Banting Research Foundation

2023
annual report

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Contents

- 4 Introduction
- **7** Our Supporters
- 11 Mentorship Open House
- 13 Our Reach Across Canada
- 15 2023 Discovery Award Winners
- 17 Health Research Partnerships with Mitacs
- 19 Impact of Our Past Awards
- **34** Financial Health
- **36** Board Ambassadors
- **37** 2023 Discovery Award Selection Panel
- 39 Looking Ahead

Introduction

I'm delighted that the Banting Research Foundation funds such excellent internationally appreciated research.

It is so important that Canada should know about this foundation as a legacy of Banting's work. It should be taught at school, it's a piece of Canadian history.

Nona Macdonald Heaslip patron of the Foundation





Discovery Mentorship The Banting Research Foundation started in **1925**, originating from Sir Frederick Banting's Nobel Prize-winning discovery of insulin. We are the only charity in Canada that provides seed funds to early-career health and biomedical researchers.

To date, **1,366** brilliant young academics have received our Banting Discovery Award to launch their independent research programs. Also, over 90% of our recipients have won other major research funds within five years thanks to our award's added prestige, credibility, and leverage.

In May 2023, we reaffirmed our steadfast support for our awardees by launching the Discovery Mentorship Program. With a tightly knit network, this multi-faceted professional learning experience helps further develop skills that are critical to academic success, such as grant writing, laboratory leadership, and scientific communication.

This year also marked the first cohort of the Mitacs-Banting Discovery Postdoctoral Fellowship Program. A product of partnership with Mitacs, this program places a postdoctoral fellow under the supervision of a past Discovery Awardee and a partner organization to research the impact of climate change on human health.



Our ongoing mission is to recognize and empower early top talent in discovering solutions to our most urgent health challenges and to improve the well-being of all Canadians. The calculated risks we take have translated and will continue to translate into tangible improvements for a healthier society.

We would like to express our deepest gratitude to the Jarislowsky Foundation for their immense generosity that has been a driving force behind our Discovery Program.

A heartfelt thank you also goes to our patron Nona Macdonald Heaslip, for 12 years of unwavering support to the Banting Research Foundation. Her remarkable contributions, especially to the Discovery Award – now named after William and Nona Heaslip – have catalyzed biomedical research breakthroughs that will benefit Canadians for years to come.

Our Supporters

100% of your financial support goes directly to our Discovery Award Program.

Thank you for being an important part of our story in FY 2023 (July 2022–June 2023).

\$30,000 and above

The Jarislowsky Foundation
The William and Nona MacDonald Heaslip Foundation
Mitacs

\$10,000 and above

Donald A. Guloien and Irene A. Boychuk Toronto Elegant (Ladies) Lions Club

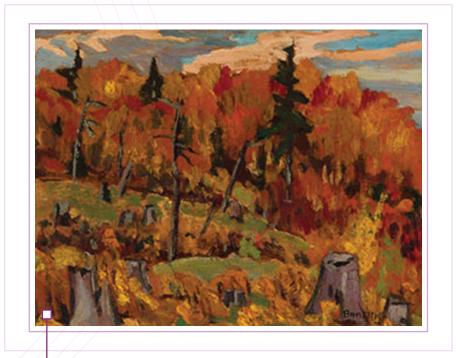
\$1,001 to \$5,000

Catharine Whiteside Sheelagh Whittaker Richard Nunn Anonymous

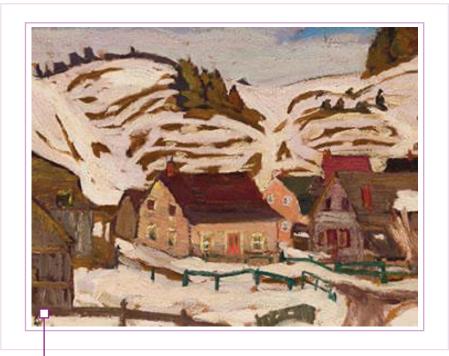
\$100 to \$1,000

Gerry Lokash Molly Verrier Shanon Grauer Andre Morriseau Alex Waugh

Harry Elsholtz Andrea Lucas







Quebec Village, Sir Frederick Grant Banting.

The Banting Research Foundation is very grateful for the kind support of the Heffel Fine Art Auction House in selling two landscape paintings by Sir Frederick Banting, as well as donating their professional fees to the Foundation.

The sale raised \$97,500 for the Discovery Award Program.

