ROTMAN RESEARCH INSTITUTE

FEAR**NO**AGE™

Baycrest
Rotman Research Institute

Leading research.
Transforming aging.

2021–2022 Year in Review

RRI BY THE NUMBERS

27 SCIENTISTS | **81** TRAINEES

4 SCIENTIFIC ASSOCIATES

52 RESEARCH STAFF

2 CLINICIAN ASSOCIATES

26 New grants received

$11.2M New grant funding awarded over multiple years

16,110 ACTIVE RESEARCH PARTICIPANTS

4 CANADA RESEARCH CHAIRS, INCLUDING A CANADA 150 RESEARCH CHAIR

4 ENDOWED RESEARCH CHAIRS

23 ADMINISTRATIVE AND SUPPORT STAFF

#1 RESEARCH-INTENSIVE HOSPITAL IN CANADA

$25.1M Total research funding spent (including operations and grants)

269 Ongoing studies

89 Keynote and invited presentations by scientists

46 OUTREACH EVENTS | **33** STUDENT AWARDS

40 INTERNATIONAL PARTNERSHIPS

185 PUBLICATIONS

RESEARCH UNITS AND CENTRES

Anne & Allan Bank Centre for Clinical Research Trials

Ben and Hilda Katz Inter-Professional Research Centre in Geriatric and Dementia Care

Canadian Consortium on Neurodegeneration in Aging (CCNA)

Kimel Family Centre for Brain Health and Wellness

Kunin-Lunenfeld Centre for Applied Research & Evaluation (KL-CARE)

Research Training Centre (RTC)

CORE RESEARCH THEMES

Sensory and Cognitive Neuroscience

Neuroinformatics and Computational Neuroscience

Aging and Brain Health

Alzheimer's and Related Dementias
> Prevention
> Early Detection
> Intervention/Treatment
> Care

TABLE OF CONTENTS

LEADERSHIP MESSAGE

DR. ALLISON SEKULER

President & Chief Scientist,
Baycrest Academy for Research
and Education at Baycrest
Centre for Geriatric Care

*Sandra A. Rotman Chair in
Cognitive Neuroscience,*
Rotman Research Institute

President & Chief Scientist,
Centre for Aging + Brain Health
Innovation

vpr@research.baycrest.org

DR. SARA DIAMOND

Chair, Advisory Committee,
Baycrest Academy for Research
and Education at Baycrest
Centre for Geriatric Care

President Emerita,
OCAD University,
C.M., O.Ont., R.C.A., ICD.D

Despite the continued challenges of the COVID-19 pandemic, this year we were able to slowly welcome more people on the Baycrest campus. While uncertainty remains high, it has been a pleasure to resume more in-person studies and to see more of our research participants in our labs and more research taking place across our campus.

We are pleased to share that Baycrest was recognized as the #1 most research-intensive hospital in Canada, according to Research Infosource's latest rankings for Canada's Top 40 Research Hospitals. The RRI has continued to increase the reach of its crucial research in aging and brain health, Alzheimer's and related dementias, sensory and cognitive neuroscience, and neuroinformatics and computational neuroscience. We have advanced innovative mobile and virtual testing approaches, and contributed significantly to our understanding of COVID-19's effects on brain structure and function. Over the past year, the RRI's work has been supported by $25.1 million of spent research funding obtained from a growing number of organizations and foundations, including the Baycrest Foundation. We are especially grateful to donors of the Baycrest Foundation for their continued support of research.

In this report, we highlight a small selection of the many ways in which RRI researchers are furthering the prevention, detection, and treatment of dementia. We also situate this work in the broader context of the critical, emerging field of predictive neuroscience for precision aging and brain health, in which we are taking a leading role. We share more about this exciting field later in the report.

As well, we feature Baycrest's inter-disciplinary and inter-professional approaches to research through a number of research units and centres: the Ben and Hilda Katz Inter-Professional Research Centre in Geriatric and Dementia Care, the Canadian Consortium on Neurodegeneration in Aging (CCNA), the Research Training Centre (RTC), the Anne &

Allan Bank Centre for Clinical Research Trials, the Kimel Family Centre for Brain Health and Wellness, the Centre for Aging + Brain Health Innovation (CABHI), and the Kunin-Lunenfeld Centre for Applied Research & Evaluation (KL-CARE).

We also welcome Dr. Morgan Barense as the new Dr. Max and Gianna Glassman Chair in Neuropsychology, a joint position at Baycrest and the University of Toronto, and we celebrate some of our retiring senior scientists. As well, we feature some of the many individuals without whom research at Baycrest and the RRI would not be possible, from research trainees to research participants to staff members.

Further, we take a look at the ways in which Baycrest research is being translated in the community, with impacts on practice, innovation, and policy. We reaffirm our commitment to equity, diversity, and inclusion, while promoting open science. We also highlight the upcoming opening of Baycrest's new Kimel Family Centre for Brain Health and Wellness, the world's first community centre focused on dementia prevention.

To better serve Baycrest's clients and community, and to build upon our research, education, and innovation efforts for greater global impact, this year Baycrest began an organizational restructuring. As part of this process, the RRI and the Centre for Education and Knowledge Exchange in Aging joined forces to become the Baycrest Academy for Research and Education. We share more about this exciting development later in this report.

While the COVID-19 pandemic continues to pose challenges, we are excited for the year ahead and remain dedicated to creating a world in which every older adult can **Fear No Age™**.

Dr. Allison Sekuler   Dr. Sara Diamond

Rotman Research Institute Leadership and Management Team

The Rotman Research Institute advances our understanding of human brain structure and function in critical areas of cognitive neuroscience, including perception, memory, language, attention, and decision-making. With a primary focus on aging and brain health, RRI scientists, staff, and trainees, and other researchers across Baycrest, promote effective care and improved quality of life for older adults through research into age- and disease-related behavioural and neural changes.

DR. ROSANNE ALEONG

Executive Director, Research, Innovation, and Translation, Rotman Research Institute

Administrative Lead, Research Training Centre

Director, Research, Innovation, and Translation, Centre for Aging + Brain Health Innovation

raleong@research.baycrest.org

DR. NICOLE ANDERSON

Interim Executive Director, Scientific and Academic Affairs, Rotman Research Institute (January 1, 2022-present)

Director, Ben and Hilda Katz Inter-Professional Research Centre in Geriatric and Dementia Care

Associate Scientific Director, Kimel Family Centre for Brain Health and Wellness

Senior Scientist, Rotman Research Institute

nanderson@research.baycrest.org

DR. JEAN CHEN

Chair, RRI Imaging Committee

Canada Research Chair in Neuroimaging of Aging

Senior Scientist, Rotman Research Institute

jchen@research.baycrest.org

DR. HOWARD CHERTKOW

Director, Kimel Family Centre for Brain Health and Wellness

Director, Anne & Allan Bank Centre for Clinical Research Trials

Chair in Cognitive Neurology and Innovation

Senior Scientist, Rotman Research Institute

hchertkow@research.baycrest.org

DR. ASAF GILBOA

Faculty Lead, Research Training Centre

Senior Scientist, Rotman Research Institute

agilboa@research.baycrest.org

ROSHAN GUNA

Manager, Research Ethics and Participation, Rotman Research Institute

rguna@research.baycrest.org

JEAN LAZARUS

Vice President, Administration and Operations, Baycrest Academy for Research and Education at Baycrest Centre for Geriatric Care

jlazarus@baycrest.org

DR. BRIAN LEVINE

Chair, RRI Research Participation Committee

Senior Scientist, Rotman Research Institute

blevine@research.baycrest.org

SHUSMITA RASHID

Associate Director, Scientific and Academic Affairs, Rotman Research Institute

Senior Manager, Centre for Aging + Brain Health Innovation

srashid@baycrest.org

DR. JENNIFER RYAN

Director, Scientific and Academic Affairs and Reva James Leeds Chair in Neuroscience and Research Leadership (through December 31, 2021)

Senior Scientist, Rotman Research Institute

jryan@research.baycrest.org

RYAN WEBSTER

Vice President, Finance & Business Development, Baycrest Academy for Research and Education at Baycrest Centre for Geriatric Care

Director, Finance & Performance, Centre for Aging + Brain Health Innovation

rwebster@baycrest.org

To learn more, please visit **baycrest.org/research**

COVID-19'S EFFECTS ON THE BRAIN

As the COVID-19 pandemic continues, RRI scientists are harnessing their expertise in brain health to examine the effects of infection, as well as the unintended consequences of public health restrictions, on brain structure and function, mental health, and cognition in young and older adults. Their results will help inform interventions to address these effects during this and any future pandemics.

