



BIG SCIENCE
BOLD SCIENCE
BRAIN SCIENCE

ANNUAL REPORT 2018



Fondation
Brain Canada
Foundation

CHALLENGE

It is estimated that one in three Canadians will face a mental illness, a neurological disorder or a brain injury at some point in their lives. Collectively, the diseases of the brain are the major health challenge of the 21st century and impose a \$60-billion burden on the Canadian economy every year - an impact greater than cancer and cardiovascular disease combined.

WHY BRAIN CANADA

- Brain Canada supports innovative and paradigm-changing brain research across Canada;
- Brain Canada has expanded the philanthropic space for supporting brain research. Since 2011, we have had a major partnership with the Government of Canada (through Health Canada), which has provided \$160 million in matching funds for research;
- Brain Canada is a convener and a catalyst, breaking down silos between diseases, disciplines and institutions, and across all stages of the research career, accelerating the understanding of both brain function and dysfunction;
- Brain Canada has provided leadership in enabling multidisciplinary research, and on placing a focus on sex and gender considerations, Indigenous communities, and on the ethical, social and legal implications of brain research.



Annual Report 2018

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Brain Canada is a national registered charity that enables and supports excellent, innovative, paradigm-changing brain research in Canada.
Registration number: 89105 2094 RR0001.

MESSAGE FROM THE CHAIR AND PRESIDENT



Naomi Azrieli, Chair of the Board



Inez Jabalpurwala, President and CEO

2018 was the 20th anniversary year of Brain Canada's founding. Over this period, we have grown from a vision—to create the space for supporting and advancing Canadian brain research—to becoming the leading charitable organization for brain research, with a track record of raising and investing \$250 million in more than 1,000 scientists and clinicians across the country. The collective work of these researchers has resulted in 1,053 discoveries that have changed paradigms and moved us closer to understanding the brain, in health and in illness. We call this *BIG science BOLD science BRAIN science*[™].

Over the past two decades we have seen remarkable advances, including new technologies and ways to share data, tools and expertise, across institutions, provinces and countries. Canada continues to be among the world leaders in brain research, with major contributions that have propelled the field forward. As we marked our anniversary year, we highlighted 20 Canadian pioneers on our website and through social media, beginning with Dr. Wilder Penfield, who was one of the founders of modern neuroscience and the first to map the brain in a living person. He was also a visionary in integrating a hospital and research institute, in order to put patients at the centre of research, and ensure bi-directional dialogue to set research priorities and to more rapidly translate discoveries into improved patient outcomes.

Many other men and women in science have continued the tradition of world-class research and clinical care, bringing new thinking and new approaches to our study of pain, memory, the neural underpinnings of human behaviour, brain repair, as well as disorders including epilepsy, Alzheimer's, Parkinson's, Muscular Dystrophy, depression and schizophrenia, and research that focuses on sex and gender differences. Today there is much attention on Artificial Intelligence and machine learning which have also grown from strong hubs in Canada that are working at the intersection of brain and technology.

Central to Brain Canada's vision has been our understanding that *BIG science BOLD science BRAIN science*[™] does not just happen, it takes strategy and it takes a community. Throughout our history, Brain Canada has served as a catalyst and a convener: our work joins people, labs and platforms across the country, as well as institutions, organizations and sectors – to accelerate the pace of discovery and create the conditions to drive innovation. A diverse and interconnected brain research ecosystem will enable Canada to excel and to make even greater contributions to the global quest to understand the brain and brain disorders.

We now count as collaborators and supporters more than 100 donors and partners, which include private philanthropists and foundations, corporations, research institutes, provincial agencies and voluntary health organiza-

tions. We are particularly grateful to the Government of Canada, and especially to Health Canada and our Minister of Health, The Honourable Ginette Petitpas Taylor, for their valued partnership. Through the Canada Brain Research Fund, Health Canada has been matching the funds raised by Brain Canada and our partners on a 1:1 basis since 2011. We are delighted that this partnership was renewed in the 2019 federal budget, with a commitment of \$40 million in new investment.

While we have marked the contributions of our established research stars, we also recognize that the future of brain research is the pipeline of talent from a range of disciplines. In the past year, we awarded 10 grants to researchers who are within five years of their first academic appointment, through the Early-Career Capacity Building grants program. With partnered support from the Azrieli Foundation, this program is providing much-needed funds to enable our talented young scientists to begin building their careers in Canada, and is in alignment with the federal government's priority of supporting early-career researchers conducting world-class research. You can read more about this groundbreaking grants program on page 18 and 19 of this report. The success of this program has led us to launch a Future Leaders program in 2019, where we have set a goal of raising \$15 million to launch regular open calls over the next five to seven years.

The Early-Career Capacity Building grants program is one of three major program areas, the others are team grants and platform support. We have supported 255 projects through the Canada Brain Research Fund, and currently have a portfolio of about 150 active projects.

From pages 16-31, we highlight some of these projects at all stages of the research pipeline, from basic through population health. The projects we fund are selected through open and partnered competitions, using rigorous international peer review, and are monitored throughout against agreed-upon milestones. On page 11 you will find a description of that process. There are 367 researchers and clinicians from 24 countries who have been involved in our review process over the last 10 years.

Every milestone anniversary is at once a celebration and a time of reflection about the future. It is therefore fitting for us to close by honouring one of our founders, Michael H. Wilson who passed away early in 2019. The idea of Brain Canada was conceived and brought to reality by Michael and Allan R. Taylor, and their imprint is on every success we have had. Michael always believed that bringing people together with common purpose was the only way we could address the complex challenge of understanding the brain. He also reminded us that people must always be at the centre of our work, and serving them our mission. We honour Michael more fully on page 42.

Finally, we extend a heartfelt thank you to all our supporters across the country, to the dedicated researchers and clinicians carrying out this important work, to our committed Board and much-valued staff.

Big science Bold science Brain science™ has always been and will always be a collective endeavor, and Brain Canada is excited about continuing our leadership role to make this happen as we chart the next frontiers in the decades ahead.



Naomi Azrieli
Chair, Brain Canada



Inez Jabalpurwala
President and CEO, Brain Canada

BRAIN CANADA

Brain Canada is a national charitable organization that enables and supports excellent, innovative, paradigm-changing brain research in Canada. For two decades, Brain Canada has made the case for the brain as a single, complex system with commonalities across the range of neurological disorders, mental illnesses and addictions, brain and spinal cord injuries. Looking at the brain as one system has underscored the need for increased collaboration across diseases, disciplines and institutions, and led to smarter ways to invest in brain research that are focused on outcomes that will benefit all Canadians.

OUR VISION is to understand the brain, in health and illness, to improve lives and achieve societal impact.

OUR SUCCESS is connecting, convening and strengthening Canada's brain community, leveraging and granting funding for world-class research and innovation, and fostering a robust Canadian research talent pipeline.

THE PRINCIPLES at the core of every program we support:

- A business approach to science with close monitoring of all funded research and measurement of outcomes;
 - Fostering Canada's collaborative way of doing research. BRING THE BEST MINDS TOGETHER - new thinking, new approaches and the inclusion of early-career investigators;
 - Partnerships to link people and organizations;
 - Ongoing consultation with the research, clinical and patient communities;
 - And benchmarking against international standards of excellence, central to our peer review selection of funding recipients.
-

OUR SIGNATURE GRANTS



Grants that bring together teams of scientists from different disciplines to advance collaborative research.



Grants to sustain or enhance research platforms in areas such as neuroimaging and disease models to promote efficient sharing across research networks.



Grants for salary support, training and mentoring, and to convene the Canadian brain research community.

OUR IMPACT OVER THE PAST 20 YEARS

\$250M

INVESTED IN BRAIN RESEARCH

300

GRANTS AWARDED

1,000+

RESEARCHERS FUNDED

FUNDING IN

115

INSTITUTIONS ACROSS CANADA

CONNECTING

75+

DISCIPLINES

367

SCIENTISTS FROM CANADA AND OTHER COUNTRIES HAVE SERVED AS REVIEWERS

100+

PARTNERS LEADING TO A MORE COLLABORATIVE AND COORDINATED RESEARCH ECOSYSTEM

1,053

PUBLICATIONS IN SCIENTIFIC JOURNALS

OVER

90%

OF FUNDS GO DIRECTLY TO RESEARCH

MILESTONES

2012

Officially launched the
Canada Brain Research Fund (CBRF).

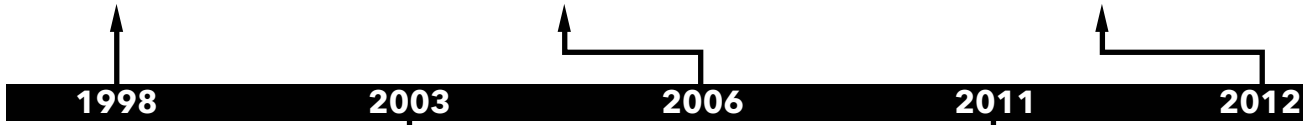


2006

Published
The Case for Canada's Increased Investment in Brain Research, which provided a calculation of the economic burden of brain disorders as one grouping.

1998

The NeuroScience Network transformed to the NeuroScience Canada Partnership and Foundation.
Vision: to create a philanthropic organization to advance Canadian brain research.



2003

Developed—through consultation with research community—and launched the **Brain Repair Program** to support brain research on cross-cutting themes.

Five projects funded at \$1.5 million each over three years; every project achieved a paradigm-changing breakthrough. Established track record of funding excellent and innovative research with international peer review and rigorous annual progress reporting.



2011

Changed the name to **"Brain Canada Foundation"** to better reflect the focus on brain and not only neuroscience.

10th anniversary of the **Barbara Turnbull Award for Spinal Cord Research**.



Budget 2011 included establishing the Canada Brain Research Fund (CBRF), a public-private partnership with Brain Canada to match \$100 million over six years.

2019

Celebrated 20th anniversary.



Budget 2019 included \$40M in new investment over two years.

2016

Budget 2016 included an additional \$20 million in matching funds to the CBRF, bringing the total of the Fund to \$240 million.

10th anniversary of the **Hubert van Tol Travel Fellowship.**



2014

Brain Canada partners with **ALS Society of Canada** to match on a 1:1 basis \$10M raised through the Ice Bucket Challenge resulting in a \$20M investment in ALS research.



2014

2015

2016

2018

2019

2014

Announced \$51.4 million to fund 32 groundbreaking projects through the 2014 team and platform support programs with Minister of Health Rona Ambrose.



2015

Reached \$100-million goal for a total investment of \$200 million, 18 months ahead of schedule.



2018

Launched \$10-million **Canadian Open Neuroscience Platform** - a national platform for the open sharing of neuroscience research data.

CANADA BRAIN RESEARCH FUND

The Canada Brain Research Fund (CBRF) is an innovative partnership between the Government of Canada (through Health Canada) and Brain Canada, designed to encourage Canadians to increase their support of brain research, and maximize the impact and efficiency of those investments. The Fund supports the very best Canadian brain research, fostering collaboration across disorders, disciplines, institutions, and provinces, and enhancing global linkages.

Since the Canada Brain Research Fund's inception, Brain Canada has raised \$115 million from private donors and non-federal partners—now numbering more than 100—which has been matched by Health Canada on a 1:1 basis, with an additional \$5 million for program and operating expenses. To date, the Fund has committed \$220 million to support 256 projects across Canada involving more than 1,000 researchers at 115 institutions.

\$40-MILLION RENEWAL FROM FEDERAL GOVERNMENT

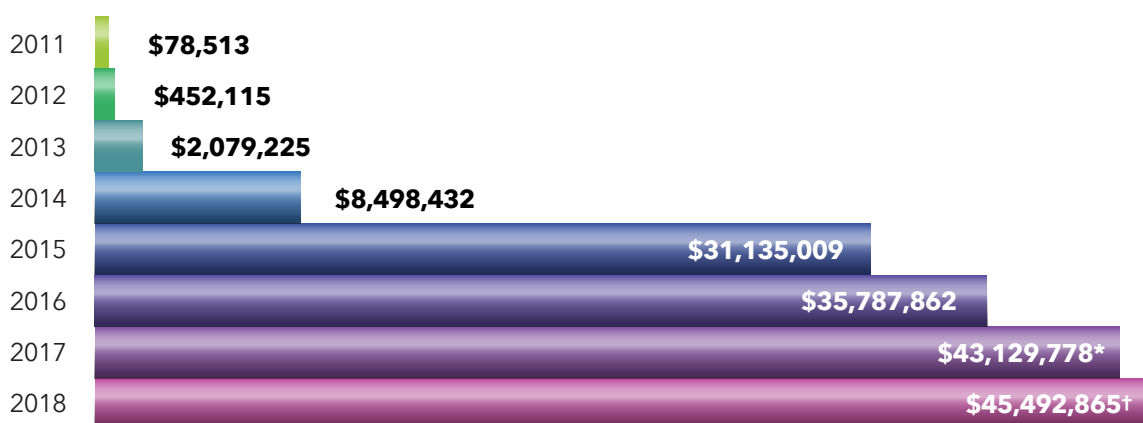
In March of 2019, the Government of Canada renewed its partnership with Brain Canada, as announced in the federal budget. Finance Minister Bill Morneau's budget committed \$40 million in new investment over two years in brain research, through the Canada Brain Research Fund. This commitment by the federal government is an important step to ensure that Canada continues to be among

the leaders in the global challenge to understand brain function and brain diseases. More than simply contributing public money to this vital cause, the matching nature of the fund is stimulating and rallying private donations and other non-governmental funders to support transformative brain research on a scale never before achieved in Canada.

"This is positive news for the brain research community and for the health of all Canadians. The added investment will allow us to expand our work with a range of valued partners, together with Government. As we build the next phase of programs, we will continue to establish our priorities through the contributions of an ecosystem of stakeholders, including researchers from different disciplines (in Canada and internationally), research institutes across the country, and the health charities that have direct outreach with patients, families and caregivers. We look forward to continuing our collaborative relationship with everyone committed to the 'One System' approach to brain research."

