



McGill

Faculty of
Medicine and
Health Sciences

McGill University Research Centre for Studies in Aging



Strategic Research Plan (SRP) 2021-2026

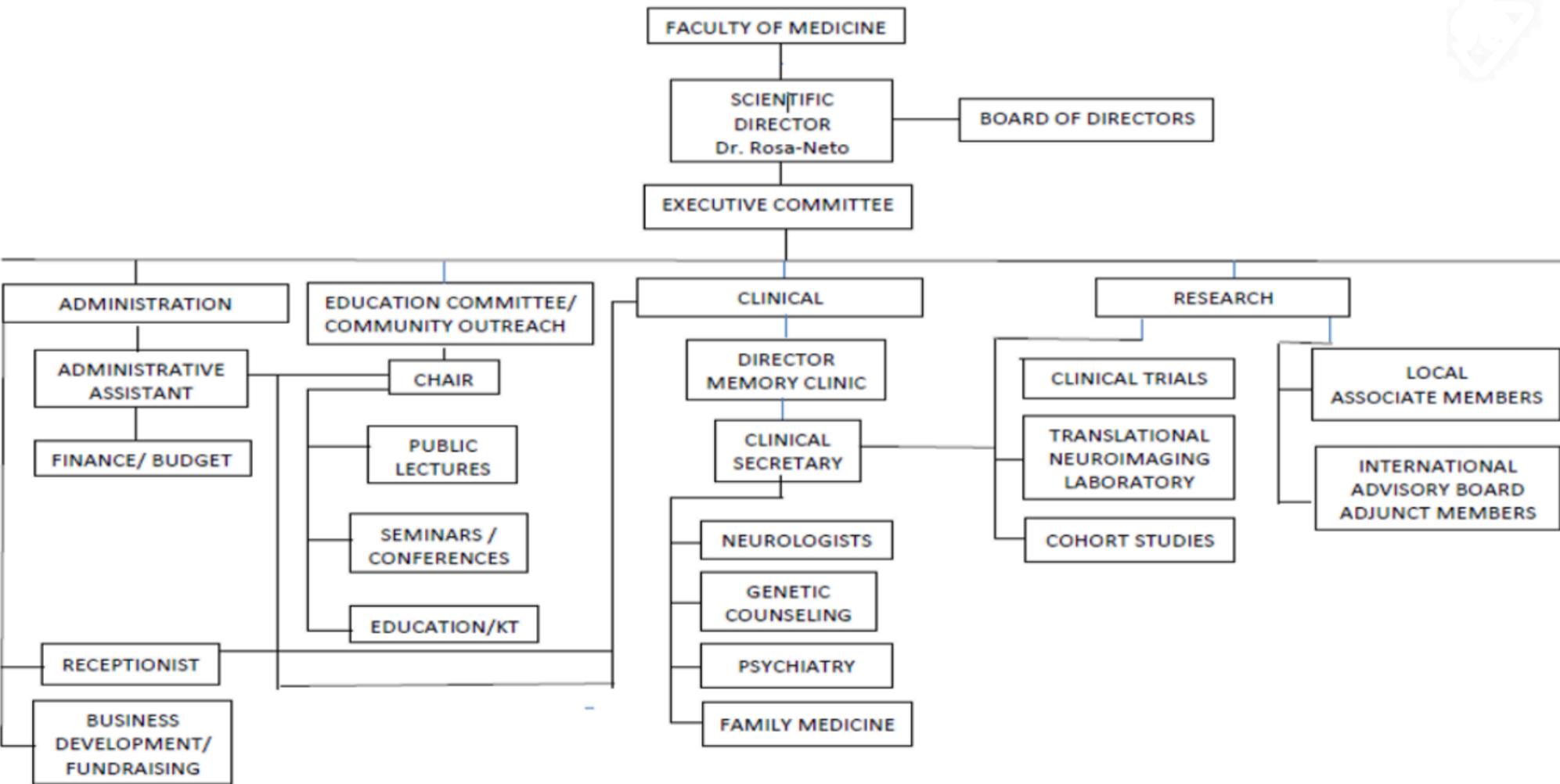
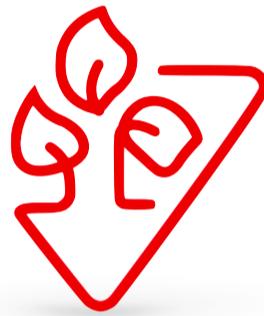




McGill

Faculty of Medicine and Health Sciences

GOVERNANCE STRUCTURE OF THE MCGILL UNIVERSITY RESEARCH CENTRE FOR STUDIES IN AGING (MCSA)





1

EXECUTIVE SUMMARY

Established in 1985 to develop and offer specialized services for the elderly, the McGill University Research Centre for Studies in Aging (MCSA) has grown into a multi-disciplinary academic unit dedicated to gerontological research and post-graduate teaching. The MCSA research scope is broad, encompassing mechanisms of aging as well as prevention of age-associated disorders.

The MCSA Strategic Research Plan



1985-1989
The Montreal General Hospital



1989-1991
Chateau Westmount



1991-1995
St-Mary's Hospital



1995-Present
The Douglas Mental Health University Institute

Since its inception, the MCSA remains dedicated to transformative research and counts numerous teaching, public education, and research accomplishments. The Centre has achieved international recognition and outreach, continuously attracting students, young scientists, and international collaborators in Alzheimer's disease research. The center's scientific production and visibility through many highly cited contributions attest to its excellence and world-class research positioning.

The MCSA Strategic Research Plan (SRP) expresses our synergism with the core McGill University commitments including:

- (1) fostering creativity.**
- (2) promoting innovation.**
- (3) problem solving through collaboration and partnership.**
- (4) promoting equity, diversity and inclusion; and**
- (5) serving society.**

The MCSA encompasses a large research community, currently composed of 53 professors and affiliated members, five PI clinicians, six staff, three Post-Doctoral Fellows, five Ph.D. candidates and six Master of Science can

dates. It is hosted by the Douglas Research Centre and the CIUSSS de l'Ouest-de-l'Île-de-Montréal. The MCSA serves as a hub between its members and an extensive network of collaborations with (currently) 20 international partner centres.

The MCSA priority research themes align with those from McGill University by:

- (1) Developing knowledge and applications of technology in the digital era for elderlies.**
- (2) Understanding the potential and challenges of the aging human brain and nervous system.**
- (3) Advancing biomedical and health research for disease prevention.**
- (4) Strengthening public policy and organizations by knowledge dissemination in aging and dementia. dissemination in aging and dementia**

Overall, the MCSA's SRP aims to promote exciting and creative responses to new challenges and opportunities as the research landscape and the social/cultural/economic/technological realities fast evolve.



