



CORE RESEARCH PROJECTS

Understanding the Needs of Older Adults (“NEEDS-OA”)

ONE: “RRITE”

Rural/Remote Indigenous Technology needs Exploration

A critical part of AGE-WELL’s mandate is to develop an in depth understanding of the technology needs and preferences of older adults. This project will focus on reaching out to those who live outside big cities and also to indigenous people. It will ask their opinions of their particular needs and how they think technology might assist in improving their lives. It will also address the challenges of connectivity in remote areas.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Megan O’Connell, University of Saskatchewan; Debra Morgan, University of Saskatchewan; **Co-Investigators:** Carrie Bourassa, University of Regina; James Carter, University of Saskatchewan; Kristen Jacklin, Laurentian University; Warry Wayne, Laurentian University

TWO: “TUNGSTEN”

Tools for User Needs Gathering To Support Technology Engagement

Older adults have often been left out of the loop in developing technology that is intended for their use—at best they have been consulted only after all the key decisions are made. This project will develop tools to involve older adults in the early stages of design and testing of products and will carry through to gain the benefit of their wisdom in marketing and advertising.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Arlene J. Astell, Ontario Shores Centre for Mental Health Sciences; Debra Fels, Ryerson University

THREE: “OA-INVOLVE”

Older adults’ needs, experiences and preferences for assistive technologies

The aim of OA-INVOLVE is to develop best practices to support the active involvement of older adults in AGE-WELL projects. It will focus on understanding how to best incorporate the experience and insight of older adults in aging and technology research.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Susan Kirkland, Dalhousie University; Judith Sixsmith, Simon Fraser University; **Co-Investigators:** Melissa Andrew, Dalhousie University; Emily Marshall, Dalhousie University; Kieran O’Doherty, University of Guelph



Understanding the Needs of Caregivers (“NEEDS-CG”)

FOUR: “INToCARE”

Innovative Technology for Caregivers

Informal caregivers provide 75% of the assistance needed for individuals with disabilities to remain in their communities. INTOCARE will survey caregivers to better understand their needs and challenges. It will reach out to them as active partners in the development of technologies that could alleviate their burdens.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Ben Mortensen, University of British Columbia; Francois Routhier, Laval University;

Co-Investigators: Paula Rushton, Université de Montréal; Andrew Wister, Simon Fraser University

FIVE: “MovIT-PLUS”

Portal for the Systematic Monitoring and Training of User-Caregiver Dyads after Provision of Assistive Technologies

In Canada 1.1 million older adults use assistive technology to compensate for physical or cognitive limitations. Many of them also count on informal caregivers, but there is little support to assist the caregivers in the use of the technologies. This project proposes to fill the gap, initially through the development of a web portal for caregivers to allow them to access ongoing training in the uses of mobility assistive devices such as canes, walkers, wheelchairs or scooters. The portal will also include other technologies developed under AGE-WELL.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Claudine Auger, Université de Montreal; Sarah Ahmed, McGill University;

Co-Investigators: Nathalie Bier, Université de Montreal

SIX: “CARE-RATE”

An Online Assistive Technology Rating System for Caregivers

There are many products that can help support an older adult with dementia to live in the community. But it is often up to family caregivers to find them—a challenging process that can be difficult, frustrating and often futile. The goal of this project is to apply a new type of artificial intelligence called “cognitive computing” to create an online tool that connects family caregivers to products they need to support themselves and the older adult with dementia. While it will be widely available via the Internet, it will be far more specific and powerful than conventional search engines, allowing lay people to describe in plain language what they need and the problem they want to solve.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Jan Polgar, University of Western Ontario; Frank Rudzicz, Toronto Rehab Institute – University Health Network (UHN)



SEVEN: “ATforCC”

Assistive Technologies that Care for the Caregiver

Assistive technologies (AT) are assumed to lighten the burden of family caregivers. But there has been little study of the direct impact—most research focuses on the care recipients. This project will focus directly on the caregivers, to study their needs and how AT affects their lives. Understanding eldercare providers’ unique needs and preferences is critical for the successful development and application of AT.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Janet Fast, University of Alberta; **Co-Investigators:** Norah Keating, University of Alberta; Megan Strickenfaden, University of Alberta

Technology for Supporting Functional Autonomy and Independence (“TECH-FAI”)

EIGHT: “VIGIL”

