2023 Catalyst Funding Program in Healthy Aging – Funded Projects

1. **Project Title**: The YourCare+ Self-Referral Platform for Home and Community Support Services – A Proof of Concept Pilot toward Large Scale Deployment
   Project Lead: Dr. Andrew Costa
   Primary Challenge Area: SUPPORTIVE HOMES & COMMUNITIES

   Community services for older adults with supportive care needs, and their caregivers, are fragmented with no central points of navigation and access, therefore limiting knowledge of and use of these important support services. YourCare+ (https://yourcareplus.ca/) is a not-for-profit, social prescribing platform that provides practical information and state of the art tools that address immediate needs to help people self-manage care in the home. We will conduct a proof-of-concept pilot to test the beta version of the YourCare+ Self-Referral Platform with older adults and caregivers living in private dwellings with supportive care needs. This platform will allow users to digitally navigate and self-refer to home care and community support services using a validated self-reported health assessment to identify service needs. The platform will generate customized lists of service recommendations in a user's specified geographic area. The YourCare+ Self-Referral Platform offers an automated mechanism for self-navigation based on validated assessment systems used in Home and Community Care Support Services across Ontario.

2. **Project Title:** Needs Evaluation to Learn Valuable Information about Aging in Canada (NELVIA-Can)
   Project Lead: Dr. Maurita Harris
   Primary Challenge Area: SUPPORTIVE HOMES & COMMUNITIES

   The Black population in Canada is younger than the total population in Canada, and is steadily aging. Across the provinces, Ontario has the largest Black population with Toronto being the centre. However, there is a lack of information on the specific challenges Black older adults face. Thus, the purpose of this study is to understand the challenges Black older adults face when completing daily and community activities, their solutions to overcome the identified challenges, and technology solutions used to support them. The findings will support the development and redesign of technologies and policies that can address the identified needs; and the development and dissemination of design guidelines that emphasize the needs, preferences, and abilities of Black older adults.

3. **Project Title:** Beginning to Co-Design Virtual Geriatric Care for Diverse Older Adults Living with HIV
   Project Leads: Drs. Kristina Kokorelias and Luxey Sirisegaram
   Primary Challenge Area: HEALTH CARE & HEALTH SERVICE DELIVERY

   Nearly half of the Canadian population living with human immunodeficiency virus (HIV) are now older than 50 years of age. Older persons living with HIV (PLWH) face numerous aging and HIV-related care needs that can be met by geriatric specialists. However, HIV care has only recently been acknowledged as a domain of geriatrics. Despite this, clinical recommendations and models of care for providing geriatric care through virtual means are lacking. Virtual care can better meet the needs of individuals who live in rural and remote areas but must be delivered in a culturally appropriate manner. As such, this research is the first step in a

larger program of research aimed at co-designing, implementing and evaluating culturally appropriate virtual geriatric care for diverse older adults living with HIV. As the population with HIV grows older, the culturally appropriate application of geriatric principles to virtual care can enhance their quality of care and overall wellbeing.

4. **Project Title:** Socially Assistive Robots for Enabling ElderCare: Creating and Validating a Best-Practices Strategy
   Project Lead: Dr. Goldie Nejat
   Primary Challenge Area: HEALTH CARE & HEALTH SERVICE DELIVERY

   Shortages of healthcare professionals and an increasing aging population have placed enormous pressures on health and social care systems. There is a clear global supply-demand mismatch occurring between the rising care needs of our aging population that is quickly outpacing the supply of care workers. Socially assistive robots can be considered disruptive technology that can enable older adults to live healthy and dignified lives, while supporting their care needs. Such technological innovation can be a crucial driver in helping to address care challenges. Although robots have the potential to decrease caregiver workload and improve care outcomes for older adults, their use has been limited in practice with many essentially creating more work for caregivers. This novel project aims to tackle these issues by generating and executing a needed strategic and best-practices plan for the successful adoption of socially assistive "collaborative" robots that provide complementary care and adapt to different tasks. This project will aid in eliminating technological and implementation barriers, while promoting adoption through the unique combination of direct experience, interaction and co-design. A key outcome is the dissemination of a best-practices plan for successful integration of robots providing complementary (not extra) care work.

