 12 YMCA sites in Southern Ontario and 16 community centers across Canada. A strong partnership with the YMCA provides the infrastructure to access both physical space and instructors already equipped to provide programming tailored to the needs of older adults. With funding from the Labarge Postdoctoral Fellowship for Mobility in Aging, I conducted an in-depth biomechanical investigation to understand the effect of GERAS DANCE on gait in older adults with early cognitive or mobility impairments, and found that GERAS DANCE improved gait speed, rhythmicity and coordination indicative of reduced fall-risk. Our vision is to bring the joy of dance to seniors to improve health and well-being across Canada and beyond.”

Patricia Hewston

AGE-WELL/ Labarge Centre for Mobility in Aging Co- funded Trainees

AGE-WELL, Canada's National Centre for Excellence focusing on aging and technology, funds research and trainees through annual, competitive requests for proposals. The Labarge Center for Mobility in Aging (LCMA) and AGE-WELL share an interest in developing trainees whose research is focused on user-centred approaches to solving problems in aging. LCMA has committed to co-funding McMaster trainees selected through AGE-WELL's trainee competition, provided that the proposed research is aligned with the LCMA's research priorities and interdisciplinary mandate.

Completed Scholarship:

Rasmi Kokash completed an AGE-WELL/LCMA Postdoctoral Fellowship examining the extent to which technological expertise impacts entrepreneurship, economic mobility and well-being roles for older adults.

Research impact:

This research yielded four presentations, 20 new collaborators, supported two trainees and has leveraged \$10,000 in additional in-kind funding.



AGE-WELL/LCMA
Postdoctoral Fellow

Joyla Furlano

*Health Research Methods,
Evidence, and Impact
(HEI)*



2021 | Indigenous Inclusion in the Canadian Therapeutic Platform Trial for Multidomain Interventions to Prevent Dementia (CAN Thumbs Up)

The Canadian Therapeutic Platform Trial for Multidomain Interventions to Prevent Dementia (CAN Thumbs Up, or CTU) is Canada's largest national dementia research initiative, evaluating the effectiveness of a web-based multimodal program (that focuses on psychoeducation, lifestyle modification, etc.) in preventing dementia among at-risk older adults. To date, CTU has not included Indigenous perspectives, culture or context in the development of the intervention or the study design, and therefore does not reflect the priorities and needs of Indigenous communities. The proposed research will focus on developing an Indigenous adaptation of CTU to ensure culturally safe inclusion of Indigenous older adults living remotely. Importantly, this project will be created and developed with Indigenous communities to ensure that CTU methodologies are culturally relevant and reflective of their geographic and social localities.

"This impactful research will help shape future national dementia prevention trials and ensure cultural relevance in the development of community-based preventative strategies. Moreover, it will ensure that culturally safe and trauma-informed dementia prevention tools are available to Indigenous peoples living remotely who are at risk of developing Alzheimer's disease or other dementias. As remote health intervention models (particularly those focused on dementia risk) for Indigenous populations do not currently exist, my work has important health implications for Indigenous populations both within Canada and beyond."

Joyla Furlano

SUPERVISOR

Jennifer Walker
*Health Research Methods,
Evidence and Impact*



AGE-WELL/LCMA
PhD Scholarship

Elise Wiley
School of Rehabilitation
Science



SUPERVISOR

Ada Tang
Rehabilitation Science

2021 | Examining the intersection between sex-and gender-based considerations and exercise-based telerehabilitation in individuals with stroke: A pilot randomized controlled trial

People with stroke often report the need for ongoing therapy after leaving the hospital, especially for more rehabilitation to further improve leg function, walking and balance. Stroke also affects men and women differently. Research has shown that levels of disability, leg recovery and participation in stroke rehabilitation programs differs between men and women. The TeleRehabilitation with Aims to Improve Lower Extremity Recovery Post-Stroke (TRAIL) program is a four-week virtual program focused on exercises to improve leg recovery after stroke. This study will examine how TRAIL impacts walking, balance, and quality of life in people with stroke with different sexes and genders. Virtual rehabilitation, such as the TRAIL program, can be an avenue for more people to participate in therapy programs after stroke. This research will allow us to better understand how virtual rehabilitation can help men and women recover after stroke.

"This study will be the first to incorporate sex-and gender-based considerations in lower extremity clinical outcomes and quality of life after stroke rehabilitation. Technology can be an efficient and accessible way to deliver stroke rehabilitation services but the impact of sex and gender on outcomes following virtual care for lower extremity recovery is unknown. Virtual programs such as TRAIL can supplement resource-intensive in-person care, facilitate the transition from hospital to home, and extend rehabilitation opportunities into the community. Establishing the effectiveness of virtual rehabilitation programs for men and women after stroke can help reduce the burden on the healthcare system."

Elise Wiley



AGE-WELL/LCMA
PhD Scholarship

Michael Zon
Biomedical Engineering



2020 | Remote monitoring of older adults with COPD for infection and fall detection using smart-home technology

To meet the increasing medical needs of our aging population, remote monitoring systems will help caregivers automate many of their time-consuming tasks and help patients rapidly detect medical anomalies to facilitate faster diagnoses and better outcomes. This research aims to develop a low-cost portable non-intrusive smart-home system that can be used for remote monitoring of health conditions in older adults to facilitate safe aging in their primary residence. Thus far, a portable smart-home system that automatically tracks heart rate, step count, location (GPS) and other mobility parameters to detect falls has been developed. Installation of the system was simple, requiring plugging small devices into the wall sockets of each room and wearing a smartwatch. Emphasis was placed on a simple setup procedure to ensure the system was easy to use for elderly individuals. The initial target application for this watch based smart-home system will be to automatically detect mobility decline in older adults. For example, to determine if the system can detect the onset of Parkinson's disease via the accelerometer/mobility data and to collaborate with health-care providers so that they can use the system to obtain real-time data on patients. The end goal of this system will be to provide health-care providers with real-time patient data, automatically detect medical abnormalities for them and allow older adults to live in their own homes longer.

RESEARCH IMPACT: This research has yielded one presentation and four new collaborators.

"The purpose of this study is to prolong the time older adults can live independently at home by promoting safe aging in place. We hope to demonstrate that our smart home system can be used to detect diseases and mobility decline early so health-care providers can intervene to prevent further decline and limit disease progression. Additionally, the real time streaming of medical data through the system will aid health-care providers in observing all of their older patients at the same time. This way, when the population continues to get older and require more care, the quality of care received by patients will remain high as tracking patients is streamlined and available through a single interface."

Michael Zon

SUPERVISOR

Qiyin Fang
Engineering Physics



AGE-WELL/LCMA
Postdoctoral Fellow

Aki-Juhani Kyröläinen
Linguistics and Languages



SUPERVISOR

Victor Kuperman
Linguistics and Languages

2020 | Aging and narratives: Linguistic markers of social well-being in late adulthood

Close to 30 per cent of older Canadians are at risk for social isolation and loneliness, defined as either an entire lack, or an impoverished quality of, communication between a person and the outside world. Social isolation is harmful for physical and mental well-being and often stigmatized either by the individual or the social group. Thus, it is difficult to identify individuals experiencing social isolation, let alone socially engage them. Prevention of social isolation and loneliness can lead to demonstrably better quality of life and reduced health costs among older adults. This project addresses an increasing need to better understand the social dimensions associated with social isolation and loneliness. This project will identify linguistic markers of social isolation and loneliness in older adults and characterize age-related cognitive changes in language production among socially isolated and lonely older adults.

RESEARCH IMPACT: Thus far, this research has resulted in three publications, two presentations, two media pieces and one new collaboration.

"The publication of the database consisting of written life stories along with the extensive survey data is expected to advance research agendas and theories on the psychology of aging."

Aki-Juhani Kyröläinen

Other co-funded Trainees



CHEPA
Postdoctoral Fellow

Maggie MacNeil

*Health Research Methods,
Evidence, and Impact*

2020 | DE-CODE EMBOLDEN: Co-design evaluation project

Partnering with citizens and community in health research can improve health outcomes, enhance the health-care system and is increasingly an expectation of Canadian granting agencies. Though the science of citizen and community engagement in research has rapidly expanded, less is known about the impact of engagement approaches on research outcomes. Rigorous approaches to evaluating participatory approaches in health research have been called for, to ensure scarce health-care resources are aligned with citizen's needs and priorities and allocated in the most impactful way. EMBOLDEN is an evidence-informed, novel community health intervention to enhance mobility that is co-designed by a 30-person Strategic Guiding Council (SGC) composed of health/social service providers and older adult citizens. Working with older adult SGC members, priorities for evaluation were identified. The evaluation will prioritize capturing diversity (gender, cultural and organizations); satisfaction, fun and respect; impact of SGC input to intervention; SGC involvement across all stages of research; and will contribute to adaptations and innovations to the EMBOLDEN co-design process as the intervention is implemented in different communities.

RESEARCH IMPACT: This research has yielded two publications, seven conference presentations, three knowledge translation activities and 45 new collaborators.

"This project contributes to the growing field of citizen and community engagement in research by offering a participatory approach to engagement evaluation that considers diversity, satisfaction and impact."

Maggie MacNeil

FUNDING COLLABORATORS

This postdoctoral fellowship is co-funded by the McMaster Centre for Health Economics & Policy Analysis and the Labarge Centre for Mobility in Aging

SUPERVISORS

Julia Abelson
*Health Research Methods,
Evidence, and Impact*

Rebecca Ganann,
Nursing



CFN MERST
Postdoctoral Fellow

Megan Racey
McMaster Evidence Review
and Synthesis Team

SUPERVISOR

Diana Sherifali
Nursing

2019 | Physical activity and nutrition recommendations for older adults living with frailty

Frailty is a leading contributor to functional decline and early mortality in older adults but can potentially be reversed through diet and/or physical activity. A systematic review and meta-analysis were conducted to identify the effectiveness of nutrition interventions, nutrition interventions with physical activity (combined approach) and physical activity interventions in improving outcomes related to frailty. Results indicated moderate certainty evidence that nutrition, protein supplementation and combined approach interventions are beneficial for certain components of frailty. There is low to moderate level evidence that physical activity interventions of different types are beneficial for frail older adults. Clinical trials with clear definitions of frail participants, which use outcomes that reflect frailty identification and diagnosis, are needed.

RESEARCH IMPACT: This research has yielded two publications, one presentation, four knowledge translation activities and ten new collaborators. Evidence from these reviews will be used by the Canadian Frailty Network in their development of clinical practice guidelines.

"Older adults living with frailty may experience large declines in health from illnesses such as the flu or adverse events like falls and are more likely to be hospitalized, need long-term care or die. Frailty is also hard to diagnose because it is not well understood by doctors, nurses or other health-care professionals and involves a collection of tests that are time consuming to complete. Even though research shows there is a benefit when older adults eat a healthy diet and get enough physical activity, there is a gap in this research for preventing and managing frailty among older adults. For example, current physical activity guidelines for seniors may be too advanced or too intense for a frailer population and puts them at risk for falls or other injuries. From the systematic reviews and evidence developed through my research, Clinical Practice Guidelines were drafted by CFN and a group of stakeholders. These will directly impact the public through their use by health-care professionals and will aid in making recommendations for older adults living with frailty. Specifically, they will tailor nutrition and physical activity recommendations for a frailer population and better support a range of health-care professionals (such as doctors, nurses, physiotherapists, dietitians, etc.) in assisting and supporting their patients."

Megan Racey



CFN
Interdisciplinary
Fellowship
Julie Reid
Rehabilitation Science

2020 | How can we screen frailty to prevent falls in older adults?

Falls are the leading cause of injury among older Canadians and cost the health-care system \$3.3 billion annually. In adults over 65 years, falls account for 85 per cent of injury-related hospitalizations with one-third of patients transitioning to long-term care post-hospitalization. Frail, older adults often have more falls than adults without frailty, but falls can be prevented. Determining an efficient and effective way to screen both frailty and fall risk may facilitate early intervention to moderate the clinical course of frailty and prevent falls. This project works to improve care for at-risk older adults and improve clinical outcomes and presents an important opportunity to engage older adults and families/caregivers to proactively identify risk factors and prevent falls. This study will evaluate two tests of frailty to determine if one is superior and determine whether these frailty tests correlate with tests of falls risk to accurately identify at-risk adults. Results will inform current practice on how to assess frailty and falls risk.

RESEARCH IMPACT: This work has yielded one conference presentation and two new collaborators.

"In the context of COVID-19, it is important to minimize non-essential physical contact, especially for older adults at higher risk for serious illness and complications. It is unclear how long the pandemic and physical distancing guidelines will persist. Even in the post-COVID era, virtual approaches to health care are likely to remain an important area of focus, especially among older adults who may have accessibility limitations. Results from this study can provide valuable information on conducting virtual fall risk assessments at home by examining the feasibility and acceptability, reliability and validity of six virtually administered tests of balance and mobility."

Julie Reid

FUNDING MATCHED

As a Canadian Frailty Network Interdisciplinary Fellowship trainee, Julie received matching funding from the Labarge Centre for Mobility in Aging

SUPERVISOR

Marla Beauchamp
Rehabilitation Science



CFN
Interdisciplinary
Fellowship
Erin Webb
Kinesiology

FUNDING MATCHED

As a Canadian Frailty Network Interdisciplinary Fellowship trainee, Erin Received matching funding from the Labarge Centre for Mobility in Aging

SUPERVISOR

Vladimir Ljubcic
Kinesiology

2020 | Investigation of CARM1 in aging-induced skeletal muscle atrophy

The enzyme co-activator associated arginine methyltransferase 1 (CARM1) is an important regulator of skeletal muscle health and function and impacts the response to common physiological stimuli, such as exercise, fasting and muscle disuse. CARM1 plays a direct role in skeletal muscle atrophy during denervation and fasting conditions. Thus, it is reasonable to hypothesize that CARM1 is also involved in the atrophic process of aging-induced atrophy and dysfunction of skeletal muscle, termed sarcopenia. This study will investigate the role of CARM1 in sarcopenia. Specifically, this study assesses the molecular, structural and functional differences in skeletal muscle of mice with CARM1 specifically deleted in skeletal muscle (mKO) compared to wild-type mice (WT at 3, 12, 18 and 22 months). In this study mKO mice have demonstrated a significantly shorter lifespan versus their normal, wild-type (WT) littermates. Furthermore, differences in body weight and muscle mass are observed between WT and mKO animals. A series of tests to investigate the functional differences between the WT and mKO mice, such as grip strength, motor control and endurance capacity are being completed. Analyses of the skeletal muscle structure will be executed through assessment of muscle fibre cross-sectional area as well as evaluating the underlying molecular mechanisms that are driving alterations in sarcopenia in mKO mice. This study will investigate the role of CARM1 in aging-induced atrophy and sarcopenia, which may provide insight into novel therapeutic strategies to mitigate sarcopenia and frailty in older adults.

RESEARCH IMPACT: This work has yielded one conference presentation, two new collaborators and has leveraged an additional \$17,500 (NSERC CGS-M) in external funding.

"Our investigation will provide important insight into the molecular mechanisms that govern skeletal muscle aging. Through improving our understanding of these mechanisms, we can identify potential therapeutic strategies to mitigate the sarcopenia of aging."

Erin Webb

Completed scholarships:



Giulia Coletta, Kinesiology, measured whether a real-time exercise program delivered via an online virtual platform improved older adults' levels of physical activity and mobility.

"The Labarge Mobility Scholarship allowed me to gain exposure to learn from an interdisciplinary team that has enriched my master's training and galvanized my pursuit of a PhD."

Giulia Coletta



Michael Kalu, School of Rehabilitation Sciences, developed a mobility enhancement comprehensive care model.

"The Labarge funding has allowed me to explore the concepts of the inter/transdisciplinary approach to aging care and research, to gain a better appreciation for the complexity of mobility and to develop an understanding of how several factors, including cognitive, environmental, financial, personal, physical, psychological and social factors, affect older adults' mobility."

Michael Kalu



Erynne Rowe, Biomedical Engineering, worked to define the biomechanical differences in the effect of aging on gait coordination patterns in and between males and females and to define normative walking gait patterns in both young and older adults.

"Receiving the Labarge Mobility Scholarship for my Master's research project back in 2019 not only provided financial opportunities for my project to expand, but also introduced me to the wonderful MIRA trainee community where I got to meet and learn from a multidisciplinary group of fellow students and researchers. As I start my physiotherapy training and move into the clinical side of aging and rehab, I will always be so grateful for my time as a MIRA trainee!"

Erynne Rowe



Tanner Stokes, Kinesiology, identified the efficacy of proteins contained in whole and skimmed milk compared with an almond beverage on skeletal muscle protein synthesis in older women.

"The Labarge Mobility Scholarship has enabled me to direct my full attention to uncovering the impact of different dietary protein sources on muscle metabolism in older women."

Tanner Stokes

Sydney Valentino, Department of Kinesiology, studied the effects of exercise on heart structure and function in cardiac rehabilitation.

Stephanie Chauvin, School of Rehabilitation Science, examined factors that distinguish between older adults with chronic obstructive pulmonary disease who have recently fallen and those who have not.

Research impact of completed scholarships:

25

new
collaborations

17

conference
presentations

15

knowledge
translation
events

3

publications

1

media piece

Leveraged an additional
\$48,000 in internal
funding and **\$70,000** in
external funding.

PART 2

Labarge Optimal Aging Initiative and the Labarge Foundation

Since their launch in 2012, the Labarge Optimal Aging Initiative and Labarge Foundation have provided seed funding to support interdisciplinary teams investigating health or social topics related to aging. This has funded 26 research projects and been the financial backbone of the McMaster Optimal Aging Portal, a free website intended for the general public that offers informative blog posts, resource ratings and evidence summaries drawn from high quality research articles.



Labarge
Optimal Aging
Initiative
Marla Beauchamp

PROJECT | Pilot study of a tailored home balance exercise program for reducing falls in older adults with Chronic Obstructive Pulmonary Disease (COPD)

This research project is examining the feasibility and preliminary effects of the first entirely home-based exercise program for reducing falls in older adults with COPD.

RESEARCH IMPACT:

- Development of improved balance-related measures of fall risk in older adults with COPD
- Pilot data informing the design of an ongoing CIHR-funded international multi-centre trial of fall prevention for older adults with COPD
- The establishment of a new collaboration between two premiere centres for respiratory care in Ontario: West Park Healthcare Centre and the Firestone Institute for Respiratory Health
- Five publications, five conference presentations and eight knowledge translation activities
- Leveraged an additional \$1.03 million in funding

INVESTIGATORS

Marla Beauchamp
Dina Brooks
Roger Goldstein
Stewart Pugsley
Julie Richardson

"The overall objective of my research program in this area is to develop evidence-based fall risk screening and prevention strategies for at-risk older adults. A key issue in our research is the need to develop interventions for preventing falls in older adults with chronic lung disease who are unable to attend hospital or community-based rehabilitation programs.

"Labarge funding has provided me with the opportunity to develop and pilot test an entirely home-based fall prevention program for older adults with COPD who are at high risk of falls. This pilot project allowed us to establish a new collaboration between two premier centres for respiratory care in Ontario: West Park Healthcare Centre in Toronto and the Firestone Institute for Respiratory Health in Hamilton. Our study team includes investigators and clinicians from both sites and the result is a significantly strengthened research capacity for other projects going forward.

"Since beginning our Labarge project, the two centers are now collaborating on three different projects related to respiratory health and mobility. The home-based fall prevention program developed for this study could offer a low-resource strategy to reduce fall risk for community dwelling older adults with COPD and other chronic health conditions. We were also able to use components of this program as a template for an international multi-site randomized controlled trial of fall prevention as part of pulmonary rehabilitation. This project was successful in receiving funding from the 2016 Canadian Institutes of Health Research project scheme competition. Furthermore, the results of this pilot study have provided us with critical information needed to pursue formal evaluation of the effectiveness of the home-based fall prevention program in a larger scale-trial."

Marla Beauchamp

Completed Projects

The impact of projects funded by the Labarge Optimal Aging Initiative has had an incredible reach. Many have provided important insights from multiple disciplines in research and aging. These include:

- The reduction of medications to improve mobility in long-term care (Dee Mangin, Family Medicine)
- The implementation of dance to improve cognition and encourage exercise in older adults (Alexandra Papaioannou, Medicine)
- The prevention of hip fractures to avoid devastating injury (Cheryl Quenneville, Mechanical Engineering)
- A better understanding of the neural and behavioural changes involved in driving and aging (Judith Shedden, Psychology, Neuroscience & Behaviour and Martin von Mohrenschildt, Engineering)
- The evaluation of the impact of the McMaster Optimal Aging Portal on knowledge and behaviours related to physical mobility (Maureen Dobbins, Nursing)
- The co-design and production of a user-optimized communication toolbox for delivering research evidence to older adults (Alfonso Iorio, Health Research Methods, Evidence, and Impact)
- Evaluating the feasibility of an older driver health promotion intervention to optimize safe mobility (Brenda Vrkljan, Rehabilitation Science; Jessica Gish, Health, Aging & Society; Lauren Griffith, Health Research Methods, Evidence, and Impact)
- Defining the optimal combination of exercise and nutrition for maximizing muscle mass and mobility in aging (Gianni Parise, Kinesiology)

Research impact from completed Labarge Optimal Aging Initiative projects





"Funding provided through the Labarge Optimal Aging Initiative launched a series of studies exploring the impact of the McMaster Optimal Aging Portal on knowledge, intentions and health behaviours of those using the Portal."

Maureen Dobbins



"The potential public impact of this study is to refine approaches to communicating research evidence to meet diverse needs amongst older adults. Results of this study can be applied by information providers and developers to address the health information needs of older adults and adapt their information products for use by this broad age group. This study also provides a valuable template for future efforts to involve older adults in research and the design of information products that optimally meet their needs as they seek to live healthier lives. Building on this work, we actively involve older adults in research co-design and have applied the persona-scenario methodology to intervention design to support the health, mobility and well-being of aging Canadians."

