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

- **TEAM GRANTS**
  Grants that bring together teams of scientists from different disciplines to advance collaborative research.

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

- **CAPACITY BUILDING GRANTS**
  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

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

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.

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.

2011
Changed the name to “Brain Canada Foundation” to better reflect the focus on brain and not only neuroscience.

2012
Officially launched the Canada Brain Research Fund (CBRF).

2014
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.

2015
Reached $100-million goal for a total investment of $200 million, 18 months ahead of schedule.

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

2018
Launched $10-million Canadian Open Neuroscience Platform—a national platform for the open sharing of neuroscience research data.

2019
Celebrated 20th anniversary.

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.

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

2006
Published /uni00540068.ligae Case for Canada’s Increased Investment in Brain Research, which provided a calculation of the economic burden of brain disorders as one grouping.

2011
Changed the name to “Brain Canada Foundation” to better reflect the focus on brain and not only neuroscience.

2012
Officially launched the Canada Brain Research Fund (CBRF).

2014
Announced $11.4 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.

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

2018
Launched $10-million Canadian Open Neuroscience Platform—a national platform for the open sharing of neuroscience research data.

2019
Celebrated 20th anniversary.

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

2018
Launched $10-million Canadian Open Neuroscience Platform—a national platform for the open sharing of neuroscience research data.

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

2014
Budget 2011 included establishing the Canada Brain Research Fund (CBRF), a public-private partnership with Brain Canada to match $100 million over six years.

2014
10th anniversary of the Hubert van Tol Travel Fellowship.

2015
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.

2015
10th anniversary of the Hubert van Tol Travel Fellowship.

2015
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.

2015
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.

2015
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.

2015
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.

2015
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.

2015
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.

2015
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.

2015
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.

2015
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.

2015
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.

2015
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.

2015
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.

2015
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.

2015
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.

2015
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.
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.

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. This 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**

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount Disbursed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>$78,513</td>
</tr>
<tr>
<td>2012</td>
<td>$452,115</td>
</tr>
<tr>
<td>2013</td>
<td>$2,079,225</td>
</tr>
<tr>
<td>2014</td>
<td>$8,498,432</td>
</tr>
<tr>
<td>2015</td>
<td>$31,135,009</td>
</tr>
<tr>
<td>2016</td>
<td>$35,787,862</td>
</tr>
<tr>
<td>2017</td>
<td>$43,129,778*</td>
</tr>
<tr>
<td>2018</td>
<td>$45,492,865†</td>
</tr>
</tbody>
</table>

* $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**

- **$115,455,237** TO TEAM GRANTS
  - 103 GRANTS
- **$82,095,569** TO PLATFORM GRANTS
  - 45 GRANTS
- **$29,505,929** TO CAPACITY BUILDING
  - 100 GRANTS
- **$2,705,200** TO KNOWLEDGE TRANSLATION
  - 8 GRANTS

DISTRIBUTION OF FUNDING ACROSS BRAIN DISORDERS

- Neurodegenerative 32%
- Neurodevelopmental 7%
- Multiple 35%
- Sensory System 2%
- Brain Cancer 5%
- Stroke/Injury 11%
- Pain/Migraine 2%
- Seizure 1%
- Neuropsychiatric and Mental Health 6%
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 project
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 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.

**STAGE 1**

<table>
<thead>
<tr>
<th>Letter of intent (LOI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teams submit letters of intent (LOIs) briefly describing the project.</td>
</tr>
<tr>
<td>LOIs are evaluated and scored by an International Peer Review Panel, benchmarked against global standards of excellence and innovation.</td>
</tr>
<tr>
<td>LOIs scoring above a threshold and deemed meritorious are recommended to advance to the full application stage.</td>
</tr>
<tr>
<td>Feedback provided to all applicants.</td>
</tr>
<tr>
<td>Invited teams submit full applications.</td>
</tr>
<tr>
<td>Full applications are evaluated and scored for excellence, innovation and impact by the International Peer Review Panel as well as external reviewers with subject-matter expertise (as required).</td>
</tr>
<tr>
<td>Full applications deemed excellent are recommended to Brain Canada and its partners for funding.</td>
</tr>
<tr>
<td>All recommended applications are required to provide proof of institutional approval for safety, ethics and animal protocols prior to funding release. Applicants must also describe how sex and gender are taken into consideration in their research project.</td>
</tr>
<tr>
<td>Funding commences.</td>
</tr>
<tr>
<td>Grant recipients provide annual progress reports that are evaluated, and funding is released upon confirmation of satisfactory scientific progress and financial information.</td>
</tr>
<tr>
<td>Upon completion of the project, grant recipients submit a follow-up report to provide Brain Canada with a progress summary and feedback on the grant process.</td>
</tr>
</tbody>
</table>
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 $75,000 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.

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.
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.

**Brain Canada has partnered with CQDM on**

**13 GRANTS,**

**totalling over**

**$18.3M**

**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

Gabriella Gobbi, M.D., Ph.D.
McGill University

*Novel First-In-Class Melatonin MT2 Receptor Agonist for Neuro-pathic Pain: Investigational New Drug (IND) - Enabling Studies*

GRANT AMOUNT: $1,600,000

Phillipe 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

**SynergiQc Program**

**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.

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.