5. **Project Title*:*** Connected, at-Home, Accessible Remote Monitoring in COPD (CHARM-COPD): a Program of Care in COPD involving Virtual Pulmonary Rehabilitation, Integrated Care and Remote Clinical Monitoring
   Project Lead: Drs. Robert Wu, Carolyn Gosse, Andrea Gershon, Alex Mariakakis & Jake Tran
   Primary Challenge Area: HEALTH CARE & HEALTH SERVICE DELIVERY

   Chronic obstructive pulmonary disease (COPD) is a prevalent and disabling chronic condition that contributes to frailty, morbidity, and mortality in older adults and incurs a high cost to the healthcare system. People with COPD often lack the support needed to manage their condition at home and in the community, and as a result rarely seek care for exacerbations until hospitalization is needed. Many patients are readmitted to hospital within 30 days of discharge. Our collaboration to create a scalable Program of Care (CHARM-COPD) for people with COPD combines new initiatives at Toronto Grace Health Centre, University Health Network, and the University of Toronto. We will create and evaluate a comprehensive program that is feasible and acceptable to COPD patients. CHARM-COPD consists of Virtual Pulmonary Rehabilitation with a respirologist, Remote Clinical Monitoring, Integrated Care with close monitoring by nurses and therapists, and novel remote monitoring including continuous monitoring of activity, coughing and sleep. Our project aims to meet the needs of most COPD patients, including those impacted by frailty, low digital health literacy, lack of English language proficiency, and other issues that impact equitable access to care.

6. **Project Title**: A Digital Active Aging Training Program for Chinese Older Adults in Canada during the Post-COVID Era

Project Lead: Dr. Lixia Yang
Primary Challenge Area: AUTONOMY & INDEPENDENCE

The project aims to mobilize a multi-disciplinary research and community team to develop and validate a digital multi-domain active aging program to promote the biopsychosocial wellbeing of Chinese older immigrants in Canada. It addresses three questions: 1) what are the sociodemographic risk factors for psychosocial functions and resilience of Chinese older adults in Canada? 2) do they benefit from the cloud-based digital multi-domain active aging program? 3) does the add-on resilience-building module enhance the training efficacy? The study takes a pretest-intervention-posttest design. The results have significant health and social implications in promoting cultural integration and psychosocial wellbeing of minority populations in Canada. The digital active aging training program would ultimately reduce the burden on Canadian economic and healthcare systems during the post-COVID era.

7. **Project Title**: iTrain my Brain: At-home Cognitive Enrichment to Improve Mobility
Project Lead: Dr. Karen Li
Primary Challenge Area: COGNITIVE HEALTH & DEMENTIA

Everyday mobility involves attending to moving visual objects (e.g., pedestrians) while in motion (i.e., motor multitasking). Motor multitasking poses challenges for older adults due to age-related declines in cognitive, sensory, and motor functions, thus increasing the risk of falling. We have shown that training cognitive control functions can improve motor multitasking and reduce falls risk, however training of visual processing is understudied despite its everyday relevance. There is also a growing need to improve the availability and delivery of evidence-based training programs to older adults for whom personal or external factors (e.g., frailty, pandemic safety, extreme weather, residential care) preclude out-of-home participation in falls prevention programs. Our preliminary research demonstrates improvements in walking, cognition, and motor multitasking following four weeks of visual attention training. These promising results were observed with participants free of motor or cognitive impairments, thus our immediate objective for the proposed 1-year period is to expand recruitment to individuals living with frailty and/or hearing loss who have increased falls risk. Our long-term research program will involve partnering with the training software company to adapt the program for use in residential care contexts.

8. **Project Title:** Use of GuardIO, a Health Canada-licensed Mobile Application, and Machine Learning to Describe Mobility Patterns of Persons Living with Dementia
Project Leads: Drs. Lili Liu and Antonio Miguel-Cruz
Primary Challenge Area: COGNITIVE HEALTH & DEMENTIA

The goal of this project is to examine the acceptance and usability of GuardIO - Family Care, mobile application. It supports persons with cognitive impairment and their care partners to develop risk mitigation strategies through understanding the patterns of their mobility by leveraging a cloud-based telematics platform licensed by Health Canada. This enables the care partners to receive timely care and support. This Health Canada licensed app is developed by WeTraq and available on app stores and SunLife Lumino Health marketplace. It combines GPS and WiFi to provide real-time location monitoring and safety alerts. It does not require an additional device other than one's personal smartphone. We will use machine learning driven analytics to describe mobility patterns of participants with dementia and without dementia (care partners). This information can be used to identify changes in mobility to inform decisions about personalized care and

support services. Increasing prevalence of dementia in Canada calls for strategies like GuardIO to address risks of getting lost and going missing, while supporting the health and wellbeing of persons aging in place.

