BANTING RESEARCH FOUNDATION

Annual Report 2019
Inspiring health science discovery—
Building on the Banting legacy

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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.
Through our Discovery Awards program, The Banting Research Foundation continues to fulfill its mission by supporting young investigators across Canada who are destined to become our future scientific and academic leaders. I am quite confident in this statement for the following reasons. First, our Awardees have demonstrated both outstanding scientific achievement and creative innovation in their highly competitive projects adjudicated by our expert Grant Review Panel. Second, based on a recent analysis, we know that within the first 5 years of their university appointments 88% of our Awardees’ successfully compete for federal Tri-Council research grants. The usual success rate for these competitions is less than 20%, attesting to the amazing quality of our Awardees. Finally, if we look back over the many years of Awardees, the vast majority represent Canada’s top health and biomedical researchers. These include Henry Friesen who discovered the hormone prolactin and as President of the Medical Research Council of Canada led its transformation into the Canadian Institutes of Health Research. Imogen Coe, recognized for her research in membrane biology, became the founding Dean of Science at Ryerson University. The Banting legacy lives on through the careers and contributions of all our Awardees.

Over the past few years, we have partnered with our donors and sponsors to increase the funds available for Discovery Awards. I wish to thank the McLean Foundation, the Dystonia Medical Research Foundation, the J.P. Bickell Foundation, the Henry White Kinnear Foundation and the McLaughlin Centre at the University of Toronto, along with our many donors for their generous support. The Foundation continues to receive applications from many excellent candidates who we are unable to fund. Therefore, we continue our efforts to increase our funding capacity through strategic partnering and fund-raising.

May I thank our volunteers including our Board of Trustees, and members of our Campaign Cabinet and Grant Review Panel for their commitment, expertise and many hours of service. Their efforts sustain the Banting legacy of scientific excellence and innovation in Canada. I wish to specifically recognize and thank three long standing Trustees who have completed their terms this year for their stellar contributions – Aubie Angel, Avrum Gotlieb, and William
Hewitt. We were delighted to welcome Gerald Lokash to our Board who will Chair our Audit, Finance and Investment Committee.

The Banting Research Foundation is now working jointly with the Charles H. Best Foundation, the Sir Frederick Banting Legacy Foundation and the Royal Canadian Institute for Science on events scheduled for April 17 & 18, 2021 to celebrate the 100th Anniversary of the Discovery of Insulin. We will highlight the continuing impact of the discovery on past and future generations of researchers and on the many lives of persons who have benefited from insulin. Mark your calendars!

This year, The Banting Research Foundation was granted Viceregal Patronage by Her Excellency the Right Honourable Julie Payette, Governor General of Canada. We are thrilled to be welcoming an Honorary Patron who shares our passion for supporting health and biomedical science and research.

Many, many thanks to our Executive Director, Tavia Caplan, who works tirelessly on behalf of the Foundation. The renewal of our website, enhanced social media presence and seamless management of our Discovery Awards competition are among her many accomplishments for which we are most grateful.

Catharine Whiteside, CM MD PhD FRCPC
Chair, Board of Trustees
The Banting Research Foundation
**Research updates from the 2018-19 Discovery Award recipients**

**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. Dr. Abdul-Sater’s research group set out to understand how TRAF1 interacts with different immune pathways—results that will ultimately help the team devise a research model to specifically target TRAF1. By employing a series of genetic and biochemical experiments, the team identified the residues of interaction between TRAF1 and cIAP2 as well as LUBAC components. With this preliminary data, Dr. Abdul-Sater was able to secure nearly 1.2 million dollars in funding from federal and other agencies and now has a robust research group composed of 10 highly qualified personnel.