Sincere thanks to the University of Toronto Temerty Faculty of Medicine for providing us with office space, and to Shift Health and all our volunteers who helped us make a difference in FY 2023.

A celebration event to honour Nona MacDonald Heaslip





Clockwise from left: Christian Legare, Sergio
 Garcia-Crespo, Nona Macdonald Heaslip, Joyce Aldrich,
 Reinhart Reithmeier, Matt (pianist), Maurine Kwok,
 Benoit Laurent, and Brenda Radford

A lovely garden party with great company.
 Two Discovery Awardees shared how Nona's generosity allowed for their biomedical research to flourish.







Mentorship Open House

For the first time in the foundation's history, we invited our recent awardees to participate in a mentorship forum.

Aspiring young researchers had the opportunity to network with previous award winners that have established themselves and have made a mark in their research field.





likely the best meeting I have attended in recent memory

amazing and extremely helpful

wonderful

incredible



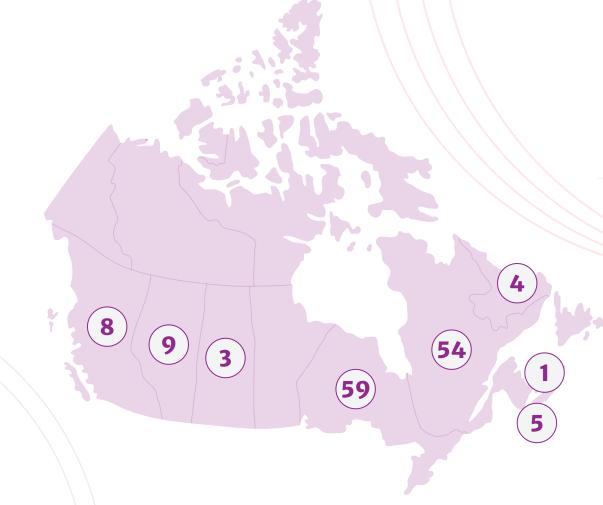




Our Reach Across Canada

From 2000 to 2023, our award recipients have come from **8 of the 13** provinces and territories in Canada, with **females accounting for 45%.**

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Province	Male	Female	lotal
Alberta	4	5	9
British Columbia	3	5	8
Newfoundland	2	2	4
Nova Scotia	2	3	5
Ontario	31	28	59
PEI	1	0	1
Quebec	34	20	54
Saskatchewar	1 2	1	3
Total	79	64	143



2023 Discovery Award Winners

We are thrilled to support these outstanding Canadian early-career researchers and to help launch their research programs.

Their commitment to improving human health is truly inspiring, and we are confident that they will make a lasting impact. 11

Dr. Catharine WhitesideBoard Chair, Banting Research Foundation



From left to right:

Andrew Harris

Assistant Professor, Carleton University, Mechanical & Aerospace Engineering, for research on the hydrodynamics of platelet shedding in macrothrombocytopenia, funded by a Banting Discovery Award.

Sergio Crespo-Garcia

Assistant Professor, Université de Montréal, École d'optométrie, for research on the therapeutic merit and cellular mechanisms of folate during age-related macular degeneration, funded by a William and Nona Heaslip-Banting Discovery Award.

Marie-Claude Sincennes

Assistant Professor, Institut National de la Recherche Scientifique, Centre Armand-Frappier Santé Biotechnologie, for research on the function of PABPN1 in muscle stem cells and myogenesis: implications for oculopharyngeal muscular dystrophy, funded by a Jarislowsky Fellowship-Banting Discovery Award.

Eva Kaufmann

Assistant Professor, Queen's University, Biomedical & Molecular Sciences, for research on mold exposure-induced reprogramming in hematopoietic stem cells, funded by a Banting Discovery Award.

Erwan Pernet

Assistant Professor, Université du Québec à Trois-Rivières, Biologie Médicale, for research on unraveling the role of type I interferons in bronchopulmonary dysplasia, funded by a Banting Discovery Award.

Brice Batomen Kuimi

Assistant Professor, University of Toronto, Dalla Lana School of Public Health, for research on Vision–Zero Policies and Road Traffic Crashes in Toronto, funded by a University of Toronto 100th Anniversary Discovery of Insulin Banting Award.

Faith Brennan

Assistant Professor, Queen's University, Center for Neuroscience Studies, for research on promoting neurological repair by understanding region-specific and sex-specific microglial phenotypes, funded by a Banting Discovery Award.