– Franco J. Vaccarino, Ph.D.
Chair of the Research Policy Committee of the Brain Canada Board

GRANTS AND AWARDS DISBURSED THROUGH THE CANADA BRAIN RESEARCH FUND



AMOUNT DISBURSED

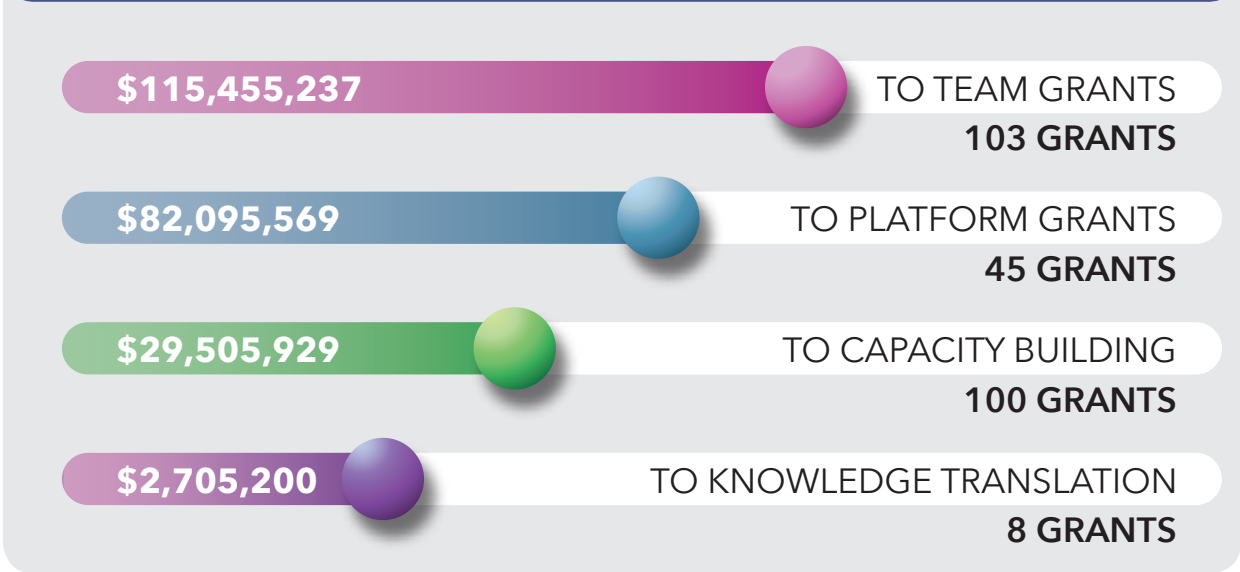
* \$42,527,060 disbursed by Brain Canada + \$602,718 sent directly to host institutions by partners = \$43,129,778.
† \$41,954,908 disbursed by Brain Canada + \$3,537,957 sent directly to host institutions by partners = \$45,492,865.

CBRF BY THE NUMBERS

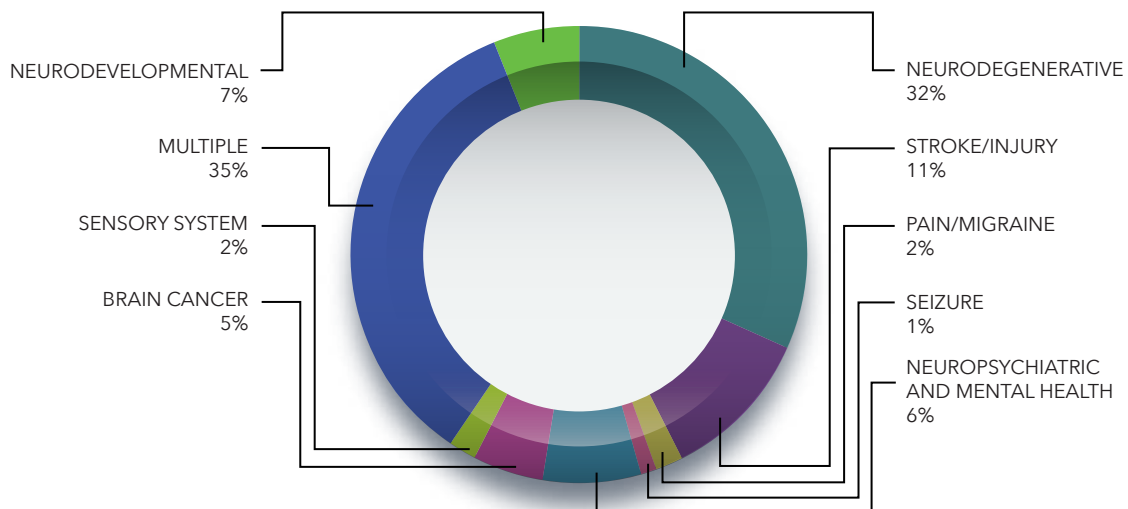
The **Canada Brain Research Fund** is the largest national fund dedicated to brain research.

- **\$220 MILLION** COMMITTED TO DATE
- **\$45 MILLION** DISBURSED IN 2018

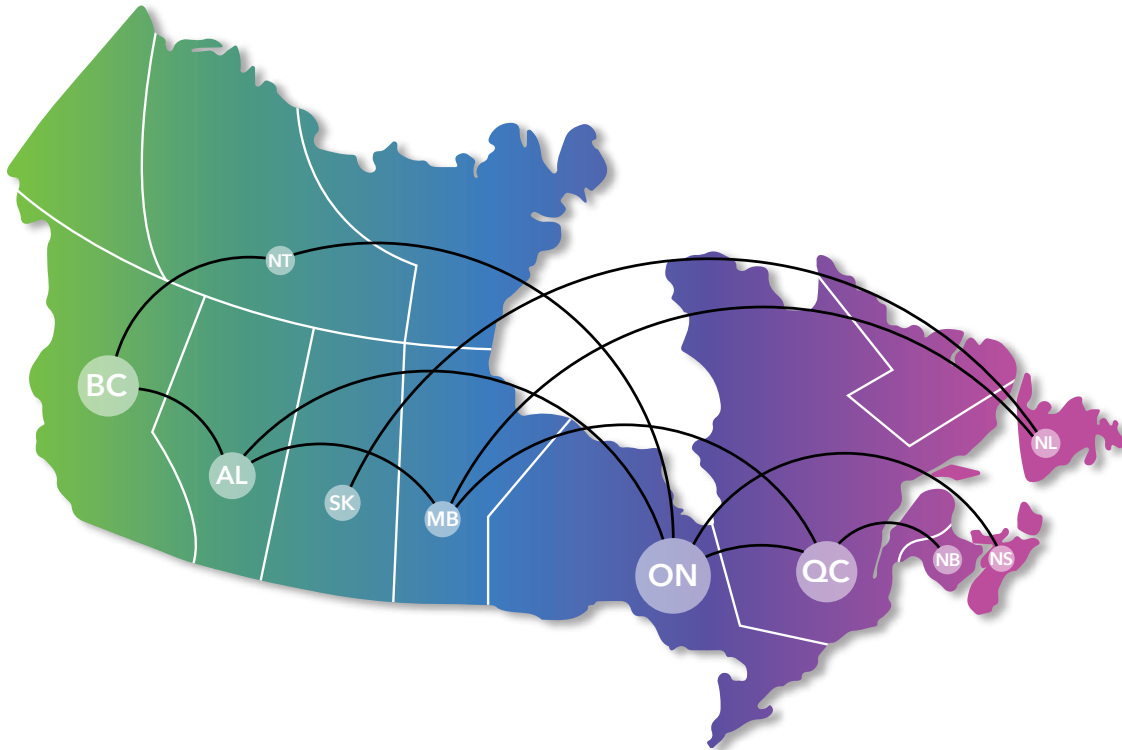
- **256 PROJECTS FUNDED**
- **152 CURRENTLY UNDERWAY**



DISTRIBUTION OF FUNDING ACROSS BRAIN DISORDERS



DISTRIBUTION OF CBRF PROJECTS ACROSS CANADA*†



BC British Columbia 40.25 projects 131 researchers/ trainees	AL Alberta 27 projects 129 researchers/ trainees	NT Northwest Territories - 1 researcher/ trainee	SK Saskatchewan 1 project 5 researchers/ trainees	MB Manitoba 3 projects 19 researchers/ trainees
ON Ontario 107.25 projects 423 researchers/ trainees	QC Quebec 69.5 projects 221 researchers/ trainees	NB New Brunswick 2 projects 3 researcher/ trainee	NS Nova Scotia 2 projects 20 researchers/ trainees	NL Newfoundland 3 projects 5 researchers/ trainees

* Based on location of the principal investigator
 † 1 training award based in the US

CANADA BRAIN RESEARCH FUND – NEXT PHASE

We are currently undertaking a planning exercise to set a framework for the allocation of the additional \$40 million in matched funding committed in Budget 2019 (funding starting in 2020). Prior to implementing new programs and disbursing funds, the following steps are taking place: discussions with Health Canada; a meeting with the Research Policy Committee of the Board; and a broader consultation with the research community. The goal of the

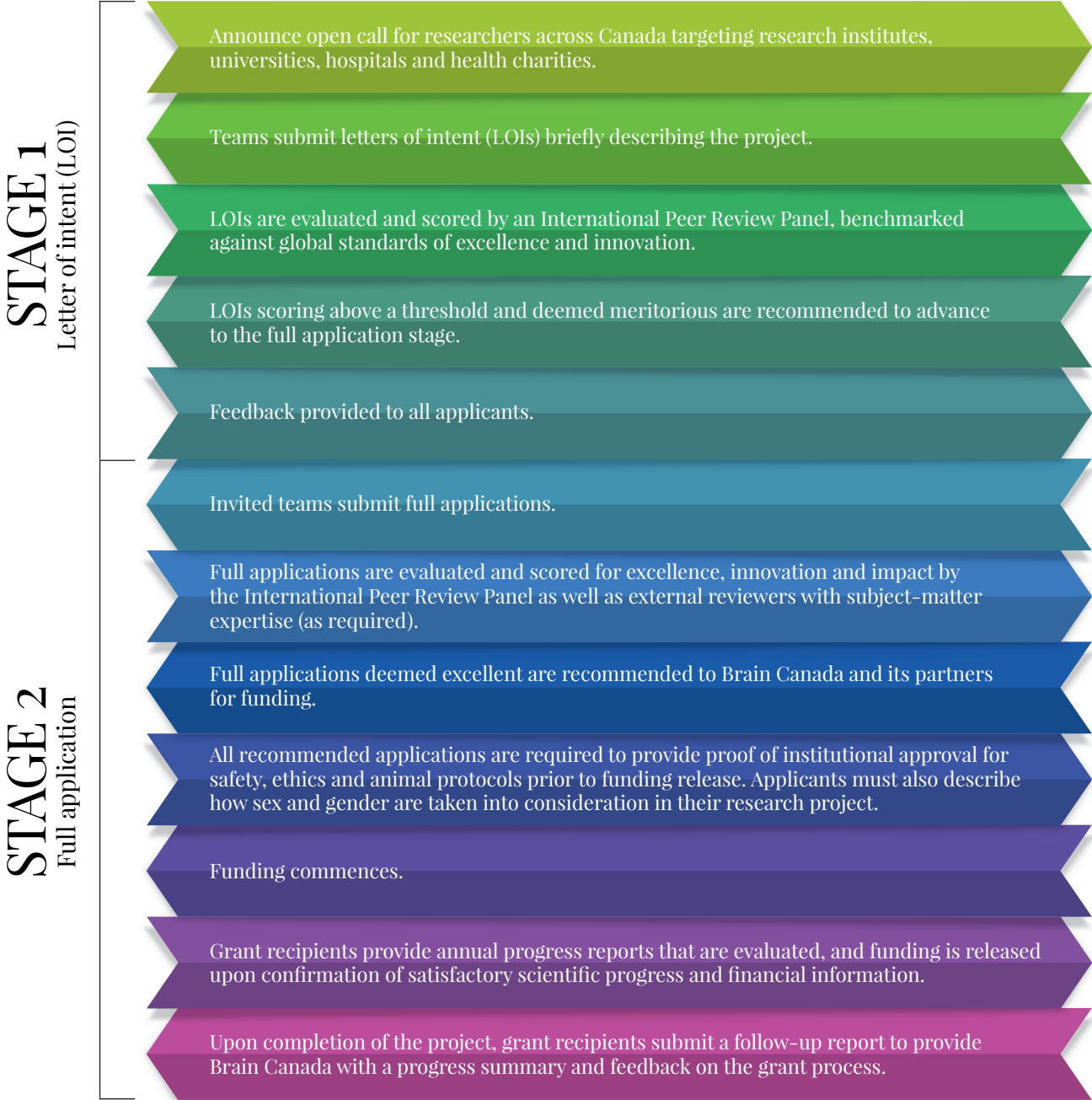
planning exercise is to identify priority areas for investment (programs, partnerships and research themes), and appropriate timelines for launching competitions. Brain Canada is committed to ensuring that our process is transparent and fair, and that funding is allocated through open calls that follow best practices. Once this work is completed, we will announce our next steps to the community. We are looking forward to this next exciting chapter!

BRAIN CANADA’S REVIEW PROCESS

Brain Canada allocates funding, first and foremost, on merit.

A key to Brain Canada’s success in bringing new funds into the brain–research ecosystem lies in the rigour of the organization’s scientific review process, which gives donors and partners a trusted mechanism to ensure projects are chosen on the basis of excellence and innovation.

Funding recipients are selected through open and partnered competitions, and international peer review that: reduces the risk of conflicts of interest; allows us to benchmark against international standards; and creates a network of ambassadors and new connections for Canada.