**Kyle Biggar, PhD, Carleton University**

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

In lung cancer patients, previous work showed that expression of the histone regulator SMYD3 predicted both progression and survival. To advance our understanding of how SYMD3 dysfunction drives cancer, Dr. Biggar’s team used modern biochemical approaches to identify new proteins that are modified by SMYD3. Dr. Biggar’s Discovery Award helped him train a team of two scientists, who successfully identified a new and functionally relevant substrate of SYMD3, which has direct implications in cancer cell migration.
Dylan Cooke, PhD, Simon Fraser University
Accelerated mapping of individual variation in brain organization with online detection of EMG activity

Brain organization varies significantly between individuals, yet no studies have tested whether it is associated with skills like dexterity. Dr. Cooke’s research is focused on developing an automated brain mapping system—a fast method to measure the organization of the part of the brain that controls muscle activity. The team has now successfully collected data which will crucially inform an algorithm to analyze muscle activity. This work will ultimately be used to answer questions such as: Are “natural athletes” aided by specific natural variations in the ways that brains control muscles?

Nomazulu Dlamini, MD PhD, The Hospital for Sick Children, University of Toronto
Recipient of the 2018 Discovery Award supported by Dystonia Medical Research Foundation Canada
Neural network reorganization and maladaptive plasticity in dystonia post childhood basal ganglia stroke

Dystonia is a disabling movement disorder common in children with basal ganglia stroke. Dr. Dlamini’s research group is examining pediatric stroke patients with and without post-stroke dystonia to assess the differences in their neural networks. The team has successfully recruited several participants and began completing structural and functional imaging (MRI and MEG) and conducting a battery of cognitive and psychological tests. This data 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 function of CLN5 and the effects of CLN5-deficiency. Their work showed for the first time that CLN5 is an enzyme that processes sugar-containing molecules, providing insight into how mutated CLN5 could ultimately lead to neurodegeneration. Using this pilot data, Dr. Huber was able to secure longer-term funding from the federal government to continue to examine the mechanisms underlying Batten disease.

Salim Islam, PhD, INRS – Institut Armand-Frappier

*Understanding colonization and persistence in bacterial social networking*

Dr. Islam’s research group examines the mechanisms used by bacteria to remodel their surfaces in order to generate connection tubes important for colonizing biological settings. To monitor the bacterial cell surface in live cells, the research team synthesized molecules to fluorescently label the cell surface. This labeling allowed them to visualize the cell surface using florescence microscopy and collect preliminary data on the events taking place to produce cell-cell interactions.

“The seed funding provided by the Banting Discovery Award has allowed me to launch a truly novel and innovative research project in my laboratory which has the potential to fundamentally change the way in which microbiologists study the surface of bacterial 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. His team of 5 student-researchers has made significant progress in understanding how the mitochondrial protease HtrA2 controls virus-induced necrosis. This work was published in Scientific Reports and let to a new avenue of research in Dr. Rodrigue-Gervais’ lab focused on how mitochondrial genetic risk is associated with mortality from severe flu disease.
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.

With the support of her Discovery Award, Dr. Shapiro’s research group developed a novel CRISPR repression system (CRISPRi) for applications in fungal pathogens. The group is continuing to discover how this system can be used for large-scale functional genomic screening of genes involved in resistance to antifungal drugs. Since receiving her Discovery Award, Dr. Shapiro’s group has published several papers on this subject and secured over 1.9 million dollars in research funding from federal and provincial agencies.

John Trant, PhD, University of Windsor

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

Certain sugars are found on most carcinomas but not on healthy cells, making them excellent targets for vaccine development. Dr. Trant’s research is focused on creating an effective vaccine against carcinomas by preparing stable forms of cancer-specific sugars that can be easily recognized by our immune systems.

The team has successfully prepared several artificial versions of cancer-specific sugars, and is now working to produce candidate vaccines.

“This is an absolutely career-changing program and is extremely important for Canadian Health Science.”
2019-20 Discovery Awards

These projects were approved for funding in the 2019-20 year.

**Lindsay Bodell, PhD, Western University**

*Negative Affect and Reward Processing in Individuals with Binge Eating*

Binge eating is a key feature of eating disorders and affects approximately 10% of the population. It is critical to understand what causes individuals to binge eat, so we can improve treatments. Dr. Bodell’s research aims to better understand the ways in which negative affect may lead to binge episodes. Her research will examine how negative affect impacts motivation to eat and how individual differences in brain responses to different mood states affect this relationship.