Scientists at the RRI have partnered with colleagues at Sunnybrook Health Sciences to examine the effects of COVID-19 on brain structure and function. To this end, they are conducting sensory, cognitive, and clinical assessments, along with electroencephalography (EEG) and magnetic resonance imaging (MRI) of the brain in recovered COVID-19 patients and people who had COVID-like symptoms but tested negative. Study participants are assessed at baseline and several months later, to detect whether brain symptoms are present and whether they resolve or linger.

Preliminary EEG results show different brain wave patterns in the COVID-19 patients several months later, indicating that their brains do not work as efficiently or as effectively. These patterns are similar to those seen in people diagnosed with mild cognitive impairment, which can develop into dementia. This clearly indicates the need for further research to determine whether the direct effects of COVID-19 on the brain also increase dementia risk, and identify ways to mitigate this.

In line with the RRI's focus on predictive neuroscience for precision aging, this data could also help identify those who might be at the highest risk of developing long COVID, as well as personalized strategies to reduce their risk.

RRI researchers contributing to this study are Dr. Allison Sekuler, President & Chief Scientist, Baycrest Academy for Research and Education, and Sandra A. Rotman Chair in Cognitive Neuroscience, Rotman Research Institute; Dr. Jean Chen, Senior Scientist and Baycrest's Canada Research Chair in Neuroimaging of Aging; Dr. Asaf Gilboa, Senior Scientist; and Dr. Eugenie Roudaia, Scientific Associate. This research is funded in part by the Canadian Institutes of Health Research.

Examining the impacts of COVID-19 on mental health

Dr. Linda Mah (Senior Clinician Scientist at the RRI) is working with colleagues at the Centre for Addiction and Mental Health to understand the effects of the pandemic

and indirect consequences of stay-at-home orders and other public health measures on the mental health of older adults. Preliminary findings show that those with mild cognitive impairment and a history of depression, as well as women in general, appear to be more vulnerable to clinically significant mental health symptoms, such as depression and anxiety.

In another study, Dr. Rosanna Olsen, Senior Scientist, and Dr. Jennifer Ryan, Senior Scientist, are examining the factors affecting older adults' dementia risk during the COVID-19 pandemic. Dr. Donna Rose Addis, Baycrest's Canada 150 Research Chair in Cognitive Neuroscience of Memory and Aging and Senior Scientist at the RRI, is investigating the effects of the pandemic on mental health in the general population and how this may impact their ability to imagine the future.

To date, both studies suggest that older adults have shown high levels of resilience throughout this difficult time.

REDUCING DEMENTIA RISK WITH AN ONLINE EDUCATIONAL PROGRAM

RRI scientists are developing and testing a year-long, online educational program to help users reduce their risk of developing dementia.

The program, called Brain Health PRO, focuses on seven different modifiable dementia risk domains: exercise, nutrition, sleep, psychological and social health, cognitive engagement, heart health, and vision and hearing. For each of these domains, the program includes 10-minute educational videos on the different brain health risks and strategies to reduce them, as well as related activities for users to complete.

"The aim is for the program to be engaging and enjoyable for users," says Dr. Nicole Anderson, Senior Scientist at the RRI and Associate Scientific Director of Baycrest's Kimel Family Centre for Brain Health and Wellness. "To this end, we put together a citizens' advisory group to review all of our content. Their feedback has helped us make sure the information is engaging and accessible."

To test the program, the Brain Health PRO team is recruiting 350 participants across Canada who have at least one risk factor for dementia, such as a first-degree relative who is living with dementia, high blood pressure, or high cholesterol.

At the beginning of the study, participants will complete a questionnaire to evaluate their dementia risk based on lifestyle factors. They will then set smart goals related to their brain health and work towards them using Brain Health PRO, reflecting the personalized approach underlying predictive neuroscience for precision aging. Throughout the program, participants will also be sent portable electroencephalography headsets to measure their brain activity while they sleep, and accelerometers to track their physical activity. As well, they will be asked to complete short cognitive tests on their smart phones at different times of the day. This wealth of data will help predict personalized approaches for participants to help reduce their dementia risk.

If the program is effective, participants should see their dementia risk decrease throughout the year.

"This study will show us whether Brain Health PRO is a good way to engage older adults to help them make lifestyle choices that will promote brain health," says Dr. Anderson, who is also the Director of the Ben and Hilda Katz Inter-professional Research Centre in Geriatric and Dementia Care.

PREVENTION

Brain Health PRO is part of the Canadian Therapeutic Platform Trial for Multidomain Interventions to Prevent Dementia (CanThumbsUp), which is part of the Canadian Consortium on Neurodegeneration in Aging (CCNA).

To learn more, please visit **canthumbsup.ca**

DETECTION
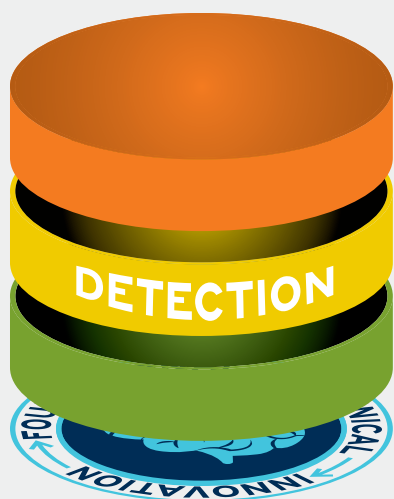
USING HEART RATE TO DETECT COGNITIVE DECLINE SOONER

RRI scientists are working to identify an innovative, accessible way to detect cognitive decline earlier using heart rate variability – that is, the beat-to-beat change in an individual's heart rate.

"Rather than being like a metronome, it's better for your heart rate to be very slightly off-beat – or in other words, to have greater heart rate variability. This seems to be linked to being more adaptive and able to more rapidly respond to changes in the environment," says Dr. Linda Mah, Senior Clinician Scientist at the RRI and the lead on this study.

Research suggests that lower heart rate variability is linked to depression, which is a known risk factor for dementia. It is also associated with poor executive function (the ability to multi-task and think flexibly), which can be seen in Alzheimer's disease.

Given these links, Dr. Mah is investigating whether low heart rate variability may be linked to memory and cognitive decline. She is working with Dr. Jean Chen, Baycrest's Canada Research Chair in Neuroimaging of Aging, to use electrocardiograms (ECGs) to look at heart rate variability in older adults with certain dementia risk factors (a history of depression, mild cognitive impairment, or both), and compare them to those of older adults who are cognitively healthy.

If they can show that heart rate variability differs between cognitively healthy individuals and those at risk, a next step will be to follow those people over time to see if heart rate variability can predict cognitive decline and dementia in the future.

"If so, heart rate variability could be used as a simple and objective way to monitor risk for dementia. ECGs are readily available in clinical settings, making them more accessible than brain imaging. As well, several popular devices on the market can already measure heart rate variability, such as fitness trackers and smart watches," says Dr. Mah. "So one hope is that ultimately, the capacity to monitor risk for cognitive decline could be scaled up so that individuals could monitor their own risk by tracking heart rate variability using their personal device."

This whole-body approach to brain health is firmly rooted in the field of predictive neuroscience for precision aging.