BRAIN CANADA FOUNDATION
ANNUAL REPORT 2018
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.
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 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 functions 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.
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...
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.
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.
“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.”
The Early Years Program: Collaborating with Indigenous Communities to Impact Young People’s Lives
Early years are crucial. They define and affect who people are. For Indigenous people in Canada, colonization 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 Ermineskin Cree Nation in Alberta to implement the program.

“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 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 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 $6 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.
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.

“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
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.
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.
“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:

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.
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 TRA nSLATIO n
AND DISSeMIn ATIOn

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.

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 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.

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.

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.

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.

**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
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.

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.

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.

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.

## LEAD DONORS

<table>
<thead>
<tr>
<th>Name</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Azrieli Foundation</td>
<td>$7.5 million</td>
</tr>
<tr>
<td>The Chagnon Family</td>
<td>$5 million</td>
</tr>
<tr>
<td>The Krembil Foundation</td>
<td>$3.27 million</td>
</tr>
<tr>
<td>The W. Garfield Weston Foundation</td>
<td>$3 million</td>
</tr>
<tr>
<td>Anonymous Donor</td>
<td>$1,528,050</td>
</tr>
<tr>
<td>RBC Foundation</td>
<td>$620,500</td>
</tr>
<tr>
<td>The Rossy Family Foundation</td>
<td>$505,000</td>
</tr>
<tr>
<td>Bell Canada</td>
<td>$500,000</td>
</tr>
<tr>
<td>CIBC</td>
<td>$500,000</td>
</tr>
</tbody>
</table>

## $100,000 - $249,999

<table>
<thead>
<tr>
<th>Name</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wayne E. Bossert</td>
<td></td>
</tr>
<tr>
<td>Goose Nest Inc. (W. David Angus)</td>
<td></td>
</tr>
<tr>
<td>The Jim Pattison Foundation</td>
<td></td>
</tr>
<tr>
<td>The Lawrence and Judith Tanenbaum Family Foundation</td>
<td></td>
</tr>
<tr>
<td>The Max Bell Foundation</td>
<td></td>
</tr>
<tr>
<td>National Bank of Canada</td>
<td></td>
</tr>
<tr>
<td>Power Corporation</td>
<td></td>
</tr>
<tr>
<td>Michael H. Wilson</td>
<td></td>
</tr>
</tbody>
</table>

## $25,000 - $99,999

<table>
<thead>
<tr>
<th>Name</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alastair &amp; Diana Gillespie Foundation</td>
<td></td>
</tr>
<tr>
<td>The Barbara Turnbull Foundation</td>
<td></td>
</tr>
<tr>
<td>Rupert Duchesne</td>
<td></td>
</tr>
<tr>
<td>The Henry and Berenice Kaufmann Foundation</td>
<td></td>
</tr>
<tr>
<td>The Ira Gluskin &amp; Maxine Granovsky Gluskin Charitable Foundation</td>
<td></td>
</tr>
<tr>
<td>Medavie Health Foundation</td>
<td></td>
</tr>
<tr>
<td>Omico Investments Inc.</td>
<td></td>
</tr>
<tr>
<td>Marianne Seger and Monica Seger-van Tol</td>
<td></td>
</tr>
</tbody>
</table>

## $10,000 - $24,999

<table>
<thead>
<tr>
<th>Name</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alvin Segal Family Foundation</td>
<td></td>
</tr>
<tr>
<td>Arrell Family Foundation</td>
<td></td>
</tr>
<tr>
<td>Beauvvard Immobilier Inc.</td>
<td></td>
</tr>
<tr>
<td>Catherine Beck</td>
<td></td>
</tr>
<tr>
<td>Bombardier Inc.</td>
<td></td>
</tr>
<tr>
<td>Jean-Guy Desjardins</td>
<td></td>
</tr>
<tr>
<td>Fondation Amelia &amp; Lino Saputo Jr</td>
<td></td>
</tr>
<tr>
<td>Fondation Daniel Lamarre</td>
<td></td>
</tr>
<tr>
<td>Fondation Sandra et Alain Bouchard</td>
<td></td>
</tr>
<tr>
<td>Gerald Sheff and Shantiha Kachan Charitable Foundation</td>
<td></td>
</tr>
<tr>
<td>Groupe Conseil RES Publica</td>
<td></td>
</tr>
<tr>
<td>Peter Kruit</td>
<td></td>
</tr>
<tr>
<td>The Linda Frum and Howard Sokolowski Charitable Foundation</td>
<td></td>
</tr>
<tr>
<td>Morris and Rosalind Goodman Family Foundation</td>
<td></td>
</tr>
<tr>
<td>Joel &amp; Jill Reitman</td>
<td></td>
</tr>
<tr>
<td>John A. Rae</td>
<td></td>
</tr>
<tr>
<td>The Rotman Family Foundation</td>
<td></td>
</tr>
<tr>
<td>Wheeler Family Foundation</td>
<td></td>
</tr>
<tr>
<td>Catherine Zahn</td>
<td></td>
</tr>
</tbody>
</table>