**Andrea Bombak, PhD, University of New Brunswick**

*Intersections of Weight Stigma in New Brunswick*

Weight stigma affects risk for stress, diabetes, and heart disease. Little research has explored how people facing other stigmas (like racism, ageism, or classism) are affected by weight stigma. Dr. Bombak’s research will explore recommendations for safe healthcare and healthy places in New Brunswick among diverse people of higher weights through interviews and accompanying people to sites they find welcoming and accessible or unsafe, unwelcoming, and inaccessible.

**Mahsa Jessri, PhD, University of British Columbia**

*Dietary Patterns and Food Policies*

Poor diet is the most common preventable behavioral risk for chronic diseases in Canada. Using Canada’s unique strength in recording population data, Dr. Jessri’s research will estimate current and predict the future contribution of dietary patterns to deaths, cardiovascular disease and diabetes. New tools will be created to allow policymakers to assess the impact of different preventive strategies, such as taxations, on death and disease burden across different social groups.

**Benoit Laurent, PhD, Université de Sherbrooke**

*Deciphering the epigenetic regulation of alternative splicing in neurons*

Aging can reduce the birth of new neurons. The challenge is to prevent neurons from dying in old age and keep growing new ones in order to stave off neurodegenerative diseases. Dr. Laurent’s research aims to understand the mechanisms promoting the generation of neurons. His research will focus
on the transcription factor GATA3 and how it regulates the production of proteins. The findings will ultimately help to develop new therapeutic strategies against neurodegenerative diseases.

Daiva Nielsen, PhD, McGill University  
*Characterization of the workplace food environment in Montreal Canada*  
The retail food environment plays a significant role in public health. Dr. Nielsen’s research aims to characterize the workplace food environment in the city of Montreal using participant workplace location data for 40,000 middle aged adults. Statistical analyses will be conducted to evaluate relationships between the workplace food environment and health status. The findings will advance methods for studying the food environment and will enable new considerations for gene-environment interaction research.

Arneet Saltzman, PhD, University of Toronto  
Recipient of the 2019 Banting Research Foundation/ McLaughlin Centre Discovery Award  
*Investigating the role of heterochromatin readers in genome stability*  
Chromosomes consist of DNA packaged with proteins to form chromatin. Mutations of genes controlling chromatin structure are prevalent in cancer. Dr. Saltzman’s research will focus on the role of proteins that recognize the more compact regions of the chromosome, termed heterochromatin. She will investigate how these proteins affect cell division, accumulation of DNA mutations, and how they interact with other cancer promoting pathways. This research will lead to a better understanding of the relationship between heterochromatin and genome integrity.

Nicholas Strzalkowski, PhD, Mount Royal University  
Recipient of the 2019 Discovery Award supported by Dystonia Medical Research Foundation Canada  
*Sensory Feedback in Dystonia*  
Idiopathic dystonia is the third most common movement disorder in adults. Muscle sensory feedback is thought to contribute to dystonia, however this has not been investigated directly. Dr. Strzalkowski’s research will use an innovative approach combining microneuroography (technique to record from sensory nerves) and a robotic exoskeleton (to control arm position and movement) to provide the first direct measurements of sensory nerve feedback in dystonia. His team expects to find elevated feedback in dystonic patients, a discovery that would help explain disease symptoms and help inform treatment approach.
In May 2019, The Banting Research Foundation was delighted to announce Her Excellency the Right Honorable Julie Payette, Governor General of Canada, as our Honorary Patron. The Governor General grants Viceregal Patronage to recognize special contributions to society, and to bring special attention to worthy causes and showcase excellence. The Foundation is honoured to gain the support of a governor general who shares our passion for supporting health and biomedical science and research.

Dr. Catharine Whiteside, Chair of the Board of Trustees of The Banting Research Foundation, met with Her Excellency at the CIHR 2018 Golf Leaf Prize Ceremony at Rideau Hall in June 2019. Dr. Whiteside had the pleasure of thanking Her Excellency for her patronage as we continue to support Canada’s most promising young researchers.
Launching Discovery Event

At our September 2019 recognition event, Dr. Susan George (1988 award recipient) shared her inspiring story from her days as an early-career researcher to her current role as Senior Clinician-Scientist at Toronto General Hospital. She expressed how critical funding from The Banting Research Foundation at an early stage of her career allowed her to yield promising data, which eventually led her to study the healthy and diseased human brain. Dr. Ali Abdul-Sater (2018 Discovery Award recipient) spoke about his research on inflammation at York University and how his Discovery Award allowed him to hire the right people and get the preliminary data he needed to secure major federal research funding in 2019.