While there is currently no cure for dementia, its symptoms can be treated to improve quality of life for those living with this condition. Among the most promising symptomatic treatments is transcranial direct current stimulation (tDCS), which involves passing a mild current of electricity through the brain while the patient is awake.
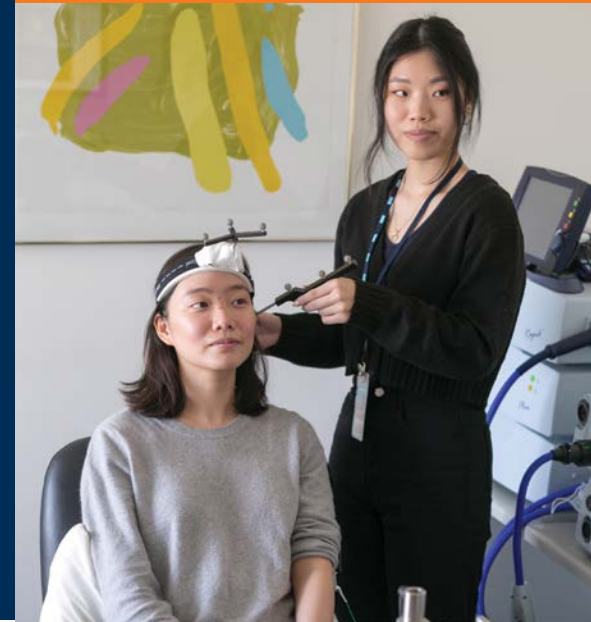
OPTIMIZING tDCS FOR PEOPLE LIVING WITH DEMENTIA

Scientific Associate Dr. Tyler Roncero aims to predict who will benefit from tDCS and optimize the use of this intervention for people living with dementia.

"We've already seen a lot of families experience positive results from tDCS in our lab. Participants show improved ability to name objects, and families report that they are more engaged at home," says Dr. Roncero. "If we can optimize its use, even more individuals could benefit from it as tDCS devices are convenient to use at home."

To this end, in a new study Dr. Roncero and his team will test the impact of different stimulation intensities. Because certain individuals seem to benefit more from this treatment than others, they are also using magnetic resonance imaging (MRI) to examine the factors that may lead to this difference, such as skull thickness and head size. In line with predictive neuroscience for precision aging, their results will help them predict who may benefit the most from this treatment, and who may require a stronger current.

This work is funded by the BrightFocus Foundation.

UNCOVERING WAYS TO BETTER TAILOR BRAIN STIMULATION TO INDIVIDUALS

While brain stimulation has been shown to be effective in treating symptoms of dementia and other neurological disorders, such as stroke, scientists do not fully know why this is the case.

Dr. Jed Meltzer is investigating the relationship between brain damage and neurological symptoms. This knowledge could help tailor brain stimulation treatments to specific individuals and disorders. He is also studying how the two sides of the brain may cooperate or compete with each other.

"The two sides of the brain seem to have a natural competition to keep each other balanced," says Dr. Meltzer, who is Baycrest's Canada Research Chair in Interventional Cognitive Neuroscience and a Senior Scientist at the RRI. "Our theory is that in certain asymmetrical neurological disorders, like stroke and some cases of dementia, the damaged side of the brain is too inhibited by the healthy side. If we could prevent that with targeted brain stimulation, we might improve people's quality of life."

This work is supported by the Canada Research Chairs program.
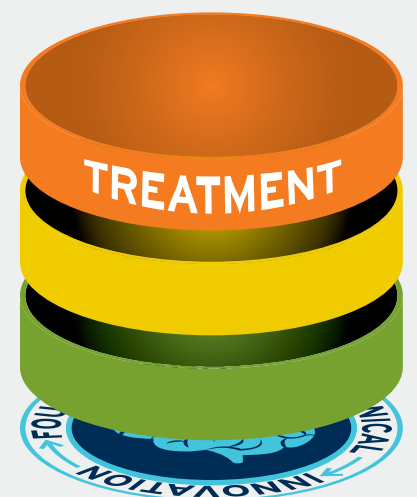
If you would like to participate in our research, please **click here** to learn more and express your interest.

Research Training Centre (RTC)

Due to the ongoing COVID-19 pandemic, the RTC continued their virtual offerings through 2021-2022, including their virtual Academic Rounds lecture series, workshops, summer student program, and trainee recruitment events. However, there were also opportunities for trainees to come together in person to connect and build community.

Sample workshops

Science Management & Science Communication, *April 2021*

Trainee Yoga Wellness, *April – May 2021*

Testing Memory and Cognition in Healthy Older Adults and in People with Memory and Cognitive Disorders, *May 2021*

Exploring Representational Space in the Mind and Brain, *July 2021*

Leveraging Emerging Technologies: Building Virtual and Real-World 3D Experiments for Desktop Computers and Virtual/Augmented Reality Headsets, *November 2021*

Equity, Diversity, and Inclusion (EDI) in Research Environments, *December 2021*

Equity, Diversity, and Inclusion (EDI) in Research and Innovation: Methodologies and Best Practices, *January 2022*

MEG Workshop: Head Localization and Co-registration with a Structural MRI, *January 2022*

"I Think I Might Have a Biomarker for Early Diagnosis of Alzheimer's Disease! Now What Do I Do?", *February 2022*

Research Ethics Brown Bag Series: Competence and Consent, *February – March 2022*

RTC Fall Social

On September 24, 2021, the RTC hosted their first in-person event since the start of the COVID-19 pandemic. RTC Steering Committee members Jordan Chad and Dr. Bruna Seixas-Lima organized a gathering of the RRI community, including trainees, scientists, and staff, at Baycrest Park to eat, drink, and be merry. Most importantly, it was an opportunity for new trainees and staff to gather safely with their peers in a social setting to learn more about each other and connect through science.

Annual General Meeting – The Failure Panel

On February 8, 2022, the RTC hosted its Annual General Meeting (AGM) for trainees, during which Dr. Barbara Sarnecka, Professor of Cognitive Sciences, University of California, Irvine, gave a presentation titled, "Cascading Mentorship and Rejection in Academia (aka Failure Panel)". As the next generation of scientific leaders, our trainees learned how to reframe and celebrate rejection (whether that be a publication, grant competition, or job application). The RTC welcomed Dr. Sarnecka's wisdom on how to build and maintain trainee resilience throughout their academic and vocational journeys.

The RTC is a unit dedicated to the technical, professional, and career development of the next generation of scientific leaders. Through expert-led lectures, workshops, internships, scholarships, and public outreach initiatives, the RTC provides trainees with opportunities to build research and leadership skills; network with scientific leaders in academia, industry, government, and not-for-profit organizations; and explore career options.

9 professional development events
39 technical development events
22 virtual wellness events
1157 workshop attendees

32 rounds
1424 rounds attendees
24 scholarships awarded
$59,700 in scholarships awarded

TRAINEE HIGHLIGHTS

A postdoctoral research fellow in the Olsen and Buchsbaum Labs, **Dr. Mrinmayi Kulkarni** is investigating how our behaviour is guided by brain networks that underlie learning and memory, and how this process changes with age and disease. Through this research, she aims to identify factors that may alleviate age-related cognitive decline.

"I'm excited by the opportunity at the RRI to work with leading researchers studying learning and memory at multiple levels of analysis," says Mrinmayi. "I believe that working at the RRI allows scientists to work on clinically relevant and translatable research, giving us the unique opportunity to more directly impact people's lives."

During her time as a summer research trainee in the Olsen Memory Lab as part of the University of Toronto-led Summer Research Opportunities Program (SROP, a program serving as a gateway to academia for students who are Black, Indigenous, and People of Colour), **Juliet Fowler** focused on cognitive neuroscience and dementia. She worked on a longitudinal study on the health of older adults during the COVID-19 pandemic, which will increase our understanding of ways to support older adults during this challenging time and beyond. She is now a research assistant at the Human Electrophysiology Lab at Simon Fraser University, where she uses electroencephalography to study attention. "Through the SROP and the RRI, I met some amazing and inspiring people and learned so much about what it means to be a researcher," says Juliet.

As a doctoral student in the Alain Lab, **Maxime Perron** is interested in how aging and age-related hearing loss affect cognition and communication abilities. He aims to determine whether personal sound amplification products – low-cost alternatives to hearing aids – can help older adults with mild to moderate hearing loss better understand speech in noisy situations. The results could help protect the cognition of older adults with hearing loss who cannot afford conventional hearing aids, thus reducing their risk of social isolation and, consequently, dementia. "For me, training at the RRI means working with multi-disciplinary teams who share a common goal: promoting healthy aging. It is very rewarding to be able to work towards this goal with highly qualified teams and state-of-the-art technologies," says Maxime.