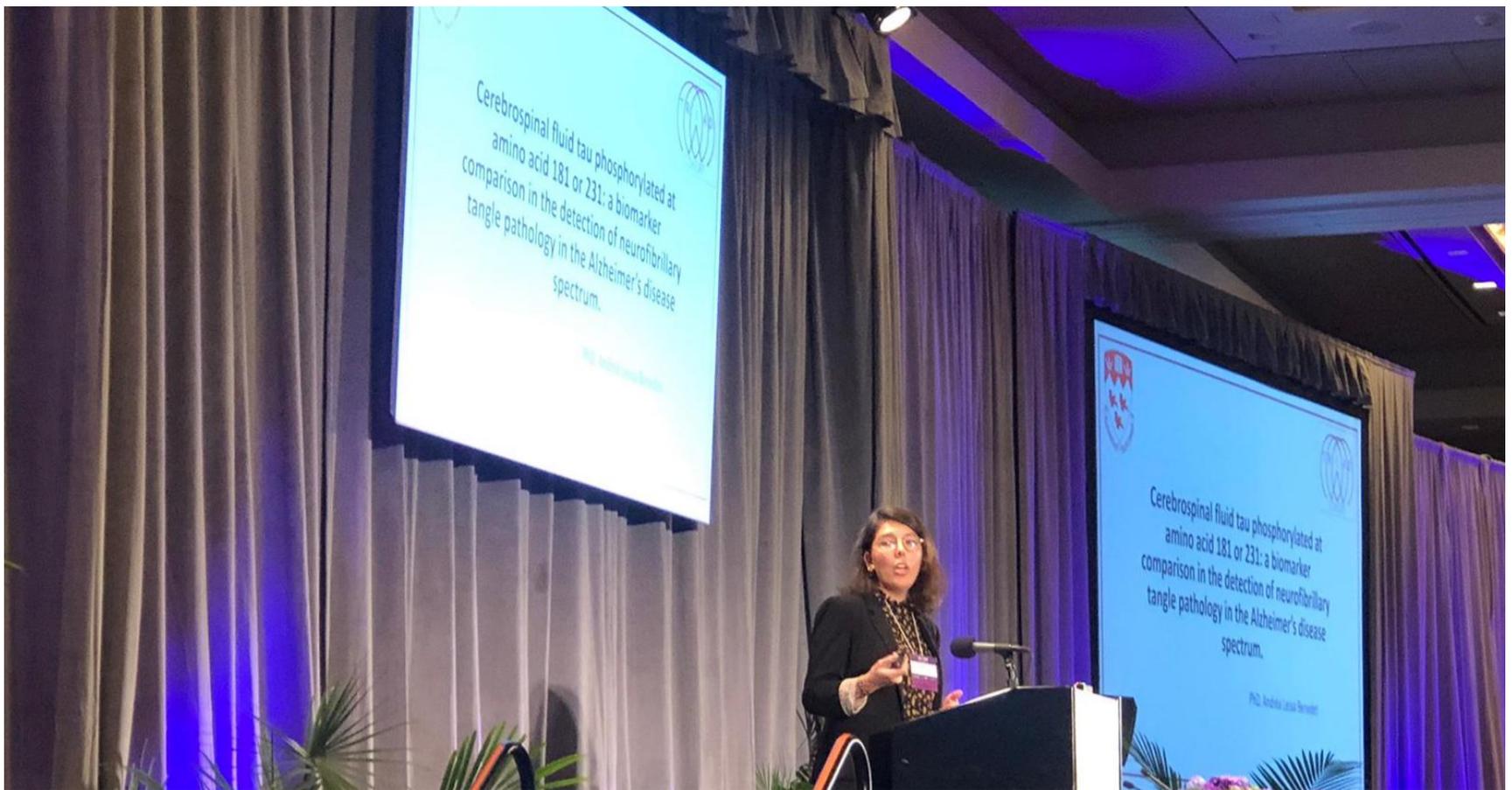
MCSA Centre Directors, Past and Present, Dr. Judes Poirier, Dr. Jens Pruessner, Dr. Jacqueline McClaran, Dr. Serge Gauthier, and Dr. Pedro Rosa-Neto.

STATEMENT OF PURPOSE

The MCSA started operations in 1985 with a mandate to promote research, education, and teaching in the field of aging and aging research, with emphasis on a multidisciplinary approach.

VISION

“ADVANCE DEMENTIA PREVENTION AND THERAPIES VIA THE INTEGRATION OF EXCELLENT PATIENT CARE, TRANSFORMATIVE RESEARCH AND WORLD-CLASS KNOWLEDGE DISSEMINATION”



MCSA student presenting at the Tau meeting in 2020 Washington DC.

MISSION STATEMENT

The Centre's mandate has been modified to reflect the emergence of novel frontiers in the field of aging research. The current objectives of the Centre are

- I. To actively promote research that will identify the underlying causes of age-related disease with particular emphasis on prevention and early diagnosis of age-associated cognitive decline.
- II. To actively engage in knowledge transfer and public education, designed to sensitize both scientists and the lay public at large, to health and social issues related to aging.
- III. To contribute to the training of Canadian and international undergraduate and graduate students as well as post-doctoral fellows, who focus their research on diseases of the aging population.
- IV. To strengthen the relationship of the Centre with community non-government organizations (NGOs) dedicated to age-related diseases.
- V. To deliver the compassionate and exceptional clinical care to our patients.

The MCSA vision, mission statement and values conform to McGill's Mission Statement and Principles.



Our Values are:

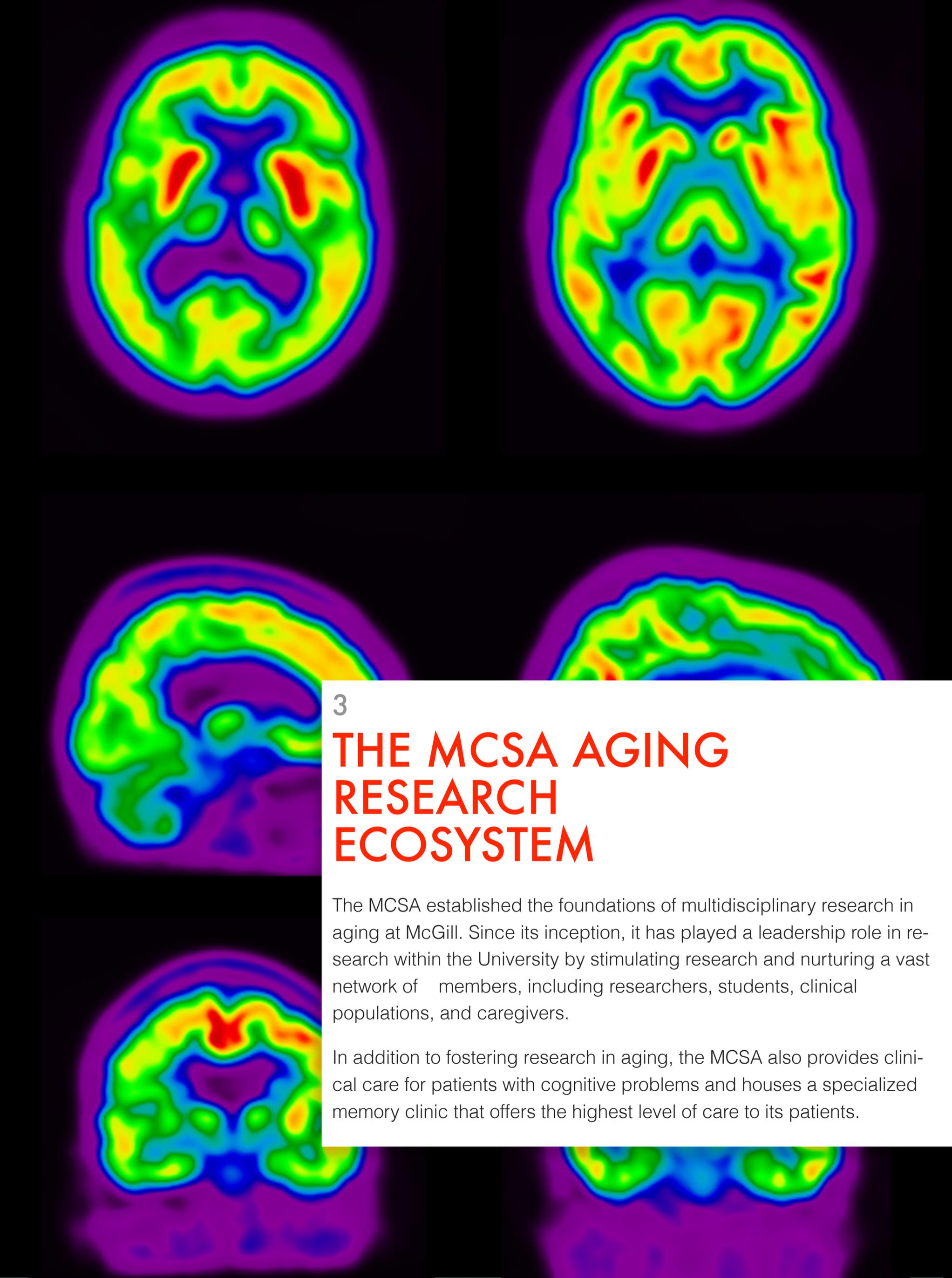
Collaborative work

Collegiality

Commitment

Innovation

Integrity

The background of the page features several axial and sagittal PET scans of a human brain. The scans are color-coded, with a scale from purple (low activity) to red (high activity). The scans show various patterns of activity across different brain regions, including the cortex and subcortical structures. The scans are arranged in a grid-like pattern, with some partially obscured by the text box.