RESEARCH PROGRAMS OVERVIEW

Brain Canada is proud to announce that more than \$45 million was disbursed to research grants in 2018, a new record for the Foundation. As of April 1st, 2019, we are supporting 152 active projects, which cover a wide range of diseases, disorders and injuries of the brain. Here we provide a brief overview of the new projects that were funded in 2018. For a complete list of Brain Canada-funded projects, please consult the searchable directory on our website, www.braincanada.ca.

ALS CANADA – BRAIN CANADA TRAINEE PROGRAM

ALS Society of Canada and Brain Canada have partnered on a new program that aims to attract the brightest young minds to ALS research to contribute to a succession plan for the Canadian ALS research community. Through this program, doctoral awards will be funded at \$25,000 per year for up to three years and postdoctoral fellowships were funded at \$55,000 per year for up to three years. This program complements the other three successful Brain Canada/ALS Canada partnered programs: The Arthur J. Hudson Translational Team Grant, Discovery grants and Career Transition awards. Three PhD scholarships and three Postdoctoral Fellowships were awarded in October of 2018.



Abdullah Ishaque
University of Alberta
MRI Biomarkers of Cerebral Degeneration in ALS and their Pathological Validation
GRANT AMOUNT: \$21,875
(award ended early by trainee)



Lilian Lin
University of Toronto
Investigating the effects of C9orf72 haploinsufficiency on TDP-43 pathology in ALS
GRANT AMOUNT: \$75,000



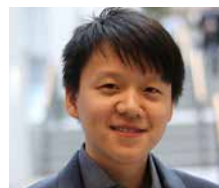
Yasir Mohamud
University of British Columbia
Characterizing Enterovirus Disruption of Autophagy as a Disease Mechanism for ALS
GRANT AMOUNT: \$75,000



Sahara Khademullah, Ph.D.
Université Laval
Examining the role of KCC2 in maintaining the balance between excitation and inhibition in ALS
GRANT AMOUNT: \$165,000



Prateep Pakavathkumar, Ph.D.
Université de Montréal
*Pre-clinical drug discovery against hexanucleotide repeat-containing C9orf72 toxicity using *Caenorhabditis elegans* and patient-derived induced motor neurons*
GRANT AMOUNT: \$165,000



Yulong Sun, Ph.D.
University Health Network
Detection of misfolded TDP-43 in CSF of ALS cases: Diagnostic potential of confirmation-specific antibodies
GRANT AMOUNT: \$165,000

ALZHEIMER'S ASSOCIATION INTERNATIONAL RESEARCH GRANT

Brain Canada has partnered with the Alzheimer's Association (USA) to co-fund projects led by Canadian principal investigators through the Alzheimer's Association International Research Grant program. In 2018, one new grant was funded.



Nathalie Bier, Ph.D.
Université de Montréal
Assistive technology for cognition to increase safety at home
GRANT AMOUNT: \$195,000

Brain Canada has partnered with the Alzheimer's Association on

8 GRANTS,
totalling over
\$1.4M

BRAIN CANADA/CQDM PARTNERSHIP

Brain Canada and CQDM formed a partnership in 2014 to fund projects linking neuroscience research to the biopharmaceutical industry. To date, 13 projects have been funded. In 2018/2019, two grants were funded through the **Quantum Leap** and **SynergiQc** programs. The Quantum Leap program is intended to support outstanding translational research projects implementing state-of-the-art technologies with very high-potential impact in key areas of unmet needs within the biopharmaceutical industry. The SynergiQc program is designed to promote university-based industrial research in the biopharmaceutical field that will generate economic benefits for Quebec.

QUANTUM LEAP PROGRAM



Brian Chen, Ph.D.
McGill University
A Drug Screening Platform to Increase Protein Expression Levels for Treatment of Neurological Disorders
GRANT AMOUNT: \$1,450,000

Brain Canada has partnered with CQDM on

13 GRANTS,
totalling over
\$18.3M

SYNERGIQC PROGRAM



Gabriella Gobbi, M.D., Ph.D.
McGill University
Novel First-In-Class Melatonin MT₂ Receptor Agonist for Neuropathic Pain: Investigational New Drug (IND) - Enabling Studies
GRANT AMOUNT: \$1,600,000



Phillippe Gros, Ph.D.
McGill University
Exploitation of a new pharmacological target for the development and validation of new anti-inflammatory drugs
GRANT AMOUNT: \$1,375,000

CANADIAN CANCER SOCIETY BRAIN CANADA PARTNERSHIP

Brain Canada has a long-standing partnership with the Canadian Cancer Society (CCS) to support research focused on brain and nervous system cancer. In 2018, one new project was recommended for funding, through the CCS's Innovation Grant program. The goal of the Innovation program is to support the development and testing of unconventional concepts and approaches to address problems in cancer research.



Livia Garzia, Ph.D.
McGill University
Evaluation of electrical activity as a tumour suppressor in medulloblastoma
GRANT AMOUNT: \$199,348

Brain Canada has partnered with the Canadian Cancer Society on

12 GRANTS,
totalling over
\$8.8M

CANADIAN OPEN PARKINSON NETWORK

Across Canada there are leading researchers in the area of Parkinson's disease and related disorders. However, platforms are not currently available to link this pan-Canadian expertise. Through a partnership between Brain Canada and Parkinson Canada, the Canadian Parkinson Network and Registry program seeks to increase data-availability and promote integration across sites, to increase the access to and impact of this data. This platform will support diverse projects from bench to bedside that will inform us on mechanisms and markers of Parkinson's disease progression, novel treatments and treatment strategies, as well as clinical trials.



PRINCIPAL INVESTIGATOR AND DIRECTOR

Oury Monchi, Ph.D.

Hotchkiss Brain Institute

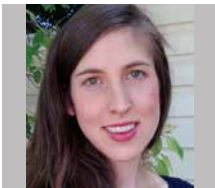
University of Calgary

GRANT AMOUNT: \$2,000,000

DR. HUBERT VAN TOL TRAVEL FELLOWSHIP

The Dr. Hubert van Tol Travel Fellowship was established in 2006 to honour the memory of neuroscientist Dr. Hubert van Tol who died suddenly in a bicycle accident on April 20, 2006. Dr. van Tol greatly valued mentoring young researchers and recognized the importance of international experiences in the early training of young scientists. The fellowship is open to all PhD students and postdoctoral fellows undertaking research on a Brain Canada-funded grant. The award provides up to \$5,000 to enable young researchers to attend a major international conference, symposium, or training course. The recipient is selected on a competitive basis by an expert selection committee.

2018 RECIPIENTS



Georgia Balsevich, Ph.D.

University of Calgary.

GRANT AMOUNT: \$4,105

Dr. Balsevich used her travel award to attend the 28th Annual International Cannabinoid Research Society Symposium in The Netherlands, and the 11th FENS Forum of Neuroscience, Berlin, Germany.



Alberto Delaidelli, M.D.

University of British Columbia.

GRANT AMOUNT: \$2,883

Dr. Delaidelli used his travel award to attend the Society for Neuro-Oncology Annual Meeting in New Orleans.

“By attending these conferences I was able to gain insight into the most up-to-date scientific advances in the broader field of neuroscience, and also had the opportunity to connect with leading, internationally-recognized scientists from the niche areas of stress and feeding.”

– Georgia Balsevich, Ph.D.

EARLY YEARS INTERVENTION ON A FIRST NATIONS RESERVE

In close partnership with the Martin Family Initiative, Brain Canada and a family foundation that wishes to remain anonymous, are providing funding for an innovative pilot project that aims to improve outcomes for pregnant Indigenous women and their children living in a First Nations reserve community. The project consists of the development of a community-based initiative that centralizes Indigenous knowledge and cultural values in the context of child wellbeing. For a more in-depth profile of this project, please see page 23.



PRINCIPAL INVESTIGATOR AND DIRECTOR

Bryan Kolb, Ph.D.

University of Lethbridge

GRANT AMOUNT: \$3,056,100

EARLY-CAREER CAPACITY BUILDING GRANTS

It is vitally important to retain, support, and build the capacity of our brightest early-career investigators to enable and facilitate the major contributions and impact that they could make to Canadian brain research. The Early-Career Capacity Building grants program provides an opportunity for the researchers to begin building their careers in Canada, and is aligned with the federal government's priority of supporting early-career researchers conducting world-class research. For a more in-depth profile of this program, please see pages 18-19.



Adrien Peyrache, Ph.D.
McGill University
The role of cortical inhibitory cells in human epilepsy
GRANT AMOUNT: \$100,000



Matthew Parsons, Ph.D.
Memorial University
Hippocampal heterogeneity in health and disease
GRANT AMOUNT: \$100,000



Jillian Stobart, Ph.D.
University of Manitoba
Brain pericyte calcium signaling during vasomotion and neurovascular coupling
GRANT AMOUNT: \$100,000



Hamed Najafabadi, Ph.D.
McGill University
Decoding the RNA stability programs that determine cell identity and function in human brain and neurodegenerative disorders
GRANT AMOUNT: \$100,000



Maxime Rousseaux, Ph.D.
University of Ottawa
Mapping the cellular origins of circuit vulnerability in neurodevelopmental disorders
GRANT AMOUNT: \$100,000



Sébastien Talbot, Ph.D.
Université de Montréal
Nociceptor neurons control cancer immunosurveillance
GRANT AMOUNT: \$100,000



Jonathan Epp, Ph.D.
University of Calgary
The influence of functional connectivity on cognitive reserve
GRANT AMOUNT: \$100,000



Francis Bambico, Ph.D.
Memorial University
Electrically guided transcranial stimulation of cells chemogenically primed for excitability: a novel, non-invasive and cell type-specific approach
GRANT AMOUNT: \$100,000



Jason Plemel, Ph.D.
University of Alberta
Neurodegenerative potential for microglia in a progressive MS model
GRANT AMOUNT: \$100,000



Stuart Trenholm, Ph.D.
McGill University
Systematic assessment of retinal output following optogenetic vision therapy
GRANT AMOUNT: \$100,000

Following the success of the Early-Career Capacity Building grants program, Brain Canada will launch the Future Leaders in Canadian Brain Research program in 2019 - a potentially

\$15 MILLION-PROGRAM

that will fund **100+** early-career researchers.

MULTIPLE SCLEROSIS PROGRESSION COHORT

The Multiple Sclerosis Society of Canada (MS Society), Brain Canada, and Biogen have partnered on an initiative to support a platform to address research questions related to the mechanisms of progression, treatment, and impact of MS. We are pleased to announce that Roche joined the partnership in April of 2019. For a more in-depth profile of this platform, please see pages 30-31.



TEAM LEAD
Jiwon Oh, M.D., Ph.D.
University of Toronto
GRANT AMOUNT: \$8,630,000



Beyond the #IceBucketChallenge: The ALS Canada and Brain Canada Partnership

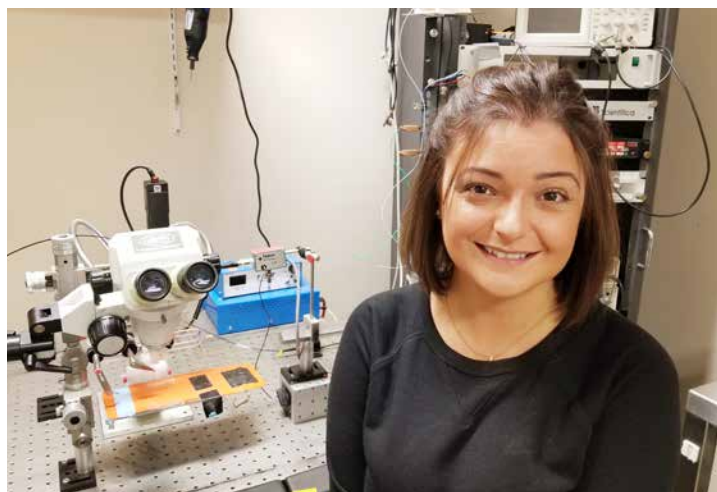
Remember the Ice Bucket Challenge? The frisson of being challenged. The chill of water cascading down a body. The issuing of a summons to a friend or family. All for a noble cause: to promote awareness and raise funds for amyotrophic lateral sclerosis (ALS). Yet, what happened beyond the hashtag?

In December 2018, ALS Canada and Brain Canada

announced \$720,000 in funding for six trainee awards. These grants sustain high-quality Canadian ALS research by providing salary support for the next generation of ALS researchers. “This was a tremendous opportunity to collaborate with Brain Canada to support more trainees in a given year than ever before,” said Dr. David Taylor, VP Research, ALS Society of Canada. This completed the last of the \$20-million research partnership with Brain Canada (through the Canada Brain Research Fund with financial support from the Government of Canada) following the Ice Bucket Challenge. A partnership that resulted in the largest one-time investment in research in the history of ALS Canada.

It brought researchers who were not working on the subject to ALS research in a multidisciplinary environment conducive to breakthroughs. Seventeen million dollars was raised through the challenge in 2014. Increased awareness resulted in a \$10-million matching grant for research by Brain Canada. ALS Canada dedicated the last of the matched Ice Bucket Challenge research funding to early-career researchers.

The historic partnership between ALS Canada and Brain Canada encompasses three jointly funded programs. The first is the Arthur J. Hudson Translational team grant, which brings together researchers from across the country to accelerate therapeutic development. The second is the Discovery grants program. It encourages basic research focused on identifying the causes of, or treatments for ALS and related neurological diseases. The third, the Career Transition Award program, aims to identify rising stars pursuing innovative research in labs and academic



Sahara Khademullah, Ph.D.

institutions in Canada. The award has a long-term goal of developing the next generation of scientists across disciplines within basic and clinical sciences, contributing to knowledge generation and translation in ALS.