Health Research Partnership with Mitacs

We are excited about the inaugural Mitacs-Banting Discovery Postdoctoral Fellowship Program.

Congratulations to the first cohort of recipients!



Dr. Zack van Allen is an expert in statistical analysis of large datasets, including population studies. He has recently joined the research team of Dr. Matthieu Boisgontier, a 2020 Discovery Awardee and Associate Professor of Health Sciences at the School of Rehabilitation Sciences, University of Ottawa. This collaboration also includes Perley Health, a community care center for seniors and veterans in Ottawa. Their project studies physical activity and the intention–action gap in older adults.

While Canada's population is aging, older Canadian adults have experienced a decrease in physical activity. Dr. van Allen and Dr. Boisgontier are investigating whether the aging brain can be reprogrammed over time to enhance physical activity for associated health benefits. This proposal is particularly exciting as it not only brings together complementary expertise but also engages Perley Health, extending beyond Mitacs's typical scope of industrial collaboration. The outcomes of this research have the potential to significantly impact the health and vitality of our aging population.



Dr. Alexis Vivoli has joined the research team of Dr. Gareth Lim, a 2017 Awardee, Associate Professor, and Canada Research Chair in Adipocyte Biology at the Centre de Recherche of the Centre hospitalier de l'Université de Montréal. This collaboration includes Inversago Pharma Inc., a Montréal-based pharmaceutical company focusing on obesity and metabolic dysfunction.

The project, titled "Evaluation of the Effects of Peripheral CB1 Receptor Antagonism on Obesity and Metabolic Dysfunction", addresses the growing global health challenge of obesity, which often leads to type 2 diabetes and other serious health conditions. Adipocytes, the fat-storing cells in the body, express CB1 receptors within their cell membrane. Dr. Lim's lab aims to explore the therapeutic potential of blocking CB1 receptor and to understand the underlying biological mechanisms. This research holds promise for addressing obesity and its related health issues.

Impact of Our Past Awards

Our past awardees have taken their Discovery Award grants and made an impact in their research field.

We are proud to highlight the accomplishments of our awardees here.



Nick Strzalkowski PhD

Assistant Professor of Biology, Mount Royal University, Calgary

Sensory Feedback in Dystonia

Dystonia is when your muscles randomly contract and make your body involuntarily move because of an illness affecting the nervous systems or side effects of certain medicines. As a result, people with dystonia may have unusual posture. So far, research has suggested that vibrating the muscles can make these abnormal muscle contractions happen.

With a technique called microneurography, Dr. Strzalkowski uses a cool device that vibrates the wrist and measures signals from nerves connected to muscles. Having understood how muscles behave in normal situations, he will now apply the same method to people with dystonia and see how the signals differ between normal and dystonic states. The goal is to learn more about how dystonia happens and then use that knowledge to develop better ways to diagnose and treat this condition.

Dr. Strzalkowski is now collaborating with Dr. Davide Martino, Professor of Neurology, Cumming School of Medicine at the University of Calgary.



Malika Oubaha PhD

Professeure régulière des sciences biologiques et chaire de recherche du Canada sur la sénescence et le développement vasculaire, Université du Québec à Montréal

Role of Cellular Senescence in Arteriovenous Specification in the Retina

In the industrial world, people lose their eyesight often because of problems with eye blood vessels, and such issues are costly for health care systems. Recent findings have shown that premature aging could be a new drug target to treat serious eye diseases including glaucoma and retinopathies.

Dr. Oubaha studies how cells and molecules related to premature aging are linked to blood vessel development in the eye. Her team is now working on treatments to fix early problems in blood vessels that can lead to blindness. If successful, these therapies can help millions of people keep their vision in both the short and long term.

"The Banting Discovery Award–Jarislowsky Fellowship is a precious recognition of my research program as an early–career researcher and a validation by nationally and internationally researchers in the field of health research. It has helped me leverage other grants, including Natural Sciences & Engineering Research Council, Vision Health Research Network, Canadian Health Institute Research (CIHR) Canada Research Chair Tier 2, CIHR Project Grant, and the Canada Foundation for Innovation John R. Evans Leaders Fund."



Dylan Kobsar PhDAssistant Professor of
Neuromechanics and Kinesiology,
McMaster University

Stepping Out of the Lab: New Methods to Translate Movement Analyses into the Real-World with Wearable Sensors

Millions of Canadians suffer from a painful joint disease called osteoarthritis (OA), which affects the hands, wrists, knees, and spines. This condition silently steals bone mass and tissue, making it hard to do daily activities including walking.