Visit the **RTC website** to learn more.

Kunin-Lunenfeld Centre for Applied Research & Evaluation (KL-CARE)

KL-CARE is a support-and-services hub that works with point-of-care staff, researchers, educators, students, companies, and not-for-profit organizations to facilitate and implement evaluations as well as basic and applied research to inform care and optimize efficiencies.

19 staff
66 projects

13 manuscripts
7 posters
8 presentations

Evaluating Possibilities by Baycrest™, an evidence-based memory care model

Possibilities by Baycrest™ is a transformational, first-of-its-kind memory care model. Drawing on 104 years of expertise, Possibilities by Baycrest™ shifts the residential experience away from a traditional focus on daily tasks to one that maximizes the abilities of each individual living with dementia. Staff and the care community are enabled to offer individuals living with dementia a personalized, flexible, meaningful experience that recognizes the person first through the nurturing of a relationship, while applying solutions that leverage our knowledge of the brain.

In collaboration with the leadership and clinical teams, KL-CARE is developing a framework to evaluate how the model is being implemented at the Baycrest Terraces, including staff training and model use. There will also be an outcome and impact evaluation to determine the model's impact on clients, caregivers, staff, and the organization. Using surveys, interviews, focus groups, medical chart data, and administrative data, KL-CARE will assist in refining the model to scale it nationally and internationally.

Understanding the needs of persons living with dementia, their caregivers, and family physicians in delivering community-based dementia care

In 2020, the Alzheimer Society of Canada and the College of Family Physicians of Canada developed and implemented national surveys of persons living with dementia, their caregivers, and family physicians, with some additional, partial funding from an Alternative Funding Plan grant. Their aim was to identify respondents' needs in terms of dementia care, potential gaps, and recommendations for improvement. With respondents from across Canada, KL-CARE was engaged to obtain research ethics approval for the project and conduct both quantitative and qualitative analyses of the survey data, identifying potential barriers to diagnosis and care. These results will inform further work in developing tools and strategies to assist physicians, clients, and caregivers to combat these barriers.

Visit the **KL-CARE website** to learn more.

A rigorous, integrated, and inter-disciplinary evaluation is needed when considering new programs, innovations, and care practices. The KL-CARE team assists health professionals, researchers, companies, and not-for-profits to effectively implement program evaluations, basic and applied research studies, or unique innovations by providing administrative, technical, and scientific support.

KL-CARE'S SERVICES INCLUDE:

Project Management and Administration

- Project scope development
- Grant writing support
- Evaluation tools design
- Facilitation of research contracts and agreements
- Stakeholder engagement

Research Design and Implementation

- Expert scientific, evaluation, and validation consultation
- Ideation and brainstorming facilitation
- Strategic planning and execution of innovation implementation
- Study design
- Research Ethics Board submissions
- Participant recruitment
- Data collection

Analysis and Statistical Consulting

- Data management
- Statistical programming
- Analysis planning
- Quantitative and qualitative:
  - Consulting
  - Analysis

Education and Training

- Research skills development through training and workshops
- Clinical research capacity development
- Clinical and research partnership development

Knowledge Dissemination

- Manuscript development
- Poster preparation
- Presentation preparation
- Program and technology evaluation reporting

Centre for Aging + Brain Health Innovation (CABHI)

A solution accelerator for the aging and brain health sector, CABHI provides funding and support to innovators for the development, testing, dissemination, and adoption of new ideas and technologies that address unmet brain health and seniors' care needs. Established in 2015, it is a unique collaboration of healthcare, science, industry, not-for-profit, and government partners whose aim is to help improve quality of life for the world's aging population, allowing older adults to age safely in the setting of their choice while maintaining their cognitive, emotional, and physical well-being.

The collaboration between CABHI and the RRI represents the deep connection between aging and brain health research and the innovative solutions designed to improve the lives of older adults and their caregivers.

Gamifying training for frontline workers in long-term care

In collaboration with the Ontario Centres for Learning, Research, and Innovation in Long-Term Care at Baycrest and the RRI's Kunin-Lunenfeld Centre for Applied Research and Evaluation, CABHI developed and evaluated the Learning Inter-Professionally Healthcare Accelerator (LIPHA), an innovative and effective virtual simulation-based learning platform to enhance the onboarding and training of a skilled workforce in the seniors' care sector.

LIPHA provides a virtual space with simulated cases and a serious educational game for healthcare professionals and students in the long-term care sector. It acts as a virtual preceptor to support self-paced learning that focuses on best practices, safety, and teamwork in a digital open world. The goal is to strengthen the long-term care sector and optimize quality of care and life for older adults during the COVID-19 pandemic and beyond.

Leap

Developed by CABHI, Leap is a welcoming, diverse, and engaged online community where life experience meets innovation. Leap bridges the gap between its members – older adults and caregivers, and the innovators developing solutions meant for them. Leap members connect to exchange stories, learn about aging and brain health innovations, and provide feedback to innovators to make their agetech solutions better and more readily accessed and adopted.

As well, Leap hosts regular virtual Q&A sessions on a variety of topics related to brain health and aging. This winter, RRI Senior Scientist Dr. Nicole Anderson facilitated two of these events on the topic of "Keeping Our Brains Fit."

Visit the **CABHI website** to learn more.

CABHI Summit

CABHI hosted its fourth annual CABHI Summit, "Empowered Aging Through Innovation," which took place virtually on March 23 and 24, 2022.

Featuring more than 50 speakers, 60 exhibitors, and 20 sponsors from around the globe, the CABHI Summit 2022 was a true meeting of the minds in the longevity sector. The jam-packed event brought together a unique blend of thought leaders, innovators, companies, investors, healthcare providers, older adults, caregivers, and people living with dementia across six continents and more than 25 countries.

Members of the RRI and CABHI moderated several important discussions throughout the CABHI Summit:

Shusmita Rashid, Associate Director of Scientific and Academic Affairs at the RRI, moderated a session that delved into how aging and brain health solutions can successfully be adopted, and why it is crucial for organizations and entrepreneurs to integrate end-user feedback into their innovations.

How are innovations like robotics, artificial intelligence (AI), virtual reality (VR), or even the metaverse going to play leading roles in the collective physical and mental well-being of older adults and caregivers? President and Chief Scientist of the Baycrest Academy for Research and Education, Dr. Allison Sekuler moderated a fascinating panel on this topic with experts in the agetech landscape.

A 2019 report from the Brookfield Institute for Innovation + Entrepreneurship found that women and people who identify as visible minorities were more likely to be underpaid and under-represented in the Canadian tech industry. Dr. Rosanne Aleong, Executive Director of Research, Innovation, and Translation at the RRI, led a discussion about how the start-up world can forge a new and inclusive path forward.

What is the procurement process really like for companies in the agetech and healthtech space in Canada? The Baycrest Academy's Vice President, Finance & Business Development, Ryan Webster, moderated a panel where experts demystified the basics, shared success stories, and gave their opinion on what companies can be doing right now to better position themselves for success.

Several Summit sessions are available for free as podcast episodes at **cabhi.com/category/podcast**

The Anne & Allan Bank Centre for Clinical Research Trials

At this time, no effective medication is available on the market to prevent, treat, or reverse the course of Alzheimer's disease (AD) and related dementias. Approved medications have the aim to relieve symptoms of AD for a limited amount of time. Clinical trials are an essential step in developing effective treatments for AD and related dementias and advancing our knowledge about these neurodegenerative disorders, ultimately creating a world where we can all age without fear.

The Anne & Allan Bank Centre for Clinical Research Trials (CCRT) at Baycrest was created to respond to a growing need to explore and test new therapies to prevent, detect, and treat dementia. Led by Dr. Howard Chertkow (Baycrest's Chair in Cognitive Neurology and Innovation and Director of the Kimel Family Centre for Brain Health and Wellness), it is a unique, multi-disciplinary department with the objective to design, conduct, analyze, and publish clinical trials and observational studies to help advance knowledge in – and find effective treatments for – AD and other types of dementia.