3

THE MCSA AGING RESEARCH ECOSYSTEM

The MCSA established the foundations of multidisciplinary research in aging at McGill. Since its inception, it has played a leadership role in research within the University by stimulating research and nurturing a vast network of members, including researchers, students, clinical populations, and caregivers.

In addition to fostering research in aging, the MCSA also provides clinical care for patients with cognitive problems and houses a specialized memory clinic that offers the highest level of care to its patients.

Importantly, the center is highly active in disseminating knowledge across health care professionals, students, and the patient population. In particular, the MCSA advocates for patient-centered care and patient/care giver empowerment.

During the last 35 years, the MCSA achieved and continuously grew with international recognition. Amongst many pioneering activities, it introduced the first pharmacological interventions for Alzheimer's disease and led a number of successful clinical trials in this field. Subsequently, the centre focused on genetic risk factors for Alzheimer's disease and research on stress as a modifiable risk factor for dementia. Currently, the MCSA became a world leader in the prevention and early diagnostics via biomarkers.

RESEARCH EMPHASIS IN EARLY DIAGNOSIS AND PREVENTION

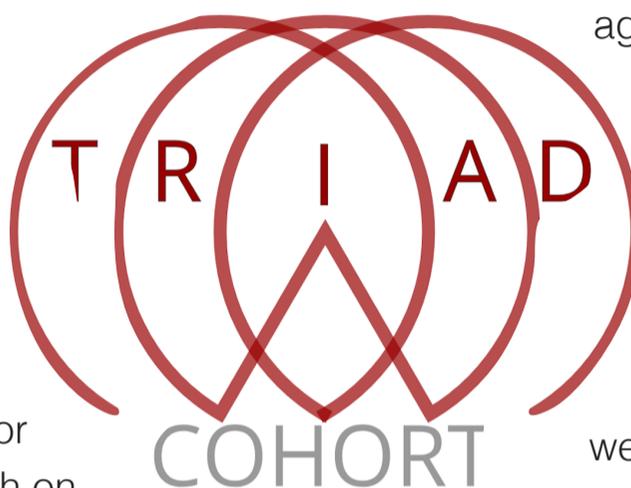
Research on early diagnostics via biomarkers positioned the Centre as one of the world leaders in the field of biomarkers development. The MCSA has successfully secured substantial and continuous funding for state-of-the-art research in the growing field of biomarkers. The implementation of the Translation biomarker for aging and dementia (TRIAD) cohort by Dr. Pedro Rosa-Neto established a landmark as it became the largest cohort in Canada specially designed to benchmark novel diagnostic tests for Alzheimer's disease. The cohort's database and biobank have attracted a vast number of local and international collaborations. TRIAD also imple-

mented tau imaging in Canada and currently leads research in blood tests for early detection of Alzheimer's disease.

Recently, the MCSA received a Canada Foundation for Innovation funding (PI, Dr. Pedro Rosa-Neto) for a cutting-edge Biomarker Discovery Platform for Aging and Dementia (BioPAD), which will bring McGill to the forefront of aging biomarker research and development.

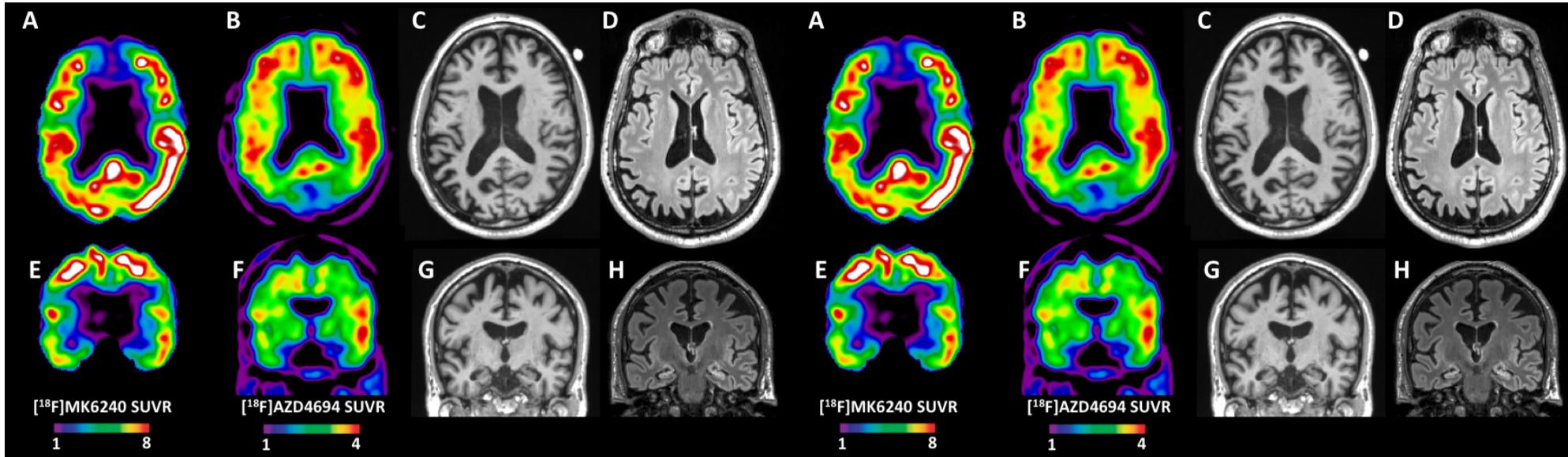
BioPAD will create a world-class network for the translation of biomarkers in clinical practice, as

well as local and unique synergy between the Montreal Neurological Institute- Brain Imaging Centre (Director, Dr. Julien Doyon), Montreal Neurological Institute – Clinical Research Unit (Dr. Angela Genge, Co-PI), and the Department of Pharmacology and Therapeutics at McGill (Dr. Gerhard Multhaup, Co-PI).



EXCELLENCE IN CLINICAL CARE

The MCSA hosts a Memory and Cognition clinic, which offers excellent clinical care within an **Ultra sensitive infrastructure for fluid biomarker, the Quanterix Simoa.**



terdisciplinary setting and cutting-edge diagnostic procedures. These procedures include imaging and plasma biomarkers as well as genetic testing and counseling. The MCSA offers specialized care for genetic forms of, as well as young-onset, dementia.

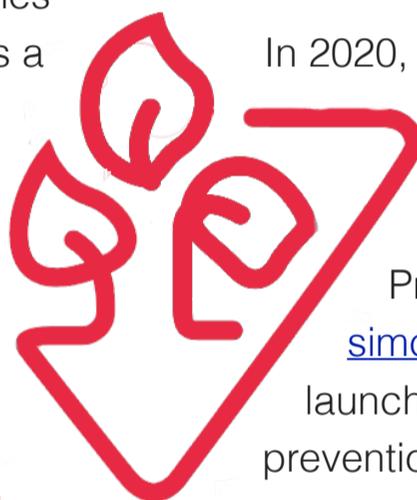
Within academic clinical sciences, the MCSA traditionally leads the Canadian guidelines for clinical management of dementia. As a result, it increasingly attracts international visiting scholars and students who wish to pursue research and doctoral and post-doctoral studies in the field of Alzheimer's disease.