For Dr. Sahara Khademullah, Brain Canada has been part of her success in studying the inhibitory system that is necessary for the brain to function normally, a crucial step in ALS research. When the signalling network func-

tions properly, there is a good balance between chemicals that excite the neurons and chemicals that inhibit them. A feature of ALS before symptoms appear is that motor neurons in the brain become over-excited – hence the impact a better understanding of the inhibitory system can have.

Dr. Khademullah worked in the Lab of Dr. Melanie Woodin at the University of Toronto as a PhD student. At the time, Dr. Woodin was funded by a Discovery grant. Now, as a postdoctoral fellow, Dr. Khademullah has received a \$165,000 trainee award from the ALS Canada Research Program, in partnership with Brain Canada, and La Fondation Vincent Bourque. The award allows her to investigate how aberrant inhibitory transmission along the pathway connecting the motor cortex to the spinal cord leads to neurodegeneration in ALS.

“A lot of my passion and drive comes from the realization that people living with ALS have extremely limited options and are putting their faith in researchers and doctors to help them in their quest to end ALS,” says Dr. Khademullah. “Every day that I’m at work, my goal is to try to find answers that will help.”

Beyond the Ice Bucket Challenge, we have invested over \$72 million in research to advance our understanding of neurodegenerative disorders, including ALS, Alzheimer’s, Multiple Sclerosis, Parkinson’s, and Huntington’s. As with the ripple effect created by the Ice Bucket Challenge, this is leading to breakthroughs that will have multiple impacts, even when the entry point is the study of one disorder.

Left page: Tammy Moore, Chief Executive Officer, ALS Canada, participating in the Ice Bucket Challenge.



Championing Future Leaders in Brain Research: Early-Career Capacity Building Grants

Jillian Stobart, Ph.D. (right) speaking with a colleague.

Early-career. What does it mean? For brain research, it is researchers within three to five years of their first academic appointment that are in a strong position to formulate innovative research projects. It is championing innovation and originality, potential for impact, and excellence. In short, it is the next generation of leaders. It is the future of brain research in Canada.

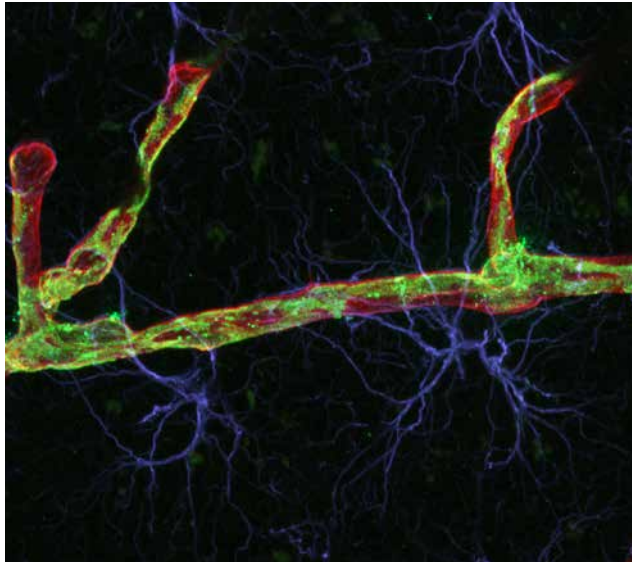
The Early-Career Capacity Building Grants program, in collaboration with the Azrieli Foundation and supported by the Canada Brain Research Fund, cements this belief into action. The program had an overall envelope of \$1,000,000 to support 10 projects that last two years each, for a total of \$100,000 per project.

“Brain Canada has always believed in the importance of supporting the next generation of researchers. With this new grant program we are helping ensure that Canada has a robust pipeline of talent, and remains at the forefront in the field of brain research,” said Inez Jabalpurwala, President and CEO of Brain Canada.

The goal is to reduce the social and economic burden of neurological and mental health problems by prevention, early diagnosis, and treatment. The program provides an opportunity to develop new lines of research on the mechanisms of the brain and nervous system, in the context of early-career. It also encourages early-career investigators to build on existing platforms and data repositories to create new research programs.

Most important, the Early-Career Capacity Building Grant has the potential to be transformative at a time when there is a funding gap to support and retain the brightest Canadian investigators.

Jillian Stobart based at the University of Manitoba is one of the 10 recipients of the Early-Career Capacity Building Grant. “As a new independent investigator, this funding will help me to establish my research program. I now have the freedom to ask big questions that could potentially redefine our views of the brain.” A freedom that positively impacts brain research. “My work will show the role pericytes cells have in regulating blood flow to ensure that the



Immunohistochemistry photo taken on a confocal microscope: pericytes (green), astrocytes (blue), and blood vessel (endothelial cells- red) are labelled with fluorescent antibodies.

brain receives the energy and oxygen that it needs. Ultimately, knowledge in this area could be applied to a number of different brain disorders, such as stroke and Alzheimer’s disease, where pericytes are potentially the missing link.”

For fellow recipient Jason Plemel based at the University of Alberta, who focuses on whether the brain’s own immune cells can make multiple sclerosis (MS) worse, the benefits of the Grant are clear: “They allow me to create another research focus in my laboratory. Funding is tough and with this grant I address something that has puzzled me for years, why would the immune system hurt the brain, when its job is to help the brain. Microglia are the immune cell of the brain and spinal cord, and despite decades of research it is still unclear why they are at times beneficial and at times

detrimental. We are investigating the role of microglia in a model of MS where we think they are exacerbating damage and contributing to white matter injury.”

Early-career researchers, such as Jillian and Jason, have the energy and imagination to bring new thinking and new approaches to our understanding of the brain. By providing early-career researchers with funding at a critical point in their careers, we can ensure that they are given every opportunity to succeed. That is why Brain Canada is committed to the Early-Career Capacity Building Grants program. In the year ahead, we will be expanding this program under a new name, Future Leaders in Canadian Brain Research. We have a goal of raising \$15 million to fund 115 grants over seven years through regular competitions.

“We are committed to investigators who are in the early stages of their careers, as they are in a unique position to advance innovative research projects. They often have difficulty securing their first grant through traditional funding, yet they bring a high risk/high reward approach, and that is something we want to encourage and support,” said Naomi Azrieli, Chair of Brain Canada.



Jason Plemel, Ph.D. (second from right) and team.



Ian Graham, Ph.D.

One in three Canadians – over 12 million people – will face a psychiatric disease, a neurological disorder or a brain or spinal cord injury at some point in their lives. This is a statistic that influences us and our immediate circle. Yet, the impact cannot be reduced to a number.

Launched in 2017, the Improving Health Outcomes and Quality of Life (IHO-QOL) competition aims to accelerate the impact of research on health outcomes, including quality of life, of people living with brain disorders. The competition is funded through the Canada Brain Research Fund with the financial support of Health Canada and institutional sponsors.

The program enables collaboration between multidisciplinary teams of researchers, clinicians, allied-health workers, carers, and patients. It channels the diversity of brain knowledge to advance the understanding and reduce the impact of brain disorders on the health of Canadians. The goal is to provide benefits to improve patient-oriented health outcomes, including quality of life, in the short-term.

“Canada is home to some of the best neuroscientists in the world, and we are pleased to support their work through the Brain Canada Foundation,” said Ginette Petitpas Taylor, Minister of Health.

“This research will help Canadians living with brain disorders to live healthy and productive lives.”

For Dr. Ian Graham of the Ottawa Hospital Research Institute and his Canadian team members, this means understanding the role of mobility in stroke recovery. They received a \$1,203,000 IHO-QOL team grant for their Stroke Recovery in Motion project.

Advances in stroke treatment have increased survival, but left more people living with chronic disability. In response, research has shifted to treatments to enhance brain recovery. Despite evidence that aerobic exercise improves motor recovery, quality of life and post-stroke cognitive function, most stroke survivors do not have access to quality exercise programs. There is a need to develop exercise programs for those living with a stroke. Therefore, Dr. Graham and his colleagues aim to scale up the implementation of sustainable, evidence-based community exercise programs for those living with a stroke, and to measure the impact of uptake.

“Our project is all about providing community groups with the tools to be able to plan, implement, and sustain community-based exercise programs tailored to people living with a stroke,” said Dr. Graham.



Stroke recovery program.

“The goal is to increase the number of exercise programs available across the country to people living in the community post stroke so that they may optimize their health outcomes and quality of life.”

Could it be that exercise is the best medicine? Dr. Benjamin Goldstein of the Sunnybrook Research Institute and his colleagues are using their grant to improve aerobic fitness among adolescents with bipolar disorder. Despite its importance, there are no prior exercise intervention studies

for teenagers with bipolar disorder. “We are grateful for the support of Brain Canada, which had provided us with the crucial funding needed to develop and pilot test a new behaviour change counselling intervention,” said Dr. Goldstein. “We are employing an established form of psychotherapy for a novel purpose in a complex population. We learned that a ‘one-size-fits-all’ approach is unlikely to be well received, so we’ve opted for a ‘bespoke’ approach designed to fit the needs and preferences of each of our participants.”



Benjamin Goldstein, M.D., Ph.D. (second from left) and members of his team.

A photograph of a baby wrapped in a traditional Indigenous cradleboard, lying on a vibrant, patterned blanket. The baby is looking upwards and to the right. The blanket features geometric patterns in purple, red, yellow, and white. The cradleboard is made of dark red fabric with yellow laces and a decorative border. The background is a solid blue color.

The Early Years Program: Collaborating with Indigenous Communities to Impact Young People's Lives



Left and right: participants in the Early Years Program.

Early years are crucial. They define and affect who people are. For Indigenous people in Canada, colonisation and underfunding of services have led to poorer health and education outcomes. Stress and trauma before conception, and in birth and early childhood, can change brain development and behaviour.

Brain Canada, in partnership with the Martin Family Initiative (MFI) and an anonymous family foundation, are providing funding for the Early Years project. The MFI, headed by former Prime Minister Paul Martin, is committed to improving elementary and secondary school education outcomes for First Nations, Métis Nation, and Inuit students in Canada, by working in full partnership with the Indigenous people of Canada. The project, led by Bryan Kolb of the University of Lethbridge, aims to improve outcomes for pregnant Indigenous women and their children living on a First Nations reserve through the development of a community-based initiative that centralises Indigenous knowledge and cultural values in the context of child well-being.

Working hand-in-hand with Indigenous communities is an essential first-step to creating systemic change. The nine months before birth, and the early child's life, are critical periods in the shaping of the structures and functions of the brain. As is high-quality culturally appropriate early childhood programming for Indigenous children and families prior to kindergarten. That is why the Early Years program is based on traditional knowledge, community innovation, effective practices, and the latest scientific evidence around early childhood development. The content, implementation, and evaluation of the Early Years is grounded in Indigenous culture and MFI is partnering with Maskwacis Health Services (MHS) and the Ermine-skin Cree Nation in Alberta to implement the program.

“From pre-natal to pre-school, the Early Years program is providing families with the tools to nurture their children in ways that activate resiliency, promote attachment, foster early language development and establish overall wellness,” said the Right Honourable Paul Martin, founder of the MFI.

The program has two parts. The first phase is a home visiting program offering health, early learning, and social service resources to young children and their families in a home environment. It starts prenatally and continues until children reach the age of two. Early Years Visitors begin with over 60 hours of initial training. The training focuses on theory and practice related to early human development, prenatal health, early childhood education, service navigation, and family well-being. It is supplemented by further professional development such as Mental Health First Aid certification, Trauma Informed Care certification, and workshops on language development, traditional birthing practices, self-care, gestational diabetes and prenatal nutrition.

The second phase is comprised of centre-based programming for children between two and four years old with a focus on conversational reading, learning games, and development of language. It also provides enriched caregiving. In both phases, health, education, and social service data is analysed to assess outcomes associated with participation.

“The Early Years program is working to achieve true substantive equality for all Indigenous children by ensuring parents and caregivers are their children's first teachers and the experts in their own child's holistic wellbeing,” said Randy Littlechild, MHS Executive Director.

The project has the potential to demonstrate how to effectively support Indigenous child well-being in a holistic and outcomes-driven way. If successful, it will function as a proof of principle that will lead to an expansion of the program to wider Indigenous populations in Canada. Brain Canada has invested over \$16 million in research which seeks to understand how the brain develops, and the complex interplay of genes and the environment which lead to disease. Getting an evidence base, by building an evaluation into a program, is key to expanding beyond a pilot. That is why we believe it is important to support these types of research projects.

Sex, gender, and the brain: Promoting Equity for Excellence

Nicole Gervais, Ph.D.

In 2012, Dr. Jeffrey Mogil piqued the science community's interest in an issue of *Nature Reviews Neuroscience*. He observed that most patients with chronic pain are women. However, it is difficult to determine whether this sex difference corresponds to differences in pain sensitivity. Fast forward a couple of years. His quest for answers on how women and men experience chronic pain stuck.

Dr. Mogil and his colleagues received a 2014 Brain Canada Multi-Investigator Research Initiative (MIRI) Team Grant from Brain Canada to further their research on sex differences in chronic pain by searching for sex differences in brain functions using imaging techniques in mice.

Dr. Mogil returned to *Nature Neuroscience* in 2015 with a study carried out by labs in Montréal and Toronto, led by him and Dr. Michael Salter, where researchers interfered with microglia functioning and found striking sex differences. While blocking microglia functioning reduced pain in male mice, it had no effect on pain transmission in female mice. An entirely different type of immune cell, likely the T cell, appears to carry out this function in females.



Jeffrey Mogil, Ph.D.

"Sex differences have been almost entirely ignored in pain research, because pain research has been performed primarily on male rodents," says Dr. Mogil. "The research, supported by Brain Canada, showing sex specificity of immune cell mediation of pain hypersensitivity in the spinal cord, is one of the more striking examples to date of qualitatively different biological underpinnings of a phenomenon experienced by both sexes."