The CCRT is composed of a devoted and multi-disciplinary team working across a wide range of specialties, including Baycrest physicians, research coordinators, research assistants, the data analysis team, and research participants.

The research studies currently being conducted at the CCRT are designed to help evaluate the safety and efficacy of interventions, such as:

- Drug therapies
- Dietary advice
- Intense cognitive training and exercise
- Non-invasive and safe electrical brain stimulation
- Meditation
- Light therapy

- Other non-pharmacological approaches to boost brain function

All assessments are offered to participants at no cost. CCRT studies never require participants to stop any of their current medications.

With the RRI's focus on predictive neuroscience for precision aging, we want to predict which individuals will benefit the most from specific treatments, thus optimizing treatment outcomes.

The CCRT is currently focused on treatments to slow or stop AD in its earliest stages. As such, we are involved in international trials supported by Lilly and Hoffmann-La Roche to test immune therapies for AD. As it is believed that immune system deficits may contribute to AD, we are also testing a new drug from Alector Inc., which aims to correct these deficits.

Further studies are being carried out by RRI scientists using electrical stimulation (transcranial direct current stimulation) and low-dose brain radiation aimed at improving dementia symptoms in individuals living with AD. As well, we are involved in supporting trials of dementia prevention techniques via the Canadian Consortium on Neurodegeneration in Aging (CCNA), whose scientific headquarters are housed at Baycrest and for which Dr. Chertkow is the Scientific Director.

All studies offered through the CCRT are first reviewed and approved by the Baycrest Research Ethics Board and the applicable regulatory authorities, such as Health Canada, the U.S. Food and Drug Administration, and the European Union, to ensure that they meet current ethical and safety standards and are in compliance with the International Conference on Harmonisation – Good Clinical Practice (ICH-GCP).

Contact us

If you are interested in participating in our clinical research trials, please contact our team to schedule an assessment of your eligibility.

p: 416-785-2500 ext. 3627

e: **navvaru@research.baycrest.org**

w: **baycrest.org/clinicaltrials**

Knowledge Mobilization, Community Outreach, and Thought Leadership

Harnessing expertise from a broad range of fields, predictive neuroscience for precision aging at the RRI will develop personalized approaches to prevent dementia and preserve brain health for older adults.

If you would like to express your interest in becoming a member of the Kimel Family Centre, please complete the form **here** and a member of the Kimel Centre team will be in touch.

Combining research and lifestyle interventions to prevent dementia

Construction of the Kimel Family Centre for Brain Health and Wellness at Baycrest was completed this year, and the centre will open in 2022! The first of its kind in the world, the Kimel Family Centre is the only community centre focused on dementia prevention.

The Kimel Family Centre will include:

- Stan's gym
- A warm water pool
- A room with soft flooring for yoga and floor exercises
- A classroom for workshops on nutrition and other lifestyle factors
- A creative arts studio

Its aim is to create personalized brain health prescriptions to help every older adult live better for longer.

The Kimel Family Centre will be the flagship of the national dementia prevention program of the Canadian Consortium on Neurodegeneration in Aging (CCNA) - Canada's largest dementia research initiative. The RRI is home to CCNA's scientific headquarters.

Bringing scientists and clinicians together to improve older adults' quality of life

The Ben and Hilda Katz Inter-Professional Research Centre in Geriatric and Dementia Care (Katz Centre) continues to bring together Baycrest researchers and clinicians from various health disciplines to conduct research that improves the lives of older adults, including those living with dementia. The program is rooted in the belief that quality of life can best be improved by integrating diverse knowledge, skill sets, and perspectives.

This year the Baycrest Research Ethics Board, Research Training Centre, and Katz Centre collaboratively organized the Research Ethics Brown Bag Series for individuals interested in research, program evaluation, quality improvement, and innovation evaluation. Sessions covered topics related to research ethics, such as participants' consent and capacity issues, meaningful involvement, and the inclusion of under-represented and vulnerable groups.

Advancing brain health through neuroscience and virtual reality

Dr. Allison Sekuler, President and Chief Scientist of the Baycrest Academy for Research and Education, was invited to speak at the 2022 South by Southwest (SXSW22) Conference to discuss how virtual reality (VR) technology provides new methods to improve assessments and to deploy sophisticated therapeutic solutions directly relevant to our aging population. Attendees learned about the latest in neuroscience research and how the coming wave of VR, extended reality, and augmented reality technologies will impact medicine, clinical care, and personal health and wellness — and how these innovations could be critical to improving brain health and advancing seniors' care.

Providing expert leadership on Alzheimer's disease treatment

Aducanumab, a possible treatment for Alzheimer's disease, was approved for use in the United States by the U.S. Food and Drug Administration in 2021 and was then submitted for review and approval by Health Canada. Dr. Howard Chertkow (Baycrest's Chair in Cognitive Neurology and Innovation and Director of the Kimel Family Centre for Brain Health and Wellness) partnered with researchers and clinicians from six Canadian organizations working in dementia research and care to analyze the situation. Together, they sent a consensus statement to health authorities in Canada, indicating that it would be premature for aducanumab to receive approval for the treatment of Alzheimer's disease in Canada. Health Canada recently rejected the application for aducanumab, which will therefore not be released to the Canadian public.

Increasing the impact of research through virtual rounds and care

RRI Academic Rounds were held virtually all year, allowing us to host a diverse group of speakers and attendees from all over the world. The Research Training Centre hosted its annual Toni Balatinecz Symposium on March 30, 2022 on the topic of individually tailored, remote rehabilitation for persons with neurological disorders. As well, Baycrest's long-standing International Behavioural Neurology Rounds continued on a weekly basis, bringing together internationally renowned clinicians and researchers to discuss evidence-based practices, and new developments in care and research.

Further expanding the impact of RRI research, Baycrest is embarking on a fundamental redesign of its care delivery systems through the new Centre for Neurology and Behavioural Support, which will build on the success of the highly innovative Virtual Behavioural Medicine (VBM) program. Launched at Baycrest in 2020 and led by Dr. Morris Freedman (Scientist at the RRI and Head of Neurology at Baycrest), VBM offers virtual assessments and management for individuals with dementia who are exhibiting severe responsive behaviours such as aggression, agitation, and hallucinations. The Centre for Neurology and Behavioural Support will include a transformational artificial intelligence (AI)-supported platform to offer precision medicine and personalized care.

Welcoming the New Dr. Max and Gianna Glassman Chair in Neuropsychology, and Celebrating Retiring Colleagues

Dr. Morgan Barense on the University of Toronto campus, where she is a Professor and Canada Research Chair in Cognitive Neuroscience. Photo by Reynard Li, courtesy of Dementia Connections.

NEW GLASSMAN CHAIR IN NEUROPSYCHOLOGY IS HELPING OLDER ADULTS IMPROVE THEIR MEMORY

Baycrest is pleased to welcome Dr. Morgan Barense as the new Dr. Max and Gianna Glassman Chair in Neuropsychology, a joint position at Baycrest and the University of Toronto. A leading neuroscientist in the field of aging and brain health, Dr. Barense's work is helping older adults better remember the events of their lives.

"Memory is one of the most remarkable feats of the human mind," says Dr. Barense, Canada Research Chair in Cognitive Neuroscience, Senior Scientist at the RRI, Director of the Toronto Neuroimaging Facility, and Professor of Psychology at the University of Toronto. "I want to understand how the brain supports memory, and how we can leverage that knowledge to support older adults."

With support from the Centre for Aging + Brain Health Innovation (CABHI) and others, Dr. Barense and her colleagues have created a smartphone-based app to boost everyday memory in individuals at risk for Alzheimer's disease. This novel digital memory aid, called the HippoCamera, is designed to mimic memory encoding and retrieval performed by the hippocampus, a part of the brain that is critical in supporting our memories.

Designed for older adults, the app is easy to use and has only two buttons: record and replay. First, the record function targets

memory encoding – that is, what happens in the hippocampus when we first experience an event and "learn" a memory. Second, the HippoCamera's replay function helps users "study" their memories with powerful eight-second memory cues using speeded-up videos and verbal descriptions captured by the user.

Early research results demonstrate that when users capture one memory per day and replay their memory cues once per day using the HippoCamera, they remember close to 50 per cent more details from events.