Mobile Robots for Telepresence and ADL (Activities for Daily Living) Assistant

This project proposes to develop mobile robots to assist older adults living at home. The technology would be capable of conducting “virtual visits” for remote consultations with medical professionals. In addition, the robots will be able to assist with advice on basic household tasks such as meal preparation, exercise/therapy, self-care and scheduling.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Francois Michaud, Université du Sherbrooke; Goldie Nejat, University of Toronto; **Co-Investigators:** Eric Beaudry, Université du Québec; Johane Patenaude, Université du Sherbrooke; Johanne Queenton, Université du Sherbrooke; Michel Tousignant, Université du Sherbrooke

NINE: “CoPILOT”

Collaborative Power Mobility for an Aging Population

This project will focus on the development of intelligent scooters and power wheelchairs. They will be designed for older adults whose physical, perceptual or cognitive limitations make it difficult to learn how to drive a powered mobility device. The research team proposes to develop intelligent control technologies that will be compensative for the user’s limitations and allow the individual to become more mobile.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Joelle Pineau, McGill University; Bill Miller, University of British Columbia; **Co-Investigators:** Phillippe Archambault, McGill University; Dahlia Kairy, Université de Montreal; Ian Mitchell, University of British Columbia



TEN: "DIY-AIDE"

Adaptable Intelligent Domestic Environments

DIY-AIDE (Do-it-Yourself Adaptable Intelligent Domestic Environments) aims to build a "do-it-yourself" version of a smart-home. The proposal is to connect users with developers of technologies that can assist older adults in the home. It will allow them to communicate in real time about the user's needs and the developer's potential technological solutions.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Jesse Hoey, University of Waterloo; Helene Pigot, Université du Sherbrooke;

Co-Investigators: Sylvian Giroux, Université du Sherbrooke; Dominique Lorrain, Université du Sherbrooke

Technology for Active Participation in Society ("TECH-APS")

ELEVEN: "CONNECT-TECH"

Promoting Social Connectedness through New and Innovative Communications Platforms

Research indicates that as many as 43% of older adults living in the community feel socially isolated. The negative effects are well documented: depression, stress, functional decline and death. The goal of this project is to design, create, test and where possible bring to the commercial market new communication technologies for older adults. This project will answer the essential question: can these technologies be helpful in reducing older adults' feelings of isolation.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Ron Baecker, University of Toronto; Sandra Black, Sunnybrook Health Sciences Centre

TWELVE: "CONNECT-PLAY"

Promoting Social Connectedness through Playing Together- Digital Social Games for Learning and Entertainment

The goal of this project is to create, research and commercialize digital games to enhance older adults' quality of life. Some research indicates that digital games can enhance older adults' happiness, cognitive development and facilitate social interaction. Today's commercially produced games can pose usability challenges. However, many older adults readily embrace the concept of lifelong learning. The games in this project will focus on *social learning*. They will involve learning content and/or skills and will be played as social games with other adults or in an inter-generational format.

PROJECT TEAM & AFFILIATIONS:

Project Leads: David Kaufman, Simon Fraser University; Louise Sauvé, TÉLUQ



THIRTEEN: “CONNECT-CREATE”

Promoting Social Connectedness through Collaborating on Digital Storytelling and Knowledge Creation and Sharing

This project will design technological platforms to enable older adults to use digital storytelling as a means of communicating and socializing. The research team plans to work with older adults in using these platforms and tools to create digital stories covering significant events in their lives and/or their communities. It is a unique means of communication that can be enjoyable, meaningful and life affirming and can assist older adults in continuing to learn, grow and maintain cognitive abilities.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Karyn Moffatt, McGill University; Cosmin Munteanu, University of Toronto

Technology for Prevention and Reduction of Disease and Disability (“TECH-DD”)

FOURTEEN: “AMBI-MON”

Ambient-Based Physiological and Functional Monitoring

Effective monitoring of at risk older adults, whether in the home or in hospital, can help increase their safety, prevent hospitalization and promptly alert health care providers when an intervention is needed. The project aims to develop sensor systems that can be embedded in the person’s environment and that deliver health and functional information in real time. For example, a bed-based pressure sensor will collect information on breathing, bed movements and characteristics of getting out of bed—all helpful in monitoring respiratory health, risk of skin breakdown and transfer safety. The goal is to quickly detect any changes in health and ability so that early interventions can prevent further decline and enhance safety.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Rafik Goubran, Carleton University; Frank Knoefel, Carleton University