Alfonso Iorio



"The Labarge Initiative funding has allowed us to build upon and pursue further research surrounding optimization of medications in older adults. Based on the results of the feasibility study conducted in long-term care homes funded through the Labarge Initiative funding, we began a pilot randomized controlled trial to evaluate the effectiveness and safety of TAPER in long-term care settings. Unfortunately, COVID-19 greatly impacted this study. Valuable implementation data was gathered, however, and we intend to submit a large-scale randomized controlled trial grant to CIHR in the near future. This trial will leverage our new collaboration with PointClickCare to better integrate TAPER and the medical records system. GeriMedRisk is also now a funded program through the Ontario Ministry of Health to support older adults in the community, long-term care and acute care across the province."

Dee Mangin



"We focused our recent NSERC Discovery Grant application (awarded 2020) on driving and multisensory integration across the lifespan. We would not have taken this aging research approach without the Labarge Optimal Aging Initiative funding and experience that gave us with testing aging drivers. The purpose of our experiments is to improve understanding about how we adapt throughout the lifespan to maintain safe driving, not only in critical situations to avoid accidents, but also in navigation and spatial memory. We want to find ways to help older drivers stay on the road for longer, safely, and in that way maintain and enhance mobility and independence. We are building innovative virtual reality tools to safely test older drivers as they navigate in realistic simulated environments. We study neural and behavioural changes across the lifespan that are related to the way that we use multisensory cues to self-motion from visual, auditory, vestibular and proprioceptive senses. As we age, the way in which the brain integrates multisensory information changes and good drivers learn to adapt to these changes. This is a new research path for us, inspired and supported by the Labarge Optimal Aging Initiative."

Judith Shedden



"This funding was extremely valuable for developing a new line of research in aging, making new research collaborations, hiring my first PhD student and generating data to write my first CIHR grant."

Cheryl Quenneville

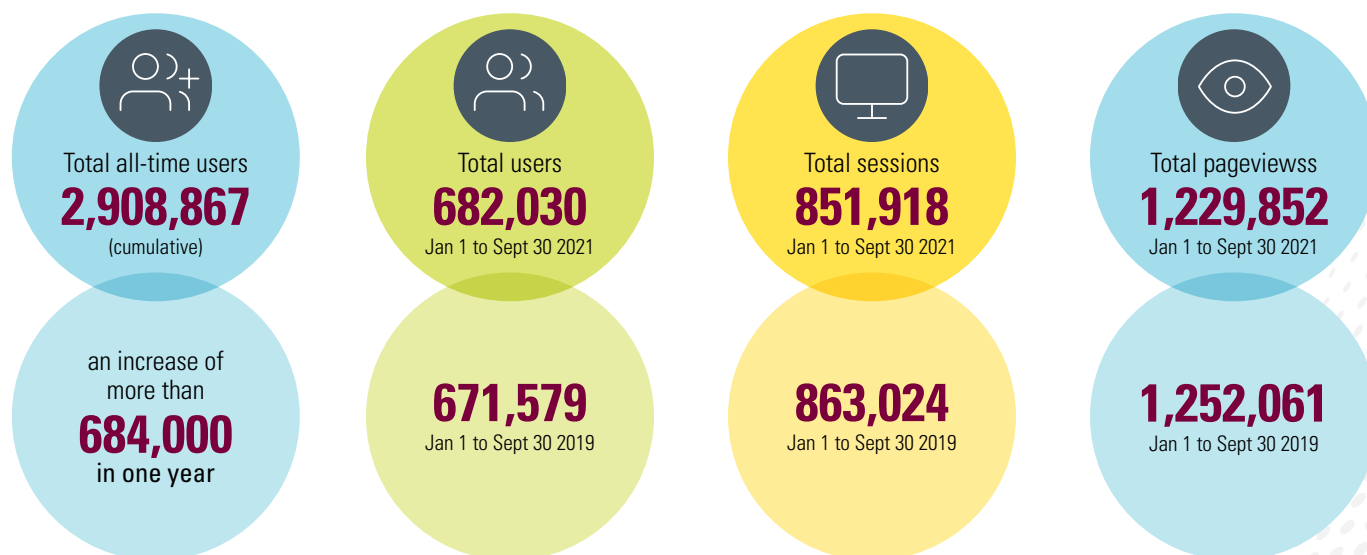
The McMaster Optimal Aging Portal

The McMaster Optimal Aging Portal continues to grow as a key resource to support older adults, caregivers, clinicians, public health professionals, social system professionals and policymakers from around the world who are looking for a trusted source of credible, evidence-based information about the health and social aspects of aging.

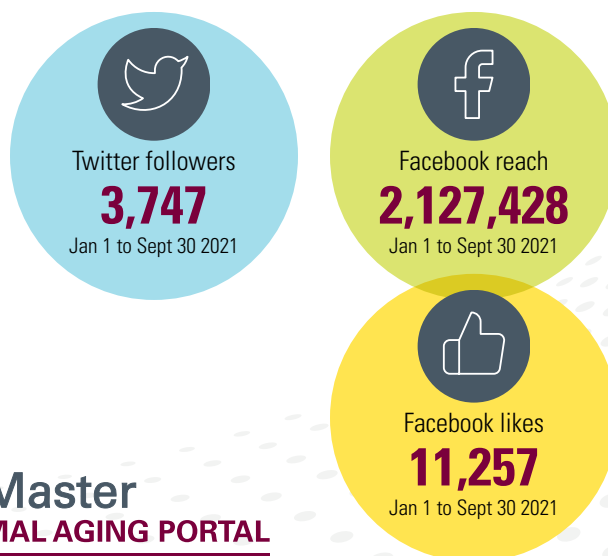
This year, the Portal continued to provide content addressing the full spectrum of topics supporting decisions related to the COVID-19

pandemic and response (e.g., public-health measures, clinical management, health system arrangements and social and economic responses). In June, the Portal launched an initiative with the goal of attracting new users, including younger audiences and those who use Facebook's more contemporary features. This initiative included piloting enhanced multimedia content; increasing engagement with Portal users and email alert subscribers; and expanding other media formats on the Portal, including images and videos.

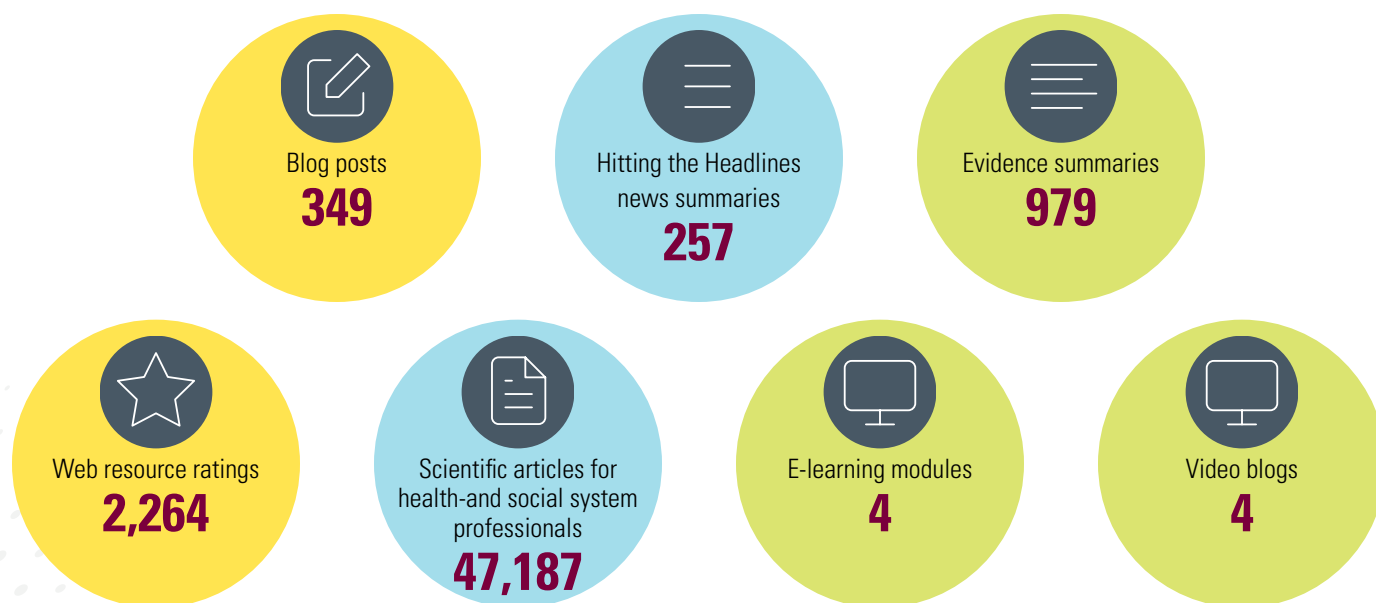
Portal engagement



Social Media



Content



COVID-19 content

In March 2020 the Portal team shifted its content strategy to meet the changing needs of citizens, caregivers and health and social systems professionals in response to the COVID-19 global pandemic. Since this time, the Portal has prepared products with actionable tips for older adults and their caregivers to help with informed decision-making during the pandemic.

In 2021, the Portal was able to leverage resources available through the CIHR-funded COVID-19 Evidence Network to support Decision-making (COVID-END), covering the full spectrum of the pandemic response — from public-health measures and clinical management to health-system arrangements and economic and social responses. Products available through COVID-END supported the preparation of plain-language content for the Portal's COVID-19 section.

New multimedia content

The new multimedia content project is supported through the McMaster Institute for Research on Aging and funds provided by the Dean and Vice-President, Faculty of Health Sciences at McMaster University. Infrastructure was put in place during the summer months to make the new multimedia format possible and September saw the successful launch of the first series of products. Each topic being addressed is presented in several formats:

- a 'long form' YouTube video (approximately 15 minutes in length) that includes a quiz
- short-form videos for Facebook stories (average six per topic)
- short-form audio versions (once Facebook launches its audio feature)
- collateral marketing materials such as infographics

New topics are being released every two weeks. Usage and user engagement metrics are already demonstrating a very good response over the first two months of the project.

Social Systems Evidence and Portal content on social aspects of aging

Launched in the fall of 2017, Social Systems Evidence (SSE) is the repository that supports the McMaster Optimal Aging Portal's content on social aspects of aging. SSE is the world's most comprehensive, continuously updated repository of synthesized research evidence relevant to 20 government sectors and program areas (e.g., community and social services; culture and gender; economic development and growth; education; and transportation) and all the United Nations Sustainable Development Goals (SDG). SSE covers the governance, financial and delivery arrangements within which these programs, services and products are provided, and the implementation strategies that help to ensure that they get to the people who need them.

SSE received funding between 2017-2020 from the Faculty of Health Sciences, the Labarge Optimal Aging Initiative, the Labarge Centre for Mobility in Aging, the McMaster Institute for Research on Aging and the Provost's Strategic Alignment Fund. In 2021, the McMaster Health Forum (where SSE is hosted), was able to leverage funding from two of its projects (grants from the Ontario Ministry of Health and from the Ontario SPOR Support Unit) to help maintain SSE's content related to optimal aging.

Currently SSE includes 5,142 documents (evidence briefs for policy, overviews of systematic reviews, systematic reviews (including protocols) and economic evaluations). For all types of documents, links are provided to user-friendly summaries, scientific abstracts and full-text reports (if applicable and when freely available). For each systematic review, SSE also provides an assessment of its methodological quality and links to the studies contained in the review.

During 2021, SSE:

- Harvested more than 110,000 documents, and evaluated their eligibility for inclusion in the repository
- Reached over 8,500 regular users, 11,705 user sessions, and 18,000+ page views
- Continued to offer curated searches on pressing issues related to optimal aging
- Continued the SSE evidence summary e-newsletter, providing monthly updates of new evidence on topics of interest to 600 registered users
- Gave several presentations and workshops about SSE in collaboration with the Monash Sustainable Development Institute

The McMaster Optimal Aging Portal **content on social aspects of aging**, which uses SSE as the source of synthesized research evidence, continues to grow and be widely promoted and used. Focused specifically on the social aspects of aging, it includes:



documents for social
systems policymakers

313



Blog posts

152



Evidence summaries

133



Web resource ratings

1,337

Sustainability

Efforts to secure the long-term sustainability of the Portal continued at an increased level during 2021. The Portal team was successful in confirming a grant of \$300,000 for January 2021 to March 2022 from AGE-WELL with discussions about a longer-term collaboration continuing. In collaboration with MIRA, The Portal team conducted discussions with several organizations and agencies to identify additional sources of funding.



SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY



2 ZERO HUNGER



3 GOOD HEALTH AND WELL-BEING



4 QUALITY EDUCATION



5 GENDER EQUALITY



6 CLEAN WATER AND SANITATION



7 AFFORDABLE AND CLEAN ENERGY



8 DECENT WORK AND ECONOMIC GROWTH



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



10 REDUCED INEQUALITIES



11 SUSTAINABLE CITIES AND COMMUNITIES



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



14 LIFE BELOW WATER



15 LIFE ON LAND



16 PEACE, JUSTICE AND STRONG INSTITUTIONS



17 PARTNERSHIPS FOR THE GOALS



Labarge Foundation Grants

The 2016 Labarge Foundation Grants provided initial funding for several projects, including the completed Health TAPESTRY project which resulted in a partnership between the McMaster School of Nursing and the McMaster Family Health Team that saw nursing students experience job shadowing with varied allied health professionals and visits to community-based resources for older adults (Ruta Valaitis, Heather Waters, Doug Oliver, Larkin Lamarche, Lisa Dolovich).



"This work was leveraged as we continued to implement and test Health TAPESTRY impacts, although not as we originally intended. A key learning from this study was that it was difficult to obtain client referrals for the Health TAPESTRY intervention from clinicians, even those who had been "bought-in" to the Health TAPESTRY option from previous research exposure. Clinicians in the well-resourced primary care settings that offered Health TAPESTRY also had difficulties remembering that it was as an option for client referral. These learnings led to development of more effective methods of enrolling clients into the Health TAPESTRY program for the Health TAPESTRY-Ontario scale up study. For example, recruitment to the program was enhanced to include an open invitation to clients and direct phone calls to recruit potential clients rather than leaning on referrals from clinicians alone. Although nursing placement students and medical clerkship students had limited exposure to older adults in the study, they gained experience with interprofessional team functioning around care for older adults and nursing students had exposure to primary care which is very difficult to obtain."

Ruta Valaitis



PROJECT | Patient/caregiver engagement in community-based research in older adults

The goal of the Aging, Community and Health Research Unit (ACHRU) is to partner with older adults who have multiple chronic conditions and their family caregivers to promote optimal aging at home, by collaboratively designing and evaluating new and innovative community-based health-care interventions to improve access to health care, quality of life and health outcomes, while reducing costs. While patients and family caregivers themselves increasingly expect to participate in decision making and problem-solving with respect to matters affecting their health, their engagement in research design, implementation and evaluation is a relatively new concept. Supported by Labarge funding, ACHRU researchers have been evaluating the process and impact of older adults' and family caregivers' engagement as partners on research teams and expanding capacity in this important area of study amongst pan-Canadian researchers, patient/caregivers and community partners, and in graduate and undergraduate education. Through valuable insights gained through this project, ACHRU continues to expand the integration of meaningful public engagement in each of its current as well as future studies. This funding has made a significant impact to our team as we have learned how to better engage patient and public research partners in ACHRU studies. We have adjusted our reimbursement for contributions of our patient and public research partners, gained more skills in ways to meaningfully engage them as active participants and created tools and products to help us both orient these partners to research and evaluate the contributions that they make to ACHRU research. These achievements are largely due to funding to support patient engagement activities.

RESEARCH IMPACT: As a result of expertise gained through this project, Drs. Ploeg, Markle-Reid, Valaitis and Ganann are co-leads on a large CIHR Strategy for Patient-Oriented Research (SPOR; patient-partnered) Programmatic Grant for older adults with diabetes and multiple chronic conditions and their family caregivers. This grant supports testing of the Aging, Community and Health Research Unit (ACHRU)-Community Partnership Program (Diabetes) in Ontario, Quebec and Prince Edward Island. This current grant builds on the expertise of this patient and public engagement study, as well as earlier research funded through the Labarge Foundation (PI: Markle-Reid) and subsequently by CIHR. Dr. Ganann (Co-PI) and Dr. Ploeg (co-investigator) completed a CIHR-funded knowledge synthesis grant to explore the out-of-pocket costs of aging in place for frail older adults. The patient engagement strategy in this grant leveraged expertise gained through this Labarge funded study. Dr. Ganann continues to collaborate with this team in a new CIHR patient-oriented project grant to enhance primary health care for persons with dementia. Together with Dr. Raina, Dr. Markle-Reid developed and co-led the Ontario SPOR SUPPORT Unit (OSSU) Research Centre on Aging – the MIRA | Collaborative



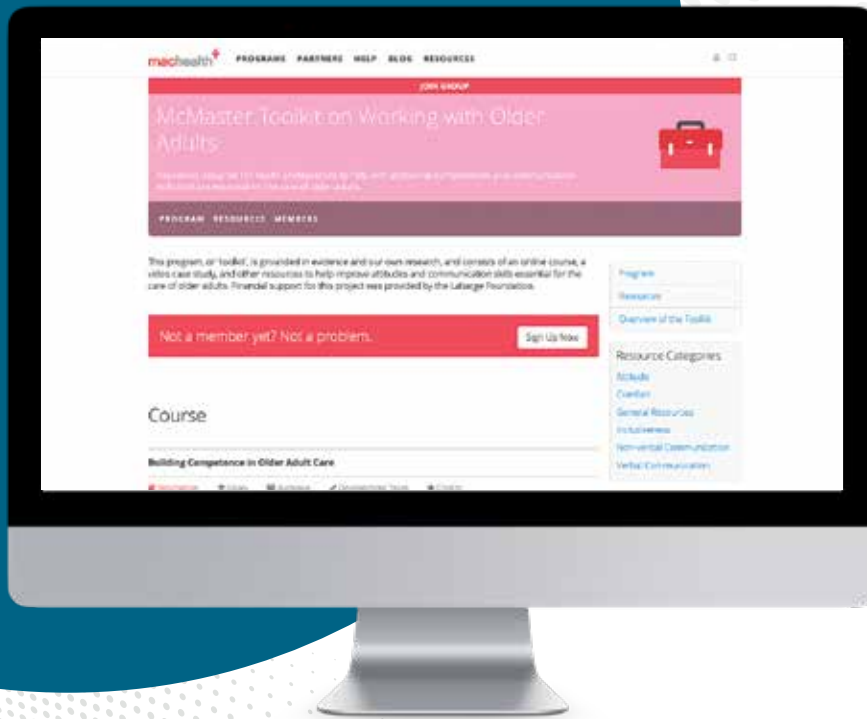
for Health and Aging. OSSU and the Collaborative's funding has just been renewed for an additional three years, with the potential for two further years. Dr. Markle-Reid will continue to lead the Collaborative in the upcoming years. Dr. Ganann is currently a Co-Lead (Acting). Major foci include advancing the science of patient engagement and patient-centred innovations. The work of the Collaborative leverages the expertise and diverse partnerships gained through this Labarge-funded study. In recognition of her expertise in patient engagement, Dr. Ganann led the Primary Health Care Patient Expertise in Research Collaboration (PERC) centre, which is co-funded by the INSPIRE-Primary Health Care Network and OSSU. PERC has been funded for an additional three years (2021-2024). Dr. Ganann also leads the LCMA funded EMBOLDEN study. The citizen engagement strategy for that research builds on the foundation of this project. Funding from the Labarge Foundation Grant has enabled leveraging of additional \$5,000 of in-kind internal funding and \$3.125 million dollars in external funding to expand this project. This project has generated seven publications, 12 presentations, 25 knowledge translation activities, seven media items, 28 new collaborators and supported nine trainees.

"This study helped build a foundation and establish the expertise of our research unit as experts in patient-oriented research. This expertise has led to multiple successful cross-jurisdictional research collaborations and enhanced the impact on the lives of aging Canadians. We continue to engage older adults as key partners in our research teams using combined central and distributed governance models to engage older adults in all aspects of study design and implementation, which enhances the relevance, acceptability and potential impacts of our research."

Rebecca Ganann

INVESTIGATORS

Ruta Valaitis, Carrie McAiney, Maureen Markle-Reid, Rebecca Ganann



McMaster Toolkit for Working with Older Adults

Funding from the Labarge Foundation also acted as a catalyst for the launch of the McMaster Toolkit for Working with Older Adults, which was developed by researchers and clinicians at McMaster University with the goal of building competence in older adult care via online instruction and resources. Today, the Toolkit is included as a component of macPAGE, a platform developed by MIRA researcher Andrew Costa, assistant professor and Schlegel Chair in Clinical Epidemiology and Aging at McMaster University. The platform was created to stimulate and recognize student interest in geriatrics. It has been piloted by the Michael G. DeGroote School of Medicine at the Waterloo Regional Campus. The Toolkit can be found at:

machealth.ca/programs/mcmaster-toolkit/

Other initiatives supported by Suzanne Labarge

Raymond and Margaret Labarge Chair in Research and Knowledge Application for Optimal Aging

McMaster alumna Suzanne Labarge established the Raymond and Margaret Labarge Chair in Research and Knowledge Application for Optimal Aging in 2006, named in tribute to her parents, to direct an interdisciplinary program of research aimed at discovering strategies for supporting the health and engagement of older adults in their daily lives.

The goal of the Chair is to contribute significantly to the body of scholarship on research and knowledge application for optimal aging. This Chair has been established in collaboration with the Faculties of Social and Health Sciences.

Dr. Parminder Raina, Scientific Director of the McMaster Institute for Research on Aging and the Labarge Centre for Mobility in Aging, was reappointed as the Raymond and Margaret Labarge Chair in Research and Knowledge Application for Optimal Aging at McMaster University on April 20, 2018. He is the inaugural Chair holder and has held the Chair for 15 years.

