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About our logo
Our logo shows the characteristic three-pair structure of the insulin molecule, with white lines radiating brightly from the centre. By evoking the explosive power of scientific discovery to change our lives profoundly, the stylized molecule and rays serve as a graphic metaphor for the history and contemporary mandate of the Banting Research Foundation.
Mission

The Banting Research Foundation invests in the early careers of researchers who demonstrate excellence and creativity in health and biomedical sciences.

La Fondation de recherche Banting investit dans le début de carrière de chercheurs qui font preuve d’excellence et de créativité en sciences de la santé et en sciences biomédicales.

A Frederick Banting oil sketch, composed during a painting expedition with AY Jackson of the Group of Seven, circa 1930
Message from the Chair

The Banting Research Foundation is very proud to provide a record number of Discovery Awards to nine new investigators across Canada from the 2018-19 competition. Our report highlights these awardees and their research proposals. We also report on the impressive outcomes of the 2017-18 awardees projects. Many thanks to our donors and new sponsors, including the McLean Foundation and the Dystonia Medical Research Foundation Canada, for their generous support that enabled us to continue to grow our Discovery Awards program. Despite this success, our Foundation continues to receive applications from many eligible candidates who we are unable to support. Therefore, we must continue to focus our efforts on increasing our funding capacity through strategic partnering and fund-raising.

May I thank our volunteers including our Board of Trustees, Campaign Cabinet members and Grant Review Panel for their commitment and expertise and many hours of service. Their efforts sustain the Banting legacy of scientific excellence and innovation in Canada.

Over the next year our Foundation will begin to plan for the 100th anniversary of the discovery of insulin in 2021. This is a great opportunity to engage both public and private sectors in learning about and investing in our Mission.

My final thanks is to Ms Ramona Rea, our Executive Director for the last 6 years, who has moved on in her career. Ramona was instrumental in propelling the Banting Research Foundation to a new level of organizational management and performance. Ms Tavia Caplan, our new Executive Director, is a recent MSc in Molecular Genetics graduate and is experienced in managing volunteer organizations. Welcome Tavia!

Catharine Whiteside, CM MD PhD FRCPC
Chair, Board of Trustees
The Banting Research Foundation
Board of Trustees 2017-18

Dr Catharine Whiteside  
Chair of the Board  
Emerita Professor and former Dean of Medicine  
University of Toronto

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University of Toronto

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Independent Financial and Investment Consultant

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Retired Partner  
Borden Ladner Gervais

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University of Toronto

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Former Governor  
Governing Council  
University of Toronto

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Dorothy M Hellebust (1990-1994)  
Elizabeth H Pearce (1981-1987)  
John K Macdonald (1960-1977)
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Professor, Department of Biochemistry
University of Toronto

Dr Patricia Brubaker, Vice-Chair and Scientific Officer
Professor, Departments of Physiology and Medicine
University of Toronto

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McMaster University

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University of Toronto

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University of Toronto

Dr Rodrigo Fernandez-Gonzalez
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University of Toronto

Dr Christopher Yip
Professor, Department of Chemical Engineering and Applied Chemistry
Director, Institute of Biomaterials & Biomedical Engineering
University of Toronto
Florian Bentzinger, PhD, Université de Sherbrooke
*Niche regulation of muscle stem cell specification*

Skeletal muscle tissue is maintained and repaired by muscle stem cells (MuSCs), which are regulated by external signals in their “niche,” the micro-environment in which they reside. Changes in niche signals that negatively affect stem cell function occur in degenerative diseases of muscles, and in aging and diabetes. To understand the role of the MuSC niche in the context of aging, Dr Bentzinger’s research team examined the effects of aging on regulatory cells and discovered an aging defect in a fibroblastic muscle resident cell population that is a key regulator of MuSC function. His work also showed that altered signals from these cells contribute to MuSC dysfunction and that this mechanism can be targeted to rejuvenate muscle tissue. Dr Bentzinger’s group continues to study the role of regulatory signals in the MuSC niche, with the goal of developing novel stem-cell-based treatments to restore or preserve healthy muscles.

Jennifer Gordon, PhD, University of Regina
*HPA axis dysregulation in the etiology of perimenopausal depression*

Women are 2-4 times more likely to develop depression during perimenopause than at any other time in their lives. Dr Gordon hypothesized that increased estrogen fluctuation during this menopause transition phase may trigger dysregulation of the body’s central stress response system, causing women to be more susceptible to depression. To test this hypothesis, Dr Gordon’s research group monitored and surveyed 100 perimenopausal women. Preliminary results show that there is a large amount of individual variability in terms of how women respond emotionally and biologically to hormonal fluctuation in the menopause transition. Her work continues with the aim of further understanding the effects of the hormonal environment on women’s risk for depression.