FIFTEEN: “PRED-FALL”

Technologies to Predict, Prevent, and Detect Falls

Falls are the largest cause of injuries in adults over age 65. The aim of this project is to develop and evaluate new technologies to predict, detect and prevent falls and fall-related injuries among people at high risk in both long term care and acute care environments. To learn more about predicting falls this project will analyze real life data, acquired both through networks of video cameras in long term care facilities and with wearable sensors. The goal is to identify differences in movement patterns during falls. In the area of fall prevention, the team will develop and evaluate low cost solutions such as compliant flooring, fall mats and padded furniture along with wearable protective gear.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Steve Robinovitch, Simon Fraser University; Fabio Feldman, Fraser Health;
Co-Investigators: Alexander Fedorova, Simon Fraser University; Greg Mori, Simon Fraser University; Ed Park, Simon Fraser University; Carolyn Sparrey, Simon Fraser University



SIXTEEN: “IIES-PHYS”

An In-home Intelligent Exercise System for Physical Rehabilitation, Enhancing Musculoskeletal Function, and Preventing Adverse Events

Having easy and frequent access to supervised and well-planned therapy for sensory and motor functions can help ensure the long-term health of older adults. This project will develop technologies that can be used for delivering appropriate, individualized rehabilitation and exercise programs. Two separate approaches are proposed: one that provides frequent, less intense regimes for in home use and the other that provides less frequent but more intense regimes for use under the guidance of a therapist in a rehabilitation or community centre setting.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Rajni Patel, Western University; Mandar Jog, Western University;

Co-Investigators: Christian Duval, Université du Québec; James Frank, University of Waterloo; Robert Teasell, Western University

Technology for Maintaining Good Mental and Cognitive Health (“TECH-MCH”)

SEVENTEEN: “MEN-ASSESS”

ICT Applications for Screening, Assessment and Interventions to Enhance Mental Health

This project focuses on the use of information communication technologies (ICTs) to provide older adults in the community with access to information that helps them manage the stressors of caregiving. It also provides access to a suite of applications that help older adults to manage their own signs and symptoms of depression and anxiety. These apps may also be in the form of games on mobile devices that older adults can use in their own homes to practice cognitive skills including those prescribed by their health professionals.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Mark Chignell, University of Toronto; Lili Liu, University of Alberta;

Co-Investigators: Miguel Cruz, Glenrose Rehabilitation Hospital

EIGHTEEN: “COG-ASSESS

Automated Assessments of Cognitive Impairment Using Environment-Based Sensing

This project will investigate how to monitor a person’s daily-life activities through an easily available and inexpensive hardware-software system, in order to recognize changes that predict future cognitive decline. A variety of commercial off-the-shelf sensors will be used including infrared sensors and cameras and sensor-embedded “smart” devices. Software will be designed for analyzing the data collected by these devices and to monitor and predict if an older adult will suffer from cognitive decline.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Eleni Stroulia, University of Alberta; Lili Liu, University of Alberta;

Co-Investigators: Ioanis Nikolaidis, University of Alberta; Norm O’Rourke, Simon Fraser University; Herbert Yang, University of Alberta



NINETEEN: “PAIN-ASSESS”

Development, Implementation and Evaluation of an Automated Pain Detection System for Older Adults with Dementia

Although pain is very frequent in older populations, older adults are often undertreated for pain, especially those with serious dementia, who live in nursing homes and cannot report their pain because of cognitive impairments that accompany dementia. The goal of this project is to develop and evaluate an affordable technology that will facilitate regular pain assessment with minimal resources. This project will develop an inexpensive vision-based sensor that can be easily implemented in most long-term care facilities. The system will be designed to assist health care staff with pain assessment while at the same time addressing limitations due to staffing shortages. The plan is to test and evaluate the complete system in at least two long term care facilities and determine its impact.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Thomas Hadjistavropoulos, University of Regina; BabaTaati Toronto Rehab Institute - UHN; **Co-Investigators:** Kenneth Prkachin, University of Northern British Columbia

Health Systems, Practice, Policy, and Regulatory Issues (“POLICY-TECH”)

TWENTY: “PRI-TECH”