"We are thrilled to welcome Dr. Barense, whose work will further our understanding of how the brain supports memory and ways to apply this critical knowledge to help older adults make the most out of life," says Dr. Allison Sekuler, President and Chief Scientist at the Baycrest Academy for Research and Education.

A FOND FAREWELL

Drs. Cheryl Grady, Stephen Strother, and Randy McIntosh retired from the RRI this year. As some of the earliest members of the RRI, their contributions to neuroimaging research, open science, and neuroinformatics, among others, helped to build the strong foundation upon which the RRI stands today. We thank them for their many years of excellent work and we wish them all the best in their future endeavours.

Spotlight: Those Who Make Us Great

People from all across the RRI make critical contributions to our research. Without our dedicated staff members, clinician associates, and research participants, our work would not be possible.

Jennifer Walmsley was in the middle of a hectic work day when a terrible headache forced her to visit the hospital. After initially being sent home with some painkillers, she was diagnosed as having two brain aneurysms – and one of them had burst. What followed was an ambulance ride to Buffalo, New York, life-saving surgery, weeks in the intensive care unit, and finally months of hard work in physical and cognitive rehabilitation to re-learn everything as a day patient at Toronto Rehabilitation Institute (TRI) and Baycrest. A year later, with the help of her care teams at Baycrest and TRI, she reached a major milestone: She got her driver's license, and her independence, back. "With the kind of aneurysms I had, I'm lucky to be alive and independent," says Jennifer. "So if I can make a difference in somebody else's world by participating in research, I will do it in a heartbeat."

Clinician Scientist **Dr. Regina Jokel** studies language changes in both typical and atypical aging, with a specific focus on primary progressive aphasia (PPA), a brain disorder that affects speech, language, and communication. She develops novel language interventions for people affected by this disorder and works with her patients to test these interventions. She has also developed **wordfinding.ca**, a freely accessible website for healthy older people who want to decrease the frequency of "tip-of-the-tongue" instances (moments when a word seems just out of reach) and improve their word retrieval ability. "I look at my research through a clinician's lens. So, until a cure is found, my overarching goal is to establish the most optimal model of service delivery for people living with PPA (patients and caregivers), based on science. Hopefully, this will translate into an improvement in the quality of their communication and life," says Dr. Jokel.

As the Manager of Research Ethics and Participation, **Roshan Guna** oversees various aspects of the recruitment and retention of research participants. Among many other tasks, he supports Baycrest staff, students, and scientists on research ethics questions and consultations, and works with the Research Ethics Board (REB) Chair to help facilitate the ethical review of new and ongoing research studies. As well, he is currently part of an REB administrators working group looking at ways to harmonize research ethics processes across Toronto academic hospitals. About working at the RRI, Roshan says, "I am approaching my 15-year anniversary here. The people – the scientists, trainees, staff, and volunteers – make the RRI a close-knit community and a special place to come to work."

The RRI is always looking for individuals to participate in research studies. For more information or to participate, please visit **www.baycrest.org/participateinresearch**

Honours, Awards, and Accolades

Baycrest is proud to be recognized as the #1 most research-intensive hospital in Canada, according to Research Infosource's latest rankings (2020) for Canada's Top 40 Research Hospitals.

Drs. Nicole Anderson and Howard Chertkow were awarded a **John R. Evans Leaders Fund** from the Canada Foundation for Innovation to enhance the state-of-the-art scientific equipment in the Kimel Family Centre for Brain Health and Wellness. This new technology will expand our holistic and personalized approach to brain health and dementia prevention.

The **National Institutes of Health** (NIH) awarded Dr. Rosanna Olsen and her international team a prestigious grant for her work on standardizing the definitions of the different regions of the brain's medial temporal lobe. This funding recognizes the RRI's leadership role in important methodological collaboratives and international consortia.

Baycrest named Canada's #1 most research-intensive hospital

Led by the RRI, Baycrest scientists attracted an average of $997,000 each in research funding last year. Baycrest also ranked as Canada's third research hospital by growth this year, with a 47 per cent increase in research spending year over year, and moved up eight positions in overall ranking over the past five years. Baycrest has been recognized among Canada's top research-intensive hospitals for 10 years in a row.

Our funding allows us to continuously expand the reach, timeliness, and impact of our critical research to help more people across Canada and around the world. For example, more than 500,000 Canadians currently live with Alzheimer's disease and other forms of dementia, affecting one out of every four Canadians over the age of 85. Before COVID-19, this number was expected to nearly double by 2030. Based on Baycrest research, the pandemic is likely speeding that growth, creating an even more urgent health crisis and need for research in this crucial area. As

highlighted in this report, studies from the RRI and collaborators have found both direct and indirect impacts of COVID-19 on the brain, which may lead to an increase in the incidence of dementia for many years to come. Research is essential to tackle this imminent challenge.

"Now more than ever, Canada must ensure all older people can live their best possible lives. To reach that goal, research is critical to show us how to optimize aging and brain health for each individual," says Dr. Allison Sekuler, President and Chief Scientist at the Baycrest Academy for Research and Education. "We are extremely grateful to the funders of our foundational and translational research addressing this vital issue; to the extraordinarily talented and creative scientists, staff, and students who move the work forward; and to the community of older adults and caregivers who give so generously of their time to help us create a world where everyone is empowered to age fearlessly."

Click **here** to read more.

Moving Forward

As part of Baycrest's organizational restructuring, the RRI and the Centre for Education and Knowledge Exchange in Aging have amalgamated to become the Baycrest Academy for Research and Education.

Introducing the Baycrest Academy for Research and Education

With the creation of the Baycrest Academy, we have an opportunity for transformational change to integrate education and research, while also aligning with clinical care across the campus, thereby maximizing the impact of both in the broader community. The Academy entities will continue their existing activities, but their combination will enable many additional benefits, such as the following:

• The Academy will bring together our unique perspectives on research and education to collaborate on initiatives and projects, amplifying the Academy's reach and impact.

• The Academy will strengthen our impact on clinical practice through applied research and evaluation, the use of effective knowledge dissemination and implementation tactics, and innovative, educational approaches.

• The Academy will bring together clinical students, research trainees, and medical trainees in a holistic approach to drive inter-professional learning and collaboration.

• The Academy will benefit from shared methodological expertise and infrastructure, enhance our ability to apply for more diverse funding and funding success, and develop and operationalize sustainable business models and opportunities.

Together, we will use our advances in research and education to help all older adults live their best possible lives.

Predictive neuroscience for precision aging

Building on the many initiatives and projects described throughout this report, scientists, staff, and trainees at the RRI are paving the way toward the new field of predictive neuroscience for precision aging, to optimize aging and tackle the dementia crisis. Predictive neuroscience brings together artificial intelligence, neuroinformatics, biomarkers, and cognitive psychology to model and predict how people will age in the future. Baycrest is home to experts and leaders in all of these areas, who are also driving partnerships with key organizations in the field.

With neuroscience at its core, predictive neuroscience for precision aging is a holistic approach that considers the brain in connection with the rest of the body, as well as the environment and society.

We are bringing the world of precision medicine into aging – to do for brain health what science did for cancer. Predictive neuroscience for precision aging will create personalized longevity and brain health prescriptions for the prevention, early detection, and care of dementia and related neurodegenerative disorders.

Open science at the RRI

By adopting open science principles, we are creating a pathway to accelerate research, discovery, and innovation that will benefit older adults everywhere. As part of this initiative, the RRI has partnered with the Data Sciences Institute (DSI) at the University of Toronto. This partnership will help Baycrest expand our potential for meaningful impact, catalyzing the transformative nature of data science to make the most of our behavioural, clinical, and neuroimaging data. Connecting with the data science community through the DSI will forge new collaborations and research opportunities.