9. **Project Title:** Winter Slip Prevention using Bioinspired Pressure Sensitive Adhesives as Wear-resistant Footwear Outsoles
   Project Leads: Drs. Kevin Golovin and Tilak Dutta
   Primary Challenge Area: MOBILITY & TRANSPORTATION

   Icy winter weather increases the risk of fall-related injury and decreases outdoor activity levels for older adults and can lead to a downward spiral of negative health effects. Slip resistant winter footwear can help address this problem. The best existing footwear provides good slip resistance when new, but our studies have found that even modest use can change the surface properties of the outsoles and reduces their slip resistance substantially. This type of footwear incorporates composite materials in their outsoles that include hard particles/fibres embedded in a soft rubber substrate that can become damaged relatively easily. Pressure-sensitive adhesives have the potential to create outsoles that are wear resistant because their adhesion properties are found throughout the outsole (not only in the outer surface layer). The objective of this project is to develop a new type of slip resistant winter footwear based on these pressure-sensitive adhesives.

10. **Project Title*:*** Wearable Biosensing-enabled Intervention to Increase Older Adults' Neighborhood-specific Mobility Self-efficacy and Actual Mobility Behavior
    Project Lead: Dr. Gaang Lee
    Primary Challenge Area: MOBILITY & TRANSPORTATION

    Extensive efforts have been undertaken to motivate older adults to be mobile beyond their homes, which is crucial for their healthy aging. Specifically, efforts to increase confidence in their outdoor mobility have received much attention as confidence is an important prerequisite of actual behavior. However, previous studies have focused only on increasing older adults' confidence in overall mobility. We suggest focusing on increasing confidence in their mobility in the context of their neighborhoods specifically. By doing so, we can encourage older adults to start by venturing outside their homes and into their neighborhoods, leading to further travels. The more specific their confidence is to the desired task, the more likely they are to undertake it. We found that simple wristband-type biosensors can increase neighborhood-specific mobility confidence. With wristbands collecting stress data from older adults, we can easily draw a neighborhood-wide stressor map that includes locations, pictures, and details of environmental stressors (e.g., steep stairs, uneven sidewalks) in their neighborhoods. The stressor map can allow older adults to preview how they can be mobile with less stress in their neighborhoods, thereby raising their mobility confidence in their neighborhoods. This project significantly contributes to Canadian healthy aging by sparking new socio-cognitive mobility interventions that focus on raising older adults' neighborhood-specific mobility confidence.

11. **Project Title:** Investigating Indigenous-friendly technology-supported approaches to aid in health promotion
    Project Lead: Dr. Amine Choukou
    Primary Challenge Area: HEALTHY LIFESTYLES & WELLNESS

Health literacy skills allow an individual to interpret health information, to find and use their own sources of health information and to understand when information is poor or misleading. Health literacy skills are essential for Indigenous communities to receive healthcare. Digital health technology (DHT) helps spread information on health, instill healthy behaviours, and promote health. However, less is known in terms of Indigenous people's health literacy and their use of DHT. There is a clear need to paint a picture of how Indigenous people are disproportionately affected by adverse health outcomes and how DHT may significantly advance Indigenous seniors' health. The objective of this research is to create an indigenous-led plan for developing digital health approaches to support health initiatives among indigenous seniors, including digital health campaigns, online healing, and wellness campaigns. The main goal of this project is to create a plan for developing digital health approaches that will support and promote healthy living for seniors in Cross Lake. The project has the potential to inspire other indigenous communities in Manitoba and Canada to use our roadmap.

12. **Project Title:** Implementation and Evaluation of a New App to Improve the Quality of Life of Older Caregivers of People Living with Dementia
    Project Lead: Dr. Thomas Hadjistavropoulos
    Primary Challenge Area: HEALTHY LIFESTYLES & WELLNESS

    Caregivers of people living with dementia experience significant stress which can negatively affect their mental health. Psychological interventions that focus on building skills and providing strategies to improve their wellbeing have been shown to improve caregiver mental health. Although mobile apps are available for informal caregivers of people living with dementia (ICPDs), existing apps do not adequately address the stress experienced by ICPDs. The goal of our study is to test a newly developed app that focuses on providing stress management strategies for older caregivers of people living with dementia. The developed app is informed by previous research and co-created with caregiver partners. The app will include research information about stress and coping strategies that caregivers can use to manage their stress. Given the demands that ICPDs face daily, the creation and evaluation of an app that aims to provide stress-management strategies has the potential of improving the quality of life of ICPDs.

13. **Project Title:** Stronger Together: The Feasibility of an Interdisciplinary Virtual Care Program Targeting Older Adults at Risk for or Living with Frailty
    Project Lead: Dr. Karen D. Kendall
    Primary Challenge Area: HEALTHY LIFESTYLES & WELLNESS

    The limited awareness and understanding of frailty, infrequent screening of frailty in health care settings, and reduced access to health services are factors that increase the vulnerability of older adults to poor health outcomes. Barriers to access including the availability of community-based services, functional status, cost, and limited transportation services result in less than optimal care and the increased risk of future adverse health events. Virtual care via the use of technology to extend health care services into the community provides an opportunity to increase access to services, reduces barriers, and increases the support for older adults to build self-management strategies for health. The aim of the project is to develop and evaluate the use of an interdisciplinary virtual care program targeting older adults at risk for or living with frailty living in rural areas of Nova Scotia.