EXCELLENCE IN KNOWLEDGE DISSEMINATION AND COMMUNITY OUTREACH

With the goal to emphasize knowledge translation and outreach to the community, the MCSA's Education Committee lead by Dolly Dastoor, introduced the Brainy Boomer Lecture Series in 2007. The objective of these lectures is to disseminate knowledge regarding brain health and promote healthy lifestyle choices among the elderly.

Between 2007 and 2020, the center offered 285 lectures reaching nearly 13,000 attendants within the community. The Education Committee plays an essential role in designing and innovating health information dissemination to our elderly population. The MCSA reacted and adjusted

rapidly to the COVID-19 pandemic, by creating online versions of each and every already designed outreach material and research activity. Within this context, the MCSA has focused on the usual themes, but also in providing accurate information about prevention of COVID-19 and its consequences affecting our patient population, such as social isolation among the elderly.



In 2020, the MCSA, in partnership with the McGill Division of Geriatric Medicine (<https://www.mcgill.ca/geriatrics/>) and the McGill Dementia Education Program (<https://www.mcgill.ca/medsimcentre/community-outreach/dementia>)

launched a new collaboration devoted to prevention, diagnostics, management, knowledge dissemination, and support for care givers and partners of patients with dementia.

This very same McGill partnership has already been commissioned by the prestigious Alzheimer's Disease International (ADI) to edit the world annual report in 2021 (<https://www.alzint.org/resource/world-alzheimer-report-2020/>). Founded in 1984, the ADI became the leading organization of more than 150 Alzheimer's Associations worldwide and campaign for policy change from governments and the World Health Organization.

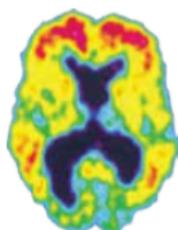
EXCELLENCE IN CONTINUED EDUCATION

For researchers and health care professionals, Laura Chalk International Lectureship Series integrates McGill researchers with international leaders in the field of dementia. In conjunction with the Ludmer Centre, we created the McGill's Ludmer and Aging Centres Educational Seminar (LACES) Series to enhance synergy across all McGill researchers interested in aging and research.



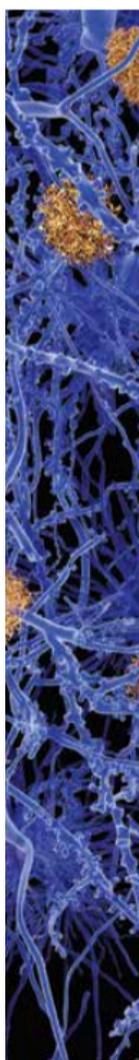
THE MCGILL UNIVERSITY RESEARCH CENTRE FOR STUDIES IN AGING

Presents a free public lecture in its series / Présente une conférence gratuite dans le cadre de sa série :
« THE LAURA CHALK ROWLES LECTURESHIP IN DEMENTIA »



Amyloid Imaging: Influence of Very Advanced Age and Genetic Alterations

By Dr. William E. Klunk, MD, Ph.D.



PROGRAMME PROGRAM

- ▶ **Bienvenue / Welcome**
9:00 am
- ▶ **Conference**
9:30-10:30 am
- ▶ **Questions**
10:30-11:00 am

LIMITED SEATING AVAILABLE

Rafraîchissements gratuits
Free Refreshments

Dr. William E. Klunk, MD, PhD, is Director of the Laboratory of Molecular Neuropharmacology and Co-Director of the Alzheimer's Disease Research Center at Pittsburgh University. Professor Klunk is one of the world's leading experts in the early detection of Alzheimer's disease and is a pioneer in the field of *in vivo* amyloid imaging in humans. During his career, he collected numerous awards for his work in the fields of Alzheimer's disease and neuroimaging such as Zaven Khachaturian Award, Alzheimer's Association Worlds Most Influential Scientific Minds, Thomson Reuters Ronald and Nancy Reagan Research Institute Award for research in Alzheimers disease, Alzheimer's Association Potamkin Prize for Research in Pick's, Alzheimer's, and Related Diseases, American Academy of Neurology MetLife Foundation Awards for Medical Research, MetLife Foundation.

In 2001, in collaboration with Dr. Chet Mathis, Dr. Klunk created a molecule that could be used to image Alzheimer's disease pathology by tagging amyloid (PiB), it was one of a few eureka moments so far in Alzheimer's disease research. With PiB, Dr. Klunk changed history of neuroimaging in Alzheimer's disease, allowing for the first time a non-invasive quantification of brain pathology *in vivo*, which was considered as the single most important advance in the history of imaging in neurodegenerative conditions. (adapted from: *William Klunk: imaging Alzheimer's disease in vivo; The Lancet of neurology 2015*). Now, in the 15th anniversary of the publication showing the first results *in vivo* subjects using PiB, Dr. Klunk comes to Montreal to talk about the developments of his discovery.

LUNDI LE 15 OCTOBRE, 2018 / MONDAY, OCTOBER 15, 2018
8H30 - 8:30 AM

Endroit / Location

Institut et hôpital neurologiques de Montréal
Montreal Neurological Institute and Hospital
3801 rue University, Montréal, Québec H3A 2B4

Centre de recherche sur les tumeurs cérébrales / Brain Tumor Research Centre
Centre of Grandpré Communications Centre (Take the elevators down to 3B (bottom floor) the Grandpré Communications Centre is on the right side of the elevators when you exit)