Catherine Larochelle, MD PhD, CRCHUM, Université de Montréal
*Molecular mechanisms underlying T lymphocytes interactions with oligodendrocytes in neuroinflammation*

In multiple sclerosis (MS), there is an abnormal response of immune cells. This inflammatory response injures oligodendrocytes, the cells that support and insulate neurons, leaving neurons vulnerable. Dr Larochelle’s research team previously discovered that certain immune cells, T lymphocytes, directly interact with oligodendrocytes. To understand this interaction, Dr Larochelle’s team used biophysical technology to identify the cell adhesion molecules present on oligodendrocytes and showed that the expression of these molecules is increased in neuroinflammatory conditions. Her work to further characterize T lymphocytes interactions with oligodendrocytes continues towards the aim of understanding immune-mediated oligodendrocyte injury in MS.
Gareth Lim, PhD, CRCHUM, Université de Montréal

*Evaluating the therapeutic potential of 14-3-3ζ for the treatment of obesity*

Current therapies for reducing body weight are only modestly successful, and none directly target fat cells, which are key in the development of obesity. Fat cells require a complex roadmap of signals to grow. How these signals are coordinated is not known, but molecular scaffold proteins could be key players. The 14-3-3ζ scaffold protein plays an essential role in the growth of fat cells, which raises the possibility of targeting it to treat obesity. Dr Lim’s research team explored how obesity influences the types of molecules that interact with 14-3-3ζ. By identifying how these proteins control the growth of fat cells, this work will help to increase our understanding of the processes behind the development of obesity. Furthermore, these proteins may also represent potential therapeutic targets for treating obesity.

Adena Scheer, MD, St Michael’s Hospital, University Of Toronto

*Cross-cultural communications in breast cancer treatment*

Breast cancer is a delicate diagnosis with multiple surgical treatment options to discuss, many of which are preference-based decisions. To understand how cultural and language barriers affect these decisions, Dr Scheer’s research team conducted in-depth interviews with patients and health care practitioners. This foundational work showed that there is a clear inequity in the shared decision making process for immigrant women around the type of breast cancer surgery they should have. Multiple barriers to shared decision making have been identified including language, resource availability, and the use of family members as translators. These findings will ultimately be used to develop decision-support tools culturally tailored for immigrants diagnosed with breast cancer in order to reduce communication-related health inequities.

Julien van Grevenynghe, PhD, INRS – Institut Armand-Frappier, Université de Québec

*Autophagy regulates CD8 T-cell killing activity during chronic HIV-1 infection*

Persistent HIV-1 infection is associated with elevated inflammation that drives metabolic and molecular deregulations. In order to restore proper memory CD4 T-cell (Mem) survival in persistently-infected patients, Dr van Grevenynghe’s research group is targeting sustained increased interferon type I (IFN-I) signaling among these cells. His team determined that blocking IFN-I pathways using specific antibodies in patients leads to a significant improvement in both cell resistance to programmed cell death and long-lasting cell maintenance. Further, these treatments improve Mem survival by inducing the activation of AKT signalling. His work continues with the aim of further identifying new molecular targets to enhance Mem survival and function during persistent HIV-1 infection.
These projects were approved for funding in the 2018-19 year.

**Ali Abdul-Sater, PhD, York University**

*Dissecting the role of TRAF1 in regulating inflammatory and autoimmune diseases*

TRAF1 is an immune signaling molecule associated with the development of Rheumatoid Arthritis. By determining how TRAF1 functions and interacts with different immune pathways, Dr Abdul-Sater’s group will be able to devise a research model to specifically target TRAF1, which may provide a favorable therapeutic outcome for Rheumatoid Arthritis.

**Kyle Biggar, PhD, Carleton University**

*Identification of new substrates of the histone regulator, SMYD3, and their implication in lung cancer development*

Dr Biggar’s research team is using modern biochemical approaches to investigate the function of the histone regulator SMYD3. In lung cancer patients, analysis showed that SMYD3 expression predicted both progression and survival. The research team is working to identify new proteins that are modified by SMYD3 to advance our understanding of how SMYD3 dysfunction drives cancer.

**Dylan Cooke, PhD, Simon Fraser University**

*Accelerated mapping of individual variation in brain organization with online detection of EMG activity*

Dr Cooke’s research team is developing a fast method to measure the organization of the part of the brain that controls muscle activity. The resulting “maps” will show how individual brains differ in their organization, and whether different patterns relate to different levels of ability.