As the Lead Principal Investigator of the Canadian Longitudinal Study on Aging (CLSA), Raina heads the largest and most comprehensive cohorts on aging in the world, with data from 50,000 Canadians collected over 20 years. He is a professor in the Department of Health Research Methods, Evidence, and Impact, specializing in the epidemiology of aging. He holds a Canada Research Chair in Geroscience and in 2019, he was elected to the Canadian Academy of Health Sciences, one of the highest honours in the country's health sciences community.

In 2021, Raina attended and participated in several virtual speaking engagements for colleagues, community members and government stakeholders. He also published 10 papers in areas such as the impact of COVID-19 on the mental health of older adults, PTSD among Canadian veterans and the impact of childhood adverse experience on multi-morbidity. Raina's work with the CLSA also contributed to the "WHO Baseline Report for the Decade of Healthy Ageing 2021–2030." This report will support and transform the way policy makers and multi-service providers engage older adults. He continues to lead CLSA's COVID-19 studies, which will provide a national perspective on the impact of COVID-19 on older adults. Recently Raina was awarded funding from the Weston Family Foundation to study the biological and lifestyle factors that underpin successful cognitive aging. This knowledge will be critical to the development of screening and prevention strategies that are specific to age and sex.

Dr. Parminder Raina's appointment of Chair holder is effective through June 30, 2023.

"Suzanne Labarge and her family have been remarkable champions of research that aims to give people the opportunity to age well, in the right place and with dignity. Their continued support makes this all possible."

Parminder Raina





**Tarek Rajji &
Nick Kates**



INVESTIGATORS

Tarek Rajji
Nick Kates
Karen Saperson
Carrie McAiney
Pallavi Dham

PROJECT | CAMH-McMaster collaborative care initiative for mental health risk factors in dementia

Since data collection for this project was concluded last year, our efforts have focused on three areas.

The first has been writing up the project and preparing papers, the first of which is now ready to be submitted for publication.

The second has been to present the results of the survey at conferences, including the International Collaborative Mental Health Care Conference organized by the Collaborative Family Health Care Association in the US and the annual meeting of the Canadian Association of Geriatric Psychiatry. In both situations the presentations were well received and there was a lot of interest.

The third has been to get together a group from the original team who are looking at how we may be able to develop a similar project with a couple of residential facilities in Hamilton that are part of the Greater Hamilton Health Network (the Ontario Health Team in Hamilton). We have added Dr. Anthony Levinson to the team as he has not only worked on several projects funded by the Labarge Foundation, but brings his expertise in knowledge translation and online training resources to the project.

The team is now planning and developing new projects based on the adaptations to the integrated care pathway that we successfully evaluated with the primary care practices in Hamilton. This is consistent with one of the goals of the original project, which is to look at how this model could be spread to other practices.

RESEARCH IMPACT: To date, the team has shared its outcomes and lessons in nine presentations and nine publications and abstracts.

"We are very pleased to see the possibility of a second phase of the project, applying the model to residential care facilities, as one of our original goals was to learn how to spread what proved to be a very effective project to other primary care practices and setting"

Nick Kates





PART 3

McMaster Institute for Research on Aging (MIRA)

The McMaster Institute for Research on Aging is McMaster University's cross-faculty research institute for advancing the science of aging. MIRA's mission is to optimize the health and longevity of the aging population through leading-edge research, education and stakeholder collaborations, while upholding the values of integrity, excellence, interdisciplinary collaboration and transparency.

MIRA is helping create a future where people live longer, healthier lives.



Message from the Scientific Director

Resilience, resourcefulness and perspective: older adults have a lot to offer about what can make for a happy, healthy life at all ages. But we all face new barriers as we age. Many older adults experience social isolation, poor health outcomes, limitations on mobility or unaddressed frailty — all issues we have seen amplified by the pandemic. MIRA researchers are working with older adults to draw on their deep well of understanding, across all areas of living a good life, while working toward solutions for the barriers older adults face.

This past year, MIRA has continued to support these relationships, between researchers and the community as well as between the needs of older adults and skillful research. In this report, you will see how we are funding exciting new projects while supporting established programs of research to continue their growth with successively larger external grants. As mentors and teachers, our members are training the next generation of aging researchers right here at McMaster and, as the host institution for the 2021 CIHR Summer Program in Aging (SPA), we shared that leadership with a national cohort of trainees too. Along with our partners at Dixon Hall, a multi-service agency in downtown Toronto, we are growing the MIRA | Dixon Hall Centre as a model for weaving aging research into the work of organizations directly serving older adults.

We are greatly thankful to Suzanne Labarge and McMaster University for continuing to champion interdisciplinary research that supports people to age well.

Dr. Parminder Raina
Scientific Director of the Labarge Centre for Mobility in Aging and the McMaster Institute for Research on Aging



Message from the Chair of the International Scientific Advisory Committee (ISAC)

On behalf of MIRA's International Scientific Advisory Committee (ISAC), I am very pleased to report on MIRA's ongoing success in applying innovative approaches to advance interdisciplinary aging research and educational programs at McMaster University. MIRA has been able to support and expand its researcher and trainee network while developing novel research projects in aging during the second year of the COVID-19 pandemic.

MIRA is unique in how it supports and stimulates interdisciplinary collaborations, incorporating co-design approaches to aging research. This was clearly demonstrated in the first two major programs of research MIRA sponsored. Now in their second year, both have skillfully adapted their protocols to the COVID-19 challenge. MIRA is supporting the development of an additional program of research titled The Intergenerational and Life Course Cohort and Intervention Research Platform. In this, researchers will longitudinally track an intergenerational cohort in Hamilton. This will allow interdisciplinary teams to investigate interrelationships among the biological, physical, social, lifestyle and behavioural domains that influence health across the life course and between generations. MIRA is also working with an emerging interdisciplinary team to develop Complex Interventions for Frailty and Aging Well, a second novel proposed major research initiative.

The ISAC supports MIRA's leadership in their ambitious efforts to develop a citizen-based research infrastructure in Canada utilizing the VOICE digital platform through an international collaboration with Newcastle University and the National Innovation Centre for Ageing in the United Kingdom. It is anticipated that VOICE will empower the public in shaping health and social care research and driving innovation for an aging population, which aligns with MIRA's philosophy of engaging end users at all stages of research.

MIRA's approaches to aging research, which address a number of the most pressing aging-related questions facing older adults, their families and social networks, health professionals and policy makers have the ISAC's continued support. We enthusiastically look forward to our ongoing involvement with the leadership, faculty, trainees and staff of MIRA.

Dr. David B. Hogan
*Professor and Academic Lead, Brenda Strafford Centre on Aging, University of Calgary
Chair, International Scientific Advisory Committee (ISAC) of MIRA*

Governance overview

MIRA's governance and management structure ensures scientific excellence and has successfully supported the Institute over the last five years with management and oversight from both the Labarge Gift Board and the University's senior leadership. In 2021, MIRA underwent an external five-year review. On the recommendation of the external review board, MIRA started to refocus and redesign the composition of both the End User Stakeholder Committee and the Training and Capacity Working Group. Going forward, the End User Stakeholder Committee will be separated into a Stakeholder Committee and a Community Partner Network to ensure efficiency and an optimal consultation model.

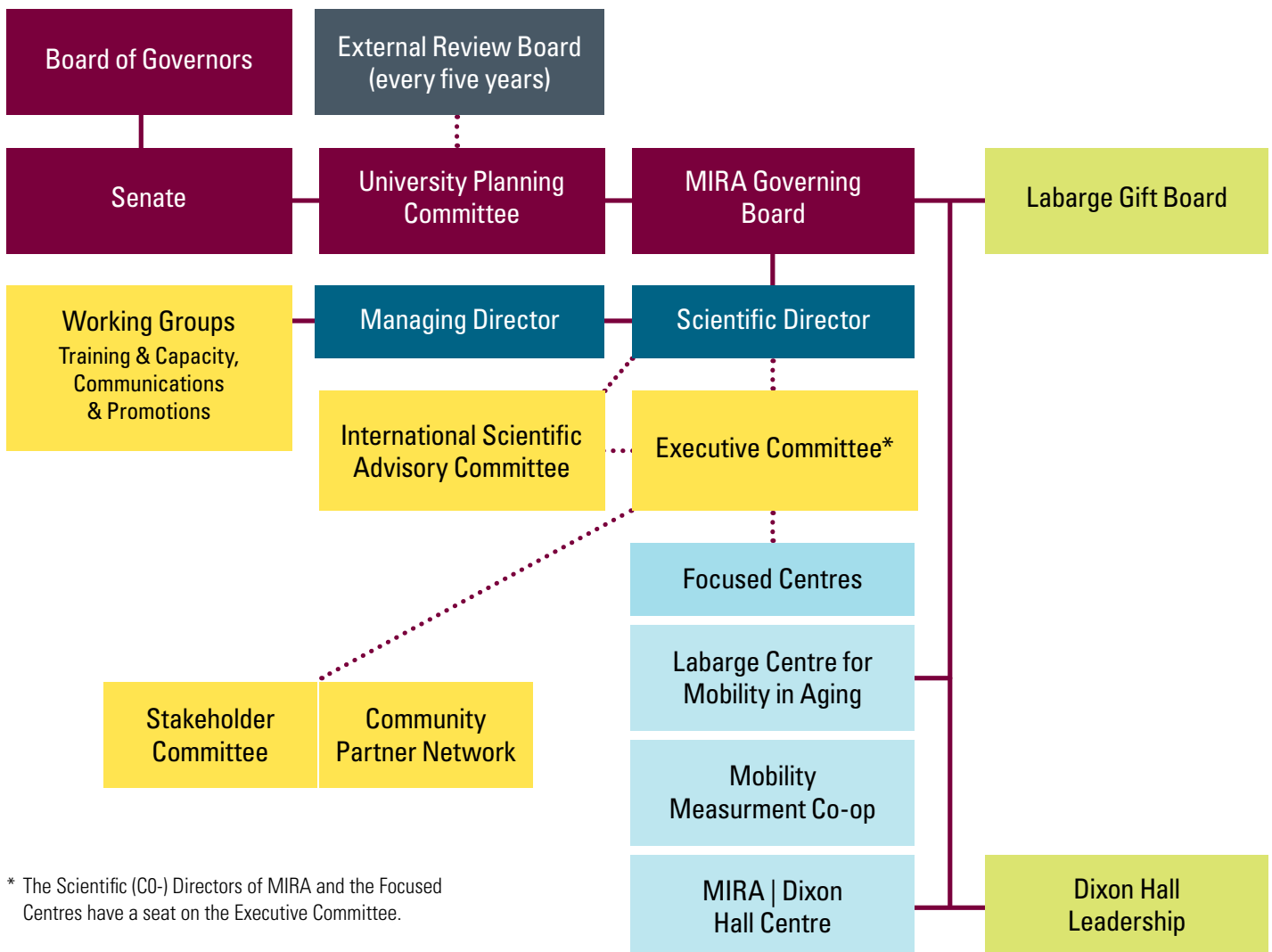
In 2022 MIRA will finalize recruitment of new members for its governance committees, providing time for a gradual transition to new members. Renewing the governance committees and working groups will ensure the Institute's work remains relevant and continues to reach communities that will most benefit from research that supports older adults to live longer, healthier lives.

As outlined in the governance structure, MIRA's Scientific Director reports to the MIRA Governing Board and the Labarge Gift Board. The Scientific Director is advised by the Executive Committee and the International Scientific Advisory Committee. The Scientific Director of each focused centre has a seat on the Executive Committee. Working groups, the Stakeholder Committee and the Community Partner Network provide a variety of perspectives to support MIRA's research initiatives and programs.

"Since first forming, MIRA has benefitted from the critical insight and guidance of a dedicated group of researchers holding key roles in our governance structure. I am excited to see how MIRA continues to evolve as our committees and groups bring in new members."

Ine Wauben

Managing Director, McMaster Institute for Research on Aging



* The Scientific (CO-) Directors of MIRA and the Focused Centres have a seat on the Executive Committee.

Research approach

Design thinking

MIRA encourages the use of design thinking to apply iterative approaches to research. MIRA researchers connect with stakeholders and end users and use those interactions to develop and refine their research questions and approach. Ultimately, MIRA research aspires to inspire solutions at the intersection of need, possibility and opportunity.

While top-down facilitation of design thinking has been effective in fostering design-centred research initiatives, such as the Major Programs of Research, the design thinking philosophy is permeating MIRA- and Labarge-funded research at the ground level, as applicants increasingly place design thinking at the forefront of their research proposals. For example:

MIRA's reputation for applying design thinking to research challenges has also spurred collaborations outside of the University. The **United Way of Hamilton Halton (UWHH)** sought MIRA's partnership in 2020 as they looked to develop and evaluate design thinking informed programming on **Social Enterprise** and **Social Prescribing**. UWHH partnered with MIRA to apply for a Seed Grant from the Ontario Trillium Foundation, receiving \$75,000 to convene a roundtable to assess the need, acceptability and capacity for a social prescribing initiative in Hamilton and Halton. This grant allowed UWHH staff to consult with over 60 stakeholders, including MIRA researchers; health-care workers and administrators; social service providers; and end users. In addition, UWHH worked with McMaster researcher Gillian Mulvale (DeGroote School of Business) to leverage Ontario Trillium Foundation funds with Mitacs Accelerate funding to support a MIRA Trainee, Le Tien Duong, in an internship which served to bring evidence-based perspectives to the roundtable. This year-long exercise will culminate in a knowledge translation event and ongoing engagement with the stakeholder roundtable as UWHH looks to move from consultation to action and evaluation.

MIRA is not alone in its embrace of design in research; in 2019, the McMaster Strategic Alignment Fund established the **McMaster Co-Design VP Hub** for vulnerable populations, with a goal of bringing together interdisciplinary researchers, students, service providers and service users to ultimately support innovative research. MIRA and the Co-Design Hub have worked together to share resources and support activities, recognizing shared goals and values.

Combined, these approaches and activities position MIRA as a leader in the application of design thinking in research. MIRA continues to be active in contributing to the academic discourse on design in research. In July 2021, MIRA Research Manager Audrey Patocs co-presented **Interdisciplinary Gerontological Research by Design** with long-time MIRA collaborator Dr. P.J. White (IT Carlow) at the British Society of Gerontology's 50th annual conference. The presentation described how design methods were used to grow an interdisciplinary aging research culture at McMaster and how barriers to interdisciplinary research and impactful research can be overcome using design.

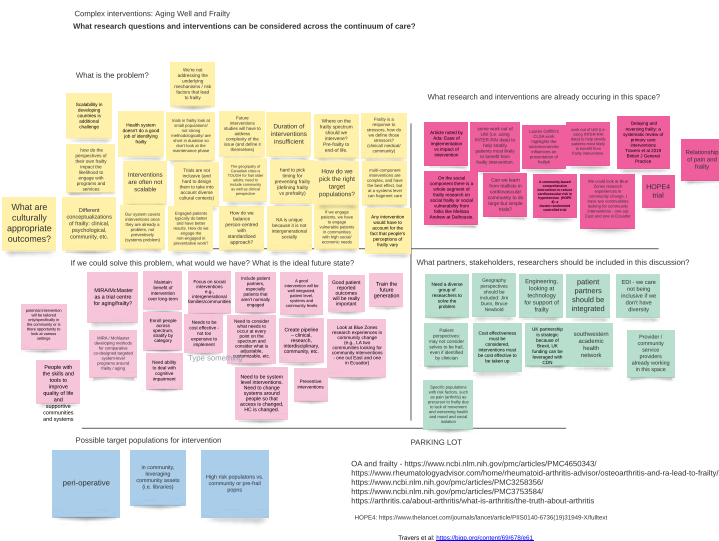


FIGURE: Facilitating design thinking in a virtual environment: Post-it board from session to develop major program of research in frailty.

Implementing design thinking in MIRA research programs has been challenged by the pandemic, as many mechanisms for facilitating were designed to be used in-person. MIRA has found virtual approaches to facilitating design thinking, including the **idea exchange** webinar series and launching new, interdisciplinary **Major Programs of Research**. Further, design thinking capacity has increased with the recruitment and engagement of members (e.g., Michelle Wyndham-West, Paula Gardner), colleagues (e.g., Michelle Phoenix, Sandra Moll) and trainees (e.g., Stephen Surlin, Isabel Rodrigues) whose leadership in design thinking contributes to a collective expertise.



“The integration of researchers from Software Engineering and Health Policy and Management will be integral to the proposed program of research using a design thinking approach to create innovative solutions on how to best implement fall and fracture prevention resources in long-term care. This diverse group will ensure knowledge in action and future sustainability of tools and resources to potentially improve management of falls and fractures in long-term care”

Isabel Rodrigues

Health Sciences, 2021 Postdoctoral Fellow



“Co-design allows us to consider the needs of older adults as articulated by older adults and puts their requirements and aspirations for healthy aging in community at the centre of the research and design process, thereby increasing the likelihood of the uptake of proposed housing and supports mobility pathways”

Michelle Wyndham-West & Jim Dunn

2021 Catalyst Grant co-PIs

Interdisciplinary connections

MIRA works to highlight the possibilities, mechanisms and impact of interdisciplinary research in aging, presenting success stories and research challenges to the McMaster community and beyond. MIRA has had success in this approach through social media and original news items and has launched a seminar series, entitled One Topic, Two Disciplines to further amplify interdisciplinary research stories. This series features two McMaster researchers from different disciplines, whose complementary expertise focus on an important topic in aging.

In 2021, MIRA hosted four One Topic, Two Disciplines seminars:

- **Intergenerational Trauma and Life Course** | Amy Montour (Family Medicine) & Andrea Gonzalez (Psychiatry and Behavioural Neurosciences)
- **Dementia & Driving** | Brenda Vrkljan (Rehabilitation Science) & Richard Sztramko (Medicine)
- **Aging in the Right Place** | Jim Dunn (Health, Aging & Society) & Gina Agarwal (Family Medicine)
- **Aging, Health Equity, & the Digital Divide** | Milena Head (Information Systems) & Jeremy Petch (Medicine)

Developing major programs of research

In 2021, MIRA began the process of launching the second cohort of its Labarge Major Programs of Research, which use design thinking methods to develop interdisciplinary teams who will investigate complex challenges related to mobility in aging. MIRA is supporting the development of the following themes:

- **Intergenerational approaches to aging and mobility:** How should we study the impact of aging across the lifespan and across generations?
- **Complex interventions for frailty:** How can we detect frailty and intervene, at the individual or community level, to improve mobility outcomes for older adults?
- **Aging, technology and digital equity:** How can we ensure that advances in health technologies, communication platforms and other digital tools serve our most vulnerable older adults?

Throughout 2021, MIRA has worked to invite researchers and partners to discussions and workshops developing each of these themes. MIRA will invite teams to submit proposals in late 2021 and early 2022 for review and feedback from MIRA's International Scientific Advisory Committee. MIRA aims to approve projects for funding by mid 2022.

Equity, Diversity and Inclusion (EDI)

MIRA is committed to embracing McMaster's equity, diversity and inclusion framework, through leadership, capacity development opportunities and integrating principles of EDI into research and funding practices. While MIRA appreciates the process for reaching inclusivity is ongoing, the team has worked toward this goal in the following ways:

- Supporting staff to participate in and share learning from EDI-related training, including the workshops presented by the McMaster University Equity and Inclusion Office: Accessibility 101; Digital Accessibility 101; What's in a Word: Insult or Inclusion?; Accessibility in Online Teaching and Learning.
- MIRA is working with McMaster researchers and collaborators in industry, non-profit and other institutions to develop a training program in EDI-centred research practices. This program will focus on technology, digital equity, aging and mobility. We have invited a team of researchers and research partners to submit a proposal to MIRA for funding.

Stakeholder and user engagement

Following guidance received during MIRA's five-year review and in light of significant changes to membership in 2020, MIRA's leadership is undertaking a redesign of its End User and Stakeholder Committee, restructuring the committee into two bodies: the MIRA Stakeholder Committee and the MIRA Community Partner Network.

The **MIRA Stakeholder Committee** will bring local, provincial and national perspectives to informing MIRA's research priorities and advancing and supporting projects. This committee will include representatives from government; industry; health and long-term care; and community and advocacy organizations. This body will provide MIRA researchers with an opportunity to share their work with external stakeholders and build relationships with committee members, while offering insights, connections and a variety of perspectives on the challenges, wants and needs of older adults.

The **MIRA Community Partner Network** will include local partners that work with older adults in the community. MIRA aims to develop a mutually beneficial relationship with these partners to support the mobilization and implementation of researcher's work in practical settings. This group will be in regular communication with MIRA and participate in annual community design thinking events to help think through challenging questions in aging from diverse perspectives. Through this committee, MIRA aims to cultivate community connections and allies who can support researchers and trainees in developing their research.



Training and Capacity Working Group

MIRA's Training and Capacity Working Group provides feedback to support the development of MIRA's educational and training initiatives. In the 2020 to 2021 academic year, teaching faculty at McMaster University faced unprecedented challenges and significant additions to their workload as they transitioned to online learning. With this added workload and its impact on the faculty members that serve on MIRA's Training and Capacity Working Group, this group was temporarily put on hold. MIRA leadership used this time to review its membership and structure and relaunched meetings of the group in Fall 2021. While this group was on hiatus, MIRA's project manager continued its work, including supporting a MIRA postdoctoral fellow, Shera Hosseini, in reviewing macPAGE, an online platform created to stimulate and recognize student interests in geriatrics. Shera's review helped identify strategies to engage students, especially in the new online learning environment. This has included adding features to ease website navigation, developing new marketing materials and planning structured engagement opportunities to encourage participation in macPAGE during the 2022 academic year.