McGill



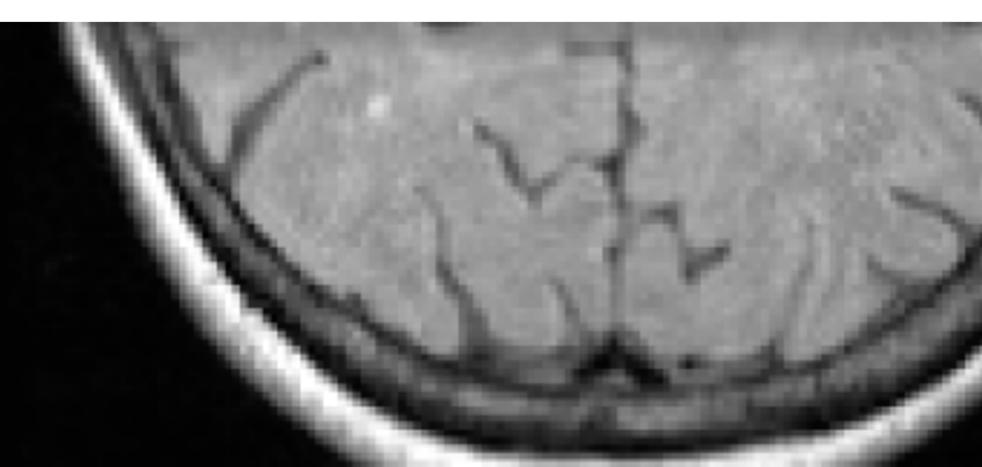
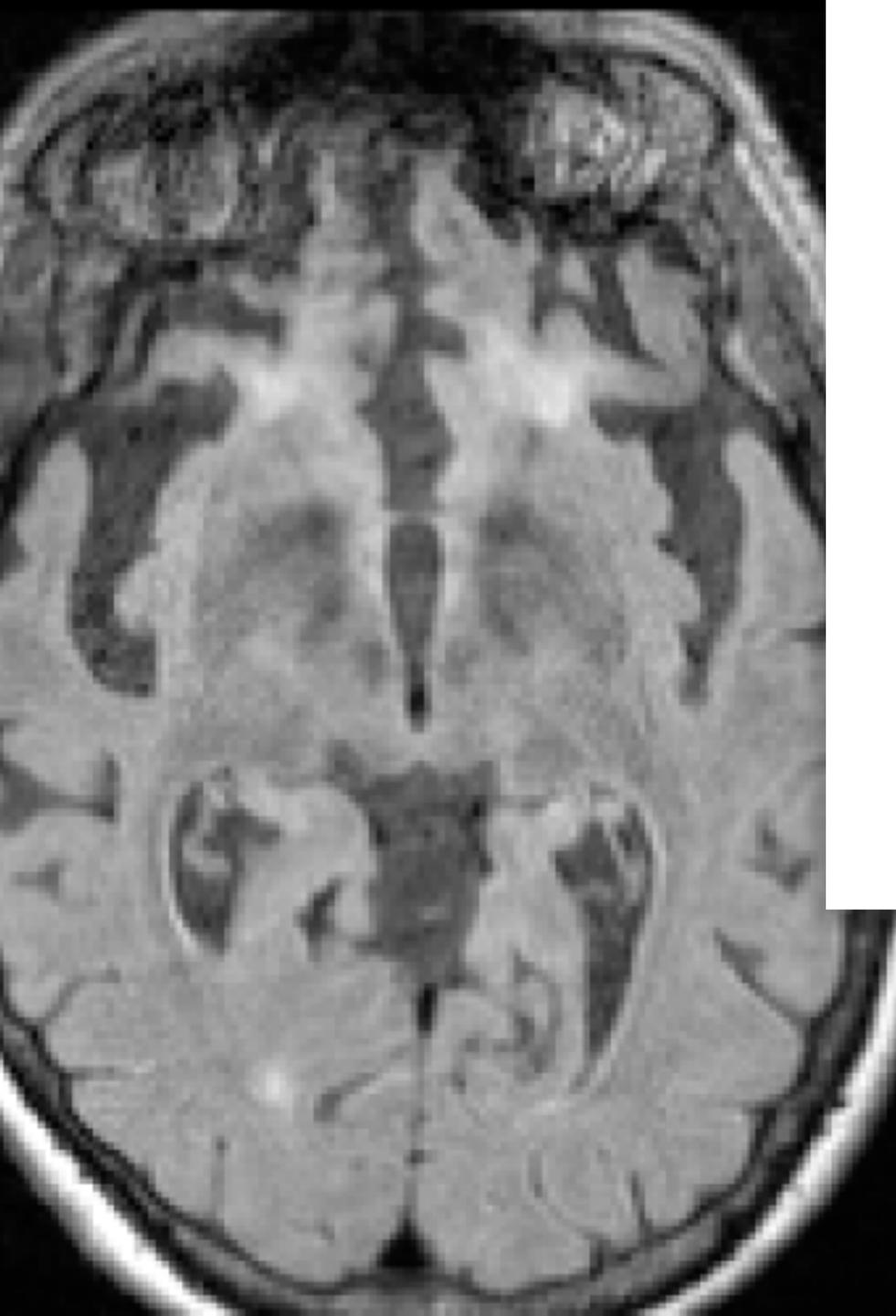
Centre intégré
universitaire de santé
et de services sociaux
de l'Ouest-de-
l'Île-de-Montréal

Québec 



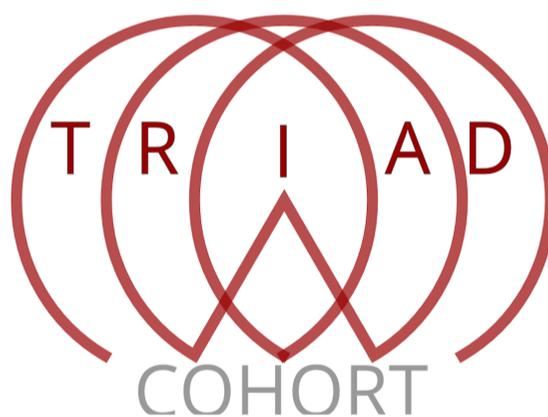
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**STRATEGIC
DIRECTIONS,
ACTION PLAN,
AIMS &
MILESTONES**





MCSA TRIAD team working at Crossroads Pavilion



Among several Goals and activities, the key emerging themes are:

Transformative global outreach in dementia

Innovative online outreach programs

Efficient telemedicine platforms in dementia and cognition care

Excellence in early dementia biomarker research

Enriched collaboration networks and open science initiatives

Enhancement and advocacy for equity, diversity & inclusion (EDI) at all levels of care and research



STRATEGIC GOAL 1:

TRANSFORMATIVE GLOBAL OUTREACH DEMENTIA



The MCSA leads a number of clinical guidelines and consensus clinical papers at the provincial and national levels. The MCSA took the lead in organizing the provincial guidelines and le Réseau des cliniques de mémoire du Québec. The MCSA also has a leadership role in the Canadian Consensus Conference on the Diagnosis and Treatment of Dementia. Due to its active participation in international guidelines, the MCSA will play a leadership role in Dementia international guidelines and world reports in the next five years.

ACTION PLAN: GLOBAL INITIATIVES FOR ALZHEIMER'S DISEASE

Due to its ubiquitous presence in the international leadership scenario, an application led by the MCSA in conjunction with the McGill Division of Geriatric Medicine and the McGill Dementia Education Program has been commissioned by the prestigious Alzheimer's Disease International (ADI) to edit the world annual report in 2021 and 2022 (<https://www.alzint.org/resource/world-alzheimer-report-2020/>). Founded in 1984, the ADI became the

leading organization of more than 150 Alzheimer's Associations worldwide and campaign for policy change from governments and the World Health Organization.

AIM 1: LEAD THE WORLD REPORT FOCUSING ON THE DIAGNOSIS OF DEMENTIA (2021)

As two-thirds of people still incorrectly think that dementia is a normal part of ageing rather than a medical condition, the 2021 report will focus on the diagnosis of dementia. It will also highlight the importance of diagnosis of dementia in high, medium, and low-income countries. The report will be released in September 2021, on the occasion of celebration of World Alzheimer's Month. The goal is to complete submission of this report by June 2022.

AIM 2: LEAD THE WORLD REPORT FOCUSING ON THE MANAGEMENT OF PERSONS LIVING WITH DEMENTIA (2022)

The second 2022 report refers to the management of persons living with dementia, and therefore falls upon another expertise from the MCSA's clinical and research team. Receiving a diagnosis of Alzheimer's Disease is the most frequent scenario in patients with dementia and neurocognitive symptoms. Many of these persons living with dementia (PLWD) and family members become de facto care partners and are left to manage the difficult journey ahead with no "prescription of care." McGill has a significant role in this process, enabling optimal education across multiple geographic, cultural and socio-economic contexts. The goal is to submit this report in June 2022.





STRATEGIC GOAL 2:

INNOVATE ONLINE OUTREACH PROGRAMS



The COVID-19 crisis generated an urgent need to reconceptualize the MCSA's public outreach program.

Seniors are aware that physical exercising, learning new things, and indulging in social activities are fundamental requirements for maintaining mental and physical health. When social distancing imposed by the COVID - 19 crisis limits the traditional face-to-face outreach activities, patient's benefits are significantly impacted. As such, online outreach programs became a novel and crucial strategic direction to pursue and we acted immediately to adjust to this unforeseen new reality.



As computer illiteracy is prevalent among elderlies and many seniors have difficulties using computers or cell phones, we created a novel research program to develop online services specially designed for an aging population. This program also intends to teach elderlies how to use online resources and to develop dedicated platforms to promote wellness and education, in addition to helping them feel comfortable in the digital world.