Dr. Kobsar is working to understand how OA progresses so that he can help doctors improve when and how it is treated. He uses wearable sensors on people with OA to gather new information about how it affects walking and climbing stairs. With machine learning and artificial intelligence, he is figuring out how OA impairs our muscles and bones. His measurements are more accurate than regular lab tests, which helps to know when treatment is needed. Dr. Kobsar's research has brought together experts from St. Joseph's Healthcare Hamilton Fracture and Orthopaedics Clinic, businesses, and other universities like Queen's and Dalhousie. It has also led to important projects involving multiple research centres.

Dr. Kobsar has obtained funding from the McMaster Institute for Research on Aging and the Canadian Frailty Network. Additionally, the PhD student initially supported by the Banting-CANSSI Discovery Award in Data Science earned a prestigious Arthritis Society Salary Award.

Chantelle Capicciotti PhD

Assistant Professor of Chemistry, Queen's National Scholar in Precision Molecular Medicine, Queen's University

Harnessing Cell-Surface Glyco-Engineering to Enhance Stem-Cell Therapies

Stem cell treatments are showing promise for various diseases, including cancer and infections. Meanwhile, all human cells are coated with sugar molecules called glycans, which interact with proteins on target cells as part of normal or disease processes. For treatment, stem cells travelling in the bloodstream use these glycans to bind to blood vessels in the bone marrow, making the transplantation work.



Left to right: Sara Fraser, Alex Golds, Daniel Whalen, Chantelle Capicciotti, Jonathan Babulic, Joshua Kofsky, Youjin Kim, Marie Boddington, Fabiola De Leon Gonzalez, Pascal Vogt.

Supported by the Banting Discovery Award, Dr. Capicciotti uses organic chemistry to explore how specific glycans on stem cells used in bone marrow transplantation are crucial for successful delivery. Her aim is to tweak these glycans on stem cells to make transplantation even better, especially for cancers like leukemia. The insights she generates about these sugar-protein interactions are vital for creating new drugs and therapies.

Dr. Capicciotti's work has earned her several awards, including the Queen's University Prize for Excellence in Research – Outstanding Emerging Researcher Award.

Che Colpitts PhD

Assistant Professor of Biomedical and Molecular Sciences, Queen's University

Membrane Re-modelling as an Antiviral Target for Coronaviruses

The COVID-19 pandemic showed us how vulnerable we are to new viruses. A virology expert, Dr. Colpitts is on a mission to create versatile antiviral drugs, challenging the traditional "one bug, one drug" model. Thanks to the Banting Discovery Award-Jarislowsky Fellowship, she found a molecule in green tea that can disrupt the infection process for many viruses.

Working closely with Dr. Capicciotti, another Banting Discovery Award recipient, Dr. Colpitts identified specific sugar molecules (glycans) on cell surfaces that are crucial for coronaviruses to attach.

This understanding helps design drugs that can stop viruses from attaching and causing infection.

Dr. Colpitts has also teamed up with Dr. Arinjay Banerjee, a coronavirus expert at the Vaccine and Infectious Disease Organization, University of Saskatchewan. Together, they explore new ways to fight coronaviruses by developing better treatments.

"The Award was very helpful for establishing my research program and allowing my group to obtain preliminary data for other grant applications."

Dr. Colpitts' pioneering research has garnered additional funding from the Canadian Institutes of Health Research Early Career Investigator Award and the JP Bickell Foundation for Medical Research, reinforcing the significance and potential of her work.



Back row (L to R): Heidi Scott, Emma LeBlanc, Julien Miri, myself, Sophia Stegeman, Isabella Delano, Alice Ball, Elana Kertzman.

Front row (L to R): Bruno (service dog), Trinity Tooley, Ujjwal Sangwan, Keya Jani, Carla Gallardo

Jennifer Geddes-McAlister PhD

Associate Professor of Molecular and Cellular Biology and Canada Research Chair, University of Guelph

Combatting Fungal Infections through the Discovery and Mechanistic Elucidation of Novel Anti-Virulence Strategies

Fungal infections are becoming a global concern, especially with some strains that have migrated because of climate change and become resistant to medicine. For example, *Cryptococcus neoformans* is a fungus found worldwide causing a deadly disease called cryptococcosis.