14. **Project Title:** FUSE-for-Frailty: A Technology-based Solution to Empower Self-management of Daily Health-related Behaviors Linked to Frailty
Project Leads: Drs. Karen Van Ooteghem, Marla Beauchamp & William McIlroy
Primary Challenge Area: HEALTHY LIFESTYLES & WELLNESS

    Frailty is common in older adults, but it is not assessed as standard clinical practice in Canada. Frail individuals are less likely to avoid or recover from illness/injury, resulting in increased rates of hospitalization and death. However, unlike some age-related conditions, it is possible to reverse declining health to prevent frailty or restore a person to non-frail status. We have developed a system for at-home use (FUSE) that includes wearable biosensors and a web-based 'dashboard' that can 1) monitor health-related behaviors, and 2) provide personalized feedback to help manage health-related behaviors. These behaviors include things like physical activity, sleep and mobility. Project activities will be grounded in a participatory research approach with input from individuals who represent end users of the system (or the information gained from it) including older adults, community program representatives, and clinicians. Together, the team will work to advance FUSE so that it includes other behaviors specifically important for frailty prevention. We believe that empowering individuals to self-manage daily health-related behaviors is a critical and promising approach to frailty prevention.

15. **Project Title**: Development of Assistive Listening Technology Best Practices for Live Music
Project Lead: Dr. Ian Bruce
Primary Challenge Area: STAYING CONNECTED

    The prevalence of hearing loss in the Canadian population increases dramatically from 38% of people in their 40s and 50s to 93% of people in their 70s. While hearing aids can provide benefit in some social situations, they are not well suited to listening to live music in environments such as concert halls, an activity that can be important for continued social engagement, connectedness, and wellbeing. Live music venues usually have assistive listening systems utilizing wireless headsets, but these headsets do not typically work well with most hearing aids. In the planned research project, we will investigate several different alternative assistive listening technologies that send audio signals directly to the sound-processor chip in a hearing aid via magnetic or radio-frequency connections. Based on the results of this research, we will develop a set of best practices that can be adopted by music venues across Canada and around the world, removing barriers to participation in live music events for seniors experiencing hearing loss, contributing to healthy aging and wellbeing.

16. **Project Title:** Developing a Digital Technology Evidence Portal or Toolkit for Mitigating Social Isolation and Loneliness in Older Adults
Project Lead: Dr. Vivian Welch
Primary Challenge Area: STAYING CONNECTED

    Social isolation and loneliness are serious public health concerns linked to increased mortality and poorer mental and physical health outcomes in older adults, leading to increased health and social service use. Several approaches including digital technology have been described to mitigate social isolation and loneliness but there are disparities in access to digital technologies especially among older adults related to equity issues such as lack of digital skills, disabilities, gender, discrimination, geographic divide, socio-economic status and affordability. Our objective is to develop a digital evidence portal or toolkit to support

decision making about the use of technology to mitigate social isolation and loneliness in older adults and promote healthy aging and socially connected lives. This project will inform health policy and practice aimed at keeping older adults socially connected and healthy within their homes and/or communities. It will contribute towards building a strong evidence architecture as part of WHO's strategy to address social isolation and loneliness which is a priority issue considered in the Decade of Healthy Ageing.

17. **Project Title**: Addressing Ethical Challenges in AgeTech: Co-creating a Way Forward with National and International Communities
Project Leads: Drs. Andrew Sixsmith, Mei Lan Fang, Charlene Chu, Jennifer Boger, Judith Sixsmith
Challenge Areas: ALL

AgeTech is about using technologies, such as e-health, robotics, artificial intelligence, and mobile devices to support the health and independence of older people. While AgeTech has many benefits, it also brings ethical challenges, and could be seen as a double-edged sword. Technology can lead to efficient and cost-effective services, but it can also be disruptive to people's lives. In-home health monitoring systems raise concerns about privacy. The digital divide of unequal access and use of technology can have a substantial impact on a person's health. These kinds of ethical issues are often overlooked by technology researchers and developers. The aim of our project is to ensure ethical thinking is part of the design and development of technology from start to finish. The project will promote ethical design thinking by encouraging and supporting culture change within AgeTech research and industry. The goal is to contribute to more effective and inclusive technologies for healthy aging. As a 1-year Catalyst project, we will be laying the foundations for future work that will be mapped out in a plan of action.