Communications and Promotions Working Group

MIRA meets regularly with communications representatives from other platforms in aging research at McMaster University to effectively collaborate and cross-promote where applicable. These include McMaster University's Communications and Public affairs as well as members of the Communications and Promotions Working Group: GERAS Centre for Aging Research; Gilbrea Centre for Studies in Aging; the McMaster Optimal Aging Portal; the McMaster Health Forum; the Aging, Community and Health Research Unit (ACHRU); and the Canadian Longitudinal Study on Aging (CLSA) and allies who can support researchers and trainees in developing their research.



MIRA | Collaborative for Health and Aging

The McMaster Institute for Research on Aging | Collaborative for Health and Aging was established in 2019 by Parminder Raina (MIRA) and Maureen Markle-Reid (ACHRU) to build capacity in patient-oriented research on aging. The Collaborative provides consultation and support to researchers and knowledge users and facilitates important and meaningful connections between diverse stakeholders to enhance research and improve the health and well-being of older adults. Its focus areas support Canada's Strategy for Patient-Oriented Research (SPOR) core functions (e.g., data platforms, methods, knowledge translation).

Since its inception, the Collaborative has successfully built capacity in research on aging and patient-oriented research on aging by:

1. developing and disseminating resources,
2. invited presentations at conferences/symposia and offering webinars and
3. hosting its second Annual Knowledge Transfer and Exchange Meeting.

When initially funded (2019-to 2021), the Collaborative was situated within the McMaster Institute for Research on Aging (MIRA), as a partnership with the Aging, Community and Health Research Unit (ACHRU). Thanks to the leadership of both Drs. Raina and Markle-Reid as co-leads, and with the support of the MIRA and ACHRU teams, the Collaborative has been established as part of the OSSU network of health research centres across the province that provide scientific knowledge and support high quality patient-partnered research with the goal of improving health and the health system.

Funding was received for the next five years (2021-2026) and the Collaborative will be focussed on providing consultations and access to resources, demonstration projects, development and dissemination of resources and tools to build Ontario's patient-oriented research capacity and capacity of stakeholder and bring new patient-oriented research discoveries and interventions to the health-care system to improve health outcomes, experiences, health policies and health-care delivery. Now that The Collaborative has been established, Maureen Markle-Reid will assume the role of Principal Investigator for the Collaborative for Health & Aging at McMaster for the next five years. The Collaborative will now be known as the McMaster Collaborative for Health & Aging and will be solely housed in the Aging, Community and Health Research Unit.



Institute for
Research on Aging

COLLABORATIVE FOR HEALTH & AGING

Research support

MIRA funded research and trainee support

MIRA funds strategic research and training initiatives that support high-quality aging research. These supports include funding for graduate student and postdoctoral fellowships, and in 2021, two exciting new grants. The Interdisciplinary Fellowship Grant allows interdisciplinary teams of McMaster researchers to propose a project that will be advanced by the recruitment of an excellent postdoctoral fellow. The Biology of Aging Catalyst Grant supports interdisciplinary approaches to studying the basic biological processes associated with aging.



Biology of Aging Catalyst Grant

In 2021, MIRA issued its first call for proposals for a Catalyst Grant in the Biology of Aging to stimulate collaborative and interdisciplinary research in the topic and allow researchers to collect preliminary data to support future proposals for full-scale studies.

This grant seeks to support investigation of the aging-related molecular and cellular mechanisms that are candidate risk factors and drivers of common chronic conditions and diseases associated with age, including neurodegenerative diseases, diabetes, many cancers, cardiovascular disease, arthritis, reproductive aging and frailty, among others. This year, MIRA awarded \$40,000 to one interdisciplinary team representing three McMaster Faculties.



Gianni Parise

Lifelike 3D cell culture constructs to investigate the role of branched-chain amino acids in type 2 diabetes in aging

As we age, our muscles get weaker, we accumulate body fat and we become less resilient to periods of inactivity. Age, poor diet and inactivity are the biggest risk factors for developing type 2 diabetes mellitus (T2DM). T2DM is a condition characterized by reduced blood sugar uptake by tissues, such as skeletal muscle, which become less responsive to insulin (insulin resistance). The result is prolonged elevations in blood sugar, which leads to many secondary complications of T2DM (blindness, amputation and renal failure). Lifestyle interventions are the most effective drug-free strategies mitigating risk of T2DM. Exercise training and protein ingestion work together to change body composition – increased muscle mass and reduced body fat. However, recent evidence suggests that long-term exposure to branched-chain amino acids (BCAA), a component of normal dietary protein, which are an anabolic stimulus to maintain muscle, may contribute to reduced insulin sensitivity and increase the likelihood of developing T2DM. However, exploring this concept in aging adults presents a challenge. How do we study something that is ostensibly good for the muscle of older adults, but that may reduce insulin sensitivity, exposing older adults to a risk of T2DM? We propose that ‘cell culture’ experiments can be useful to study the mechanisms that cause disease in a consistent, reproducible and adaptable manner. The cell culture model that will be examined uses tissue taken from a human (muscle) in the form of a small ‘biopsy’ - allowing experiments to be performed directly on living cells that would otherwise not be possible. We have developed a state-of-the-art, three-dimensional (3D) cell culture model that we can “exercise” and “feed,” recreating the complex cellular interactions seen in a normal human muscle. The utilization of this model will generate data that will provide a better understanding of the complex disease mechanisms that occur in an environment much more like normal human physiology.

INVESTIGATORS

Gianni Parise
Kinesiology

Mark Tarnopolsky
Pediatrics & Medicine

Ravi Selvaganapathy
Mechanical Engineering

James McKendry
Kinesiology

Josh Nederveen
Pediatrics

Changhyun Lim
Kinesiology

Co-funded and matched projects

To improve the positioning of McMaster’s researchers in external funding competitions, MIRA and the Labarge Centre for Mobility in Aging (LCMA) have allocated funding that may be used to match or leverage external funds. The following project is a standout example of how MIRA and LCMA funds can be leveraged.



Jennifer Ploeg



Allison Williams

PROJECT | ACHRU community partnership program for diabetes self-Management for older adults - Canada

PRIMARY FUND SOURCE	INVESTIGATORS
CIHR PIHCl, \$999,996	Jennifer Ploeg Maureen Markle-Reid Ruta Valaitis Diana Sherifali Janet Pritchard
MATCHED FUNDING	
\$25,000	

The support of MIRA funding was integral to the conduct of an administrative database study co-led by researchers and patient and public partners. This study utilized data from the Canadian Institute for Health Information (CIHI) Dynamic Cohort, linked to other administrative data sources in Ontario and Alberta, to identify the socio-demographic, health and health-care service use characteristics associated with high Emergency Department (ED) use in older adults with diabetes. These characteristics supported the eligibility criteria for the next phase of the research program—the randomized controlled trial. In consultation with MIRA member, Janet Pritchard, mobility measures were integrated as outcome measures in the clinical trial.

RESEARCH IMPACT: This research has yielded nine conference presentations, two knowledge translation activities, 26 new collaborators and leveraged \$504,173 in in-kind internal funding from McMaster University and affiliated institutes for this project as well as \$1,971,452 in external funding.

PROJECT | Mobilizing a caregiver-friendly workplace standard: A partnership approach, CIHR/SSHRC Healthy and Productive Work – Partnership Grant (PI)

PRIMARY FUND SOURCE	INVESTIGATOR
SSHRC/CIHR Partnership Grant	Allison Williams
MATCHED FUNDING	
\$22,000	

RESEARCH IMPACT: This matching contribution funded CLSA data access and helped to partly support one postdoctoral fellowship.

Interdisciplinary Fellowship Grants

In 2021 MIRA launched its Interdisciplinary Fellowship Grants, inviting teams of MIRA researchers to propose a project that will attract a highly qualified postdoctoral fellow to conduct collaborative and interdisciplinary research focused on aging. The interdisciplinary proposals are led by MIRA researchers and include at least two co-applicants from McMaster Faculties outside of the primary applicant's. The proposals can also include knowledge users or mentors from outside academia.

In 2021, three Interdisciplinary Fellowship Grants were awarded:



The digital empowerment of vulnerable senior living: A case study of digital literacy training at CityHousing Hamilton

This project explores digital literacy training solutions to address the tremendous gap in the digital empowerment of vulnerable seniors living in social housing projects, specifically at CityHousing Hamilton (CHH), with the help of digital literacy training resources available at Hamilton Public Library (HPL). These older adults experience poverty; generally lack the financial resources to obtain computer devices and access the internet; and often struggle to use information technology devices in their daily lives. Better access to digital literacy training is required for these older adults to succeed and thrive in daily life. This funding will allow a postdoctoral fellow to explore potential digital literacy training solutions for this community of seniors under the supervision of the academic research team (Detlor, La Rose, Laganse) and the general guidance of CHH (Silverthorne) and HPL (Weaver). Design thinking will inform the digital literacy training solutions to be explored. These will include design, testing and evaluation of over-the-phone training and the establishment of new digital literacy training solutions at HPL for the CHH community. The postdoctoral fellow will also help plan and develop a mobile/informal “pop-up” solution that can deliver flexible, sustainable digital literacy training to older vulnerable adults at a time and place that is convenient to them and when it is needed most. This research will yield theoretical contributions and practical recommendations. Importantly, this project will set a firm foundation for a SSHRC Partnership Grant application in the areas of digital literacy training assessments for older adults and mobile/informal “pop-up” trailer solutions that provide much needed “on-the-spot” digital literacy training for seniors.

RESEARCH TEAM

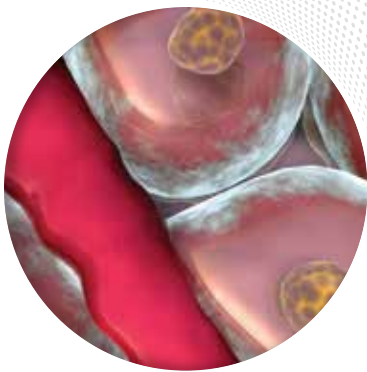
Brian Detlor
Information Systems

Tara La Rose
Social Work

Carmela Laganse
School of the Arts

Brenda Silverthorne
*Collaborator,
CityHousing Hamilton*

Lisa Weaver
*Collaborator,
Hamilton Public Library*



Unraveling the mechanisms contributing to the anti-aging effects of metformin

Aging is the leading risk factor for developing many deleterious chronic diseases, such as diabetes, heart disease, cancer and Alzheimer's disease. Over 60 per cent of those aged 65 and above have more than one chronic disease, which often leads to frailty and loss of independence. The type 2 diabetes medication metformin has been shown to delay the onset of many age-related diseases in mice and in cross-sectional studies in humans. However, how metformin exerts beneficial effects in so many tissues, despite acting primarily in the liver, is unknown. Our team discovered that metformin increases the production of certain hormones which are upregulated in the blood in aging in mice and humans, and are associated with reduced food intake, body mass and inflammation in animal models. In this project, a mouse model will be studied to better understand if and how these hormones may modulate the anti-aging effects of metformin.

RESEARCH TEAM

Gregory Steinberg
Medicine

Vladimir Ljubicic
Kinesiology

Stuart Phillips
Kinesiology

Saman Sadeghi
Chemistry and Chemical Biology

Michael Noseworthy
Electrical and Chemical Engineering

Guillaume Paré
Pathology and Molecular Medicine



Does exercise enhance synaptic plasticity in individuals with mild cognitive impairment and in aging?

Aerobic exercise appears to delay age-related decline in cognition and memory performance. The way in which exercise affects memory is not entirely clear, but there is no doubt that a molecule called brain-derived neurotrophic factor (BDNF) is involved. BDNF strengthens the connections between nerve cells in the brain, creating 'synaptic plasticity.' BDNF is reduced in Alzheimer's disease, mild cognitive impairment (MCI) and aging, and is increased by exercise. Our research asks whether exercise can increase synaptic plasticity in individuals living with MCI and in healthy aging. Using unique tools that involve noninvasive brain stimulation, six weeks of exercise training, measures of cognition and BDNF, this study will determine whether synaptic plasticity can be enhanced in MCI and aging and whether these changes relate to improvements in memory. Two groups of individuals diagnosed with MCI will be tested, one group will experience the exercise training and the other will not. A third group of age- and sex-matched cognitively healthy control participants will experience the exercise training. This research aims to improve cognition in MCI and the aging population and to understand the neural pathway by which improvements in cognition occur in response to exercise. This research will make significant advances in understanding how exercise improves cognition in aging.

RESEARCH TEAM

Aimee Nelson
Kinesiology

Margaret Fahnestock
Psychiatry and Behavioural Neurosciences

Ravi Selvaganapathy
Mechanical Engineering

Martin Gibala
Kinesiology

Christopher Patterson
Geriatric Medicine

Trainee funding

MIRA Scholarship in Aging Research

The MIRA Scholarship in Aging Research was launched in 2020 and seeks to promote the study of optimal aging in one or more of the following research areas:

- The impact of exercise on optimal aging
- The interrelationship between psychological function and social function
- Causes and consequences of multimorbidity, frailty and polypharmacy
- The role of caregiving, equity, economics and transportation in optimal aging
- The understanding of the biological mechanisms of diseases of aging
- Evaluating approaches to knowledge translation to improve optimal aging
- The use of technology to promote optimal aging and aging in place



2021 MIRA
Master's Scholarship
Mariia Khamina

PROJECT | Understanding how aging affects blood pressure through oxidative stress

Reactive oxygen species are the metabolic by-products that accumulate in cells throughout life and cause age-related pathologies. To develop drugs targeting these pathological changes, it is essential to study the effect of oxidative stress at the molecular level. This research will focus on a key regulator of blood pressure - cGMP-dependent protein kinase 1 α (PKG1 α) to determine how oxidation changes the structure and function of PKG1 α . Under oxidative stress, PKG1 α is continuously active, leading to hypotension and, ultimately, the degradation of vascular walls. This project will investigate the molecular mechanism behind PKG1 α damaging behaviour under aging-induced oxidative stress.

"This project will expand the current understanding of cGMP-dependent protein kinase 1 α (PKG1 α) structure and function. As a regulator of vasorelaxation, PKG1 α is a desirable drug target. This research will explore PKG1 α behavior under aging-induced oxidative stress. The gained knowledge can impact the development of a drug controlling blood pressure in older adults. Furthermore, this study will contribute to the fundamental understanding of aging, revealing the novel mechanisms, through which oxidative stress leads to cardiovascular disorders."

Mariia Khamina

SUPERVISOR

Giuseppe Melacini
Chemistry and Chemical Biology

MENTOR

Jonathan Schertzer
Biochemistry & Biomedical Sciences



2021 MIRA
PhD Scholarship
Rebecca Correia

SUPERVISOR

Andrew Costa
*Health Research Methods,
Evidence, and Impact*

MENTOR

Lennox Arthur Sweetnam
Economics

PROJECT | Promoting optimal aging through equitable access to “Care of the elderly” family physicians

Compared to other physician groups, family physicians deliver the highest volume of medical services to older adults. To increase family physicians’ knowledge and skills in caring for older adults, the regulatory College of Family Physicians of Canada offers a Certificate of Added Competence in ‘Care of the Elderly.’ Since 2015, more than 340 family physicians have earned this designation, but little is known about how these providers practice and their impacts within the health system. This research will examine how ‘Care of the Elderly’ family physicians influence patient- and population-level outcomes among older adults in Ontario. This work will establish a novel classification for these providers in population health databases, so that their practice patterns and the health services outcomes of their patients can be studied.

“Findings from this study may impact the post-graduate medical education of family physicians, the delivery of primary care services to older adults, and health human resources planning to ensure capacity within our health system to meet population-level demands in the care of older adults. We will disseminate our results to clinicians, medical school administrators, and policymakers in academic literature and at conference presentations to discuss the roles of ‘Care of the Elderly’ family physicians in promoting the optimal aging of older adults.”

Rebecca Correia



2020 MIRA
Master's Scholarship
Zaryan Masood

PROJECT | Tracking real-world changes in osteoarthritic gait patterns using wearable sensors

Gait analysis provides a non-invasive approach to study the mechanical environment of the lower limbs that can provide valuable information on the aetiology, progression and treatment of knee osteoarthritis (OA). Conventional gait analysis systems, involving motion capture cameras, are expensive and confined to laboratory settings limiting their accessibility and generalizability. The advent of wearable sensors has revolutionized gait analysis, making it more accessible and affordable, while providing the unique ability to collect data out-of-lab. Further, these wearable sensor-based gait analyses have the potential to support clinical decisions for common musculoskeletal disorders such as OA. Unfortunately, much of this work still involves highly controlled and short walking protocols that represent a single snapshot of gait and may not be indicative of the fluctuations occurring daily in more real-world gait patterns. Individuals with knee OA are commonly given intra-articular corticosteroid injections (ICI) to treat the affected joint and reduce pain. This pain reduction from ICI has been shown to provoke individual changes in gait patterns. Therefore, this project will use ICI as a model to assess the ability of wearable inertial sensors and machine learning algorithms to identify changes in gait, amidst the day-to-day fluctuations in out-of-lab gait patterns. This research will measure day-to-day fluctuations in the out-of-lab gait patterns of older adults with knee OA through a dual-task perturbation measured by wearable inertial sensors, which allow for assessments in real-world, out-of-lab environments and can help alert health-care providers to significant gait changes which may be related to OA treatment or progression.

RESEARCH IMPACT: This research has yielded one publication, two conference presentations, two knowledge translation pieces and four new collaborators.

"This study aims to understand the changes in gait patterns in older adults with knee osteoarthritis who are given knee injections. If clinicians can understand a patient's 'normal' gait pattern, they then have the ability to detect and monitor a meaningful change in gait. This meaningful change can be knee osteoarthritis improvement, or a response to an intervention or treatment. In understanding the changes from knee injections, clinicians can assess if a patient will be a suitable candidate for knee injections in the future. This positively impacts older adults as well as lessens the burden on the health-care system."

Zaryan Masood

SUPERVISOR

Dylan Kobsar
Kinesiology

MENTOR

Janie Wilson
Surgery



2020 MIRA
PhD Scholarship
Laura Garcia Diaz

SUPERVISOR

Lori Letts
Rehabilitation Science

MENTOR

Paula Gardner
*Communication Studies &
Multimedia*

PROJECT | Using technology-enabled community engagement strategies to identify community needs of people impacted by dementia

The Empowering Dementia Friendly Communities-Hamilton and Haldimand (EDFC-HH) project is a four-year community initiative funded by the Public Health Agency of Canada in which two dementia-friendly community plans will be developed and implemented in Hamilton and Haldimand. As a result of the COVID-19 pandemic, public consultations to learn about the community needs of people impacted by dementia were executed using remote communication technology (online survey, phone and video calls). To our knowledge, no other dementia-friendly community initiative has had to rely solely on remote communication technology for the community engagement process needed to develop their plan. This presents a unique opportunity to conduct an evaluation of the process used to conduct the public consultations for the EDFC-HH project. The process evaluation will seek to explore the implications of using communication technology to develop a dementia-friendly community plan, and the benefits and challenges of using communication technology to conduct public consultations about community needs with people impacted by dementia.

RESEARCH IMPACT: This research has yielded one conference presentation and engaged 13 stakeholders and end users.

"Findings from this study highlight the potential negative impact that the digital divide can have on participation in community life by people living with dementia and caregivers. The increasing reliance on online services to participate and access different aspects of community life (e.g., booking a medical appointment), could result in people with dementia that do not have access to the internet, or that may have difficulty using technology, to be excluded from important aspects of society or from advocating for their needs. If the aim of dementia-friendly community initiatives is to ensure that people with dementia are able to participate in activities that are meaningful to them, then working on diminishing the digital divide should be considered an important element of dementia-friendly community initiatives."

Laura Garcia Diaz

MIRA Postdoctoral Fellowships

The McMaster Institute of Research on Aging has now funded and awarded 16 postdoctoral fellowships to incoming trainees. Candidates have one primary supervisor and two mentors from other Faculties.



2021 MIRA
Postdoctoral
Fellow

Jessica Breznik
Medicine

Examining the role of frailty in SARS-CoV-2 infection and vaccine response in older adults

SUPERVISOR

Dawn Bowdish
Medicine

MENTORS

Arthur Sweetman, *Economics*;
Paul McNicholas, *Mathematics
and Statistics*

COVID-19 is having a devastating impact on older adults in long-term care in Canada. This research project is part of the largest study in Canada to examine immunity and vaccine efficacy in older adults in long-term care homes and retirement communities. This research will examine questions such as whether vaccination against COVID-19 is protective, if booster shots are needed to prolong protection and whether older adults, especially those with complex health conditions like frailty, require other measures to keep them safe. Protective measures of immunity (e.g., antibody levels and immune cell responses) over time after vaccination will be examined in addition to the effects of biological factors (i.e., sex, frailty, other health conditions, prior infections) on those measures of protective immunity. Data from this study will inform initiatives to empower individuals and their families to make decisions about their health, as well as contribute to policy reforms in long-term care.

"Data from this project contributed to the decision of the province of Ontario to provide third doses of COVID-19 vaccines to older adults. Our research will answer fundamental questions about the aging immune system and vaccine efficacy in older adults and will inform evidence-based reform of long-term care, to prevent future outbreaks of COVID-19 and other infectious diseases."

Jessica Breznik



2021 MIRA
Postdoctoral
Fellow
Stephanie Hatzifilalithis
*Health, Aging, and
Society*



2021 MIRA
Postdoctoral
Fellow
Mina Nouredanesh
Rehabilitation Science

Ageism in the time of technological innovation: Understanding older people's digital landscapes

SUPERVISOR

Nicole Dalmer, *Healthy, Aging & Society*

MENTORS

Milena Head, *Information Systems*; Paula Gardner, *Communication Studies and Multimedia*

Ageism continues to be the most invisible and persistent form of discrimination. Discriminative biases work in digital systems via different mechanisms. While there is some awareness of gender, racial and socioeconomic discrimination that are perpetuated and exacerbated via digital platforms, ageism has received less attention. COVID-19 has exacerbated and exposed these fault lines on several accounts; people who lack digital literacy or access have been less likely to use digital means to connect socially, use health related technologies, access government supports and more. This timely project will examine how ageism tends to be amplified in the scripts, codes and programming that power digital infrastructures. In this project, we will disentangle the types of ageist mechanisms that are common in the approaches, design and implementation systems of digital landscapes.