Supported by the Banting Discovery Award–Jarislowksy Fellowship, Dr. Geddes–McAlister is looking for new ways to fight these fungal infections. She is studying the proteins that C. neoformans produce when interacting with human cells. By determining which proteins make the fungus more dangerous, she found a way to stop their production, reducing the fungus's ability to survive in the host body. Now, she is identifying proteins in our immune cells that can be targeted when developing new treatments against these fungi.

"The Award provided me with funding to get my research program up and running when I first started my position. I had the excellent opportunities to meet with other early-career researchers and to build collaborations. The early research results provided leverage into a CIHR Project Grant along with an NSERC Tier 2 Canada Research Chair in the Proteomics of Fungal Disease in One Health."



Left to Right: Reid Buchanan, Jarod Morgenroth–Rebin, Brianna Ball, Amy Hoff, Sam Pladwig, Arjun Sukumaran, Michael Woods, Nick Prudhomme, Sarah Renaud, Anthony Hendriks, Dr. Jennifer Geddes–McAlister, Lochlan McAlister and Hazel McAlister, Michael Prudencio–Brunello, Hannah West, Natalie Kim, Kushal Gandhi, Boyan Liu, Ben Muselius, Oriana Robinson.

2021



Sagi Abelson PhDAssistant Professor of Molecular Genetics, University of Toronto

High-Resolution Automatic Single-Cell Classification of Human Cancers and Blood Cells

Cancerous tumours are complicated because they consist of many cell types including malignant, non-malignant, and immune cells. Once the cancer spreads, the variety in cell types makes it difficult to determine the organ of origin in a biopsy. Yet, determining the exact cell composition in a tumour is crucial for effective treatment. Currently, single-cell RNA sequencing (scRNA-seq) can identify all cells within a biopsy sample, but its practical application has been limited.

With the Banting Discovery Award-Jarislowsky Fellowship,

Dr. Abelson combined machine learning with scRNA-seq to create single cell annotation of tumour microenvironments in pan-cancer settings (scATOMIC). This comprehensive tool can identify different cell types in various cancers, and its database can be easily updated for improved accuracy, making it easier to develop targeted and effective treatments.

Dr. Abelson's work has been published in a top scientific journal (Nature Communications), and he is sharing scATOMIC with the wider scientific community. Anyone interested can find a user manual and all the open-source code on his lab's website (https://github.com/abelson-lab/scATOMIC).

Building on his initial success, Dr. Abelson has received additional research funding from the Canadian Institutes of Health Research and the Ontario Institute for Cancer Research.



Matthieu P. Boisgontier PhD Associate Professor of Health Sciences, University of Ottawa

Retraining the Automatic Reaction to Physical Activity and Sedentary Stimuli in Geriatric Patients

Even with all the campaigns encouraging people to exercise more, many of them still fall short. As a result, they experience health problems such as physical disabilities and chronic diseases, with the elderly being especially vulnerable.

With the help of the Banting Discovery Award, Dr. Boisgontier is looking into an often-overlooked aspect of human behaviour: our tendency to avoid putting in too much effort. His research combines neuroscience, psychology, and health to understand why people struggle to turn their intention of becoming physically active into action.

In the past two years, Dr. Boisgontier's work has uncovered some important findings. It highlights how sitting around is tempting, how exercise helps our brains, and how not moving enough is linked to poor sleep and depression.

"The Banting Discovery Award has contributed to 12 articles published in prestigious journals such as Cortex, Journal of Affective Disorders, Preventive Medicine, Journal of Alzheimer's disease, and Scientific Reports. The research has been featured in over 150 media outlets in over 20 countries, including the Washington Post, The Globe and Mail, Radio Canada, La Presse, and The Conversation. This research supported by the award was instrumental in securing a \$1M grant from John Evans Leaders Fund, the Canada Foundation for Innovation, the Ontario Research Fund for Small Infrastructure Funds, and the University of Ottawa."



Angela C. Cheung MD
Assistant Professor of Medicine,
Division of Hepatology, University of
Ottawa and Associate Scientist and
Clinical Hepatologist at the Ottawa
Hospital

Machine Learning in Hepatocellular Carcinoma

A recipient of the Banting-Mitacs Discovery Award, Dr. Cheung uses artificial intelligence (AI) to tell the difference between cancerous and non-cancerous liver lesions. Hepatocellular carcinoma (HCC), a form of liver cancer, is ranked as the 6th most common cancer and the 3rd leading cause of cancer-related deaths.