**Salim Islam, PhD, INRS – Institut Armand-Frappier**

*Understanding colonization and persistence in bacterial social networking*

Dr Islam’s research group is examining the mechanisms used by bacteria to remodel their surfaces in order to generate connection tubes important for colonizing biological settings. This knowledge can ultimately be used to develop therapeutics to target and disrupt the systems responsible for bacterial surface remodeling and enhance health outcomes for patients with both acute and chronic infections.
Nomazulu Dlamini, MD PhD, The Hospital for Sick Children, University of Toronto

*Neural network reorganization and maladaptive plasticity in dystonia post childhood basal ganglia stroke*

Dr Dlamini’s research group is examining the neural networks of pediatric stroke patients with and without post-stroke dystonia. Identifying differences in neural networks between the patient populations will improve our understanding of why, when, and in whom dystonia occurs, and help to identify potential targeted therapies.

Robert Huber, PhD, Trent University

*Using the social amoeba Dictyostelium discoideum to study Batten disease*

Mutations in the CLN5 gene cause Batten disease, a rare and devastating neurological disorder. Dr Huber’s research team is using a social amoeba as a model system to examine the effects of CLN5-deficiency on cellular and developmental processes. Translation of this work to human cell models will enhance our understanding of CLN5 function in human cells.

Ian Rodrigue-Gervais, PhD, INRS – Institut Armand-Frappier, Université de Québec

*Examining the function of mitochondrial proteases in flu pathogenesis*

The flu kills thousands of people annually, often as a result of tissue death, or necrosis, which occurs as the body attempts to clear the virus. Dr Rodrigue-Gervais’ group is working to understand how proteins control necrosis, which is a key step towards developing new methods to combat the flu.

Rebecca Shapiro, PhD, University of Guelph

*Using genetic and functional genomic analysis to study antifungal drug resistance in Candida auris*

*Candida auris* is an emerging fungal pathogen that is highly resistant to antifungal drugs, and a critical threat to public health. Dr Shapiro’s research group is developing cutting-edge CRISPR-based technologies to study how *C. auris* can tolerate antifungal drugs and cause life-threatening disease.

John Trant, PhD, University of Windsor

*Developing enzymatically-resistant carbohydrate vaccines for treating lung cancer*

Vaccines incorporating sugars found exclusively on cancer cells are promising strategies for treating cancer. Dr Trant’s research team is working to create an effective vaccine that uses a form of stabilized sugar and is recognized by the immune system, that can ultimately be used to treat carcinomas.
Pathway to Discovery Event

At our September 2018 recognition event, **Dr Imogen Coe** (1998 Discovery Awardee) spoke on the importance of supporting researchers early on in their careers. She emphasized that early-career funding not only helps establish longer-term funding, but allows researchers to feel accepted and valued. **Dr Michael Suits** (2015 Discovery Awardee) spoke about his research on periodontal disease and acknowledged with gratitude how his award allowed him to hire students, read more, and apply for more grants.

The Board recognized Executive Director of over six years, Ramona Rea, for her dedication and genuine commitment to the mission of the Foundation. The Board also recognized Dr Robert Chen and Dr Paul Cadario for their dedicated service to the Grant Review Panel and Board of Trustees, respectively.

Members of the Banting Research Foundation Board of Trustees and Honorary Patron Mrs Nona Macdonald Heaslip.
Henry G Friesen International Prize in Health Research

The Banting Research Foundation co-sponsored the Henry G Friesen International Prize in Health Research awarded to Sir Paul Nurse in 2015 and Janet Rossant in 2016. Dr Rossant and Dr Henry Friesen were both funded by the Banting Research Foundation early in their careers. In conjunction with the Friesen Prize Program, Roundtables were held in Ottawa to address major issues in Canadian science and education. The thoughts and ideas of the leading scientists brought together by the Roundtables are assembled in the 2015 and 2016 Proceedings of the Policy Roundtables.