"Ensuring that women's voices are heard and celebrated in research is not only about equity; it is also about excellence."



The same quest for answers motivates Dr. Nicole Gervais at the University of Toronto. Dr. Nicole Gervais and her research colleagues, funded by Brain Canada and the Alzheimer's Association through the Alzheimer's Association Research Fellowship, study how the loss of estrogen due to natural or surgical menopause affects sleep, cognitive function, brain inflammation and brain structure. The results could shed new light on how hormones and genetics may interact to promote Alzheimer's risk, possibly through effects on sleep and brain inflammation. A better understanding of these biological mechanisms could suggest ways to reduce risk or develop targeted treatments to slow or prevent Alzheimer's disease.

With projects such as those led by Dr. Mogil and Dr. Gervais, Brain Canada wants to raise awareness about the importance of conducting research that is sensitive to sex and gender differences. That is why we ask researchers applying for grants to describe how sex and gender are taken into consideration in their research project. Our commitment extends to gender parity. **While 49% of the applications received for our last three major competitions announced in 2018 were submitted by female researchers, 57% of the recipients were women.**

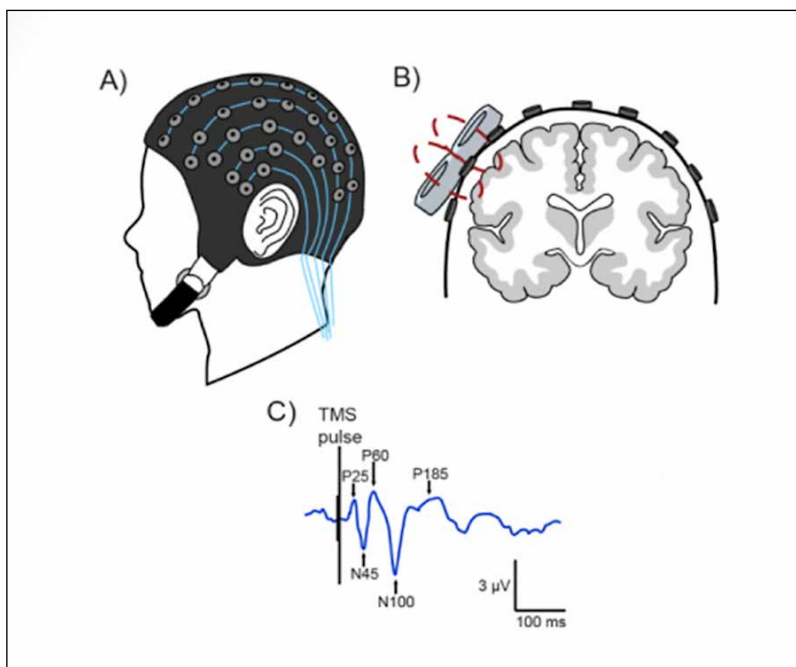
Furthermore, Brain Canada's partnership with the Women's Brain Health Initiative (WBHI), which began in 2016, has been transformative. As part of the partnership, Brain Canada has sponsored editions of the WBHI magazine *Mind Over Matter* focused on sex and gender and prevention of age-related cognitive decline. Brain Canada and WBHI have also co-organized 12 Millennial Minds events in Toronto designed to educate young Canadians on the importance of brain health and gender-based brain-aging disease research.

"Ensuring that women's voices are heard and celebrated in research is not only about equity; it is also about excellence", said Inez Jabalpurwala, President and CEO of Brain Canada.



Supporting
Novel Ideas:
Treating Depression
with Brain Stimulation

Left:
Daniel Blumberger, M.D.
administering rTMS
to a patient.



(A) EEG cap; (B) Transcranial magnetic stimulation (TMS) applied to the cortex;
(C) electrophysiological tracings from the cortex in response to TMS.

In Toronto, 150,000 people per year are diagnosed with a form of depression. That is the equivalent of the population of Moncton, New Brunswick. The majority of them show limited or no improvement with existing medication and therapy. This intrigued Dr. Z. Jeff Daskalakis at the Centre for Addiction and Mental Health.

He notes that while electroconvulsive therapy (ECT) works very well to help address severe forms of depression, a patient must be put under general anesthesia during a 40-minute daily treatment session. With the support of a 2014 Brain Canada Multi-Investigator Research Initiative (MIRI) Team Grant, Dr. Daskalakis and his team of Canadian researchers pioneered a new method to administer less invasive brain stimulation treatment: rTMS. Repetitive transcranial magnetic stimulation (rTMS) is a treatment for patients with depression who have not responded to antidepressant medications. Not only has the treatment shown to be effective, but unlike ECT, it does not need anesthesia.

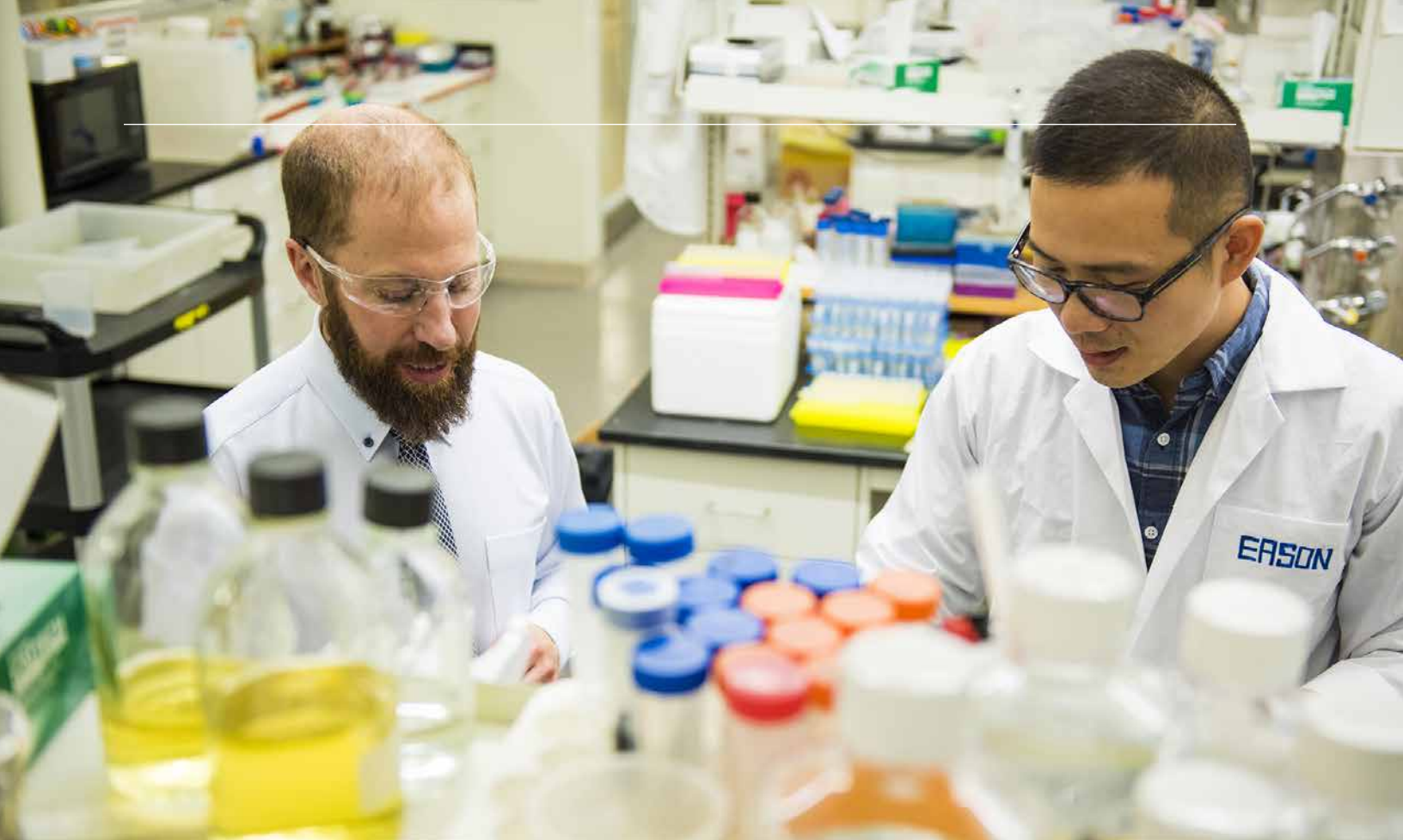
Specifically, Dr. Daskalakis and his team are exploring a new type of rTMS called intermittent theta-burst stimulation (iTBS). rTMS treatment duration takes about forty minutes, whereas iTBS takes only three minutes to administer. The Canadian rTMS Treatment and Biomarker Network in Depression (CARTBIND) Trial, as the project is known, started with clinical trials comparing standard rTMS to iTBS in 294 patients with medication resistant

depression. Half receive conventional rTMS treatment and the other half receive iTBS.

“The goal of CARTBIND is to derive a more fulsome understanding of the brain mechanisms responsible for the therapeutic effects of rTMS in the treatment of depression,” says Dr. Daskalakis.

The team’s preliminary work is encouraging. It demonstrates that iTBS, while being faster to administer, works as well as standard rTMS in depression. If successful, the project will prove a method for increasing rTMS treatment capacities which will improve access to rTMS for all Canadians. Overall, improving the efficiency of rTMS – one of the few established treatments in medication resistant depression – will produce more personalized treatment approaches.

For Dr. Daskalakis, Brain Canada is unique. It was the first granting agency to take a risk in funding his work. Once he had secured a funding base, he was able to get additional monies, including internationally; he secured a grant from the United States National Institutes of Health. Indeed, certain sites in the United States are already using transcranial magnetic stimulation, including to test as a therapy for Post-Traumatic Stress Disorder.



Robert Campbell, Ph.D. and Yi (Eason) Shen, Ph.D.

A Catalyst for Global Connections: Science without Barriers or Borders

Brain Canada's vision of science without barriers or borders is promoting global thought and connections. Innovation does not hold a passport or recognize frontiers. Science knows no nation. The understanding of the brain, in health and in illness, requires knowledge, expertise, and resources that do not exist in one place. It benefits from an international focus.

This focus is advanced by the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative. The White House BRAIN Initiative is a collaborative, public-private research enterprise announced by President Barack Obama on April 2, 2013. Its aim is to fund the invention of new techniques to revolutionize our understanding of the brain as one interconnected system. In the spirit of fostering innovation, the BRAIN steering committee proposes collaborations that cut across neuroscience,

engineering, physics, genetics, mathematics, medicine, and chemistry.

Brain Canada has partnered with the 10 National Institutes of Health (NIH) that form the BRAIN Initiative, to support the involvement of Canadian researchers. In so doing, Brain Canada was one of the BRAIN Initiative's first international partners. Both NIH and Brain Canada believe that the ambitious goals of the BRAIN Initiative can best be attained by collaboration across disciplinary and geographic boundaries.

The Neuronal Mechanisms of Human Episodic Memory project, led by Dr. Taufik Valiante at the University Health Network, is a product of this collaboration. It led to Dr. Valiante receiving a \$1,033,182 Brain Canada/NIH grant in 2017.



Taufik Valiante, M.D., Ph.D.

“The project aims to significantly advance the mechanistic understanding of how human memory works by moving beyond a ‘parts list’ of neurons and brain areas,” says Dr. Valiante.

Memories inform decisions and are essential for human cognition. Yet, their underlying neural mechanisms remain poorly understood. Dr. Valiante’s objective is to assemble a team to test predictions on the neural substrate of human memory. The approach allows the investigation of circuit-level mechanisms of human memory.

By participating in a consortium, the team can pool data and multidisciplinary experience across multiple centres for the same experimental tasks and recording methods. The consortium of investigators collects data sets of a size and quality that are difficult to achieve in an individual, isolated lab. For Dr. Valiante, “The amount and quality of data we will acquire allows us to directly address key scientific hypotheses using sophisticated analysis, which is only possible with a large, high-quality data set. Such studies pose a unique opportunity to answer questions related to the neuronal mechanisms involved in human cognitive processing.”

One of the major challenges facing the BRAIN initiative is the development of technologies that will enable the recording of neural activity throughout the rodent brain. Optical imaging approaches for the recording of neural activity in model organisms have already proven to be highly effective, but are generally limited to imaging of activity near the brain surface.

Robert Campbell at the University of Alberta has embraced the challenge. Dr. Campbell is a chemist who uses protein engineering to invent new tools for imaging dynamic biochemical events in live cells and tissues. The tools created in his lab are then distributed to cell biologists and neuroscientists who apply them to address questions ranging from fundamental mechanisms in cell biology, to the underlying causes of mental illness, to the development of novel therapeutics. He received a Brain Canada/NIH grant in 2015 to develop a probe that can convert the electro-chemical activity of neurons into signals that can be easily visualized, even when those neurons are deep in the brain.

“The Brain Canada/NIH grant was critical for enabling my lab to develop the first genetically encoded near-infrared Ca²⁺ biosensor for neural activity imaging. This new biosensor opens the door to high-resolution imaging of neural activity deep within the brains of rodent models of human brain disorders.” Results from this project were published in the February 2019 edition of *Nature Methods*. Brain Canada’s partnership with NIH is not limited to North America. In addition to providing funding, Brain Canada is part of the BRAIN Multi-Council Working Group along with the National Science Foundation, the Food and Drug Administration, the Defense Advanced Research Projects Agency, the Australian National Health and Medical Research Council, and the Intelligence Advanced Research Project Agency, therefore participating in a truly global scientific endeavour.



A Quartet, a Plan, a Team:

Larry Lynd, Ph.D., University of British Columbia; Anthony Traboulsee, M.D., University of British Columbia; Alexandre Prat, M.D., Ph.D., Centre de Recherche du CHUM; Scott Patten, M.D., Ph.D., University of Calgary; Jiwon Oh, M.D., Ph.D., University of Toronto; Roger Tam, Ph.D., University of British Columbia; Shannon Kolind, Ph.D., University of British Columbia.