ACTION PLAN: ADVANCING ONLINE OUT-REACH PROGRAMS

In 2020, the MCSA developed various online pilot projects (<https://www.youtube.com/channel/UC9q0DRFcb6cgJRskdwwKD1Q/videos>) that take advantage of online platforms interactive possibilities (i.e., Zoom). The MCSA Zoom platform allows for live lectures on various topics of interest among elderlies and interactions between the lecturer and the attendants mediated by a facilitator. This level of real-time interaction promotes engagement and stimulates discussions, leading to patient and caregiver empowerment. Subsequently, all these activities become available on the MCSA YouTube channel for future reference. The MCSA YouTube channel reportedly became very useful, particularly for physical exercise programs. Our pilot data support the notion that online interactive lectures, virtual learning experiences, and online physical exercises, helped our community to cope with stress and social isolation-imposed during the still ongoing COVID-19 pandemic. In the next five years, we will further develop innovative online outreach programs.

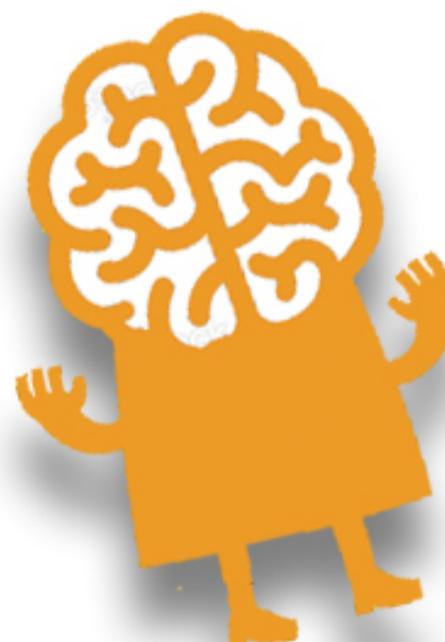
AIM 1: ONLINE BRAINY BOOMER LECTURE SERIES

The MCSA has ten years of experience with the Brainy Boomer lecture series. In 2020, the e-Brainy Boomer pilot project consisted of nearly 40 lectures covering various topics related to healthy aging, including COVID-19 prevention, dementia prevention, mitigating impact of social isolation, with presentation, and Q&A sessions. Moreover, these sessions also aid the attendees on how to use other available online communica-

tion platforms and social media unrelated to the specific scope of our centre's main initiative. Based on our evaluations, we were able to establish objective milestones for the next five years. Depending on the topic, we had an average of 40 (maximum, over 70) attendants. This successful pilot data already established collaboration with the McGill Dementia Education Program to specially address the patient's caregivers' needs (<https://www.mcgill.ca/medsimcentre/community-outreach/dementia>).

AIM 2: ONLINE INTERACTIVE PHYSICAL EXERCISES PROGRAM

With the partnership of Giuliana Guerriero, we compiled 25 exercise classes specially designed for elderlies. These classes are real-time interactive classes with the instructor (Giuliana Guerriero) and are subsequently made available on our YouTube channel for repeat engagement. The data collected to date further allowed us to create measurable milestones to scale and recruit attendants to participate in online health promotion research topics.



AIM 3: SUPPORT FOR SOCIAL ISOLATION AND HEALTHY LIFESTYLES

Social isolation with the absence of social contact can lead to loneliness, which potentially disrupts individual's physical, mental and cognitive health. Emerging literature supports the idea that social interactions involving video platforms might mitigate social isolation. The MCSA project tackling social isolation will establish an interactive real-time experience to disseminate healthy lifestyles particularly focusing on nutrition and cooking. Cooking naturally stimulates interactions and discussions among participants, as it constitutes an essential activity with a wide geographic and cultural diversity.



GSC Athletics is a fitness studio located in LaSalle. Co-Owner Giuliana Guerriero has been volunteering her time to teach our Exercise for Seniors Program.

References: PMID: 32376698, 32153942, PMID: 30401000



Giuliana Guerriero in action, coaching at the MCSA physical exercise program

Sign In

Forgot your password?

SIGN IN

SIGN UP



SNAP

[About the project](#) | [Terms and Conditions](#) | Copyright © 2020 McGill University

**SNAP WEBPAGE - THE NEW
MCSA ONLINE COGNITIVE
ASSESSMENT TOOL**

STRATEGIC GOAL 3:

Fast internet and mobile phone data connectivity enabled the development of multiple online medical assessment technologies. Today, one can perform an online cognitive assessment in elderlies at low cost as more than half of the world's population and nearly 85% of Canadians have access to the internet.

In previous years, former MCSA director Dr. Jens Pruessner pioneered online cognitive screening in the centre's clinical and research populations. Today, as a measure to control COVID-19 spreading, remote cognitive and behavioural assessment have been implemented as part of the clinical care at the MCSA.

TELEMEDICINE IN DEMENTIA CARE AND COGNITION



TELEMEDICINE AND ONLINE RESEARCH ON COGNITIVE ASSESSMENT AT THE MCSA

The COVID-19 has shifted our clinical assessments to online format using the MSSS approved Zoom Health platform. One of our clinician-scientists, Dr. Maiya Geddes, has systematically assessed methodologies for and provided a multi-dimensional framework to remotely assess cognitive, functional, behavioural,

and physical aspects of people with cognitive impairment. In the next years, Dr. Maiya Geddes together with Dr. Paolo Vitalli, another neurologist and a neuropsychologist, will expand and validate remote cognitive and behavioural assessment methods via telemedicine.

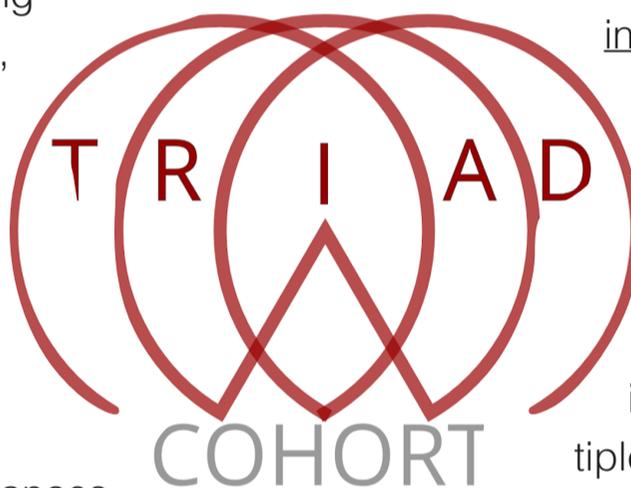
ACTION PLAN: ADVANCING ONLINE COGNITIVE ASSESSMENTS

Although complete cognitive evaluations are sensitive to cognitive decline, a single assessment might befall within the normal range even for those individuals who have an evidence drop in their cognitive skills. By tracking cognitive performance over time, one can better flag drops in people's performance as we compare individual rather than populational trajectories, opening opportunities for efficient interventions/counselling.

However, despite significant advances in this research field, an appropriate methodology remains to be developed to validate cognition in elderlies, particularly to screen for cognitive decline or dementia. To this end, we will validate novel cognitive batteries within the already cited above Translational Biomarkers' participants in Aging and Dementia (TRIAD; <https://triad.tnl-mcgill.com/>) cohort. TRIAD constitutes an advantageous testing framework, as all its participants undergo an in-depth phenotypical characterization with gold-standard cognitive assessments, imaging and fluid biomarkers. As such, in the following 5 years the MCSA will innovate the validation of online assessments of cognition and dementia.