CSCI-CITAC Young Investigators Forum

For the last four years, the Banting Research Foundation has sponsored the oral abstract and poster presentation awards in the Young Investigators Forum at the annual meeting of the Canadian Society for Clinical Investigation and the Clinician Investigator Trainee Association of Canada. Young clinician investigators presented research posters in several categories, and some were invited to present their research orally. Prizes were awarded to the highest-ranked presenters. These young clinician investigators in training represent the future of clinical research in Canada, and we are pleased to offer our support.
## BALANCE SHEET

As at June 30

<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>Cash and cash equivalents</td>
<td>23,849</td>
<td>28,788</td>
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<tr>
<td>HST recoverable</td>
<td>6,297</td>
<td>6,292</td>
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<tr>
<td>Investments, at fair value</td>
<td>4,670,922</td>
<td>4,402,920</td>
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<tr>
<td>Artwork</td>
<td>60,000</td>
<td>—</td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td>4,761,068</td>
<td>4,438,000</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th><strong>LIABILITIES AND FUND BALANCES</strong></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Liabilities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts payable and accrued liabilities</td>
<td>10,770</td>
<td>17,327</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Fund balances</strong></th>
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</thead>
<tbody>
<tr>
<td>General Fund</td>
<td>829,723</td>
<td>664,555</td>
</tr>
<tr>
<td>Restricted Fund</td>
<td>12,500</td>
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<tr>
<td>Endowment Fund</td>
<td>3,908,075</td>
<td>3,756,118</td>
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<tr>
<td><strong>Total fund balances</strong></td>
<td>4,750,298</td>
<td>4,420,673</td>
</tr>
<tr>
<td><strong>Total fund balances</strong></td>
<td>4,761,068</td>
<td>4,438,000</td>
</tr>
</tbody>
</table>

This summarized financial information is derived from financial statements that were audited by Ernst & Young LLP, Chartered Professional Accountants. Complete financial statements are available upon request.
## CONDENSED STATEMENT OF REVENUE AND EXPENSES AND CHANGES IN FUND BALANCES

Year ended June 30

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REVENUE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment income, net</td>
<td>460,840</td>
<td>430,920</td>
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<tr>
<td>Donations</td>
<td>63,739</td>
<td>38,964</td>
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<tr>
<td>Contribution of artwork</td>
<td>60,000</td>
<td>—</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td>584,579</td>
<td>469,884</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EXPENSES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grants awarded to new investigators</td>
<td>149,565</td>
<td>146,000</td>
</tr>
<tr>
<td>Other grants</td>
<td>9,500</td>
<td>14,500</td>
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<tr>
<td>Professional fees</td>
<td>75,932</td>
<td>70,493</td>
</tr>
<tr>
<td>Accounting and audit fees</td>
<td>11,164</td>
<td>10,964</td>
</tr>
<tr>
<td>Office, general and administrative</td>
<td>8,793</td>
<td>10,153</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td>254,954</td>
<td>252,110</td>
</tr>
</tbody>
</table>

**Excess of revenue over expenses for the year**

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Excess</strong></td>
<td>329,625</td>
<td>217,774</td>
</tr>
<tr>
<td>Fund balances, beginning of year</td>
<td>4,420,673</td>
<td>4,202,899</td>
</tr>
<tr>
<td><strong>Fund balances, end of year</strong></td>
<td>4,750,298</td>
<td>4,420,673</td>
</tr>
</tbody>
</table>

This summarized financial information is derived from financial statements that were audited by Ernst & Young LLP, Chartered Professional Accountants. Complete financial statements are available upon request.
Donors, Partners and Sponsors

The Banting Research Foundation was established in 1925 to fund biomedical research innovation. From its endowment, interest and new donations the Foundation has now funded 1350 awards. Currently, only 10-12% of eligible Discovery Award applicants across Canada are funded due to our limited resources. To ensure that every opportunity to support innovative scientific discovery is achieved, we made it our aim in 2016 to double the number of awards over the next 5 years. We have since made great progress, increasing the number of awards from 6 to 9 in 2018-2019. Still every year several meritorious applications are left unfunded.

Your contribution will go a long way to help launch the careers of our young scientists whose research promises to have major impacts on improving health. We are interested in providing opportunities for sponsors who wish to partner with the Foundation targeting research in a specific health or biomedical field.

The Banting Research Foundation gratefully acknowledges donations from the following individuals and corporations during the 2018 fiscal year:

Mr John Burnes
Mr David J Foley
Ms Laura Formusa
Ms Sheila Jarvis
Ms Hollie Matthews
Dr Stephen Scherer
Dr Catharine Whiteside

Dystonia Medical Research Foundation Canada
The McLean Foundation
Donors through CanadaHelps
Donations in memory of Joanne Matthews
Anonymous

Thank you! Your donations have supported innovative health and biomedical research projects by outstanding early-career investigators.

Many thanks to the University of Toronto Faculty of Medicine for the in-kind contribution of our office space.

Thank you to Heffel Fine Art Auction House for the in-kind appraisal of our Banting paintings.

Charitable registration number 108072927 RR 0001
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Toronto ON M5S 3H2

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info@bantingresearchfoundation.ca

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