The quartet? Brain Canada, the Multiple Sclerosis (MS) Society of Canada, Biogen, and Roche Canada contributing over \$9 million to an initiative focused on helping people living and affected by MS in Canada. The plan? To study the progression of MS in a Canadian cohort. The team? Led by Dr. Jiwon Oh, based at St. Michael's Hospital, and comprising nearly 50 leading MS researchers in multiple disciplines from across Canada. The project: a five-year collaborative study, the first of its kind in the country, to better understand the progression in MS, and why some people progress in their disease while others do not. The researchers will try to pinpoint triggers leading to progression and establish methods of managing them while measuring the impact of MS on individuals, as well as on the Canadian healthcare system. "Canada has one of the highest rates of MS in the world, so it is imperative that we learn more about this disease and how it progresses," said Dr. Oh.

"By gaining a better understanding of MS progression, we can make a significant impact on how people manage their disease and improve the quality of life of many Canadians."

Progression – or the steady worsening of disease, resulting in increased disability – is a challenging reality faced by people affected by MS. While major advances have been made in MS research over the last thirty years, the mechanisms of progression, and the ways in which researchers and clinicians can track progression, are still not fully understood.

"This incredibly collaborative project has the potential to uncover the mysteries surrounding progression in MS that can alter how we view this disease," said Dr. Pamela Valentine, President and CEO of the MS Society of Canada.



Building a Patient Database to understand Progression in Multiple Sclerosis

Through the Canadian Prospective Cohort Study to Understand Progression in Multiple Sclerosis (CanProCo), Dr. Oh and her team hope to collect and analyze data from Canadians living with MS. They will account for biological, physical and socioeconomic factors, allowing for an understanding of each person's experience with the disease. Using this data, researchers hope to improve the diagnostic process, treatment, long-term monitoring, and potentially prevent MS. Long-term monitoring of MS progression also enables researchers to create a centralized and open source of data. As with the Ice Bucket Challenge approach, this could be relevant for other neurodegenerative diseases including Alzheimer's, Parkinson's, Amyotrophic Lateral Sclerosis, and Huntington's because of the potential for common disease mechanisms.

"By gaining a better understanding of MS progressions, we can make a significant impact on how people manage their disease and improve the quality of life of many Canadians."

The CanProCo could have significant implications on how those living with MS manage and understand their illness, from diagnosis and through the various stages of the disease. Ultimately, the goal of the cohort is to connect biological findings with real world findings to create a comprehensive picture of progression in MS. The hope is that researchers will better understand the unpredictable nature of MS and find a cure.

KNOWLEDGE TRANSLATION AND DISSEMINATION

Brain Canada believes that by better connecting research findings and practice, every discovery along the pathway carries the potential to improve lives. This is seen through Brain Canada's commitment to funding projects across the entire spectrum of research, including knowledge translation and exchange. Such programs are instrumental in ensuring the knowledge generated by research can deliver benefits to all Canadians. Here we highlight some of the knowledge translation partnerships and activities that took place in 2018/2019.

MENTAL HEALTH COMMISSION OF CANADA

First responders, whose jobs commit them to persistent, repeated exposure to potentially triggering incidents, are at ongoing risk of developing mental health problems. Work stress, workloads, and work-life issues have a negative impact on the physical and mental health of a substantive portion of Canada's first responder personnel. Stigma is a major barrier preventing people from seeking help for mental health problems or mental illness and it is the fear of stigma that often delays diagnosis and treatment. Brain Canada has partnered with the Mental Health Commission of Canada and Medavie Health Foundation Family to develop **The Working Mind First Responder Family Module (TWM-FRF)**, (*adapted from Road to Mental Readiness program*), an education-based program designed to address and promote mental health and reduce the stigma of mental illness in a first-responder setting.

The program launched in 2018 and ran in nine locations across eight provinces, with the goal of expanding in the future. Participants say the program helped improve their confidence and reduce their worries in approaching mental health and wellness issues experienced within their families.

Brain Canada will partner with the Mental Health Commission of Canada, Bell Canada, and the Rossy Foundation to support Phase II of "*Supporting Student Success – Development of a National Standard to address the psychological*

health and safety of post-secondary students." Funds will be used to carry out knowledge translation and exchange (KTE) activities to raise awareness and uptake among post-secondary institutions. The expected start date is Fall 2019.

CAPITALIZE FOR KIDS

Brain Canada has partnered with Capitalize for Kids to translate capacity building research and strategies into evidence-based solutions for mental health service providers. The goal of Capitalize for Kids' work is to increase capacity for mental health service providers – to help them do more with their existing resources. This will reduce wait times for children requiring mental health services, and will ultimately help more kids get the help they need. With the pro-bono support of management consulting firms such as Bain & Company, McKinsey & Company, and the Boston Consulting Group, Capitalize for Kids identifies opportunities to improve the efficiency of their beneficiaries. With the help of partners like Brain Canada, they then fund and support the implementation of solutions that will help capitalize on these opportunities. The results of these consultations are published and shared with other organizations, helping other mental health service providers to build their own capacity and improve their efficiency. This project recently ended, and we are expecting a final progress report/update in the Fall.

WOMEN'S BRAIN HEALTH INITIATIVE (WBHI)

Brain Canada and the Women's Brain Health Initiative (WBHI) have formed a partnership to engage and educate Canadians on the importance of brain health. To date Brain Canada has sponsored five editions of the WBHI publication *Mind Over Matter*, a magazine featuring articles about brain health and the prevention of age-related

cognitive decline. The most recent edition was released in Fall of 2018. 130,000 magazines were printed in English and distributed across Canada through *The Globe & Mail*, to doctor's offices, support groups, hospitals and teaching centres, memory clinics, care centers, and hospices/palliative care providers. They were also distributed in Toronto and GTA through *The Toronto Star*. 7,500 magazines were printed in French and distributed to doctors' offices, hospitals and other relevant waiting rooms in the Quebec market.



SELECT CONFERENCES AND EVENTS

Raising the Bar – May 10, 2018

The event was held in celebration of the Women's Brain Health Initiative's 5th anniversary, and provided an overview of what WBHI has accomplished in the last five years. Inez Jabalpurwala received a WBHI Catalyst Award at the event – an award to honor those who have been instrumental in WBHI's success.

Alzheimer's Association International Conference (AAIC) – AWARE Panel

– July 24, 2018

Inez Jabalpurwala was invited to speak at the Alliance of Women Alzheimer's Researchers (AWARE) Professional Development Panel event held in Chicago, Illinois. The panel was titled “*Advancing Women Scientists: An Honest Forum with Global Perspectives about Overcoming and Challenging Barriers to Success*”.

Canada-Israel Bilateral Directorate on Science, Technology and Innovation Cooperation – October 29-30, 2018

Inez Jabalpurwala participated in a discussion about the areas of current and future potential collaboration in health research between Canada and Israel. This inaugural meeting was hosted by Global Affairs in Ottawa.

Forum on Emerging Trends in Biopharmaceutical R&D – November 19, 2018

Brain Canada attended this event organized by CQDM in celebration of their 10th anniversary. It brought together members from the pharmaceutical industry, scientists, entrepreneurs, partners and government representatives. An announcement of one of the CQDM-Brain Canada partnered projects was done at this event.



Second Roundtable on Brain Health

– January 28, 2019

Brain Canada participated in the roundtable teleconference, co-chaired by the Public Health Agency of Canada and the Neurological Health Charities of Canada. Various organizations provided an update on progress and collaborations since the last meeting and discussed possible opportunities to work together to advance brain health.

Women's Heart and Brain Health Panel – February 18, 2019

Inez Jabalpurwala was a panellist at this event held in Montreal, which was organized by Women in the Network and moderated by Dana Ades-Landy, the Quebec CEO of the Heart and Stroke Foundation. The panel was composed of practitioners and experts discussing heart and brain health, with a focus on women's health.



Effervescence 2019 – April 24-25, 2019

Inez Jabalpurwala was a panellist at this event in Montreal. The panel, organized by BIOQuébec, was entitled *Venture Philanthropy: an impactful tool for advancing science and society*, and included speakers from various organizations/charities, as well as researchers in the life sciences sector.



Healthy Bodies, Healthy Minds Event – April 29, 2019

Inez Jabalpurwala moderated this panel on women's health, organized by the Women's Brain Health Initiative. The panellists discussed the best ways to prevent disease and how to take control of your health.

12th Annual Current Research in Engineering, Science and Technology Conference (CREST)

– May 16, 2019

Inez Jabalpurwala was the keynote speaker at this event at McMaster University, organized by the Women in Science and Engineering (WISE) Initiative. The CREST keynote talk features a renowned, female leader in Canada discussing issues surrounding women in STEM and leadership.

OUR DONORS

Our philosophy is that every gift to Brain Canada signifies an investment and a partnership in our collective search to understand the brain.

We gratefully acknowledge the following individuals, foundations and corporations that have made leadership contributions.

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The Chagnon Family	\$5 million
The Krembil Foundation	\$3.27 million
The W. Garfield Weston Foundation	\$3 million
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 Gerald Sheff and Shanitha Kachan
 Charitable Foundation
 Groupe Conseil RES Publica
 Peter Kruyt
 The Linda Frum and Howard
 Sokolowski Charitable Foundation
 Morris and Rosalind Goodman
 Family Foundation
 Joel & Jill Reitman
 John A. Rae
 The Rotman Family Foundation
 Wheeler Family Foundation
 Catherine Zahn

\$5,000 - \$9,999

Stephanie Azrieli
 Claudine and Stephen Bronfman
 Family Foundation
 Sari Hornstein
 La Fondation J & A Chrétien
 Lallemand Inc.
 Reitmans (Canada) Limited
 Les Services Financiers André
 Azzi Inc.
 Mark L. Smith

We also thank the many other individuals who made donations through our website: www.braincanada.ca and through CanadaHelps.org

A TRANSFORMATIONAL LEGACY

The Brain Canada Foundation received a generous unrestricted donation of \$1,078,538.99 from the late Ms. Donna Canary.

Ms. Canary reached out to us through our Facebook page in March 2018 with a public review supporting Brain Canada's work. She shared her wish to include the Foundation in her will, because of how her own family was touched by brain disorders, and because funding for brain research still lags behind funding for other major diseases. We are deeply touched that Ms. Canary chose to honour her family and its struggles through a donation to Brain Canada.

Through the donation, we will ensure that Ms. Canary's legacy, and her desire to raise awareness of and support Canadian brain research, lives on.

IN 2018 GIFTS WERE MADE TO HONOUR THE FOLLOWING INDIVIDUALS:

Paul Agius
Brenda Appleton
Mr. Bannerholt
Maria Beal
Crawford Bell
Gregoire Bestavros
Isabelle Breyse
Arie Boers
Rob Carrière
Jeff Courtney
Dany Dandouni
Sumita Das Sarkar
Helen Eames
Brian England
Giuseppina Falcone
Heshmat Zamanzadeh Fazel
June Fuller
Joyce Ginther
Charles G. Gonsalves
Donald A. Holder
Patrick Johnston

Andreas Jørgensen
Jerold Justo
Brian King
Mariejo Koevoet-Filak
Jean Ligouri
Zaiboon Mahamad
Norman Robert Miller
Bimba Nanayakkara
Andrea Noel
Saraswathie Ponnampalam
Richard Colin Rozario
Patricia Elizabeth Silberman
Barbara Ann Tracey
Ron Van Riel
Namita Varma
Madeleine and Raymond Vien
Les Wanklin
George Ki Yan Wong
Michael Lawrence Young

FUNDRAISING EVENTS

PARLOUR DINNERS

Brain Canada organized two parlour dinners in 2018, hosted at the homes of Board members. The first dinner took place on October 9th in Toronto. The theme was “**Food for Thought**,” and featured keynote speaker Brett Finlay Ph.D., world-renowned microbiologist and author of *Let them Eat Dirt*, with celebrity chef Rob Gentile. Chef Gentile prepared a menu based on themes from Dr. Finlay’s research about the relationship between the gut and the brain, and did a demonstration about how to ferment vegetables—which supports a healthy microbiome. The gut-brain relationship was an entry to talking about Brain Canada’s one system approach, which extends to links between the brain and the rest of the human system.



Brett Finlay, Ph.D.



Chef Rob Gentile

A second dinner took place in Montreal on November 6th, 2018. The theme was “**Quand le cœur parle au cerveau**” (when the heart talks to the brain), and featured keynote speaker Dr. Denis Roy, a clinician-researcher at the Montreal Heart Institute, who is studying the relationship between heart arrhythmia and cognition. Dr. Roy’s talk was complemented by a second speaker, Gregory Charles, entertainer extraordinaire, who shared his very personal story about the impact on a family when a loved one has Alzheimer’s; as his story was another way to look at the heart-brain link. He underlined that there is still so much we need to learn about devastating brain disorders like Alzheimer’s, and we must support research that will lead to advances in our understanding. As with the gut-brain talk, the heart-brain theme was an entry to talking about Brain Canada’s one system approach, and how brain research is a multidisciplinary endeavor.



Gregory Charles

Through these two events, we raised a total of \$261,000. With the support and generosity of other hosts, we will be organizing more of these intimate gatherings in cities across the country.

A RIDE TO REMEMBER

A group of cyclists, who have family members with Alzheimer's disease, organized a 140-km bike ride that took place on August 5, 2018, with funds raised going to Brain Canada. The ride began in Lachute, Quebec, continued along the north side of the Ottawa River, and finished in Hull, overlooking Ottawa's Parliamentary buildings.

The 2018 ride was very successful and raised \$22,321 for Brain Canada. Planning for the third edition, which will take place in August of 2019, has already begun.



Participants in the 2018 A Ride to Remember event.