Policy and Regulatory Issues in Enabling Technological Innovation

This project will examine current policy and regulatory frameworks and developments that are relevant to the licensing, approval, regulation, reimbursement and evaluation of new technologies and innovations resulting from AGE-WELL. The development of new technologies demands a new evaluation of the questions they provoke. For example, should “smart systems” used for remote health monitoring be regulated in the same fashion as medical devices? Should payment for these systems be the responsibility of health authorities, insurance companies, or consumers? Recommendations will be made for how innovation in health technologies for older adults can be accommodated and stimulated within existing policy and regulatory frameworks, as well as how these frameworks might be modified to support safe adoption of promising and effective technologies.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Don Juzwishin, Alberta Health Services; Paul Stolee, University of Waterloo

TWENTY-ONE: “DRIVE”

Developing Regional health Innovation Ecosystems

Translating AGE-WELL research into practice, policy and commercial applications will require strong partnerships and linkages among researchers, policy-makers, practitioners, and industry. This can be most effectively done at the local or regional level, where the participants can meet and collaborate face to face. This project will explore how technology innovations can be fostered and driven in what we are calling Regional Health Innovation Ecosystems (RHIEs). The research team will develop models for AGE-WELL that will facilitate partnerships in local collaborations among researchers, policy makers, practitioners and industry.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Josephine McMurray, Wilfrid Laurier University; Heidi Sveistrup, University of Ottawa; **Co-Investigators:** Don Husereau, University of Alberta



TWENTY-TWO: “3DHC”

Data-Driven Decision-making in Healthcare

The provision of health care is moving increasingly from hospitals to the community and home. It is not only cheaper, but provides a more attractive quality of life for older adults. The objective of this project is to develop and prove the feasibility of home health monitoring and data-driven decision making systems. Recent advances in mobile devices, sensor technology, cloud computing, telecommunications and Big Data analytics can empower older adults and their caregivers to continuously monitor their health. This project will target pressure ulcers as a pilot application but will also pursue other suitable applications.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Joon Lee, University of Waterloo; John Hirdes, University of Waterloo;

Co-Investigators: George Heckman, University of Waterloo; James Tung, University of Waterloo; Jim Wallace, University of Waterloo; Mu Zhu, University of Waterloo

Ethical, Cultural, and Social Aspects of Technology (“ETHICS-TECH”)

TWENTY-THREE: “AT-SELECT”

Understanding the issues around adoption of e-decision support for self-selection of assistive technology by elders

This project will investigate factors that contribute to the adoption of an e-decision assistive technology (AT) tool for older adults and their caregivers. The project has two objectives: 1) to evaluate the feasibility of adapting a UK e-decision support system to the English and French Canadian context and 2) to explore the readiness for an e-decision support system for self-selection of AT in Canada. This project will investigate the cultural, ethical, and social issues that surround the adoption of such a technology.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Manon Guay, Université de Sherbrooke; Claudine Auger, Université de Montreal;

Co-Investigators: Annette Leibing, Université de Montreal

TWENTY-FOUR: “ADT-RIP”

Aging, disability and technology: Understanding and advancing Canadian policies for technology access

The current policies for technology funding and services are not coordinated and vary across Canada. This project will study how assistive technologies are accessed by Canadians and will identify funding and services gaps. The research team will explore the ethical, social and policy issues, including data privacy and confidentiality. They will also work with policy makers, the users of technology, researchers and others affected by the issue to recommend policies that can improve access to technology in a fair way.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Rosalie Wang, University of Toronto; Michael Wilson, McMaster University

Co-Investigators: Jerome Bickenbach, University of Lucerne; John Lavis, McMaster University; Michelle Putnam, Simmons College



TWENTY-FIVE: “PRIV-SENSE”

Privacy, Security, and Ethics of the use of Emerging Technologies: Development and Validation of a Framework for Research and Policy

While millions of Canadians with disabilities use technologies to assist them in their daily lives, users' concerns about ethics, security and privacy limit the diffusion and adoption of information communications technologies. This project aims to develop a framework to describe the influence of ethical, security and privacy factors in technology adoption. It will be achieved through the creation of a mobile application to promote safe and rational medication use by the elderly and people with disabilities.

PROJECT TEAM & AFFILIATIONS:

Project Leads: Virgine Cobigo, University of Ottawa; Jeffrey Jutai, University of Ottawa;

Co-Investigators: Céline Blanchard, University of Ottawa; Ann Cavoukian, Ryerson University; Wendy Cukier, Ryerson University; Yves Lachapelle, Université du Québec