"This project will develop knowledge and provide inventory regarding how older people actually use and experience technologies in their everyday lives and elucidate a greater understanding of ageism and their digital landscapes. We will also identify enablers and barriers in the approaches to digital infrastructures that are often designed to prevent exclusion and promote inclusion in later life"

Stephanie Hatzifilalithis

Identification of older adults' mobility decline trajectories in longitudinal studies using machine learning approaches

SUPERVISOR

Marla Beauchamp, *Physical Medicine and Rehabilitation Sciences*

MENTORS

Parminder Raina, *Health Research Methods, Evidence, and Impact*; Manaf Zargoush, *Health Policy & Management*; Paul McNicholas, *Mathematics and Statistics*

Mobility limitation is a strong predictor of disability, hospitalization and death among older adults. To address new personalized rehabilitative interventions for improving late-life mobility, researchers' attention has increasingly focused on understanding trajectories of mobility decline, rather than merely studying the onset of limitations. However, identification of these trajectories is challenging, as there are complex interactions between different factors (e.g., biological, behavioral, environmental), at the individual level, which impact the trajectories. This study will work to develop machine learning models to identify mobility decline trajectories in large-scale longitudinal datasets. By investigating a comprehensive set of measures, the anticipated models will provide information on risk factors contributing to mobility decline trajectories. Therefore, early preventive interventions could be addressed to delay the presence of adverse mobility-related outcomes (e.g., falls).

"While there have been several studies investigating different factors contributing to mobility limitation in older adults, to date, no model has been developed to reliably address 'how' and 'why' mobility changes happen in different individuals. By incorporating comprehensive large-scale datasets measuring different aspects of mobility in a longitudinal manner, this postdoctoral research program aims to develop machine learning models to address the aforementioned research questions by identifying trajectories of mobility decline. The anticipated older adult-centred models will aim to promote aging in place by addressing early intervention programs."

Mina Nouredanesh



2021 MIRA
Postdoctoral
Fellow
Diego Roger Silva
Rehabilitation Science

Relationship between biomarkers and musculoskeletal pain and falls in older adults - A cross-sectional analysis of the Canadian Longitudinal Study on Aging data

SUPERVISOR

Luciana Macedo, *Rehabilitation Science*

MENTORS

Stuart Phillips, *Professor, Kinesiology, Faculty of Science*;
Manaf Zargoush, *DeGroote School of Business*

Musculoskeletal pain, risk for falls and the presence of inflammatory biomarkers in older adults have been identified as potential measures for functional decline, including frailty, quality of pain and severity of disability. There has been an increasing number of studies aiming to evaluate the relationship of biomarkers with both musculoskeletal pain and falls and the inter-relationship between the two. However, most studies have focused on smaller 'pieces of the puzzle' such as inflammatory biomarkers or measures of body composition alone. The proposed study will use the dataset of the Canadian Longitudinal Study on Aging (CLSA) to evaluate multiple biomarkers associated with musculoskeletal pain and falls, while controlling for known psychosocial factors (e.g., age, depression). The purpose of this study is to observe the associations and interrelationship between biomarkers with musculoskeletal pain and falls in older adults.

"The results of this study will elucidate the inter-relationship between important biomarkers such as inflammatory biomarkers and body composition with musculoskeletal pain and falls in Canadian older adults. This information will be crucial to highlight potential mediators for the development and maintenance of pain and potential biological changes that may lead to increased risk for falls. The results of this study will be published in international journals and may be used to inform the development of new prevention strategies and potentially reveal new factors that may be used to improve current fall risk assessments which have generally low accuracy."

Diego Roger Silva



2021 MIRA
Postdoctoral
Fellow
Chi-Ling Joanna Sinn
Health Research Methods, Evidence, and Impact

Developing a real-world framework for remote patient monitoring technologies that promote optimal aging

SUPERVISOR

Andrew Costa, *Health Research Methods, Evidence, and Impact*

MENTORS

Carolyn Gosse, *Vice President Integrated Care and President, St. Joseph's Home Care*; Jean-Éric Tarride, *Health Research Methods, Evidence, and Impact*; Nicole Wagner, *Information Systems*

Remote patient monitoring (RPM) is a virtual mode of health and social services delivery that organises care around the patient and family and makes care more accessible. Existing evidence suggests that RPM reduces hospitalisation, length of stay and mortality, particularly among older adults living with chronic disease. However, there is a lack of research focused on how RPM contributes to the overall goal of delivering integrated care, which has stalled the uptake of RPM into routine chronic disease management as well as for the broader population of older adults. To address the identified knowledge and practice gap, a research and community partnership will be created in an effort to understand RPM's contribution to achieving the Quadruple Aim, identify the components of successful RPM programs and expand the virtual component of St. Joseph's Health System's Integrated Comprehensive Care program for the care of older adults with congestive heart failure/chronic obstructive pulmonary disease in the community.

"This research is expected to generate relevant and timely evidence about the use of RPM for health status monitoring/management, comprehensive needs screening, collaborative care planning and community referrals. In particular, the partnership with St. Joseph's Health System will test the feasibility of applying a population health lens to stratify patients based on their level of need and align in-person and virtual resources according to patient preference and circumstances. This model is expected to increase access to appropriate care, improve patient outcomes and reduce overall system costs in the care of older adults with complex health and social needs."

Chi-Ling Joanna Sinn



2020 MIRA
Postdoctoral
Fellow
Fatemeh Jazinizadeh
Surgery

Enhancing the quality of life for older adults with end-stage knee osteoarthritis through patient phenotyping to tailor the clinical management

SUPERVISOR

Janie Wilson, *Surgery*

MENTORSS

Michael Noseworthy, *Electrical and Computer Engineering*; Dylan Kobsar, *Kinesiology*

Worldwide, knee osteoarthritis (KOA) is one of the largest contributors to disability in older adults. End-stage treatment for KOA is total knee arthroplasty surgery; however, up to 30 per cent of patients continue to have significant pain and disability after surgery. Patients presenting with end-stage KOA vary considerably in clinical and structural presentation. Despite this variability, clinical management and perioperative rehabilitation lack the consistency and evidence to incorporate patient-specific factors. During the wait time for the hip and knee joint replacement surgery, patients' pain, function, walking ability and quality of life could change and can often worsen. This might affect the outcome of the surgery. More studies are required to provide evidence on how these changes happen, which patients are more prone to these changes, and how they would influence the surgery outcome. This study will investigate how waiting for knee and hip joint replacement surgery affects osteoarthritis symptoms, walking ability and health conditions in patients (from the time of the decision for the surgery to immediately before surgery). This project aims to identify phenotypes of patients with end-stage KOA who would benefit from targeted management of rehabilitation, and clinical and surgical decision-making, to improve patient quality of life and reduce the societal and economic burden.

RESEARCH IMPACT: This research has yielded one presentation and eight new collaborators.

"This research will provide evidence for how different groups of people with severe osteoarthritis (OA) differ in how their disease, symptoms, and quality of life get worse while waiting for surgery, and how this affects them after surgery. Our comprehensive approach to understanding multifaceted disability in individuals with end-stage knee OA will provide novel insight into patient variability. The knowledge gained will i) provide critical evidence for changing clinical care pathways in a way that optimizes the process to the individual, ii) provide the opportunity to make informed decisions on timing, type of surgery and rehabilitation and self-management approaches to affect quality of life both while waiting for and after surgery, and iii) allow us to identify patient subgroups who may benefit for targeted treatments. Our goal is to directly translate these results into trials for evidence-based change in the clinical pre-operative management of this large group of older adults suffering from severe OA."

Fatemeh Jazinizadeh



2021 MIRA
Postdoctoral
Fellow

Xuecong Lu
Information Systems

Designing a real-time cybercrime alert system for older adults: neurophysiological solution during COVID-19

SUPERVISOR

Milena Head, *Information Systems*

MENTORS

Brenda Vrkljan, *Rehabilitation Science*; Ridha Khedri, *Computing and Software*

Older adults are increasingly vulnerable to cybercrime, losing up to \$36 billion in recent years in North America, with Google data revealing that phishing websites tripled from 149k to 522k from January to March in 2020. With an increasing number of older adults spending time online, combined with the sense of confinement and anxiety due to COVID-19 restrictions, cybercriminals have taken advantage of the situation. Therefore, it is imperative for governments and online service providers to address this issue of cybercrime targeting older adults. The overarching objective of this research program is to empower older adults through the design of a real-time cybercrime alert system with a neurophysiological solution during COVID-19. A real-time neurophysiological quantification of the characteristics specific to older adult victims of cybercrime has public policy implications and may assist in identifying persons at high risk of victimization. This can aid in directing interventions to these vulnerable older adults, ideally before they are targeted for cybercrimes. Data will be collected through the lab at McMaster Digital Transformation Research Centre (MDTRC) that is equipped with state-of-the-art research infrastructure to enable the collection of rich and diverse streams of neurophysiological and psychological data in addition to traditional behavioral data. This project engages cross-disciplinary perspectives from information systems, psychology and neuroscience to design a real-time cybercrime alert system for older adults with the objective to secure their online experience. The information systems perspective informs the system design theory on how to delineate the real-time cybercrime alert system. The psychology perspective sheds light on the theoretical

foundation of our research regarding emotional and cognitive factors that would impact older adults' susceptibility for cybercrime. The neuroscience perspective offers insights on the objective quantification of older adults' psychological states and cognitive abilities, which could further be linked to mouse cursor movement for the convenience of system design.

RESEARCH IMPACT: This work has yielded four presentations, one knowledge translation activity and five new collaborators.

"This project can have an immediate and positive impact on the lives of older adults, especially in the context of COVID-19. Firstly, older adults may experience a more personalized protection for cybercrime, with the real-time monitoring of emotion and cognition with our system. Secondly, older adults are exempted from the technical difficulties associated with installing and updating anti-virus software, as the proposed system will be implemented by the online service providers. Thirdly, in future, the data for emotion and cognition of older adults may be transmitted and stored in the health-care system for predicting older adult's well-being."

Xuecong Lu



2020 MIRA
Postdoctoral
Fellow

**Alireza
Shahin-Shamsabadi**
*Mechanical
Engineering*

An in vitro study on the effect of exercise on brain health in the elderly: Studying the crosstalk between the brain, skeletal muscle, and adipose tissues

SUPERVISOR

Ravi Selvaganapathy, *Mechanical Engineering*

MENTORS

Margaret Fahnestock, *Psychiatry & Behavioural Neurosciences*;
Aimee Nelson, *Kinesiology*

Exercised skeletal muscle cells are believed to affect brain health and prevent neurodegenerative diseases either directly or indirectly, but the molecular pathways and role of the tissues responsible for such effects are not well understood. Complex physiology of the human body makes it difficult, if not impossible, to understand the underlying mechanisms governing each tissue and the cross-talks between different tissues. More reductionist but physiologically relevant in vitro models that allow each tissue to be studied in isolation as well as in coculture with others are lacking. In the current project, a previously developed platform for creating three dimensional and dynamic models of tissues was adapted. In the first step, proper models were developed for each of the target tissues, skeletal muscle, bone, adipose and neuronal tissues. A comparison with other in vitro and in vivo studies confirmed the accuracy and in vivo relevance of the models. The next step was to model the effect of exercise on bone and muscle constructs. Electrical stimulation was used and proper parameters including, voltage, frequency and signal type were optimized not only to create exercise-like effects on each tissue, but also to model different types of exercise. The last step was to study how rested and exercised muscle and bone tissues affected adipose and neuronal tissues. It was found that bone and muscle tissue, independent of exercise, couldn't affect mature adipose cells but they could support pre-adipocytes, progenitors of adipose cells, while they were differentiating and maturing. Similarly, none of the bone, muscle and adipose tissues were able to

improve neuronal cell behavior in stationary conditions but when the neuronal cells were polarized, similar to when they are active in the human body, they could be positively affected by the other tissues. Future steps include further improving the models to reach the required complexity and accuracy so that the results can be directly compared with in vivo conditions.

RESEARCH IMPACT: This research has yielded one presentation and two new collaborators.

"Our limited understanding of physiology of the brain has resulted in ineffective treatments for its diseases including neurodegenerative ones. The current study allows us to gain a deeper knowledge on neuroregenerative processes, how to induce them and how to slow down neurodegenerative ones by proper type and amount of exercise. The models can also be used to gain a deeper understanding of different processes for each of the tissues that have been studied to understand and seek treatment for other diseases involving them. This could help improve quality of life in the elderly and the general population and lower health-care costs."

Alireza Shahin-Shamsabadi



2019 MIRA
Postdoctoral
Fellow

Léa Ravensbergen
*Earth, Environment
& Society*

Understanding older adults' public transit use

SUPERVISOR

Bruce Newbold, *Earth,
Environment & Society*

MENTORS

Rebecca Ganann, *Nursing*;
Christina Sinding, *Health, Aging
& Society*

A key factor relating to older adults' quality of life is their mobility, a basic human need associated with independence, health and well-being. While older adults rely primarily on the private automobile as their means of transportation, many must either reduce their driving or "give up the keys" when health problems arise. Little, however, is known about older adults' experiences using travel modes alternate to the private car. This project explored older adults' experiences using public transportation (HSR, DARTS or the taxi-script program) in Hamilton.

Older adults must do various kinds of 'mobility work' to access and use the HSR and DARTS because public transit is not designed for their needs. Examples of this work include avoiding falls on the way to the bus stop (especially in winter), lifting oneself, and sometimes one's walker, on and off the bus, the stigma of boarding the bus slowly, embarrassment asking for a seat and staying home when the weather is bad. Able-bodied passengers do not have to think about or do this work: it is an added burden imposed on those experiencing declining ability, in this case older adults, when accessing public transit. Taken together, results from this study contribute to our understandings of how older adults can maintain independent mobility as they age and transition from driver to non-driver.

RESEARCH IMPACT: This research has yielded one publication, two conference presentations, two knowledge translation activities, one media piece, six new collaborators and engaged 32 end users as participants and consultants.

"This project has informed transportation planners and researchers, as well as the HSR, the City of Hamilton, research participants and the Hamilton Council on Aging on how to foster age-friendly transportation systems and how to maintain older adults' independent mobility as they age and transition from driver to non-driver."

Léa Ravensbergen



2019 MIRA
Postdoctoral
Fellow

Tatiane Ribeiro
*Biochemistry &
Biomedical Sciences*

Accelerating the aging trajectory through prenatal adversity

SUPERVISORS

Deborah Sloboda, *Biochemistry
& Biomedical Sciences; Dawn
Bowdich, Pathology & Molecular
Medicine*

MENTORS

Jose Moran-Mirabal, *Associate
Professor, Chemistry & Chemical
Biology, Faculty of Science;*
James Dunn, *Professor, Health,
Aging & Society, Faculty of Social
Sciences*

The aging process is programmed early in life; the in utero environment is a major player in the development of chronic disease. Prenatal adversity (i.e., maternal obesity or stress) is a key predictor of age-related diseases, including metabolic disorders, cardiovascular diseases, cancer and dementia. The maternal disadvantage is associated with obesity and these factors predict higher fat mass in children and increase the risk of respiratory diseases. Chronic conditions also increase with advancing age, as does susceptibility to pneumonia. Pneumonia in mid- to late-life is associated with an increased risk of developing cardiovascular disease, metabolic disorders and dementia. More than 30 per cent of older adults who are hospitalized for pneumonia will develop dementia or become cognitively impaired earlier than expected. The most frequent cause of pneumonia in older adults is the bacteria *Streptococcus pneumoniae*, which also causes invasive pneumococcal disease when the bacteria spread to the blood or cerebrospinal fluid. Having pneumonia in mid-to-late-life is associated with an increased risk of developing cardiovascular disease, metabolic disorders and dementia. Over 80 per cent of patients die earlier than expected of diverse causes, even when pre-existing co-morbidities are accounted for. In mice, a high-fat diet during pregnancy impacts the health conditions of both the mother and offspring. Maternal obesity increased the susceptibility to lung infection in neonatal offspring. The offspring infected with *Streptococcus pneumoniae* showed increased bacterial colony-forming units in the lungs and spleen during the peak of pneumonia infection. 30 days after infection the early life adversity animals also showed increased intestinal permeability. Together these results suggest an increased susceptibility to infection.

RESEARCH IMPACT: Tatiane Ribeiro was awarded a Michael G. DeGroote Postdoctoral Fellowship and will be leveraging MIRA funds to extend her project over the course of two years.

*"The most frequent cause of pneumonia in older adults is the bacteria *Streptococcus pneumoniae*. Having pneumonia in mid-to-late-life is associated with an increased risk of developing chronic disease and dementia. Over 30% of older adults who are hospitalized for pneumonia will develop dementia or become cognitively impaired earlier than expected. Our research will help understand how early life adversity impacts the immunological mechanisms and increases vulnerability to infectious disease in older adults through elevated systemic inflammation. The MIRA funding will help to provide considerable insight to prevent post-pneumonia sequelae and to improve the health of older adults."*

Tatiane Ribeiro



2019 MIRA
Postdoctoral
Fellow

Sophie Hogeveen
*Health Research Methods,
Evidence, and Impact*

Promoting optimal aging through equitable access to specialized geriatric services in Ontario

SUPERVISOR

Andrew Costa, *Health Research Methods, Evidence, and Impact*

MENTORS

Jose Moran-Mirabal, *Chemistry & Chemical Biology*; James Dunn, *Health, Aging & Society*

Specialized geriatric services (SGS) play a vital role in caring for frail, older adults with multiple, complex needs. However, resources are limited and services are not equitably distributed geographically. Access to SGS is further limited by factors such as lack of caregiver support, difficulty moving around and availability of transportation. It is generally accepted that SGS should be targeted to the most vulnerable older adults but there is a lack of evidence for how to best allocate these limited resources. The aim of this research will be to explore factors associated with access to SGS; investigate future supply and demand for these services; develop a SGS tool to equitably allocate SGS resources to frail older adults who would most benefit; increase collaboration and integration between care providers; help policymakers at system-level to better allocate resources; and guide the growth and expansion of SGS services to meet the needs of an aging population. The findings from this study will help to improve access to specialized services for the most vulnerable older adults.

RESEARCH IMPACT: Sophie Hogeveen received a two-year CIHR Health Systems Fellowship and will leverage MIRA funding to extend this project over three years.

"SGS manage complex medical needs in a holistic, patient centred-manner, preventing avoidable emergency department visits, hospital admissions and long-term care placement. Use of the SGS tool may help allocate limited resources and increase collaboration and integration between care providers. The findings of this project will also help policymakers at a system-level better allocate resources and guide the growth and expansion of SGS services to meet the needs of an aging population."

Sophie Hogeveen



2018 MIRA
Postdoctoral
Fellow

Irene Mussio
Economics

Changes in higher order risk attitude during a pandemic: the impact of rapid increases in health background risk on financial decisions

SUPERVISOR

Jeremiah Hurley, *Economics*

MENTORS

Andrew Costa, *Health Research Methods, Evidence, and Impacts*; Jean-Éric Tarride, *Health Research Methods, Evidence, and Impact*

Individuals make economic decisions while being exposed to a multitude of risks that they cannot completely control. The current COVID-19 pandemic as well as quarantine measures have prompted changes in behaviour such as impulse purchasing, hoarding non-perishable goods or defying government rules to social distance or self-isolate. This study proposes to understand changes in behavior involving financial decisions determined by the exogenous introduction of COVID-19 in people's lives. This economic experiment will study the behavior of different age cohorts following the beginning of the COVID-19 pandemic, with economic behaviour data collected prior to the start of the pandemic, and aims to determine the differential effect of increased background risk (through COVID-19) and if this effect changes across age groups.

RESEARCH IMPACT: This research has resulted in three conference presentations.

"This project is intended to inform policy makers in the determination of policies that have a risk component to them. For example, vaccinations, financial help and job stability programs. This also includes older adults who want to keep active and want to take measures to keep and improve their health, as our conclusions in terms of risky behaviors reach all ages."

Irene Mussio

Co-funded Postdoctoral Fellowship

Completed fellowships

Tara Kajaks, *Rehabilitation Science*, the challenges of caregiving using a 'cooccupation' perspective to examine aging and mobility in the community.

Ya-Tang Chuang, *Health Policy and Management*, improving mobility of alternate level of care seniors in the Canadian health-care system.

Wael Brahim, *Walter G. Booth School of Engineering Practice and Technology*, remote monitoring of breathing patterns and mobility patterns in older adults.

Caitlin McArthur, *Medicine*, portable technology to support exercise in the homes of frail older adults.

Research impact of completed postdoctoral fellowships: These studies resulted in seven publications, nine presentations, three media pieces, 29 new collaborators and leveraged \$125,000 in external funding.



2020 MERIT
Postdoctoral Fellow
Shera Hosseini
Family Medicine

Evaluating the macPAGE Geriatric Education Program: Quality improvement step to enhance design

Implementing voluntary geriatric-focused educational curricula is challenging due to the negative stereotype associated with this field among medical and health profession students. This study investigated how to co-design and adapt the macPAGE online geriatric-focused educational program during the COVID-19 pandemic to enhance interest and traction from the perspectives of university students in health-related fields. Between January and March of 2021, the research team conducted a series of semi-structured one-on-one online interviews of students pursuing health-related academic fields at a Canadian university. Students reviewed the pilot program platform and were asked about their perceptions of the program and its relevance to their degrees and academic goals to obtain their perspectives of the current platform and co-create one that would enhance students' interests in geriatric education. The students' perspectives were qualitatively assessed to identify areas for program improvement. Three main themes related to factors associated with program quality improvement emerged: website set-up and usability, building interest through promoting relevancy and boosting awareness through topical channels of advertising. Academic institutions need to pay particular attention to properly identifying and addressing the challenges of developing influential online didactic programs. Successful facilitation of online education programs would require paying particular attention in making online platforms appealing and user friendly, underscoring their relevancy among the potential audience group(s) and using topical advertising strategies. Future work is needed to determine whether incorporating these elements would enhance program traction and interest among the students.