"A Ride to Remember was first conceptualized with warm memories of family members that suffered from Alzheimer's and dementia. Initially thought of as a challenge among friends and family, this event now welcomes all cyclists and volunteers willing to support this important cause."

– Evan Wener, Matthew Wener and Dan Pfeffer
Organizers of A Ride to Remember

If you would like to organize a fundraiser to support Brain Canada, please contact us. Over 90% of every dollar raised goes directly to fund brain research, and is matched on a 1:1 basis.

BRAIN CANADA IN THE NEWS

In March of 2019, Brain Canada was featured on banners on downtown Montreal streets, to mark Brain Awareness Week.



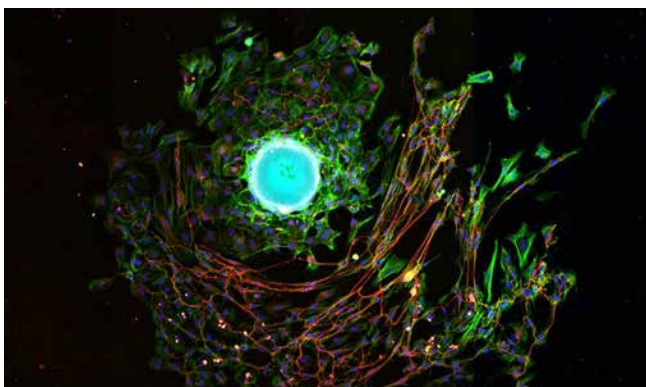
Introducing
Top 100 Rated Charities
 Charity Intelligence's Highest Rated Charities

Brain Canada made the list of the **top 100 charities in Canada in 2018**, as rated by Charity Intelligence Canada, and was among the **top 10 charities in the health sector**.

BRAIN CANADA IMAGE CONTEST

In honour of our 20th anniversary, Brain Canada launched an image contest in the spring of 2019. The contest was open to all lab members of Brain Canada-funded projects and participants were invited to submit images that visually depicted one of the many facets of brain research.

1st Prize - **Daryan Chitsaz**, McGill University:
An oligodendrocyte cultured upon artificial plastic threads, around which it has extended a complex web of membrane and protein which will grow into tubular sheaths.



BRAIN CANADA-FUNDED RESEARCHERS IN THE NEWS

Below we provide a small sampling of news coverage on Brain Canada-funded researchers.

GLOBE & MAIL – JANUARY 21, 2018

What does the future hold for the war on Alzheimer's?
 This research is supported by a \$10M Chagnon Family and Brain Canada Interventions for Prevention of Alzheimer Disease and Related Disorders (ADRD) team grant.

FORBES – FEBRUARY 26, 2018

Stress may not only affect the brains of the stressed, suggests new study.
 Jaideep Bains was supported by Brain Canada through a Brain Canada team grant "Understanding stress to improve mental health".

OTTAWA CITIZEN – OCTOBER 11, 2018

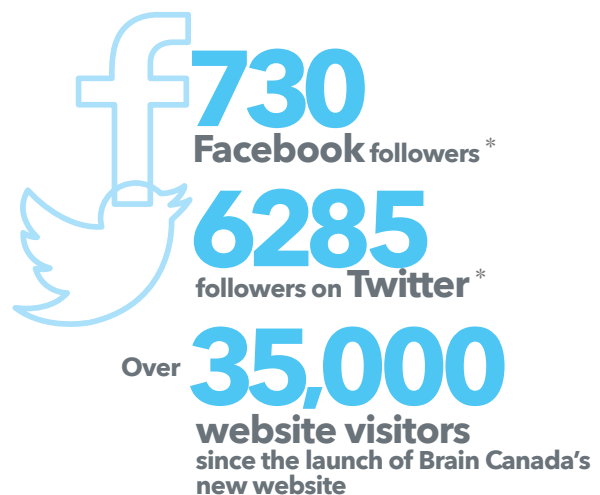
Exercise might be the magic bullet for stroke survivors — but how do you get them to do it?
 Dr. Ian Graham is supported by an Improving Health Outcomes and Quality of Life team grant.

NATIONAL POST – OCTOBER 16, 2018

How human brain donations could help prevent suicide.
 The Douglas-Bell Canada Brain Bank was supported by Brain Canada through a Platform Support Grant – Gustavo Turecki is the Principal Investigator on this grant.

CBC NEWS – DECEMBER 19, 2018

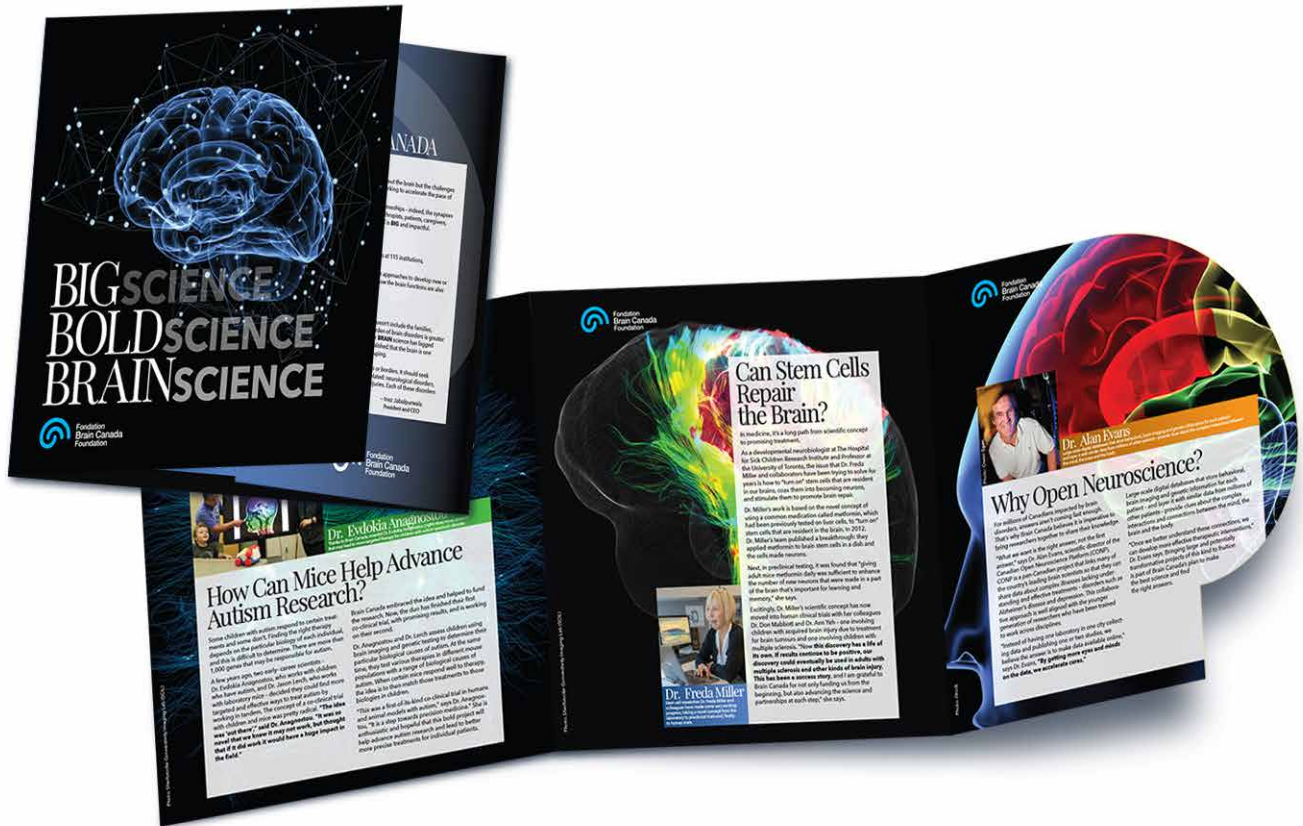
Study of female rugby players shows concussions even worse than we thought.
 This research was supported by Brain Canada through the Centre for Functional Metabolic Mapping Platform Support Grant, led by Ravi Menon.



* as of April 1st, 2019

BRAIN CANADA'S 20TH ANNIVERSARY CELEBRATIONS

As part of Brain Canada's 20th anniversary, an insert was included in the *Globe & Mail* on April 27, 2019. The insert featured three Brain Canada-funded researchers.



20TH ANNIVERSARY GALA

On June 18, 2019, Brain Canada celebrated 20 extraordinary years as the only national organization focused solely on brain research. We honoured two Canadian visionaries who have been at the centre of our Foundation: Allan R. Taylor and the late Michael H. Wilson. Their unwavering dedication to supporting and advancing brain and mental health were central to every success we have had.

The celebration, *BIG Science BOLD Science BRAIN Science*, presented by our partners Bell, Biogen, and RBC, was held at the Globe & Mail Centre in Toronto. Chaired by Dr. Naomi Azrieli, the evening welcomed the corporate, philanthropic, and research communities, and featured a video history of the organization. A bold interactive program highlighted Brain Canada's leadership in brain research over two decades. Please visit our website to view our 20-year history video, and tribute to Messrs. Taylor and Wilson.



OUR PARTNERS

HEALTH CHARITIES

Alberta Paraplegic Foundation
ALS Society of Canada
Alzheimer Society - Alberta and
Northwest Territories
Alzheimer Society of Canada
Alzheimer's Association US
Brain Tumour Foundation of Canada
Canadian Cancer Society
Capitalize for Kids
CHU Sainte-Justine Foundation
Douglas Mental Health University
Institute Foundation
Fondation CERVO
Heart and Stroke Foundation
of Canada
Huntington Society of Canada
Jewish General Hospital Foundation
The Marigold Foundation
Mount Sinai Hospital Foundation
of Toronto
MS Society of Canada
Parkinson Society of Canada
SickKids Foundation
Sunnybrook Health Science
Foundation
UHN Toronto General & Western
Hospital Foundation
University Hospital Foundation
Vitae Foundation
Women's Brain Health Initiative

PROVINCIAL AGENCIES

Alberta Health Services
Alberta Innovates Health Solutions
Federation quebecoise de l'autisme
Fonds de recherche du Québec -
Santé (FRQS)
Genome BC
Manitoba Health Research Council
Michael Smith Foundation for Health
Research (MSFHR)
Network of Applied Medical Genetics
(RMGA)
Nova Scotia Health Authority
Ontario Brain Institute (OBI)
Ontario Neurotrauma Foundation
(ONF)
Pacific Alzheimer Research
Foundation (PARF)
Quebec Pain Research Network
Vancouver Coastal Health Authority
(VCHA)

CORPORATIONS

Atuka, Inc.
Biogen
Eli Lilly & Company
Life Chemicals, Inc
Magventure
Roche Canada
Trentavis

RESEARCH NETWORKS

Age Well
Campus Alberta Neuroscience
Canadian Partnership for Stroke
Recovery
Canadian Stroke Consortium
Canadian Stroke Network
CQDM
Kids Brain Health Network
(NeuroDevNet)
Le Réseau québécois sur le suicide,
les troubles de l'humeur et
les troubles associés (RQSHA)

OTHER ORGANIZATIONS

Canadian Institute for Advanced
Research (CIFAR)
Les Grands Ballets
Martin Family Initiative
Medavie Health Foundation
Mental Health Commission of Canada
National Institutes of Health (NIH)

INSTITUTIONS

Alberta

Alberta Children's Hospital Research
Institute (ACHRI)
Hotchkiss Brain Institute
University of Alberta
University of Calgary
Women & Children Health Research
Institute

British Columbia

BC Children's Hospital Research
Institute
BC Women's Hospital & Health Centre
Centre for Heart Lung Innovation
(UBC and St. Paul's Hospital)
Djavad Mowafaghian Centre for
Brain Health
Institute of Mental Health
International Collaboration On Repair
Discoveries (ICORD)
Providence Health Care Society
Simon Fraser University

St Paul's Foundation
University of British Columbia

Manitoba

Health Sciences Centre
University of Manitoba

Nova Scotia

Dalhousie University
Izaak Walton Killam (IWK)
Health Centre

Ontario

Baycrest
Brain and Mind Research Institute
(UOBMRI)
Centre for Addiction and Mental
Health (CAMH)
Holland Bloorview Kids Rehabilitation
Hospital
The Hospital for Sick Children
McMaster University
Ottawa Hospital Research Institute
Queen's University
St. Michael's Hospital
Sunnybrook Health Sciences Centre
University Health Network
University of Toronto
University of Western Ontario
York University

Quebec

Centre de Recherche Institut
universitaire de geriatrie
de Montreal (CRIUGM)
Centre for Interdisciplinary Research
in Rehabilitation of Greater
Montreal (CRIR)
Centre hospitalier de l'Université
de Montréal (CHUM)
CHU Sainte-Justine Research Centre
CIUSSS-CHUS
CIUSSS-NIM
Douglas Hospital Research Centre
École polytechnique de Montréal
Institut de Cardiologie de Montréal
Institut de Recherche Clinique
de Montréal
Institut universitaire en santé mentale
du Québec (IUSMQ) (CIUSSS-CN)
Jewish Rehabilitation Hospital
McGill University
Montreal Neurological Institute
Université de Montréal
Université Laval

Saskatchewan

University of Saskatchewan

SCIENCE ADVISORY COUNCIL

CHAIR

Sheena Josselyn, Ph.D.

Senior Scientist, Neurosciences & Mental Health Program, Hospital for Sick Children Research Institute; Canada Research Chair in Molecular and Cellular Cognition; Associate Professor, Department of Physiology, Institute of Medical Science, University of Toronto
[Area of expertise: Cognition and Behaviour](#)

CANADIAN MEMBERS

Jacques Drouin, D. Sc., MRSC

Director, Molecular Genetics research unit, IRCM; Full Researcher Professor, Department of Biochemistry, Université de Montréal; Adjunct Professor, Department of Anatomy and Cell Biology and Department of Biochemistry, McGill University
[Area of expertise: Integrative Systems: Neuroendocrinology, Neuroimmunology and Homeostatic Challenge](#)

Alan C. Evans, Ph.D.