The RRI also has partnerships with several other important groups, including the following:

• Canadian Brain Research Strategy

• Canadian Open Neuroscience Platform

• GEMINI Study

• Krembil Centre for Neuroinformatics, Centre for Addiction and Mental Health

• Ontario Brain Institute

• Ontario Neurodegenerative Disease Research Initiative

• Toronto Dementia Research Alliance

Equity, diversity, and inclusion (EDI)

The RRI is committed to making changes that lead to a more equal and just workplace and community, and to being intentional in identifying and eliminating active and passive forms of discrimination in all aspects of our work, including making our research more inclusive. Below, we reflect on some of our EDI outreach activities in the community:

- To celebrate the International Day of Women in Science on February 11, 2022, Baycrest partnered with Women's College Hospital to host a virtual panel on the importance of equity data and metrics in health research. The RRI's Dr. Allison Sekuler and Women College Hospital's Dr. Rulan Parekh designed the panel, provided opening and closing remarks, and moderated the discussion.

- Senior Scientist Dr. Jed Meltzer has partnered with the Kingston Indigenous Language Nest (KILN) to support Indigenous language revitalization. With funding from Canada's Social Sciences and Humanities Research Council (SSHRC), they are using neuroscience and community engagement to develop a software-based course to teach the Indigenous language Ojibwe, or Anishinaabemowin, and evaluate its use among adult learners.

- The RRI helped organize and took part in the Youth DiverSTEAM Symposium sponsored by the Ontario Hospital Association and Let's Talk Science. This event aimed to promote careers in science, technology, engineering, arts, and mathematics (STEAM) in hospital-based research institutes to high school students across the province, particularly those from under-represented and racialized communities.

- To help advance the more equitable representation of women in health research fields, RRI scientists were nominated to be part of an edit-a-thon organized by Women's College Hospital and Wikipedia's Women in Red initiative. The edit-a-thon aimed to spotlight women scientists by creating Wiki pages for them, including Drs. Donna Rose Addis and Allison Sekuler.

RRI MEDIA HITS

RRI researchers engage in media and advocacy efforts to inform the public about the latest scientific findings and their potential impact on health, science, and government policy. Below, we highlight a small sample of media stories featuring our researchers.

- Older adults process too much information, leading to cluttered memories: study – Featured Dr. Lynn Hasher on CTV News

- Learning another language is good for your brain, even if you don't become fluent: study – Featured Dr. Jed Meltzer on CTV News

- How COVID Might Sow Chaos in the Brain – Featured Dr. Allison Sekuler in Scientific American

- Canadian calls U.S. approval of Alzheimer's drug a 'light at the end of the tunnel,' but scientists skeptical – Featured Dr. Howard Chertkow on CBC's The Current

- Will Canada approve new Alzheimer's drug? It's not certain Aducanumab will get green light – Quoted Dr. Howard Chertkow in The Globe and Mail

- Depression levels increase the longer older adults are isolated but they are resilient, research shows – Featured Dr. Donna Rose Addis on CTV News

- Jan 1: Our annual holiday listener question show – Featured Dr. Jed Meltzer on CBC's Quirks & Quarks

- Can we use radiation to treat Alzheimer's? Canadian pilot study finds improved cognition after CT scans – Featured Dr. Morris Freedman on CTV National News

- Doing household chores such as cleaning and tidying could help prevent dementia, study claims – Featured Noah Koblinsky in the Daily Mail

- How Does Retirement Affect Your Brain? – Featured Dr. Brian Levine on the Freakonomics podcast

- How Covid attacks the brain may explain long-lasting symptoms – Featured Dr. Allison Sekuler on NBC News

- Covid-19 vaccination does not make MRI scans dangerous – Quoted Dr. Jean Chen for AFP Fact Check

- Brain Medicine: How Learning a New Language Boosts Cognitive Health – Featured Dr. Jed Meltzer in Zoomer Magazine

- Debating the risks, benefits of a controversial Alzheimer drug – Featured Dr. Howard Chertkow on CBC's The National

2022 ROTMAN RESEARCH INSTITUTE VIRTUAL CONFERENCE

The 2022 Rotman Research Institute Virtual Conference attracted leading experts in the field of aging and brain health to discuss state-of-the-art research and clinical practices related to sensory and cognitive interactions in the aging brain.

The RRI virtual conference space on the *gather.town* platform

 Watch a recording of the Conference's public event **here**.

During this two-day event, 18 internationally renowned speakers presented their latest discoveries on sensory and cognitive interactions in the aging brain, as well as innovations and interventions to enhance sensory function for improved quality of life.

Speakers came from leading organizations around the world, including Johns Hopkins University, Stockholm University, Bar Ilan University, and Baycrest. Topics ranged from the use of piano lessons to improve cognitive and psychosocial outcomes in aging, to implementing hearing screening in memory care, to smell-based memory training.

The event was held in the virtual RRI space using the gather.town platform. In addition to the fascinating plenary sessions, attendees had access to dedicated networking events and discussions with the speakers and sponsors, as well as interactive poster sessions.

The conference also featured a public event, which was jointly produced by the RRI and the Centre for Aging + Brain Health Innovation (CABHI) and moderated by Canadian author and broadcaster Jay Ingram, on the importance of hearing, vision, and other senses for brain health. Stigma and ageism, unfortunately, lead many older adults to ignore worsening senses for many years, negatively impacting their communication abilities, social interactions, cognitive function, and more. This panel brought together experts with unique perspectives from science, innovation, policy, and clinical practice. The discussion focused on the importance of sensory health in dementia prevention, and how to create better supports for individuals living with sensory loss, ultimately creating a world where older adults can live life to the fullest.

After the conference, leading innovators, entrepreneurs, older adults, and global companies came together at the CABHI Summit 2022: Empowered Aging Through Innovation. This collaboration between the RRI and CABHI served as a bridge between research and innovation, and connected researchers with diverse stakeholders.

IMPROVING QUALITY OF LIFE FOR PEOPLE LIVING WITH PARKINSON'S DISEASE

In addition to Alzheimer's and related dementias, RRI researchers also focus on other neurological disorders. With the support of a generous gift from Fern Glowinsky, Ian Sandler, and the Glowinsky Family, RRI scientists aim to uncover ways to improve quality of life for individuals living with Parkinson's disease.

In Canada alone, more than 100,000 people live with Parkinson's disease, and 25 more are diagnosed every day.

Those who live with Parkinson's disease often experience anxiety and depression, and report worsening symptoms following stressful situations. Our scientists want to find ways to address this, to reduce both their stress and their symptoms. In particular, they are examining the use of mindfulness meditation, which involves focusing on the present moment without judgement, and without attempting to change it.

In an ongoing study, research participants are using the Muse brain-sensing headband and app from InteraXon. This commercially available system allows users to practice mindfulness meditation at home. The app provides real-time feedback on users' state of mind based on brain activity recorded from the electroencephalography (EEG) headband. When the mind is calm and focused, the user will hear a soothing background soundscape with quiet weather (for example, gentle waves lapping on a beach and birds chirping). When the mind becomes busy and starts to wander, the weather gets increasingly stormy, with sounds of wind and rain. The user then needs to re-focus to return to their mindful state. This real-time neurofeedback may make it easier to learn meditation, and to maintain a consistent meditation practice.

"Our family has been impacted by Parkinson's disease, and we approached Baycrest seeking an opportunity to support a research project that could result in improving the lives of all those affected by the disease," says Fern Glowinsky. "The work being done by the research team has great potential, and we look forward to learning about the outcomes of the study."

The study will determine whether neurofeedback-based mindfulness meditation can decrease stress and symptoms in people living with Parkinson's disease. If so, it could be prescribed as a simple, at-home intervention to improve quality of life for these patients and their caregivers.

Thank you to Fern Glowinsky, Ian Sandler, and the Glowinsky Family for supporting this critical research. This generous donation aligns with and supports the RRI's growing commitment and research related to motor disorders. For example, several other RRI scientists have ongoing or planned projects delving into various aspects of Parkinson's disease.

Thank You to Our Generous Funders 2021-2022

We thank the Baycrest Foundation for their continued support of research at the RRI. To donate to research, visit **baycrest.org/supportresearch**.

External funders

Alberta Innovates

Alector LLC

Alzheimer Society of Canada

Anavex Canada Ltd.