RESEARCH IMPACT: This research has yielded one presentation and four new collaborators.

FUNDING COLLABORATORS

This postdoctoral fellowship is funded by MIRA and the McMaster Education Research, Innovation & Theory (MERIT) Program

SUPERVISORS

Michelle Howard, Family Medicine; Jonathan Sherbino, Medicine

Continued response to COVID-19

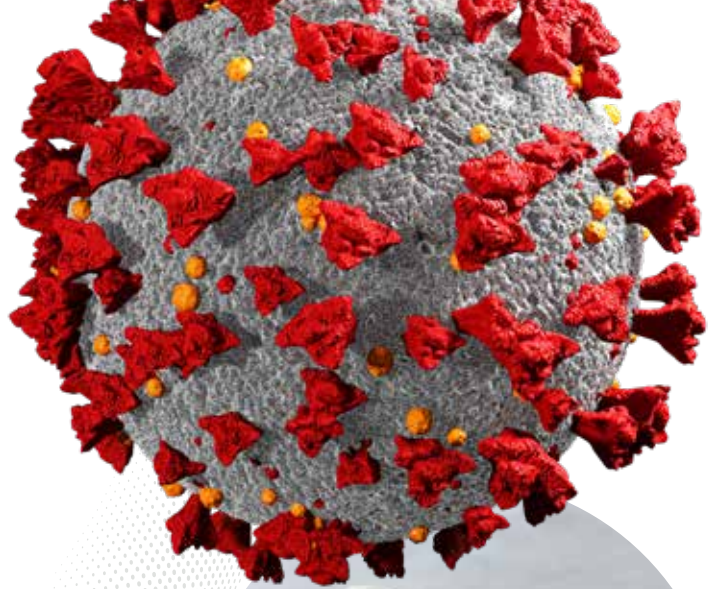
Many of the programs and adaptations implemented in 2020 continued in 2021. Putting the safety of the public, staff and faculty members first, McMaster University's COVID-19 research directives remained in-place. Physical distancing and contact-limiting protections continued to impact the ability of researchers to meet with participants, conduct physical assessments and follow many of the research protocols developed in advance of COVID.

MIRA supported its researchers at the start of the pandemic through a series of Idea Exchanges that were held virtually with Dr. P.J. White from IT Carlow. Together with Dr. White, MIRA wrote an article on conducting interdisciplinary research on aging during the COVID-19 pandemic entitled: "What are the needs of Interdisciplinary Researchers on Aging in the COVID-19 era?" The article has been accepted for publication in *Tuning Journal for Higher Education* and will be available in 2022.

The MIRA Idea Exchange continued with a virtual, open-ended discussion regarding aging research in a post-pandemic setting on April 12, 2021, and the creation of a MIRA Idea Exchange Forum on Microsoft Teams, with channels covering aging research and COVID-19; calls for papers; communication and knowledge translation resources; current affairs; design thinking resources; research resources; and remote data collection resources.

This year, MIRA staff continued to work from home. As McMaster began lifting restrictions on in-office work, some staff have returned to the office part-time. Seminar sessions continued online as did meetings of the MIRA Trainee Network.

The Labarge Catalyst Grants in Mobility in Aging funding program resumed in 2021, with new projects designed to be prepared for the continuance of COVID-19 restrictions.



PART 4

MIRA | Dixon Hall Centre

The MIRA | Dixon Hall Centre was created in April 2021 as a collaboration between McMaster Institute for Research on Aging (MIRA) and Dixon Hall – a multi-service agency situated in downtown Toronto that focuses on poverty, social injustices and isolation, across the lifespan. Dixon Hall is well established and celebrated for its commitment to comprehensive client care to support Toronto’s most vulnerable, including low-income, homeless and precariously housed older adults. The MIRA | Dixon Hall Centre is nested within MIRA to extend and expand on MIRA’s reach, while targeting populations of citizens for whom mobility work can have positive outcomes. This collaboration will assist to improve quality of life and enable older adults to live with dignity through purposeful initiatives planned over the short- and long-term. The MIRA | Dixon Hall Centre’s work is enabled by a generous donation by Suzanne Labarge.

Since April, the MIRA and Dixon Hall teams have increased their resource capacity by hiring staff and have worked together to introduce the organizations and their members to one another. The Centre is establishing processes for collaborative work, including considerations of client confidentiality; equity, diversity and inclusion; communication strategies; and standard operating procedures. The governance structure has been established and MIRA has started the search for a Scientific Director to lead the institute alongside Parminder Raina.

During the pandemic in 2020 and into this year, MIRA and Dixon Hall have actively engaged in a short-term project through a collaboration with the Intergenerational and Life Course Program of Research (InHamilton; Dr. Andrea Gonzalez; 2018 Catalyst Grant). In response to COVID-19, the InHamilton program pivoted to collect measures examining the impact of COVID-19 on the physical and mental health of individuals. Part of the data for this study was collected through the MIRA | Dixon Hall Centre and includes Dixon Hall clients. Findings are currently being analyzed and will be published in 2022.

In the past year, the Centre has started working on longer-term directed research projects. The MacM3 and EMBOLDEN teams, who lead MIRA's first two major programs of research have started discussions with the Dixon Hall team and are planning to enroll participants from the communities Dixon Hall serves to amplify the scope of these major programs of research and expand the findings to a wider range of diverse communities. The implementation of these directed projects will be tailored to the Dixon Hall communities using a co-design approach. The Centre is now also expanding its collaboration with Dr. Andrea Gonzalez in a larger examination of intergenerational research (MIRA iGEN) across communities in Hamilton and in communities in Toronto served by Dixon Hall.

Dixon Hall is conducting a needs assessment to identify projects that will inform the development of evidence-based information to support their priority programs and services. These will become new MIRA | Dixon Hall Centre research initiatives that will start rolling out in 2022. The Dixon Hall team has also embarked on an evaluation of the Optimal Aging Portal as the vision is that Dixon Hall will become ambassadors for the Portal and will assist in developing additional content that is relevant to the Dixon Hall community. The longer-term vision is that this new technological library for seniors, also enabled by Suzanne Labarge, will be available to support Dixon Hall's client base.

The integration of these directed and new projects within the mandate and operations of Dixon Hall has started the development of a local research milieu that will attract research and policy experts willing to engage in the future of this work and shared discoveries and participate in the body of research developments cultivated by the MIRA | Dixon Hall Centre.



"The goal is to improve quality of life through purposeful initiatives planned over both the short- and long-term. It is exciting to think about the voices and experiences of our clients being captured as part of this work. So often they go unheard."

Christine Chow

Director of Seniors Services, Dixon Hall



"We are immensely grateful for Suzanne Labarge's continued commitment to and keen interest in our researchers' world-class research into aging. With her leadership and generosity, McMaster has grown to be a powerhouse in understanding and improving health and well-being throughout the aging process. This new partnership with Dixon Hall is another example of the way in which collaboration and expertise can make a remarkable impact."

David Farrar

President, McMaster University



"The everyday realities of vulnerable seniors are exacerbated by imposed COVID-19 restrictions. Social isolation is more pronounced and social mobility is stymied. There is an urgency to consider the pandemic-specific issues facing older adults in the larger area Dixon Hall represents, since the exploration of these challenges will inform future areas of inquiry and decisions on program design for these populations."

Parminder Raina

Scientific Director, MIRA



PART 5

Capacity building

CIHR Institute of Aging Summer Program in Aging (SPA)

The Summer Program in Aging (SPA) is held every year by the Canadian Institutes of Health Research (CIHR) Institute of Aging (IA). SPA is the IA's flagship training program. It aims to provide graduate students and postdoctoral fellows involved in aging research with advanced training in methodologies, knowledge translation, grant writing and research communication. It also provides trainees with the opportunity to further develop their networks.

In partnership with the Canadian Longitudinal Study on Aging (CLSA), MIRA was named as the host for SPA 2020. While planning initially began for an in-person event in May 2020, the event was first postponed and later moved to a virtual setting, to be hosted in May 2021. MIRA staff, supported by CLSA staff, a planning committee and a curriculum development committee, hosted 56 trainees for a unique and innovative eight-day online learning experience that allowed them to interact with each other and 29 guest speakers to build their skills in using longitudinal study data to answer aging research questions. Trainees were supported by 13 McMaster, national and international experts in longitudinal studies on aging, with varied specializations. Trainees worked in teams with their mentors to shape a CLSA Catalyst Grant application and present their ideas to all attendees.

While offering learning and networking opportunities online is new territory, MIRA's SPA offering was well-received by all participants, speakers and mentors. Online programming offered improved accessibility and flexibility for trainees and speakers, which attracted trainees who may otherwise not have been able to join in-person programming and allowed MIRA to offer high-quality programming with international experts who may otherwise have been unable to participate in a full week of programming. MIRA staff supplemented structured talks with networking opportunities, community engagement sessions and social programming to trainees. A Discord server ensured conversation could keep flowing outside of program sessions. MIRA mailed backpacks to participants which brought the SPA experience home and generated excitement for the virtual program. CLSA Data Access fee waivers were offered to the four teams that received top marks from judges of the presentation sessions. All four teams have continued their research by submitting applications for data access. This uptake demonstrates that the virtual SPA was especially successful, since research projects developed at SPA are rarely continued after the program.



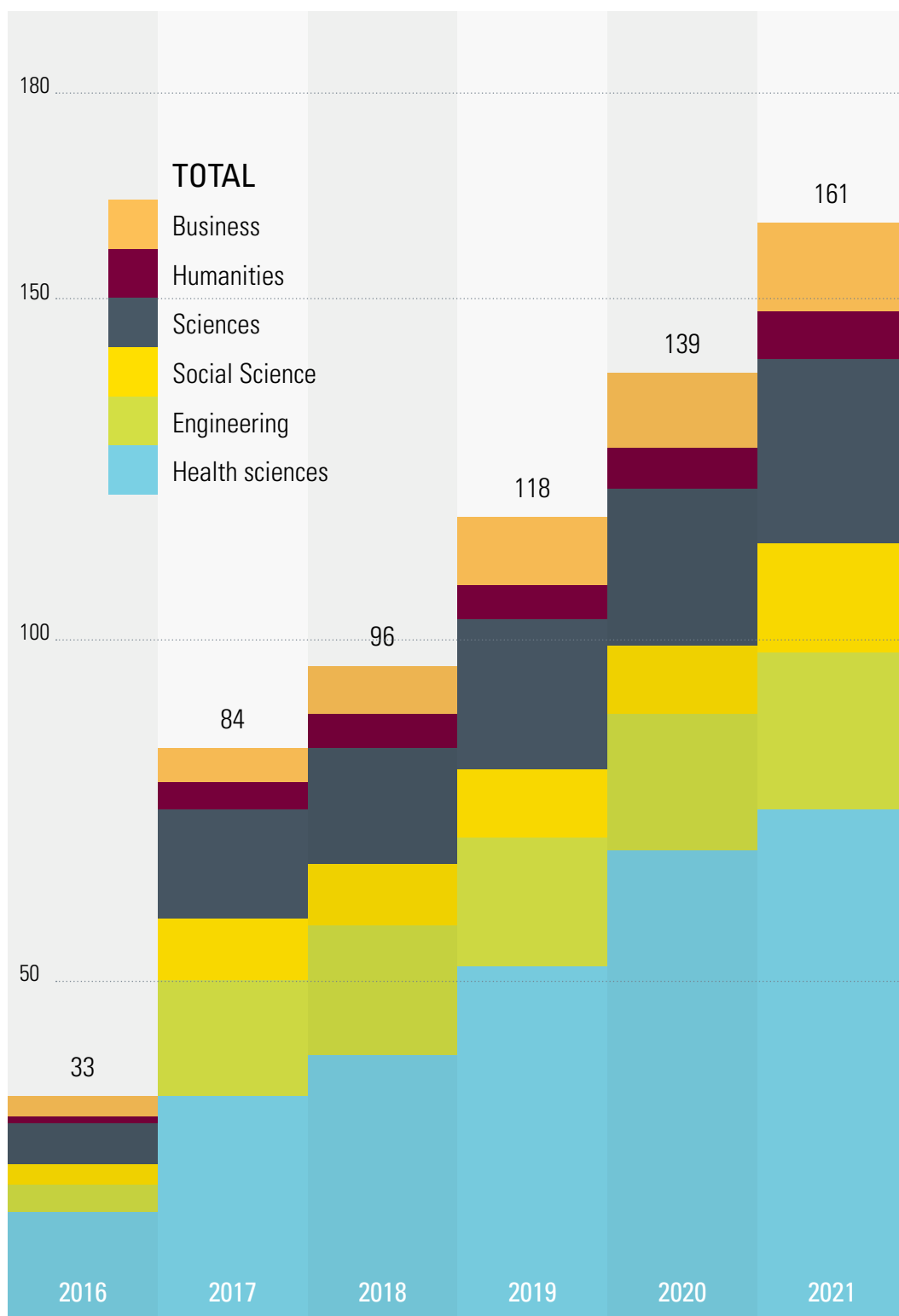
MIRA

Membership

The McMaster Institute for Research on Aging (MIRA) continues to attract new members across all Faculties at McMaster — including 22 new members in 2021, bringing the total membership to 161. While membership tends to self propagate in some disciplines, growth in others is fueled by direct efforts in outreach and by MIRA and Labarge funding, which drives new membership among funding recipients and trainee supervisors. As MIRA grows, so too do opportunities for collaboration. Members report using the MIRA website and researcher map to search for interdisciplinary collaborators.

MIRA onboards new members with an invitation for an introductory meeting with MIRA's research support staff. One of the positive consequences of remote work has been an increase in uptake of these meetings, which are valuable to both the researcher and MIRA; communicating about research and collaboration goals enables MIRA to better support and inform members about opportunities.

MIRA membership growth by year and faculty affiliation



Growth of MIRA membership since inception.

MIRA continues to invite new membership from across all six McMaster Faculties. As of October 2021, MIRA had 161 members.

MIRA Trainee Network

MIRA and the Labarge Centre for Mobility in Aging (LCMA) are invested in the development of the next generation of researchers in aging and helping to foster a collaborative culture of aging research excellence at McMaster.

In 2017 MIRA worked with trainees to create the MIRA Trainee Network, bringing together around 40 graduate students and postdoctoral fellows. This group worked to define their peers' interests and needs, and identify gaps in trainee support including:

- Opportunities for interdisciplinary interaction and collaboration
- Funding aging related research activities
- Informal networking to better understand the perspectives of others working in aging
- Broad capacity development and skill building

Since inception, the Trainee Network has grown in size and scope, becoming more autonomous. As of November 2021, the MIRA Trainee Network has 172 active members, attracting new members each year as trainees graduate or move on. The Trainee Network conducted a membership survey (2019) to better understand how the network was meeting interests, desires for engagement and needs of its members. MIRA and the Trainee Network meet these objectives by:

- Convening monthly, virtual meetings for informal research presentations and knowledge sharing
- Hosting two annual knowledge translation events: Meet My Method (Spring 2021) and Pitch Your Project (December 2021)
- Supporting science communications skill building through the Trainee Network Blog and MIRA-facilitated webinar Science Communication (July 2021)



- Funding trainee research through graduate scholarships, postdoctoral fellowships, undergraduate research fellowships and graduate professional development awards
- Trainee capacity development through the **MIRA Trainee Planning Grants**

2021-22 MIRA Trainee Planning Grant

MIRA issued its second call for proposals for **MIRA Trainee Planning Grants in 2021** to develop trainee capacity in research planning and development, and leverage the creative ideas informed by MIRA trainees' own experiences. The grants were open to MIRA Trainee Network and Association of Undergraduate Research on Aging (AURA) members. The process yielded several promising proposals. The selected proposals will bring together trainees from multiple Faculties to develop skills or promote collaboration in aging research:



- **MIRA trainee grant writing workshop |**

Kenny Noguchi (PhD candidate) proposed a semester long grant writing workshop, that will include a "bootcamp" of resources and webinars, a team-based mock grant writing exercise, peer evaluation and a reflective assessment of program efficacy, with a goal of publication.



- **Aging research stakeholder codesign workshop |**

Cassandra Thorne (PhD candidate) proposed to host a codesigned half-day workshop, where trainees will draw on the experiences of older adults to codesign research and knowledge translation activities.



- **Research 101 for Undergraduates |**

Sanjum Hunjan (Undergraduate) proposed to host a virtual session featuring senior MIRA Trainee Network members and MIRA in October 2021. Speakers discussed navigating the world of aging research, in advance of MIRA's own Catalyst Grant Symposium – priming students to make the most of the session featuring research highlights and opportunities to get involved.

Undergraduate and graduate student development

Undergraduate Support & AURA

MIRA supported its fourth cohort of MIRA Undergraduate Summer Research Fellows (USRFs) in the summer of 2021, funding ten undergraduates working with MIRA researchers over the summer term. The Undergraduate Fellows joined the Trainee Network meetings and presented their work to more senior trainees in August. They remain part of the trainee network membership following their summer fellowship.

Driven by several Undergraduate Fellows, MIRA supported a student-led effort to form an undergraduate club under the MIRA umbrella. The Association of Undergraduate Research on Aging (AURA) was formally launched in fall 2021 with an interdisciplinary membership of 35 students and oversight by its own executive committee. AURA has applied to MIRA for support through MIRA Trainee Planning Grants and will host several events in the 2021/22 school year, including Research 101 for Undergraduates, a networking event connecting undergraduates with MIRA members. AURA will also leverage MIRA's existing capacity to bring MIRA's intergenerational programming and research events to AURA's undergraduate audience.

Graduate student development

In 2021, MIRA continued to offer Graduate Student Professional Development Awards, as a replacement for the previously offered Graduate Student Travel Awards. **Seventeen graduate students** from across the Faculties of Science, Engineering, Health Sciences and Social Sciences were awarded funding to present aging research at virtual conferences or complete online training. Because of this funding, MIRA trainees had a presence at numerous conferences including:

- British Society of Gerontology 50th Annual Conference
- International Conference on Frailty and Sarcopenia Research 2021
- Experimental Biology 2021
- North American Primary Care Research Group (NAPCRG) 49th Annual Meeting
- Gerontological Society of America 2021 Annual Scientific Meeting



Other trainee support

MIRA has again partnered with National Centre of Excellence AGE-WELL to support trainees who propose to conduct research that meets the mandates of both organizations. In 2021, MIRA and AGE-WELL identified two **AGE-WELL/MIRA co-funded trainee awards**: Postdoctoral fellow Joyla Furlano (Supervisor: Jennifer Walker) for her project Indigenous Inclusion in the Canadian Therapeutic Platform Trial for Multidomain Interventions to Prevent Dementia (CAN Thumbs Up) and PhD candidate Elise Wiley (Supervisor: Ada Tang), who will pursue her project Examining the Intersection Between Sex-and Gender-Based Considerations and Exercise-Based Telerehabilitation in Individuals with Stroke: A Pilot Randomized Controlled Trial.

Scholarly Assessment of Trainee Network impact

A group of trainee network members, working with MIRA staff, have used a mixed methods approach to assess the impact of the MIRA trainee network on its members training experience and perceived self-efficacy in interdisciplinary aging research. The group presented a poster, "Interdisciplinary trainee networks to promote research on aging: Facilitators, barriers, and next steps," (Ruheena Sangrar, Kelsey Harvey, Rachel Weldrick, Anna Garnett, Michael Kalu, Stephanie Hatzifilalithis, Audrey Patocs, & Tara Kajaks) at the Canadian Association on Gerontology Annual Meeting in October 2021. The team has also submitted a paper of the same title to Gerontology & Geriatrics Education.



Educational programming

Increasing awareness of educational opportunities currently available at McMaster University and in the community is part of MIRA's mandate. MIRA recently conducted research on the kinds of opportunities available for learners at different levels, including those available for older adults, graduate and undergraduate students and practicing professionals. MIRA created a section on its website for this content, which highlights educational opportunities that are available on campus and in the community. MIRA's Training and Capacity Working Group continues to discuss new ways to encourage student interest in research on aging and has met this year to ensure students at McMaster are able to access aging-related learning opportunities while learning from home.

Additionally, MIRA continues to support partners in the University and in the community to expand educational opportunities for several audiences, including the CIHR Institute of Aging Summer Program in Aging (SPA), Caregiving Essentials, macPAGE and Integrated Biomedical Engineering and Health Sciences.

Caregiving Essentials

In 2018, MIRA partnered with McMaster Continuing Education (MCE) to develop a course for caregivers that was piloted in three Ontario communities. This project was funded through a Seniors Community Grant from the Province of Ontario. In 2019, Regional Geriatric Programs of Ontario (RGPO) entered a partnership that enabled MCE to continue free offerings of the program for the next two years as part of their Senior Friendly Caregiver Education Project. MCE co-designed new modules for a second program to align with the RGPO's Senior Friendly Seven toolkit. The two programs include learning opportunities and supports for caregivers of older adults and strategies for caring for an older adult living with frailty.

This course continues to be a popular and in-demand resource. More than 1,300 caregivers have participated in the course since it launched, and MCE experienced growing interest in its fall 2020 offering of the course, as many family caregivers took on new roles supporting family in their homes during COVID-19 or providing caregiving support at a distance. MCE has expanded their offerings to meet the growing demand for information on preventing and controlling infections in home health-care settings. They began offering a companion course "Infection Prevention and Control of Caregivers and Families" in January 2021.