Professor, Departments of Neurology and Neurosurgery, Biomedical Engineering, Medical Physics, McGill University
[Area of expertise: Disorders of the Nervous System](#)

Lesley K. Fellows, M.D., DPhil

Associate Professor, Department of Neurology & Neurosurgery, Montreal Neurological Institute
[Area of expertise: Neurologist](#)

Kurt Haas, Ph.D.

Associate Professor, Department of Cellular and Physiological Sciences, University of British Columbia
[Area of expertise: Model organisms and systems](#)

James L. Kennedy, MSc, M.D., FRCP(C), FRSC

Director of the Neuroscience Research Department and Head of the Psychiatric Neurogenetics Section, Centre for Addiction and Mental Health (CAMH)
[Area of expertise: Genetics](#)

Bryan E. Kolb, Ph.D.

Professor, Department of Neuroscience, University of Lethbridge
[Area of expertise: Cognition and behaviour](#)

Doug P. Munoz, Ph.D.

Professor of Physiology, Psychology and Medicine, Queen's University; |Director, Queen's Centre for Neuroscience Studies; Canada Research Chair in Neuroscience
[Area of expertise: Sensory and Motor Systems](#)

Rachel F. Tyndale, Ph.D.

Professor, Department of Pharmacology & Toxicology, University of Toronto; Endowed Chair in Addictions, Department of Psychiatry, University of Toronto; Head Pharmacogenetics, Centre for Addiction and Mental Health (CAMH)
[Area of expertise: Addiction](#)

INTERNATIONAL MEMBERS

Karl Deisseroth, M.D., Ph.D

D.H. Chen Professor of Bioengineering and of Psychiatry and Behavioral Sciences, Stanford University, Howard Hughes Medical Institute (CA, USA)
[Area of expertise: Psychiatry/Behavior/Leader in optogenetics](#)

Arnold Kriegstein, M.D., Ph.D.

Director, Eli and Edy, the Broad Center of Regeneration Medicine and Stem Cell Research, Department of Neurology, UCSF School of Medicine (CA, USA)
[Area of expertise: Development/photoinics, Neural Stem Cells and Embryonic Cortical Development](#)

Lorne Mendell, Ph.D.

Distinguished Professor, Stony Brook University (NY, USA)
[Area of expertise: Pain, neuroplasticity of the mammalian spinal cord](#)

Klaus-Armin Nave, Ph.D.

Head Max-Planck Gottingen, Glial biology and neurodegeneration, Max Planck Institute for Experimental Medicine, Göttingen (GER)
[Area of expertise: Glial biology and neurodegeneration](#)

Bill Newsome, Ph.D.

Arman Family Provostial Professor and Professor of Neurobiology and, by courtesy, of Psychology, Stanford School of Medicine (CA, USA)
[Area of expertise: Visual perception and visually-based cognition, neural mechanisms of decision making](#)

Angela Roberts, Ph.D.

Professor of Behavioural Neuroscience, Department of Physiology, Development and Neuroscience, Cambridge (UK)
[Area of expertise: Prefrontal cortex/behavior/psychiatric diseases](#)

Bruce Rosen, M.D., Ph.D.

Professor of Radiology at the Harvard Medical School; Professor of Health Science and Technology at the Harvard-MIT Division of Health Sciences and Technology; Director of the Athinoula A. Martinos Center for Biomedical Imaging at Massachusetts General Hospital (MA, USA)
[Area of expertise: World leading expert in functional neuroimaging](#)

Rosalind Segal, M.D., Ph.D.

Professor of Neurobiology, Dana Farber Cancer Institute, Harvard (MA, USA)
[Area of expertise: Cellular and molecular neuroscience/oncology](#)

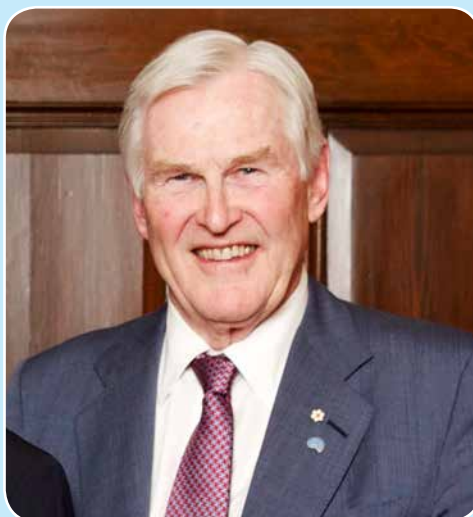
D James Surmeier, Ph.D.

Chair, Department of Physiology, Nathan Smith Davis, Professor of Physiology, Northwestern (IL, USA)
[Area of expertise: Basal ganglia/cell metabolics and neurodegenerative disease; Molecular Biology; Movement Disorders; Neuroscience; Parkinson's disease; Physiology; Schizophrenia](#)

Li-Huei Tsai, Ph.D.

Director, The Picower Institute for Learning and Memory; Picower Professor of Neuroscience, Department of Brain and Cognitive Sciences; Senior Associate Member, Broad Institute Massachusetts Institute of Technology (MA, USA)
[Area of expertise: Neurodegeneration](#)

TRIBUTE TO THE HONOURABLE MICHAEL H. WILSON



The Brain Canada Foundation and its Board of Directors were deeply saddened by the passing of one of our founders, the Hon. Michael H. Wilson, on February 10, 2019.

It is difficult to put into words the impact Michael had on our organization, as a past Chair and, along with Allan R. Taylor, our heart and soul. It was Michael's vision to create an organization that would support brain research — an area underserved for too long. Michael led us through our first fundraising campaign and made possible the partnership we established with the federal government. Brain Canada was a personal priority; he devoted the time, resources and his network to ensure our success. He remained a passionate champion through the years.

But perhaps most important, Michael created a space for the conversation about mental health. Every person and organization working to reduce stigma, improve services, deepen our understanding of the causes, and accelerate the pace of our search for new or improved diagnostics and treatments—and ultimately cures—was in some way directly linked to Michael, or indirectly a beneficiary of a new public awareness about mental illness and its impact on individuals, families, society and the economy.

Michael was the example of doing things with integrity and without ego, because that was the way to build a community and not a silo. Michael inspired our tagline “One brain. One community.”

He believed in the power of people coming together to address our greatest challenges.

He always sought ways to create links and to find common ground.

Canada has lost one of its greatest advocates for brain and mental health, and as Brain Canada looks back on our history, we know that we stood on the shoulders of a giant to build something magical. Michael's vision for a brain research organization is as important and relevant as ever, and we honour his legacy as we write the next chapter.

BOARD OF DIRECTORS

CHAIR OF THE BOARD

Naomi Azrieli, DPhil.

Chair and CEO
The Azrieli Foundation
(Toronto)

DIRECTORS

The Hon. W. David Angus, Q.C., Ad. E.

(until June 2019)
Former Member, Senate of Canada
(Montreal)

Wayne E. Bossert

*Chair, Audit, Finance, Investment and
Risk Management Committee*
Deputy Chairman
RBC Wealth Management
(Toronto)

Vincent Castellucci, Ph.D.

(until June 2019)
Professor Emeritus
Faculty of Medicine
Université de Montréal
(Montreal)

France Chrétien-Desmarais, C.M.

(Montreal)

Graham Collingridge, Ph.D.

Director
Tanz Centre for Research in
Neurodegenerative Diseases
Senior Investigator
Lunenfeld-Tanenbaum
Research Institute
Mount Sinai Hospital (Toronto)

George A. Cope

President and Chief Executive Officer
BCE Inc. and Bell Canada (Toronto)

Celeste Haldane, QC

Chief Commissioner
BC Treaty Commission (Vancouver)

Inez Jabalpurwala

President and CEO
Brain Canada Foundation (Montreal)

Robert Mark Krembil

President and Chief Executive Officer
The Krembil Foundation (Toronto)

Glenda M. MacQueen, M.D., Ph.D.,

F.R.C.P.(C), FCAHS (since June 2019)
Professor, Department of Psychiatry,
Vice Dean, Cumming School of
Medicine, University of Calgary
(Calgary)

Ravi S. Menon, Ph.D., FCAHS

Professor, Medical Biophysics
Scientist, Robarts Research Institute
Western University
(London)

Larry Tanenbaum, O.C.

Vice Chair
Chairman and CEO
Kilmer Van Nostrand Co. Ltd.;
Chairman, Maple Leaf Sports &
Entertainment Ltd.
(Toronto)

Franco J. Vaccarino, Ph.D., FCAHS

Chair, Research Policy Committee
President and Vice-Chancellor
University of Guelph
(Guelph)

**Catherine Zahn, C.M., M.D.,
F.R.C.P.(C)**

*Chair, Governance, Nominating and
Ethics Committee*
President and CEO
Centre for Addiction and
Mental Health
(Toronto)

HONOURARY DIRECTORS

PATRON

The Right Honourable

**David Johnston, C.C., C.M.M.,
C.O.M., C.D.**

Former Governor General of Canada

HONOURARY CHAIR

**Michael H. Wilson, P.C., C.C., LL.D
(Hon.)** (Deceased)

Chairman
Barclays Canada;
Former Canadian Ambassador to
the United States of America
(Toronto)

Albert J. Aguayo, O.C., M.D., FRSC

Emeritus Professor,
and Former Director
Centre for Research in Neuroscience,
McGill University, Montreal General
Hospital Research Institute
(Montreal)

Rick Hansen, C.C., O.B.C.

President and CEO
Rick Hansen Man in Motion
Foundation
and Rick Hansen Institute
(Vancouver)

Ronald N. Mannix, O.C.

Chairman
Coril Holdings (Calgary)

**Heather Munroe-Blum, O.C., O.Q.,
Ph.D., FRSC**

Principal Emeritus
McGill University (Montreal)

**J. Robert S. Prichard, O.C., O.Ont.,
Ph.D.(Hon.), LL.D.**

Chair
Metrolinx Corporation;
Chairman, Torys LLP
President Emeritus
University of Toronto (Toronto)

Allan R. Taylor, O.C.

Retired Chairman and CEO
Royal Bank of Canada (Toronto)

**Dave Williams, O.C., O.Ont., M.D.,
C.M., F.R.C.P.(C).**

Canadian Astronaut
President and CEO
Exploration Incorporated (Oakville)

2018 FINANCIAL REPORT

BRAIN CANADA FOUNDATION

December 31, 2018, with comparative information for 2017

	2018 \$	2017 \$
ASSETS		
Current Assets:		
Cash and cash equivalents	12,737,831	24,683,912
Short-term investments	7,778,000	3,152,299
Accrued interest receivable	87,670	61,911
Advance payments		
on grants and awards	101,000	92,500
Other receivables	70,808	19,259
Grants and awards reimbursement receivable	34,097	-
Prepays and deposits	30,797	27,011
	20,840,203	28,036,892
Long-term investments	-	1,700,000
Advance payments		
on grants and awards	91,500	182,000
Capital assets	95,652	100,150
	21,027,355	30,019,042
LIABILITIES AND NET ASSETS		
Current liabilities:		
Accounts payable and accrued liabilities	55,559	60,001
Salaries and benefits payable	282,460	306,200
Current portion of deferred contributions	19,205,504	24,715,742
	19,543,523	25,081,943
Deferred contributions	1,047,890	4,830,333
	20,591,413	29,912,276
NET ASSETS		
Unrestricted net assets	340,290	6,616
Invested in capital assets	95,652	100,150
	435,942	106,766
	21,027,355	30,019,042

Year ended December 31, 2018, with comparative information for 2017

	2018 \$	2017 \$
REVENUES		
Restricted contributions	44,504,963	45,104,216
Unrestricted contributions	68,061	161,856
	44,573,024	45,266,072
Fundraising events:		
Revenues	299,933	-
Direct costs	38,818	-
	261,115	-
	44,834,139	45,266,072
EXPENDITURES		
Grants and awards	41,954,908	42,527,060
Operating expenses	2,382,081	2,495,312
Administrative expenses charged by other organizations	151,670	215,857
Amortization of capital assets	16,304	27,843
	44,504,963	45,266,072
Excess of revenues over expenditures	329,176	-

The financial statements of Brain Canada Foundation are audited by KPMG LLP and are available on our website at www.braincanada.ca

VISION

To understand the brain, in health and illness, to improve lives and achieve societal impact.

MISSION

Brain Canada is achieving its vision by:

- Increasing the scale and scope of funding to accelerate the pace of Canadian brain research;
- Creating a collective commitment to brain research across the public, private and voluntary sectors;
- Delivering transformative, original and outstanding research programs.

VALUES

- Connecting with purpose.
 - “One brain”. Seeking to understand different brain functions and dysfunctions as part of a single interconnected system.
 - Partnerships. Building mutually beneficial and transparent relationships with every partner.
 - Diverse perspectives and approaches. Fostering original insights and outcomes.
- Outcome focused. Delivering value and benefits with efficiency and effectiveness.
- Professional integrity. Ensuring the highest standards of ethical behaviour and good governance.

Production of this Annual Report has been made possible with the financial support of Health Canada through the Canada Brain Research Fund. The views expressed herein do not necessarily represent the views of the Minister of Health or the Government of Canada.

Canada

Photo credits

Page 2: Owen Egan

Page 14: (photo Alberto Delaidelli) BC Cancer

Pages 22, 23: Josie Rain

Pages 30/31: MS Society of Canada



@BrainCanada



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[facebook.com/brain.canada](https://www.facebook.com/brain.canada)

This annual report is also available in French.
An online version can be downloaded at www.braincanada.ca.



**Brain Canada
Foundation**

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Montreal, Quebec
H3B 4G7
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info@braincanada.ca
www.braincanada.ca