Baycrest Foundation

Bial Foundation

BioTalent Canada

Brain Canada Foundation

BrightFocus Foundation

Canada Foundation for Innovation

Canada Research Chairs

Canadian Consortium on Neurodegeneration in Aging

Canadian Institutes of Health Research

Canadian Nurses Foundation

Canadian Partnership for Stroke Recovery

Centre for Aging + Brain Health Innovation

Eli Lilly Canada Inc.

Heart and Stroke Foundation

Hoffmann-La Roche Limited

Indoc Research

Karolinska Institute

Ministry of Economic Development, Job Creation, and Trade

Mitacs

Natural Sciences and Engineering Research Council of Canada

Novartis

Ontario Brain Institute

Ontario Ministry of Colleges and Universities

Ontario Ministry of Health

Ontario Ministry of Long-Term Care

Ontario Research Fund

Social Sciences and Humanities Research Council of Canada

Toronto Dementia Research Alliance

University of Toronto

William Demant Foundation

Women's Brain Health Initiative

ROTMAN RESEARCH INSTITUTE SCIENTISTS, SCIENTIFIC ASSOCIATES, AND CLINICIAN ASSOCIATES

DR. DONNA ROSE ADDIS

Canada 150 Research Chair in Cognitive Neuroscience of Memory and Aging

Senior Scientist, Rotman Research Institute

draddis@research.baycrest.org

DR. MORGAN BARENSE

Dr. Max and Gianna Glassman Chair in Neuropsychology

Senior Scientist, Rotman Research Institute

mbarense@research.baycrest.org

DR. CLAUDE ALAIN

Senior Scientist, Rotman Research Institute

calain@research.baycrest.org

DR. MALCOLM BINNS

Statistician Scientist, Rotman Research Institute

mbinns@research.baycrest.org

DR. NICOLE ANDERSON

Interim Executive Director, Scientific and Academic Affairs, Rotman Research Institute (January 1, 2022-present)

Director, Ben and Hilda Katz Inter-Professional Research Centre in Geriatric and Dementia Care

Associate Scientific Director, Kimel Family Centre for Brain Health and Wellness

Senior Scientist, Rotman Research Institute

nanderson@research.baycrest.org

DR. BRADLEY BUCHSBAUM

Senior Scientist, Rotman Research Institute

bbuchsbaum@research.baycrest.org

DR. JEAN CHEN

Chair, RRI Imaging Committee

Canada Research Chair in Neuroimaging of Aging

Senior Scientist, Rotman Research Institute

jchen@research.baycrest.org

DR. HOWARD CHERTKOW

Director, Kimel Family Centre for Brain Health and Wellness

Director, Anne & Allan Bank Centre for Clinical Research Trials

Chair in Cognitive Neurology and Innovation

Senior Scientist, Rotman Research Institute

hchertkow@research.baycrest.org

DR. DEIRDRE DAWSON

Senior Scientist, Rotman Research Institute

ddawson@research.baycrest.org

DR. MORRIS FREEDMAN

Head, Division of Neurology, Baycrest

Scientist, Rotman Research Institute

mfreedman@baycrest.org

DR. ASAF GILBOA

Faculty Lead, Research Training Centre

Senior Scientist, Rotman Research Institute

agilboa@research.baycrest.org

DR. CHERYL GRADY

Senior Scientist, Rotman Research Institute

cgrady@research.baycrest.org

DR. AMANDA GRENIER

Norman and Honey Schipper Chair in Gerontological Social Work

Senior Scientist, Rotman Research Institute

agrenier@research.baycrest.org

DR. LYNN HASHER

Senior Scientist, Rotman Research Institute

lhasher@research.baycrest.org

DR. BJÖRN HERRMANN

Canada Research Chair in Auditory Aging

Scientist, Rotman Research Institute

bherrmann@research.baycrest.org

DR. REGINA JOKEL

Clinician Associate, Rotman Research Institute

rjokel@research.baycrest.org

DR. NASREEN KHATRI

Clinician Associate, Rotman Research Institute

nkhatri@research.baycrest.org

DR. BRIAN LEVINE

Chair, RRI Research Participation Committee

Senior Scientist, Rotman Research Institute

blevine@research.baycrest.org

DR. LINDA MAH

Senior Clinician Scientist, Rotman Research Institute

lmah@research.baycrest.org

DR. ANTHONY R. MCINTOSH

Senior Scientist (through December 2021) *Senior Scientist Emeritus*, Rotman Research Institute (January 2022-present)

rmcintosh@research.baycrest.org

DR. JED MELTZER

Canada Research Chair in Interventional Cognitive Neuroscience

Senior Scientist, Rotman Research Institute

jmeltzer@research.baycrest.org

DR. MORRIS MOSCOVITCH

Senior Scientist, Rotman Research Institute

mmoscovitch@research.baycrest.org

DR. NUWAN NANAYAKKARA

Scientific Associate, Rotman Research Institute

nnanayakkara@research.baycrest.org

DR. ROSANNA OLSEN

Senior Scientist, Rotman Research Institute

rolsen@research.baycrest.org

DR. RACHEL RABI

Scientific Associate, Rotman Research Institute

rrabi@research.baycrest.org

DR. CARLOS TYLER RONCERO

Scientific Associate, Rotman Research Institute

troncero@research.baycrest.org

DR. BERNHARD ROSS

Senior Scientist, Rotman Research Institute

bross@research.baycrest.org

DR. EUGENIE ROUDAIA

Scientific Associate, Rotman Research Institute

eroudaia@research.baycrest.org

DR. JENNIFER RYAN

Director, Scientific and Academic Affairs and Reva James Leeds Chair in Neuroscience and Research Leadership (through December 31, 2021)

Senior Scientist, Rotman Research Institute

jryan@research.baycrest.org

DR. ALLISON SEKULER

President & Chief Scientist, Baycrest Academy for Research and Education at Baycrest Centre for Geriatric Care

Sandra A. Rotman Chair in Cognitive Neuroscience, Rotman Research Institute

President & Chief Scientist, Centre for Aging + Brain Health Innovation

vpr@research.baycrest.org

DR. KELLY SHEN

Scientific Associate, Rotman Research Institute (through December 2021)

kshen@research.baycrest.org

DR. STEPHEN STROTHER

Senior Scientist, Rotman Research Institute

sstrother@research.baycrest.org

ROTMAN RESEARCH INSTITUTE SCIENTISTS EMERITUS

DR. FERGUS CRAIK

Senior Scientist Emeritus, Rotman Research Institute

fcraik@research.baycrest.org

DR. CAROL GREENWOOD

Senior Scientist Emeritus, Rotman Research Institute

cgreenwood@research.baycrest.org

DR. GORDON WINOCUR

Senior Scientist Emeritus, Rotman Research Institute

gwinocur@research.baycrest.org

ADJUNCT SCIENTISTS

Dr. Sue Becker
Professor, McMaster University

Dr. Patrick Bennett
Professor, McMaster University

Dr. Dirk Bernhardt-Walther
Associate Professor, University of Toronto

Dr. Ellen Bialystok
Professor, York University

Dr. Sandra Black
Senior Scientist, Sunnybrook Health Sciences

Dr. David P.R. Burnes
Associate Professor, University of Toronto

Dr. Thecla Damianakis
Associate Professor, University of Windsor

Dr. Gillian Einstein
Professor, University of Toronto

Dr. Susanne Ferber
Professor, University of Toronto

Dr. Esme Fuller-Thomson
Professor, University of Toronto

Dr. Jennifer Heisz
Associate Professor, McMaster University

Dr. M. Sasha John
Assistant Professor, University of Toronto

Dr. Stefan Köhler
Professor, Western University

Dr. Margaret McKinnon
Professor, McMaster University

Dr. Emily Nalder
Assistant Professor, University of Toronto

Dr. Goldie Nejat
Professor, University of Toronto

Dr. Shayna Rosenbaum
Professor, York University

Dr. Shlomit Rotenberg
Assistant Professor, University of Toronto

Dr. Tamara Sussman
Associate Professor, McGill University

Dr. Laurel Trainor
Professor, McMaster University

Dr. Laura Wagner
Associate Professor, University of California, San Francisco

FEAR NO AGE™ **Baycrest**
Rotman Research Institute

Baycrest is fully affiliated
with the University of Toronto

UNIVERSITY OF
TORONTO