Testimonials

"This course has really helped me understand a lot more about the caregiver rules and having to take time for yourself as well. So I thank you and this school for offering this course for free. I found it very helpful and it also gave me some time to myself to do something I have been wanting to do and that's learn more about the health side of things." - **Charity**

Our course participants were in different stages of their caregiving journeys. We heard from people who had just started to become more involved in care, to people who had been providing care for decades or more. Please find shared below a sampling of the sentiments and opinions. These stories highlight the need for a flexible approach to caregiver education, and the various demands that caregivers face in their roles.

- "I've referred at least 4 people...I've shared resources...so congratulations for offering something that is much needed in the community"
- "I particularly liked was that I could access it when I had time to. That was a big bonus for me, and being free is also helpful too. I found it exceptional. I found it very useful and very helpful."
- "The material was very well organized... It lent itself well to doing things independently and online which is what I was looking for."


macPAGE: McMaster Passport for Geriatric Education

MIRA continues to support opportunities for student engagement with older adults and research on aging. Dr. Andrew Costa and his team in the Faculty of Health Sciences at the Michael G. DeGroote School of Medicine Waterloo Regional Campus, together with project partners at Schlegel Villages, the Research Institute for Aging and MIRA have created macPAGE: McMaster Passport for Geriatric Education. The macPAGE program is designed to encourage learners to engage in experiential education opportunities related to working with older adults and enhance their skills and geriatrics-related competencies. The macPAGE program was trialed at the Waterloo Region Campus by undergraduate medical students. Feedback from early participants was overwhelmingly positive and was incorporated into future iterations of the program. MIRA submitted its certificate of completion for this program: the “MIRA Certificate of Enhanced Geriatrics Competencies & Education” to McMaster’s Undergraduate Council in Fall 2019.

In 2019, MIRA and the macPAGE team, including MIRA’s Training and Capacity Working Group and a student working group, developed macPAGE 2.0. MIRA’s trainee network and undergraduate student fellows provided guidance and feedback throughout the development process to ensure the platform met the learning needs and interests of students from diverse faculties. macPAGE 2.0 features updated platform content and functionality and will be accessible to all McMaster students.

Due to the changes of online learning during COVID-19 uptake of the platform was initially poor. Shera Hosseini, a co-funded postdoctoral fellow from MIRA and the Faculty of Health Sciences McMaster Education Research, Innovation and Theory (MERIT) Program, conducted an assessment of macPAGE in Winter 2021 in order to identify ways to improve uptake. Many students indicated their appetite for participating in extra programming online was low while they were also doing most of their learning online, but they also provided useful feedback on how to market the program and improve some features to make it easier to use and more appealing to students. Based on These findings, the platform underwent a redesign and MIRA staff developed a more targeted marketing strategy demonstrating how much work students have already done towards completing the certificate already. MIRA communications staff are completing the development of marketing videos which will be used in a relaunch of the platform in Winter 2022.





McMaster Portal for Aging Education (macPAGE)

Coming in January 2020

The McMaster Institute for Research on Aging (MIRA) together with Big Data and Geriatric (BDG) Models of Care Research Cluster at McMaster School of Medicine, Waterloo Regional Campus, is launching its online program, macPAGE, in January 2020. macPAGE will provide undergraduate and graduate-level learners with opportunities to learn about and participate in out-of-classroom experiences with older adults and related to research in aging. macPAGE makes sharing learning experiences easier as students pursue future employment and educational opportunities.

What is macPAGE?

- A tool to track and collect all of out-of-class activities related to aging research or working with older adults in one convenient place
- A way to discover new opportunities to learn about this field, and share opportunities with other students
- A tool to communicate the value of these experiences with others

What do I do on macPAGE?

Students complete 20 hours of experience across seven learning pillars: 1) Courses, 2) Experiential Learning, 3) Clinical Experience, 4) Volunteering and Interpersonal Community Involvement, 5) Self-Directed Learning, 6) Research, and 7) Lectures.

Pre-populated lists of activities get students started, but students are welcome to submit any activity that fits within a pillar as long as it involves working with older adults or learning about aging. Students complete a short reflection for each pillar, and an overall reflection outlining how completing these activities has shaped their views on aging and older adults. Students can retrospectively include experiences they have completed in the past 12 months.




Upon completion, students will receive a MIRA Certificate of Completion for Research on Aging and Engagement with Older Adults.

How can I or my students use macPAGE?

macPAGE can be accessed at beta.macpage.ca. Log in requires a Google account.

The program will be open for enrollment in the Winter term, starting on **January 6th 2020**. This first offering is a trial offering. Students who enroll between January and April will be contacted to provide feedback about the program.

For more information please contact Allison Ward, Project Manager at MIRA at warda2@mcmaster.ca or (905) 525-9140 ext 21428

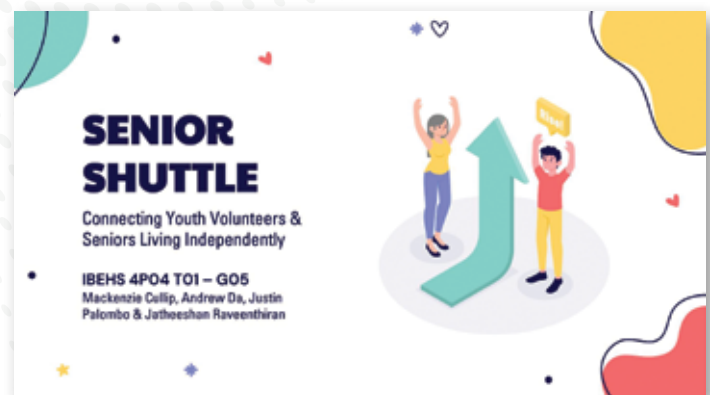




Integrated Biomedical Engineering and Health Sciences

MIRA is serving as a community partner for the Integrated Biomedical Engineering and Health Sciences course 4P04 | Health Solutions and Design Projects IV: Economics and Project Management for the second year in 2021. In this course, students apply their project management and design skills in partnership with a community partner to develop a solution to a health systems problem. Five teams of students are tackling how to support older adults and combat ageism in the health system, especially considering challenges created by COVID-19.

In 2020, project ideas included suggestions to improve systems navigation for older adults and services and technologies to support mental health-care access during COVID-19. Student participants noted the course improved their knowledge of the challenges older adults experience in accessing health care and made them more thoughtful about the complexity of the older adult population. In 2021, students are focusing on some of the challenges that older adults continue to experience in accessing virtual health care, including monitoring health for older adults not currently accessing in-person services and identifying ways to promote maintaining mobility, continuing safe exercise and reducing falls risks for older adults accessing virtual care.







PART 6

Community and stakeholder engagement

Age-Friendly University

In 2017, McMaster University joined the international Age-Friendly University (AFU) network, a global body of higher education institutions that are committed to being more accessible to older adults. Launched in 2012 by Dublin City University (DCU) in Ireland, the AFU network builds on the World Health Organization's Age-Friendly Communities Initiative, which encourages all communities to shape their physical and social environments to support people of all ages.

In 2018, the McMaster Institute for Research on Aging (MIRA) undertook several studies to understand the alignment of McMaster University's existing facilities and programs with the 10 principles of an AFU. Through this research, MIRA identified three key areas through which McMaster University could improve its alignment with AFU principles and continue developing the campus into a welcoming and inclusive space for people of all ages:

- 1. Communications and outreach:** Ensuring members of the public are made aware of relevant events on campus, including research on aging and aging-specific programming; making online information accessible and easy to find and navigate for the public, including older adults.
- 2. Accessibility and inclusion:** Ensuring accessibility features on campus are installed and maintained; continue to develop the experience of first-time visitors to campus; communicating the value that older adults can contribute in society and the McMaster community.
- 3. Programming and engagement:** Developing educational programming that appeals to older adults and allows them to learn about McMaster's diverse research strengths; creating new opportunities to bring older adults to campus; encouraging older adults to become or continue to be part of the McMaster community to support the creation of new social networks and combat social isolation.

As a response to these studies, MIRA assembled a steering committee to act on these recommendations. The committee is comprised of 40 members from 30 different units at McMaster, including student, staff, alumni and community service units, as well as representatives from other aging platforms at McMaster, the McMaster University Retirees Association, the Age-Friendly Hamilton Committee and MIRA's Trainee Network.

Since the emergence of COVID-19 in 2020, the committee has been working to adapt programming for online audiences and new mediums. Members are transitioning their programs online while offering support to make it easier to access online programming and learning opportunities; developing new programming that is taking advantage of opportunities created by virtual events; participating in research on COVID-19 and aging; and examining ways to continue to engage older adults in MIRA's research process. As such, MIRA's new priorities are to:

- 1. Bridge the digital divide** by supporting online information accessibility for community members of all ages
- 2. Develop an information hub** to ensure members of the public can quickly and easily learn about McMaster University and opportunities that are available to them
- 3. Continue to serve as a supportive community of practice,** sharing ideas and programming to stay connected to and engaged with older adults

In 2021, MIRA staff volunteered to support an AFU Network initiative to draft International Organization for Standardization (ISO) standards for Age-Friendly Universities. It is hoped that establishing these standards will set a model that universities interested in joining the network can use to establish action plans, ensure their institution is a good fit for joining the network and help institutions that are already part of the network set future goals for areas of development to ensure they are aligning with the principles of an AFU.



Intergenerational programming

MIRA continues to seek opportunities to engage with older adults in the community through the development of intergenerational programming. Beginning in 2017, a project team led by MIRA and Dr. Brenda Vrkljan (Rehabilitation Science) conducted a study on establishing an intergenerational hub on McMaster's campus, as well as interest among older adults and students in participating in programming together. Both groups indicated a strong interest in the proposed intergenerational hub and programming. Based on the findings of this study, MIRA partnered with Residence Life Services to pilot intergenerational programming through a Living Learning Community in residence. Living Learning Communities bring together students, who have self-identified, in an integrated academic residential environment focused on a particular area of interest. Students also participate in activities related to that shared interest. In 2019-2020, 28 students and 20 older adults enrolled in this social program and met monthly, providing both groups with an opportunity to spend time and engage in activities together.

Funding from the New Horizons for Seniors Program has allowed MIRA and Residence Life to expand this pilot program offering in 2020-21, engaging more diverse seniors, a larger population of students living in residence and students from the broader campus community. Due to the COVID-19 pandemic, plans for this program were adapted to a virtual setting. 'Meet My Hamilton,' a virtual intergenerational program, attracted 10 older adults and 20 undergraduate students in Fall 2020, with the goal of helping first year students feel like part of the McMaster Community and keeping older adults connected to their community. By winter 2021, the program had grown to include 16 older adults and 50 students, spread across two session offerings. These sessions are facilitated by eight conversation partners from the Health, Aging and Society practicum program, who run sessions and design programming and activities. MIRA is offering programming again in 2021-22 and is seeking to grow participant numbers in its second year.

MIRA conducted end-of-program interviews with participants. Student participants indicated that programming had positively impacted their perspectives of older adults and interest in research on aging. Participants of both age groups indicated that programming had a positive impact on their mood and that they appreciated the opportunity to build community and meet new people during COVID-19 restrictions. Adapting the program to an online setting was supported by additional funding from New Horizons for Seniors. MIRA research assistant Shannon Scherer wrote recommendations for implementing online programming with older adults that could be disseminated as a toolkit.



**Allison
Dubé**



**Brenda
Vrkljan**





E-learning for older adults

In 2020, MIRA facilitated a partnership between its members, the Department of E-Learning and Innovation (DELI) in the Faculty of Health Sciences and the McMaster Optimal Aging Portal. This partnership aims to leverage the information available on the Portal and share it in new and engaging formats. Through this partnership, DELI has created four e-learning modules, housed on the Portal, about exercise and osteoarthritis; brain health; walking and mobility; and social isolation. A fifth module on driving and transportation will be released in November 2021.

More than 80,000 users have accessed the osteoarthritis and exercise module since March 2020, more than 85,000 users have accessed the e-learning module on brain health since its release in July 2020, and more than 25,000 users have accessed the walking speed e-learning module since April 2021. The Social isolation module was launched in late August 2021 and was accessed by over 500 users in its first two weeks. These resources have provided the community with a new way to engage with research that can support their mobility as they age.



Combatting social isolation during COVID-19

Current guidelines and risks associated with COVID-19 mean MIRA cannot physically welcome older adults on campus at this time. However, McMaster researchers and staff have put great thought and effort into ensuring that the shift to virtual programming is as age-friendly as possible and that they can continue to actively engage with older adults while programming opportunities have been reduced and there is a greater risk of social isolation.



The VOICE Digital Platform

MIRA has a strong focus on stakeholder and end user engagement in its research processes. To further this strength, the Institute developed a partnership with the National Innovation Centre for Ageing (NICA) to license VOICE. VOICE is a digital platform that brings together a large network of citizens that contribute insights, experience, ideas and vision to identify unmet needs and opportunities, to drive innovation for aging and improve health research. The VOICE digital platform will enable MIRA and its network to establish a citizen community in Canada to harness experience and insights on aging, wellbeing and longevity in order to manage citizen involvement and engagement in research and projects. MIRA will be the first Canadian organization to join members in the UK, US and Singapore — helping create and sustain an international community of citizens and organizations, working together to drive innovation for positive aging and enabling a global discussion around the opportunities and challenges of demographic change. MIRA expects to have this platform fully enabled in 2022.

PART 7

Funding and research impact

Partnerships

Over the past five years MIRA has developed a wide network of collaborators and partners who support MIRA's research, educational endeavors and community-based initiatives.

2021 partnership highlights include:

- In partnership with Newcastle University and the National Innovation Centre for Ageing (NICA), MIRA is planning to implement the VOICE platform to enable citizen-based research
- MIRA has now formalized a partnership with Toronto's Dixon Hall, forming the MIRA | Dixon Hall Centre.
- MIRA hosted the Summer Program in Aging in 2021, partnering with CIHR and several other leaders in aging to deliver this online event to great success

External partners

MIRA engaged with the following external partners in 2021

MIRA has established a partnership with **Newcastle University's National Innovation Centre for Ageing (NICA)** to share knowledge, experiences and research ideas in the aging space. An important aspect for the partnership will be MIRA's membership in the VOICE digital platform, which will facilitate, coordinate and manage citizen involvement and engagement activities in MIRA's activities. This platform will enable citizen based research and extend MIRA's reach by creating and connecting international citizens and communities.

MIRA formalized its partnership with Toronto's **Dixon Hall**, and with the generous gift of Suzanne Labarge, established the MIRA | Dixon Hall Centre to support research to help improve the lives of marginalized and at-risk older adults. MIRA and Dixon Hall are actively collaborating to enhance research with, and programs and services for, older people living in Toronto who are facing housing insecurity, barriers to transportation and transitions in care, such as hospital-to-home and end-of-life.

In May 2021 MIRA hosted the CIHR Institute of Aging Summer Program in Aging (SPA) on the topic of Longitudinal Studies in Aging: Understanding Health Span and Longevity. MIRA collaborated with the **Canadian Institutes for Health Research (CIHR) Institute for Aging** to host this flagship training program virtually for graduate students and postdoctoral fellows. Close to 60 Canadian and international trainees participated in this event to advance their understanding of health span and longevity across disciplines. The event brings together trainees, researchers and members of the public and private sector from Canada and abroad. MIRA developed an additional **16 partnerships** (13 with external partners) through sponsorship and participation in this training. Through these partnerships, MIRA exposed trainees to key organizations and businesses in aging — advancing trainees' knowledge and providing opportunities for them to apply their skills in aging, population health, longitudinal research data harmonization and data linkage, as well as exposing them to future employment opportunities.

To stimulate investment in aging research in Canada, MIRA joined the international alliance between the **Northern Health Science Alliance and the Centre for Aging and Brain Health Innovation**, along with its Canadian partners: Michael Smith Foundation for Health Research; AGE-WELL Network of Centres of Excellence; University of Waterloo; and Simon Fraser University STAR Institute. In 2020 an MoU between these partners was established to work together to

drive knowledge exchange and innovation in healthy aging. The group meets online regularly to disseminate information and collaborate on international funding opportunities. Through this network, MIRA established a partnership with **Lancaster University** to develop an international partnership for Highly Qualified Personnel (HQP) through exchange opportunities for visiting scholars, postdoctoral fellows and graduate students. Due to COVID-19 this has not come to fruition yet. However, MIRA is engaged with Lancaster to develop a funding application to the UK Research and Innovation's Engineering and Physical Sciences Research Council. If funded, this project would establish international research collaborations to address key issues at the intersection of housing, social care and health — specifically focusing on transforming care and health at home and enabling independence.

MIRA also continues a collaboration with Dr. Andrew Clegg from **Leeds University**. Through this collaboration MIRA is developing a major research initiative by bringing together an interdisciplinary and international team that will investigate Complex Interventions for Frailty and Aging Well.

MIRA is developing a partnership with the **University of Birmingham** to explore holding a one-day event that coincides with the Canada stop in Hamilton of the Queen's Baton Relay (QBR) in advance of the Commonwealth Games hosted by Birmingham in 2022. The symposium will focus on themes of healthy aging, physical activity and the intersection with our diverse communities.

The **Institute of Technology Carlow** actively supported MIRA in the development of the MIRA Idea Exchange webinar series by applying co-design and design thinking principles to each session. The MIRA Idea Exchange was implemented in the summer of 2020 to help researchers adapt their work to COVID-19. This work has resulted in a publication: "What are the needs of Interdisciplinary Researchers in Aging in the COVID-19 Era?" in the *Tuning Journal for Higher Education* (in press).

MIRA continues its partnership with AGE-WELL and the Canadian Frailty Network to support trainees whose interests align with both organizations.

Internal partnerships

This year MIRA worked with many great internal partners at McMaster.

The **McMaster Optimal Aging Portal** is one of MIRA's key strategic partnerships. The Portal sits within MIRA and MIRA leadership works closely with the Portal team and **McMaster Advancement** to identify and secure sponsors to support the growth and sustainability of this important platform. In addition, through MIRA's partnership with **Dixon Hall**, MIRA is creating opportunities for the Portal to bring its content to underrepresented and underserved older adults.

MIRA has further invested in the Portal for the enhancement of mobility content through short-form, multimedia e-learning in collaboration with the **McMaster Division of e-Learning Innovation**. The goal is to leverage the Portal to enhance McMaster's reputation and generate interest from future sponsors or donors to provide revenue to sustain the portal.

MIRA collaborates with the **Office for International Affairs** in many ways — promoting MIRA's research and engaging potential international partners to explore opportunities. This year, MIRA participated in the McMaster Global virtual showcase presenting on "McMaster and the Age-Friendly University Network: Learning and sharing with global partners to serve our communities locally." McMaster Global is an annual event highlighting global engagement activities supporting McMaster University's vision and mission to make global engagement and knowledge generation an integral part of the University's identity and presence in Canada and around the world.

MIRA established an Age-Friendly University Committee in 2019 with a broad membership, including **McMaster University's service units for students, staff and alumni, major academic units and aging platforms** and the **McMaster University Retiree Association**. This committee continued engagement in 2021 and met once in the past year to establish directed projects to work on collaboratively.

Partnerships with McMaster's institutes and programs supports MIRA in its efforts to train the next generation of interdisciplinary researchers and trainees in the field of mobility and aging. Through collaborations with several groups and institutes at McMaster, MIRA has strengthened its support for developing Highly Qualified Personnel through co-funded opportunities for research trainees, while leveraging Labarge Centre for Mobility in Aging (LCMA) and MIRA funds. This has resulted in greater reach in nurturing and deepening interdisciplinary connections across the University. Over the last two years, MIRA has co-funded Catalyst Grants in aging with the Michael G. DeGroote **Institute for Pain Research and Care (IPRC)** and funded a postdoctoral fellowship in collaboration with the **McMaster Education Research, Innovation and Theory Program (MERIT)** to evaluate MIRA's certificate program in geriatric competencies and research on aging, as well as the Caregiving Essentials course that was developed in collaboration with **McMaster Continuing Education (MCE)**.

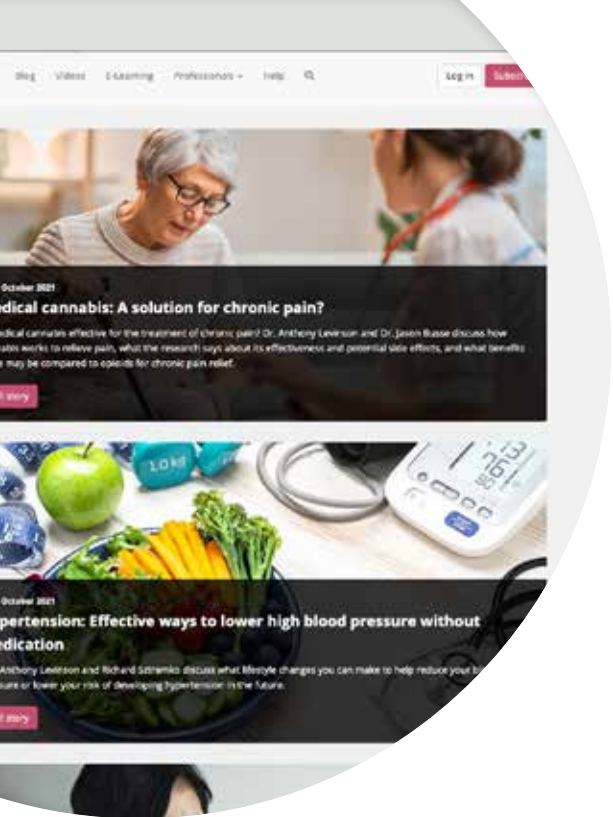
McMaster
OPTIMAL AGING PORTAL
Community and social services
Complementary and alternative medicine
Consumer protection
Coronary heart disease
Crime prevention or reduction
Diabetes and metabolic syndrome
Digestive conditions
Early disease detection (non-cancer)
Elder abuse
Employment
End of life care
Exercise
Fall and injury prevention
Food safety and security
Frailty and functional decline
Health and social conditions
Hypertension
Mental health
Oral health
Pain management
Sexual health
Smoking cessation
Substance use
Tobacco use
Vision and hearing problems

McMaster
University



**CONTINUING
EDUCATION**

Deli



Government relations

Government relations activities continue to be a high priority at MIRA. MIRA recognizes the importance of local government champions, as well as leaders with a broader, national mandate.