The Board recognized Dr. Aubie Angel, Dr. Avrum Gotlieb, and Mr. William Hewitt for their dedicated and long-term service on the Board of Trustees. The Board also recognized Dr. Reinhart Reithmeier, Dr. Robert Maunder, and Dr. Rodrigo Fernandez-Gonzalez for their dedicated service to the Grant Review Panel.

From left to right: Dr. Avrum Gotlieb, Dr. Catharine Whiteside, and Dr. Aubie Angel (1965 award recipient)

From left to right: Dr. Janet Rossant (1983 award recipient), Dr. Mark Bayfield (2009 award recipient), Dr. Jennifer Steeves (2007 award recipient), and Dr. Ron Pearlman.

From left to right: Dr. Rebecca Shapiro (2018 Discovery Award recipient), Dr. Alicia Viloria-Petit (2009 award recipient).
## BALANCE SHEET

As at June 30

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<tr>
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<th>2019</th>
<th>2018</th>
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<tbody>
<tr>
<td><strong>ASSETS</strong></td>
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<tr>
<td>Cash and cash equivalents</td>
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<td>HST recoverable</td>
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<td>Investments, at fair value</td>
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<td>4,670,922</td>
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<td>Artwork</td>
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<tr>
<td><strong>Total Assets</strong></td>
<td>4,832,130</td>
<td>4,761,068</td>
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<tr>
<th><strong>LIABILITIES AND FUND BALANCES</strong></th>
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<tbody>
<tr>
<td><strong>Liabilities</strong></td>
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<td>Accounts payable and accrued liabilities</td>
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<td><strong>Fund balances</strong></td>
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<td>General Fund</td>
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<td>Restricted Fund</td>
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<td>Endowment Fund</td>
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<td><strong>Total fund balances</strong></td>
<td>4,824,248</td>
<td>4,750,298</td>
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<td></td>
<td>4,832,130</td>
<td>4,761,068</td>
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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>
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<th>2019</th>
<th>2018</th>
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<tbody>
<tr>
<td><strong>REVENUE</strong></td>
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<tr>
<td>Investment income, net</td>
<td>281,446</td>
<td>460,840</td>
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<td>Donations</td>
<td>106,273</td>
<td>63,739</td>
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<tr>
<td>Contribution of artwork</td>
<td>-</td>
<td>60,000</td>
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<tr>
<td><strong>Total</strong></td>
<td>387,719</td>
<td>584,579</td>
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<td><strong>EXPENSES</strong></td>
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<tr>
<td>Grants awarded to new investigators</td>
<td>225,000</td>
<td>149,565</td>
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<tr>
<td>Academic grants</td>
<td>7,500</td>
<td>9,500</td>
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<td>Professional fees</td>
<td>57,087</td>
<td>75,932</td>
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<tr>
<td>Office, general and administrative</td>
<td>12,879</td>
<td>8,793</td>
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<td>Accounting and audit fees</td>
<td>11,303</td>
<td>11,164</td>
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<tr>
<td><strong>Total</strong></td>
<td>313,769</td>
<td>254,954</td>
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<tr>
<td><strong>Excess of revenue over expenses for the year</strong></td>
<td>73,950</td>
<td>329,625</td>
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<td><strong>Fund balances, beginning of year</strong></td>
<td>4,750,298</td>
<td>4,420,673</td>
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<tr>
<td><strong>Fund balances, end of year</strong></td>
<td>4,824,248</td>
<td>4,750,298</td>
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</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.
Board of Trustees and Campaign Cabinet 2018-19

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

Dr. Aubie Angel
Vice-Chair
Professor Emeritus
Senior Fellow, Massey College
University of Toronto
President, Friends of CIHR