AIM 1: Validating online screening for cognitive decline in participants of the TRIAD cohort

The MCSA developed an online tool for assessing decline in cognition called the Screening of Neurobehavioral Abnormalities in the Ageing Population (SNAP). SNAP determines cognitive decline in both normal ageing and populations at risk for developing cognitive decline. SNAP evolved from the Prevention of Neurological Diseases in Everyone at Risk (PONDER), also developed by the MCSA under Dr. Jens Pruessner's directorship. PONDER community outreach reached 2000 participants. <https://reporter.mcgill.ca/the-ponder-project-using-your-brain-to-ward-off-dementia/>



Rather than a mere application, SNAP is a platform able to incorporate novel tests and multiple languages, a very important and inclusive aspect of our mission within Quebec, a rich multi-ethnic and multi-cultural population setting. In the present version, in addition to cognitive assessments, SNAP encompasses a more comprehensive approach by incorporating functional assessments (<https://snap.research.mcgill.ca>). SNAP's diagnostic and predictive performance will be tested in TRIAD, as it was also designed to benchmark cognitive biomarkers. Due to its flexibility, we anticipate that SNAP will enhance collaborations within the entire McGill and the international community of cognitive researchers.

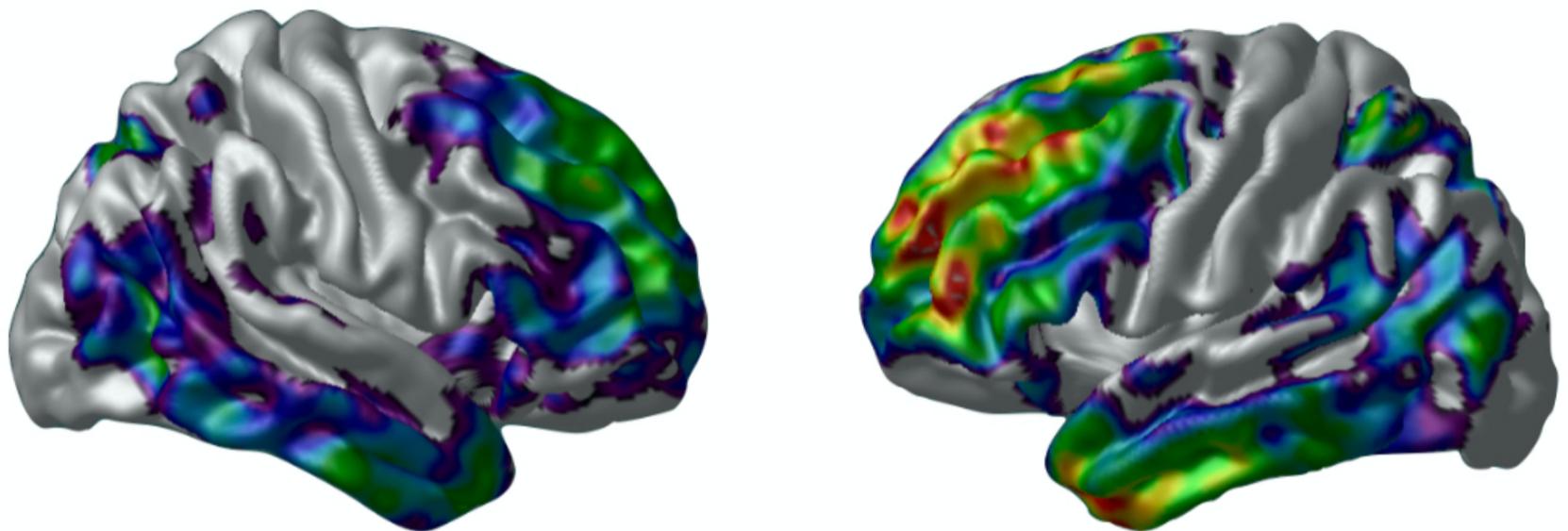
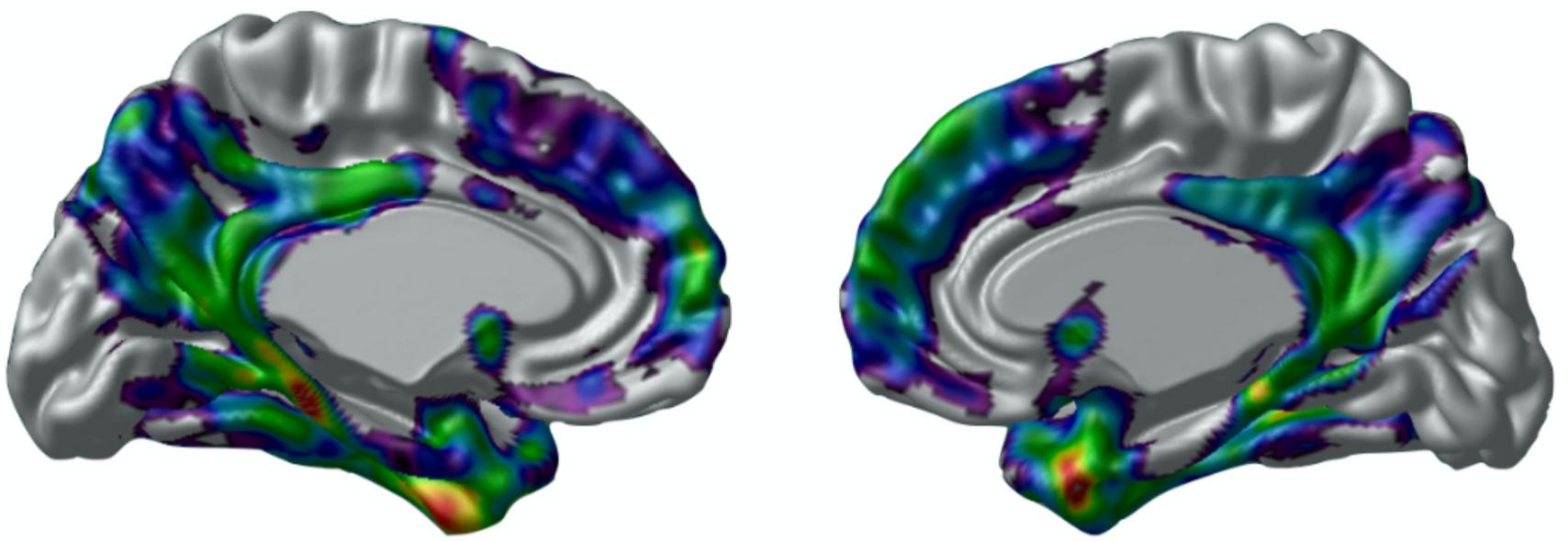
AIM 2: Validating online dementia screening in participants of the TRIAD cohort

In contrast to cognitive decline in normal individuals, dementia diagnosis requires optimized tests. The Cognitive test for dementia (CoDe) is an online application to assess cognition under investigation for dementia. CoDe was designed to meet the gap of free dementia screening tests for the medical community, which followed the commercialization of legacy tests such as the MMSE and MoCA. A number of e-alternatives for these legacy tests were developed, but the first generation of online tests are vulnerable for individuals with poor hearing and reduced visual acuity. In this context, CoDe becomes a second-generation cognitive assessment due to its ability to trace. These tests can be supervised by artificial intelligence algorithms allowing participants through self-administered tasks. CoDe remains in the early stages of acceptance testing. It is also expected that CoDe will attract important collaboration within McGill as well as in the international community.