In the past year, MIRA maintained its existing government relationships, but efforts to build new government relations were put on hold due to the fall 2021 federal election and while both the federal and provincial governments continued to focus on COVID-19. MIRA expects to ramp up these efforts again in 2022.

Recently, the Optimal Aging Portal was presented to the Public Health Agency of Canada (PHAC), Aging and Senior's division for a demonstration of how a government agency could partner with MIRA, through the Portal, as a knowledge hub for evidence sharing.

In the past year, MIRA had several conversations with ministers for seniors, labour and international development to discuss their support for an initiative to develop a Canadian big data platform that would advance Canada's health and innovation agenda. This initiative is in development through the Canadian Longitudinal Study on Aging and supported by MIRA.

Leveraging MIRA and LCMA funds

In 2021, MIRA continued to be successful in leveraging funds to support many of MIRA's initiatives. Some examples of leveraged funds include:

Two MIRA members who collaborated on a catalyst grant were successful in applying for the New Frontier Research Funds for projects
\$500,000

Matching funds for MIRA & LCMA trainee funding opportunities
\$246,000

Co-funding AGE-WELL PDF and PhD
\$35,000
Co-funding the two IPRC Catalyst Grant
\$60,000

MIRA was able to apply for funding for the CIHR Summer Program in Aging 2021 virtual event
\$75,000 and further raised **\$21,500** through sponsorship

Dr. Manaf Zargoush's 2018 Catalyst grant enabled a successful 2021-2026 Natural Sciences and Engineering Research Council (NSERC) Discovery Grant
\$160,525

Drs. Beauchamp and Ganann each received the Early Researcher Award to complement MacM3 and EMBOLDEN work
\$300,000

PART 8

Communications, outreach and events

The McMaster Institute for Research on Aging (MIRA) supports aging research through strategic communications and knowledge translation. MIRA members are active in highlighting the importance of aging and mobility in public discourse as their expert commentary and research work are regularly featured in local, national and international media. This year, MIRA researchers were featured in the New York Times, CBC, Global News, The Hamilton Spectator, The Globe and Mail and many other news outlets.

- 28,000 new users visited the **MIRA website** this year, double the number from last year, pageviews increased by 68 per cent to over 68,000
- MIRA's **social media** presence continued to grow, with over 2,300 Twitter, 252 Facebook and 163 LinkedIn followers
- MIRA continued to tell the stories of our research, experts and community engagement through 134 stories in local, national and international media. Online readership for all these media outlets is over 8.59 million people.
- **Two newsletters**, one for MIRA members and one for the public and community partners, continue to grow their readership and reach.
- During the pandemic, MIRA has continued to host many successful and engaging **events** virtually. This year, 19 MIRA events were held for researchers, trainees and the public.

Events

Events in 2021 continued to be held virtually as COVID-19 related restrictions remained in place. Despite the “Zoom fatigue” many people experienced during the pandemic, virtual events were well attended and provided excellent opportunities for researchers and trainees to discuss important topics related to aging. As restrictions begin to ease, MIRA is looking forward to getting back to in-person events but also plans to continue some offerings virtually because of the increased accessibility online events offer for some participants.

MIRA’s **One Topic, Two Disciplines** webinar series brings together two experts from different disciplines to discuss topics in aging. Now in its second year of programming, MIRA ran four seminars on a variety of important topics in 2021, highlighting the importance of interdisciplinary research.

JANUARY 19, 2021: Intergenerational trauma and life course – Andrea Gonzalez and Amy Montour

Drs. Amy Montour (Family Medicine), an Indigenous physician and Andrea Gonzalez (Psychiatry and Behavioural Neurosciences) discussed how wider social, economic and cultural contexts have shaped health and aging among Canada’s Indigenous populations while addressing how life experiences can provide clues to current patterns of health and disease and the aging experience.



MARCH 11: Dementia and driving – Brenda Vrkljan and Richard Sztramko

Drs. Brenda Vrkljan (Rehabilitation Science) and Richard Sztramko (Medicine) discussed how early and later dementia affect the ability to drive, and how driving assessments and cessation can impact older adults’ social mobility, mental health, and well-being.



OCTOBER 8: Aging in the right place – Jim Dunn and Gina Agarwal

Drs. Jim Dunn (Health, Aging & Society) and Gina Agarwal (Family Medicine) explored integrating evidence into social services, health and housing to address the challenges of transforming housing to promote aging in the right.



NOVEMBER 23: Aging, health equity and the digital divide – Milena Head and Jeremy Petch

Drs. Milena Head (Information Systems) and Jeremy Petch (Medicine) discussed the ways that technologies, such as remote monitoring, virtual care platforms, artificial intelligence, big data analytics and smart wearables can improve quality of life and health outcomes.

Other events

MIRA also continued to host and participate in a wide variety of virtual events outside of the One Topic, Two Disciplines series. Events in 2021 included:

FEBRUARY 26: MIRA | Collaborative for Health and Aging Webinar – Pivoting a large-scale aging initiative due to the Covid-19 pandemic

– Dr. Brenda Vrkljan and Marla Beauchamp

Drs. Brenda Vrkljan and Marla Beauchamp discussed the early steps and strategies implemented by their interdisciplinary research team to as they pivoted a large-scale aging and mobility study in the wake of COVID-19 and its corresponding health measures in place. This webinar also invited attendees to share their tips and strategies for conducting research during the pandemic.

MARCH 2: MIRA Trainee Funding Webinar with AGE-WELL

– Audrey Patocs, Dr. Samantha Sandassie

MIRA trainees and faculty were invited to learn more about MIRA's funding opportunities for postdoctoral fellows, graduate and undergraduate students as well as co-funded opportunities with AGE-WELL with presentations by Audrey Patocs (MIRA Research Manager) and Dr. Samantha Sandassie (AGE-WELL Senior Education and Training Manager).

MARCH 12: MIRA Trainee Event – Meet My Method

– Dr. Janie Wilson and Khaled Hassanein

This networking and knowledge translation event featured an online poster session and keynote speeches by Drs. Janie Wilson (Surgery) and Khaled Hassanein (Information Systems) discussing the advantages and challenges around interdisciplinary collaborations in aging.

APRIL 12: MIRA Idea Exchange – Aging research in a post-pandemic setting

– Dr. Parminder Raina

The MIRA Idea Exchange webinar series began in 2020 in direct response to the challenges faced by researchers during the COVID-19 pandemic. In this webinar, Dr. Parminder Raina facilitated a roundtable discussion on the ways in which researchers and trainees can plan for success in a changing research and funding landscape.

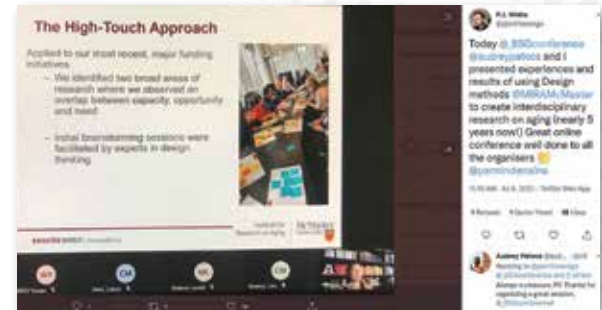
MAY 2-12: CIHR's Summer Program in Aging (SPA) – Longitudinal Studies on Aging: Understanding Health Span and Longevity

SPA is a unique, annual, interactive training program for graduate students and postdoctoral fellows and was offered virtually over six sessions from May 2 to 12, 2021. The 2021 program was hosted by MIRA and included workshops, seminars and team-building activities, as well as internationally renowned guest speakers.

MAY 20: Complex interventions for aging well and combatting frailty

– Dr. Andrew Clegg

This MIRA webinar featured a discussion with Dr. Andrew Clegg (University of Leeds) on establishing evidence-based care for older people living with frailty through development and evaluation of complex interventions. This webinar kicked-off the conversation about research on complex interventions for aging well, which MIRA is positioning as a strategic priority for 2022.





JUNE 2: MIRA | Collaborative for Health and Aging Webinar – Principles of patient-oriented research and engagement

– Dr. Rebecca Gannan, Julia Abelson, Maggie MacNeil and Penelope Petrie
Drs. Rebecca Gannan, Julia Abelson, Maggie MacNeil and patient partner Penelope Petrie presented on patient-oriented research; including principles that guide engaging older people. Presenters discussed a systematic review of the literature on the implementation and impact of patient or public involvement in health research and how patient partners contributed to that review.

JULY 9: British Society of Gerontology, 50th annual conference – Audrey Patocs
MIRA Research Manager Audrey Patocs co-presented Interdisciplinary Gerontological Research by Design with long-time MIRA collaborator Dr. P.J. White (IT Carlow) at the British Society of Gerontology's 50th annual conference. The presentation described how design methods were used to grow an interdisciplinary aging research culture at McMaster and how barriers to interdisciplinary research and impactful research can be overcome using design.

SEPTEMBER 27: MIRA Frailty Symposium – Dr. Alexandra Papaioannou, Maura Marcucci, Lauren Griffith, Paula Gardner, Andrew Clegg, and Louise Lafortune
Continuing the discussion on complex interventions for aging well, MIRA invited researchers to join a symposium and discussion on complex interventions for frailty, featuring MIRA speakers Drs. Alexandra Papaioannou, Maura Marcucci, Lauren Griffith, Paula Gardner, as well as Drs. Andrew Clegg (Leeds) and Louise Lafortune (Cambridge).

OCTOBER 20-23: Canadian Association of Gerontology

– Dr. Allison Dubé, Audrey Patocs
MIRA staff presented on work with the MIRA | Collaborative for Health & Aging, Meet My Hamilton, the MIRA Trainee Network.

OCTOBER 29: MIRA Catalyst Grant Symposium – Dr. Stuart Phillips, Jamal Deen, Carmela Alfaro-Laganse, Jim Dunn, Michelle Wyndham-West, Kai Huang, Rong Zheng, Ravi Selvaganapathy, Victor Kuperman, Michel Grignon, Laurel Trainor, Dobri Dotov, Janie Wilson, Fatemeh Jazinizadeh, Andrea Gonzalez, Divya Joshi
MIRA celebrated new and existing Labarge Catalyst Grant projects and promoted collaboration among membership — inviting presentations from each Catalyst Grant team at our 2021 Catalyst Grant Symposium. Research teams gave brief presentations on their Labarge funded projects, highlighting their research questions; value of an interdisciplinary approach and methods; and any opportunities to collaborate.

OCTOBER 29: AURA Research 101 for Undergraduates

At this virtual session for undergraduates, senior MIRA Trainee Network members discussed navigating the world of aging research in advance of MIRA's own Catalyst Grant Symposium. The session featured research highlights and opportunities for the students to get involved.

NOVEMBER 11: McMaster Virtual Global Showcase – Dr. Allison Dubé
MIRA Project Manager Dr. Allison Dubé gave an overview of the global Age-Friendly University (AFU) network focusing on McMaster University's commitment to becoming more age-friendly in their programs and policies after joining the network in 2017.

DECEMBER 10: MIRA Trainee Event – Pitch Your Project – Dr. Alexandra Mayhew, Blessing Ojembe, Denise Sabac, Dr. Diego Roger Silva, Elise Wiley, Ethan Samson, Guha Ganesh, Dr. Isabel Rodrigues, Jayati Khattar, Dr. Joyla Furlano, Kevin Zhao, Le-Tien Bhaskar, Mariia Khamina, Michael Zon, Rebecca Correia, Dr. Shera Hosseini, Simran Rooprai, Sophie Geffros, Varun Jain

MIRA hosted an afternoon of "3-Minute Thesis" style presentations from trainees in aging research from across McMaster University at this non-competitive, networking and knowledge sharing event.

PART 9

Review of achievements in 2021 and goals for 2022

In this second pandemic year, MIRA further stepped up its activities to adapt to new ways of operating, conducting research during a global pandemic and supporting the MIRA network. As highlighted in this report, MIRA's team continued to support its researchers and trainees, be involved in outreach activities, funded a substantial number of grants and supported capacity development and educational programs. Furthermore, MIRA underwent its first five-year review in early 2021 and developed a five-year report to summarize and highlight its achievements. The external review board was extremely positive and additional funding was committed by the University for the next five years.

Many of MIRA's goals for 2021 were achieved, in summary

- During COVID-19 MIRA continues to be at the forefront of the research landscape at McMaster, championing aging as a key priority while implanting design thinking and co-design principles that engage end users.
- MIRA brought together the teams developing proposals for the next two major programs of research: *The Intergenerational and Life Course Cohort and Intervention Research Platform* and *Complex Interventions for Frailty and Aging Well*.
- Through a new partnership developed in the past year, MIRA will be a Canadian leader in new ways to enable community engagement and citizen-based research by implementing the VOICE platform to capture the human experience in MIRA's research processes.
- MIRA hosted the first virtual CIHR Summer Program in Aging in May 2021, the *Summer Program in Aging: Longitudinal Studies in Aging: Understanding Health Span and Longevity*. This platform enabled interactive virtual training with international researchers, mentors and stakeholders.
- MIRA continued to support the Age-Friendly University initiative and educational activities directed to students and older adults. Specifically, the intergenerational programming Meet My Hamilton, which moved online, continues to be a success. MIRA conducted end-of-program interviews with participants to investigate the impact of this program on both older adults and students participating in the program.
- A new centre was established within MIRA. The MIRA | Dixon Hall Centre received \$5M for research to support programs and services for underrepresented older adults. This funding will also support the expansion of MIRA supported projects to this population providing much needed evidence to improve aging and well-being in this population.
- MIRA has developed several partnerships, including internationally, and MIRA's network produced high-impact publications and attracted high quality trainees

The MIRA team held a strategic planning session in October of 2021 to set strategic directions for the next five years, which will be released in 2022.

Specifically, for 2022 MIRA's goals are to continue to support all Faculties to engage with MIRA, its funding opportunities and other initiatives.

MIRA will be refreshing its governance committee membership and considering its operational requirements and ways to support its staff in their personal growth and professional development. In 2022, MIRA aims to be on the forefront of community engagement strategies, and to support research and education by rolling out the VOICE platform.

MIRA will continue to deliver its funding opportunities and support its trainees in the post-pandemic era to ensure meaningful impacts. MIRA will also develop a new focus on knowledge translation now that outputs from MIRA supported work are accumulating.

MIRA is considered a model for research institutes at McMaster University and aims to be the flagship institute on research in aging in Canada and worldwide by supporting interdisciplinarity; applying creative thinking, co-design and design thinking principles; harnessing the human experience; and listening to the voices of older adults in all the work MIRA does to have maximum impact on the well-being of older adults.



About us

MIRA's office is located at the McMaster Innovation Park, which is supported by McMaster University's Vice-President, Research. During this second pandemic year, MIRA staff have been working and communicating safely with each other from home most of the time and have started meeting in-person where required. MIRA staff look forward to returning to the office and even more so to engaging with researchers and community members in-person to continue to deliver the important work MIRA does.

Senior Leadership



Parminder Raina
Scientific Director



Ine Wauben
Managing Director

MIRA Team



Gésine Alders
Research Coordinator



Allison Dubé
Project Manager



Casey Irvin
*Communications
Coordinator*



Alison Outtrim
Program Coordinator



Audrey Patocs
Research Manager



Shannon Scherer
*Research Assistant
(part-time)*



Summer Shepherd
*Communications Assistant
(part-time)*



Acronyms and definitions

3D – three-dimensional

ABLE – Art Based therapies to encourage Longevity in Elderly participants

ACHRU – Aging, Community and Health Research Unit

AFU – Age-Friendly University

ALC – alternate level of care

AURA – Association for Undergraduate Research on Aging

BCAA – branched-chain amino acids

BDNF – brain-derived neurotrophic factor

CAMH – The Centre for Addiction and Mental Health

CAN Thumbs Up – Canadian Therapeutic Platform Trial for Multidomain Interventions to Prevent Dementia

CARM1 – co-activator associated arginine methyltransferase 1

CTU – Canadian Therapeutic Platform Trial for Multidomain Interventions to Prevent Dementia (CAN Thumbs Up)

CFN – Canadian Frailty Network

CGS-M – Canada Graduate Scholarship – Masters

CHH – CityHousing Hamilton

CIHI – Canadian Institute for Health Information

CIHR – Canadian Institutes of Health Research

cIMT – carotid intima-media thickness

CLSA – Canadian Longitudinal Study on Aging

Co-I – co-investigator

COPD – chronic obstructive pulmonary disease

Co-PI – co-principal investigator

CoSoWell – Cognitive and Social Well-being

COVID-19 – coronavirus disease 2019

COVID-END – COVID-19 Evidence Network to support Decision-making

CVD – cardiovascular disease

DARTS – non-profit, charitable organization that provides specialized transit service in Hamilton

DCU – Dublin City University

DELI – Department of E-Learning and Innovation

ED – emergency department

EDI – equity, diversity, inclusion

EDFC – HH – Empowering Dementia Friendly Communications – Hamilton and Haldimand

EMBOLDEN – The EMBOLDEN trial: Enhancing physical and community MoBility in OLDER adults with health inequities using commuNity co-design of a complex intervention incorporating exercise, nutrition, social participation and system navigation

EMG – electromyography

EMP – early mobility programs

FRS – Framingham Risk Score

GERAS DANCE – therapeutic mind-body program for older adults (aged 60+) developed with rehabilitation and geriatric medicine expertise at the GERAS Centre for Aging Research at Hamilton Health Sciences and McMaster University

GeriMedRisk – federally incorporated not-for-profit organization, funded by the Ontario Ministry of Health

GLA-D™ – Good Living with Arthritis in Denmark™

GPS – global positioning system

HIS – InterHeart risk score

HQP – Highly Qualified Personnel — research staff (assistants, technicians, coordinators, etc.) and trainees

HPL – Hamilton Public Library

IA – Institute of Aging

ICES – Ontario independent, non-profit, research organization that uses population-based health and social data to produce knowledge on a broad range of health care issues

ICI – intra-articular corticosteroid injections

IMBED – Integrated Musculoskeletal BioFeedback Device

IPRC – Michael G. DeGroote Institute for Pain Research and Care

ISAC – International Scientific Advisory Committee

KOA – knee osteoarthritis

LCMA – Labarge Centre for Mobility in Aging

LOAI – Labarge Optimal Aging Initiative

LSS – lumbar spinal stenosis

LTC – long-term care

MacM3 – Monitoring My Mobility

macPAGE – McMaster Passport for Geriatric Education

MCE – McMaster Continuing Education

MCI – mild cognitive impairment

MDTRC – McMaster Digital Transformation Research Centre

MERIT – McMaster Education Research, Innovation and Theory Program

mKO – mouse knockout

MIRA – McMaster Institute for Research on Aging

MIRA-iGEN – An Intergenerational and Life course Program of Research

MoU – memorandum of understanding

MRI – magnetic resonance imaging

NAPCRG – North American Primary Care Research Group

NFRF – New Frontiers in Research Fund

NICA – National Innovation Centre for Ageing

NSERC – Natural Sciences and Engineering Research Council of Canada

OA – osteoarthritis

OSSU – Ontario SPOR (strategy for patient-oriented research) support unit

PACE – McMaster Physical Activity Centre of Excellence

PERC – Patient Expertise in Research Collaboration

PHAC – Public Health Agency of Canada

PI – Principal investigator

PKGI α – cyclic guanosine monophosphate-dependent protein kinase 1 α

POCD – postoperative cognitive dysfunction

PPSP – persistent postsurgical pain

prehab – pre-surgical rehabilitation

PREVENT – The CIHR funded PREVENT (Person-centred Routine Fracture PreVENTion) program is a scalable model for delivering routine assessments and interventions on diet and supplements, multifactorial fall and fracture prevention strategies, and medications to long-term care teams, residents, and their families

PTSD – post-traumatic stress disorder

RCT – randomized control trial

RBG – Royal Botanical Gardens

RGPO – Regional Geriatric Programs of Ontario

RPM – remote patient monitoring

SARS-CoV-2 – severe acute respiratory syndrome coronavirus 2

SDG – sustainable development goals

SGC – Strategic Guiding Council

SPA – Summer Program in Aging

SPOR – Strategy for Patient-Oriented Research

SSE – Social Systems Evidence

SSHRC – Social Sciences and Humanities Research Council

T2DM – type 2 diabetes mellitus

TAPER – Team Approach to Polypharmacy Evaluation and Reduction — an approach that pulls on the strengths of pharmacists, family doctors, and patients to safely optimize the medicines a person is taking based on the patient's preferences and priorities for their own health

TRAIL – The TeleRehabilitation with Aims to Improve Lower Extremity Recovery Post-Stroke program

USRF – Undergraduate Summer Research Fellow

UWHH – United Way of Hamilton Halton

VOICE – a passionate community of members of the public, patients and carers who contribute their unique individual experiences to improve research & innovation

WA – Washington

WHO – World Health Organization

WT – wild-type

YMCA – a charitable organization dedicated to the growth of all persons in spirit, mind, and body, and to their sense of responsibility to each other and the global community



Labarge Centre for
Mobility in Aging

MIRA | Dixon Hall
Centre

Institute for
Research on Aging

McMaster Innovation Park, Suite 109A
175 Longwood Road South
Hamilton, ON L8P 0A1

Phone: 905-525-9140, ext. 21723

mira.mcmaster.ca



**BRIGHTER
WORLD**