Mr. Donald A. Guloien
Past President and Chief Executive Officer of Manulife

Dr. Avrum I. Gotlieb
Professor, Department of Laboratory Medicine and Pathobiology
University of Toronto

Mr. William E. Hewitt
Treasurer
Chair, Audit, Finance & Investment Committee
Independent Financial and Investment Consultant

Mr. Gerald A. Lokash
C.A./Chartered Professional Accountant and Business Advisor (Retired)

Mr. William Pashby
Secretary
Chair, Governance Committee
Retired Partner
Borden Ladner Gervais

Ms. Molly Verrier
Emerita Professor and former Chair of Physical Therapy and Rehabilitation Science
University of Toronto

Ms. Elizabeth Vosburgh
Former Governor
Governing Council
University of Toronto

Additional Campaign Cabinet members:
Dr. John Floras
Dr. Anna Jarvis
Dr. Reinhart Reithmeier
Dr. Hugh Scully

Viceregal Patron
Her Excellency the Right Honourable Julie Payette

Honorary Patron
Mrs. Nona Macdonald Heaslip

Grant Review Panel 2019

Dr. Reinhart Reithmeier, Chair
Professor, Department of Biochemistry
University of Toronto

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

Dr. Irene Andrulis
Professor, Departments of Molecular Genetics and Laboratory Medicine and Pathobiology
University of Toronto

Dr. Imogen Coe
Professor, Department of Chemistry and Biology
Ryerson University

Dr. Whitney Berta
Professor, Institute of Health Policy, Management and Evaluation
University of Toronto

Dr. Brent Derry
Professor, Department of Molecular Genetics
University of Toronto

Dr. Rodrigo Fernandez-Gonzalez
Associate Professor, Institute of Biomaterials & Biomedical Engineering
University of Toronto

Dr. Anthony Gramolini
Professor, Department of Physiology
University of Toronto

Dr. Edith Hillan
Professor, Faculty of Nursing
University of Toronto

Dr. Lorraine Kalia
Assistant Professor, Department of Medicine
University of Toronto

Dr. Peter Lewis
Professor, Department of Biochemistry
University of Toronto

Dr. Robert Maunder
Professor, Department of Psychiatry
University of Toronto

Dr. Daniel Moore
Assistant Professor, Faculty of Kinesiology and Physical Education
University of Toronto

Dr. Arthur Mortha
Assistant Professor, Department of Immunology
University of Toronto

Dr. Kelly O’Brien
Associate Professor, Department of Physical Therapy
University of Toronto

Dr. Jonathan Rocheleau
Associate Professor, Institute of Biomaterials & Biomedical Engineering
University of Toronto

Dr. Christopher Yip
Professor, Department of Chemical Engineering and Applied Chemistry
Director, Institute of Biomaterials & Biomedical Engineering
University of Toronto
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 1354 awards. Currently, only 9-12% 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 are working hard to increase our funding capacity to support more young scientists. Since 2017, we have more than doubled our annual revenue from donations thanks to generous contributions from individuals and foundations and partnerships with other small health organizations. Still in 2019, 13 deserving applications were 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 foundations during the 2019 fiscal year (donors who made donations of $1k or more are listed):

- Jackman Foundation
- J.P. Bickell Foundation
- The Henry White Kinnear Foundation
- The McLean Foundation
- The William and Nona Heaslip Foundation
- John Burnes
- Don Guloien and Irene Boychuk
- Anna Jarvis
- Catharine Whiteside
- 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 Velcro Dog Designs for the in-kind web-design services.

Charitable registration number 108072927 RR 0001
We invite you to donate online at www.bantingresearchfoundation.ca/donate

Banting Research Foundation
Save the date: The 100th Anniversary of the Discovery of Insulin

INSULIN TO INNOVATION
A Celebration of Canadian Medical Discovery

APRIL 17-18, 2021

Walk in the Footsteps of Banting
Visit the birthplace of Frederick Banting and meet today's diabetes researchers
- Saturday April 17 - Banting Homestead Heritage Park, Alliston, ON

Living Legacy of Discovery
Celebrate Canada’s gift to the world and its impact worldwide
- Sunday April 18 - University of Toronto, Toronto, ON

Presented by:

BantingResearchFoundation.ca