## $5,000 - $9,999

<table>
<thead>
<tr>
<th>Name</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stephanie Azrieli</td>
<td></td>
</tr>
<tr>
<td>Claudine and Stephen Bronfman Family Foundation</td>
<td></td>
</tr>
<tr>
<td>Sari Hornstein</td>
<td></td>
</tr>
<tr>
<td>La Fondation J &amp; A Chrétien</td>
<td></td>
</tr>
<tr>
<td>Lallemand Inc.</td>
<td></td>
</tr>
<tr>
<td>Reitmans (Canada) Limited</td>
<td></td>
</tr>
<tr>
<td>Les Services Financiers André Azzi Inc.</td>
<td></td>
</tr>
<tr>
<td>Mark L. Smith</td>
<td></td>
</tr>
</tbody>
</table>

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 Agiús  
Brenda Appleton  
Mr. Bannerholt  
Maria Beal  
Crawford Bell  
Gregoire Bestavros  
Isabelle Breyssse  
Arie Boers  
Rob Carrière  
Jeff Courtney  
Dany Dandouni  
Sunita 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  
Saraswathi 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.

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.

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.

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

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.

---

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 IN THE NEWS

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’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  

### CORPORATIONS
- Atuka, Inc.  
- Biogen  
- Eli Lilly & Company  
- Life Chemicals, Inc  
- Magventure  
- Roche Canada  
- Treventis  

### 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 (UBMRI)  
- 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 Montréal (CRIUGM)  
- Centre for Interdisciplinary Research in Rehabilitation of Greater Montreal (CRIHR)  
- 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
SCIEn Ce A DvISORY 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

BRAIN CANADA FOUNDATION
ANNUAL REPORT 2018

CANADIAN MEMBERS
Jacques Drouin, D.Sc., MRSC
Director, Molecular Genetics research unit, IRMC;
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/photonics, Neural Stem Cells and Embryonic Cortical Development

Lorne Mendell, Ph.D.
Distinguished Professor, Stony Brook University (NY, USA)
Area of expertise: Pain, neuromodularity of the mammalian spinal cord

Klaus-Armin Nave, Ph.D.
Head Max-Planck Göttingen, 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

Honorary Chair
Michael H. Wilson, P.C., C.C., L.L.D
(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 Munroec-Blum, O.C., O.Q.,
Ph.D., FRSC
Principal Emeritus
McGill University (Montreal)

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

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and cash equivalents</td>
<td>$12,737,831</td>
<td>$24,683,912</td>
</tr>
<tr>
<td>Short-term investments</td>
<td>$7,778,000</td>
<td>$3,152,299</td>
</tr>
<tr>
<td>Accrued interest receivable</td>
<td>$87,670</td>
<td>$61,911</td>
</tr>
<tr>
<td>Advance payments on grants and awards</td>
<td>$101,000</td>
<td>$92,500</td>
</tr>
<tr>
<td>Other receivables</td>
<td>$70,808</td>
<td>$19,259</td>
</tr>
<tr>
<td>Grants and awards reimbursement receivable</td>
<td>$34,097</td>
<td>-</td>
</tr>
<tr>
<td>Prepaids and deposits</td>
<td>$30,797</td>
<td>$27,011</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$20,840,203</td>
<td>$28,036,892</td>
</tr>
<tr>
<td>Long-term investments</td>
<td>-</td>
<td>$1,700,000</td>
</tr>
<tr>
<td>Advance payments on grants and awards</td>
<td>$91,500</td>
<td>$182,000</td>
</tr>
<tr>
<td>Capital assets</td>
<td>$95,652</td>
<td>$100,150</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$21,027,355</td>
<td>$30,039,042</td>
</tr>
</tbody>
</table>

### Liabilities and Net Assets

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current liabilities:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts payable and accrued liabilities</td>
<td>$55,559</td>
<td>$60,001</td>
</tr>
<tr>
<td>Salaries and benefits payable</td>
<td>$282,460</td>
<td>$306,200</td>
</tr>
<tr>
<td>Current portion of deferred contributions</td>
<td>$19,208,504</td>
<td>$24,715,742</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$19,543,323</td>
<td>$25,081,943</td>
</tr>
<tr>
<td>Deferred contributions</td>
<td>$1,047,800</td>
<td>$4,830,333</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$20,591,123</td>
<td>$30,912,276</td>
</tr>
</tbody>
</table>

### Net Assets

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted net assets</td>
<td>$340,290</td>
<td>$6,616</td>
</tr>
<tr>
<td>Invested in capital assets</td>
<td>$95,652</td>
<td>$100,150</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$435,942</td>
<td>$106,766</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$21,027,355</td>
<td>$30,039,042</td>
</tr>
</tbody>
</table>

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.

Photo credits
Page 2: Owen Egan
Page 14: (photo Alberto Delaiddelli) BC Cancer
Pages 22, 23: Josie Rain
Pages 30/31: MS Society of Canada