CoDe

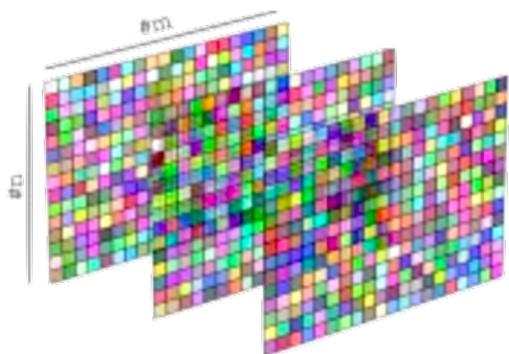




STRATEGIC GOAL 4:

EXCELLENCE IN EARLY DEMENTIA BIOMARKER RESEARCH

Early diagnosis is a sine-qua-non condition for prevention and disease-modifying therapy developments. In the last 30 years, progress in biomarkers research has enabled the diagnosis of disease processes in the absence of symptoms (i.e., early diagnosis). Recently, these advances have been incorporated into the operational definitions of Alzheimer's disease and other dementias. It is expected that biomarkers will advance therapies for many neurodegenerative conditions such as Alzheimer's disease, frontotemporal dementia, amyotrophic lateral sclerosis (ALS), and Lewy body dementia.



Voxelstats
Mathematical framework for predicting dementia in elderly

More than merely diagnosing preclinical stages of diseases, biomarkers become critical for monitoring the progression of pathophysiological changes throughout the pre-dementia phases of neurodegeneration. Traditional imaging and cerebrospinal fluid (CSF) biomarkers for neurodegeneration are not readily accessi-

ble nor affordable for most health care systems world-wide (e.g. limited availability of scanners, as well as cyclotrons for in-house production of radiopharmaceuticals). To address this gap, the MCSA will conduct transformative research to develop affordable biomarkers in the next five years.

ACTION PLAN: LEADERSHIP IN THE NEXT GENERATION OF DEMENTIA BIOMARKERS

To address the need for affordable plasma biomarkers, the MCSA lead a Canada foundation for innovation (CFI) application to develop a Biomarker Discovery Platform for Aging and Dementia (BioPAD). In conjunction with Dr. Angela Genge (MNI; CO-PI) and Dr. Gerhard Multhaup (Dept Pharmacology and Therapeutics; CO-PI), the MCSA (PI: Dr. Pedro Rosa-Neto;) will develop novel biomarkers for several brain pathological processes open new avenues for personalized approaches for dementia prevention.

BioPAD is an integrated research platform for developing and cross-validation of blood-based biomarkers for dementia and other neurodegenerative conditions, as benchmarked using well-established imaging and CSF biomarkers. BioPAD is the first platform of its kind in Canada. The requested state-of-the-art Quanterix-Simoa technology, along with advanced computing infrastructure, will accelerate novel research biomarkers' translation into more affordable clinical tests for patients.

AIM 1: DEVELOPMENT OF PRECISION DIAGNOSTIC TESTS FOR DEMENTIA USING PLASMA SAMPLES

BioPAD will implement plasma blood biomarkers based upon novel fragments of amyloid, tau, neuroinflammatory, and synaptic targets in the following five years. This platform will directly integrate state-of-the-art Simoa technology with a dedicated computational framework to accelerate the validation of novel blood-based biomarkers using the TRIAD cohort. We will focus on core biomarkers for Alzheimer's disease, alpha-synuclein and vascular pathology.



AIM 2: DEVELOPMENT OF PRECISION DIAGNOSTIC TESTS FOR OTHER NON-ALZHEIMER'S DEMENTIAS

Despite all progress achieved in the field of biomarkers specifically for Alzheimer's disease, a vast number of other brain disorders with dementia remain without identified biomarkers that possess sensitivity or specificity necessary for their diagnosis, staging and prognosis. Apart diagnosing, it is expected that these biomarkers will accelerate clinical trials by assessing individual patient suitability for specific therapeutic interventions and assessing whether a novel therapy engages its desired biological targets. In the following 5 years, in conjunction with Dr. Angela Genge and with the Brain imaging Centre from the Montreal Neurological Institute (Dr. Julien Doyon; Dr. Jean-Paul Soucy and Dr. Gassan Massaeweh), we will be developing novel imaging agents for the identification of other proteinopathies (alpha synuclein, non-Alzheimer's disease tauopathies and TDP-42).



STRATEGIC GOAL 6: The MCSA has a long history supporting equity, diversity, and inclusivity in its working environment. However, little research or outreach activities has been devoted to this topic. Moreover, there is still need to improve our tools, interventions and counselling focused on the vast immigrant allophone population, in whom cognitive declines might be confounded by cultural maladaptation or purely mental health issues related to living in a new country.

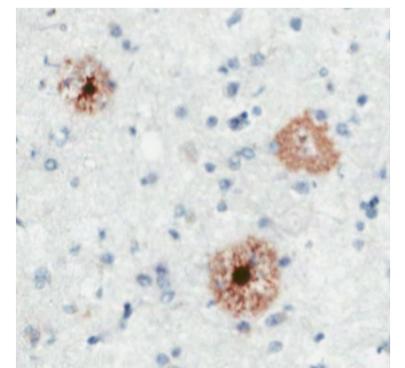
ENHANCE EQUITY, DIVERSITY & INCLUSION (EDI)

ACTION PLAN: MAINTAINANCE OF EQUITABLE, ACCESSIBLE AND INCLUSIVE WORKING ENVIRONMENTS AND DEVELOPMENT OF INTERNAL EDI BEST PRACTICES.

AIM 1: ENHANCEMENT OF EDI IN OUR OUTREACH ACTIVITIES.

EDI issues will be included in or Brainy boomer lectures, with local partnership with Natasha Rajah for designing an effective strategy.

Finally, we will combine efforts towards the population of first nations individuals, fostering accessibility of our programs via provincial organizations to better respond to their health care needs during ageing. For that, the MCSA will enhance its partnership with the CCNA and particularly with the Indigenous Dementia Research Network (IDRN).





ANTICIPATED CHALLENGES

The MCSA actively interacts with the Department of Neurology and Neurosurgery, Department of Psychiatry and the Faculty of Medicine and Health Science to secure the necessary support to proceed with enhancements in the research as proposed in the SRP.

Research space and laboratory space has been already allocated at the MNH via Dr. Julien Doyon, to support biomarker development activities. The area at the department of pharmacology and therapeutics was earmarked to house our CFI funded infrastructure and will undergo renovations soon.

New research positions for neuropsychology and biomarkers research are under negotiation with the ageing theme-based group from the Douglas research Centre. One expects that these new departmental recruits will synergize with the MCSA. The hiring of a new cognitive neurologist (Paolo Vitalli) to replace recently retired Dr. Serge Gauthier was achieved by a conjoint effort from the Centre Intégré Universitaire de Santé et de Services Sociaux (CIUSSS) de l'Ouest-de-l'île-de-Montréal, the Douglas Research Institute, the Department of Neurology and Neurosurgery and the Department of Psychiatry.

Regarding the MCSA's sustainability, we are devising a specific fundraising program to warrant these programs' longitudinal success and continuity. As these programs are free of charge, the most challenging issue is obtaining funding for these indications. The idea is to incorporate a research component into these programs.

5 Year SRP

TIMELINE

METRIC FOR ASSESSING THE SUCCESS OF PROPOSED AIMS:

The metric to assess our SRP focuses in short, medium term and long-term indicators.

SHORT-TERM INDICATORS (1.5 YEAR)

- Number of collaborators
- Dissemination and transfer of knowledge between researchers, professionals, decision-makers, general public
- Increased availability and activity of shared resources

MEDIUM-TERM INDICATORS (3 YEARS)

- Publications arising from more than 2 MCSA members
- Increased internal, cross-disciplinary collaborations
- Number of grant applications with priority areas identified by MCSA
- Success rate in these grants
- Human resources (PIs, students, personnel)
- Number and type of exchanges with general public
- Exchanges and interactions with policy decision makers

LONG-TERM INDICATORS (5 YEARS)

- National and international leadership in mental health research
- Number of publications
- Impact of publications
- Uptake by non-academic users



MCSA Members:

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Professor

Neurology/Neurosurgery and Psychiatry

Translational Neuroimaging Laboratory

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