Dr. Cheung's multidisciplinary team, including experts in mathematics, hepatology, and radiology, are improving an Al program to work with ultrasound machines. The goal is to catch liver cancer early.

If successful, this work could significantly improve the chances of curing and surviving liver cancer and other liver diseases. Ultimately, Dr. Cheung's research aims to make healthcare better for millions of people affected by liver diseases.



Owais Khan PhD
Assistant Professor of Electrical,
Computer and Biomedical
Engineering, Toronto Metropolitan
University

Healing Broken Hearts with Computer Simulations: Narrow Highways and Tight Corners

Almost one million people die from heart disease in North America every year. To help improve health care for heart disease patients, Dr. Khan's research uses anatomy models, computer simulations, and imaging to understand how the heart works. His work led to a special computer model that simulates blood flow in the heart's tiny blood vessels. Consequently, it becomes easier to locate blood vessels that have restricted blood flow, which can lead to heart issues.

This new method, supported by the Banting-Mitacs Discovery Award, is the first of its kind and offers a better way to analyze heart blood flow without invasive procedures. Dr. Khan's next step is to validate his method on a larger cohort of patients with heart disease.

J. Patrick Murphy PhD

Assistant Professor of Biology, University of Prince Edward Island

Exploring an Alternative Approach of Targeting Serine Biosynthesis-Dependent Cancers

For growth, cells take in and metabolize nutrients via various pathways. Cancer cells change the normal metabolic process, producing things called "onco-metabolites" that interact with cellular proteins, which help the tumour grow quickly. Some breast cancers use a specific pathway, called the serine biosynthesis pathway (SBP), to produce these metabolites. Yet it is still not clear how they contribute to tumour growth.

Dr. Murphy uses an advanced technique called mass spectrometry to study how these SBP metabolites interact with proteins in breast cancer cells and what role they play in cell growth. He has found several targetable molecules that regulate tumour cell growth, providing a foundation for making chemotherapy drugs more effective against SBP-reliant breast cancers.

"The Banting Discovery Award–Jarislowsky Fellowship project data was important in securing a Canadian Cancer Society Atlantic Cancer Research Grant, funded by JD Irving, Limited – Excellence in Cancer Research Fund. Now, I can continue this research that promises to improve outcomes for persons with breast and many other metabolic pathway–reliant cancers."



The Murphy Lab Team: Olivier Philips, Munkhtuul Enkhbat, Divyanshi Karmani, Niloofar Seifihesar, Clint Maramag, Mukhayyo Sultonova, Reilly Sullivan, Tayah Sommer.



Andrew J. Nicholson PhD
Assistant Professor of Psychology,
University of Ottawa and Director of
Clinical Research at the Atlas Institute
for Veterans and Families

Regulating Neural Connectivity in Post-Traumatic Stress Disorder with Real-time Neuroimaging

Dr. Nicholson combines machine learning with a sophisticated brain imaging technique called functional magnetic resonance imaging (fMRI) to better understand and predict post-traumatic stress disorder (PTSD).

Thanks to the Banting-Mitacs Discovery Award, Dr. Nicholson found and published in 2021 that neurofeedback therapy could help ease PTSD symptoms. In a big follow-up clinical study published in 2023,

he showed that more than 60% of participants with PTSD saw their symptoms diminished after 20 sessions or 3 months of neurofeedback. This finding was significant, considering 40% of people with PTSD do not respond to current treatments.

Now, Dr. Nicholson received funding from CIHR to expand his research to include frontline healthcare workers, especially those affected by PTSD after the COVID-19 pandemic. He wants to understand more about what neurofeedback does to the brains of people with PTSD and how it can be applied more widely in clinics.

"The Discovery Award allowed me to collect pilot data and publish my research within internationally recognized journals. As a result, I recently received a CIHR Project grant as Principal Investigator to continue this novel research."



Heather Prime PhDAssistant Professor of Psychology,
Faculty of Health, York University

A Family Recovery Program to Support Child Mental Health During and After COVID-19

Helping kids with their mental health, especially after COVID-19, is crucial. Dr. Prime received a Banting-Mitacs Discovery Award to create and test the COVID-19 Family Recovery Program. The goal was to reduce mental health issues in kids by making family relationships stronger and reducing conflicts caused by COVID-19.

Dr. Prime also teamed up with Dr. Diane Philipp, Professor of Psychiatry at the University of Toronto, to bring this program to families at the Hincks-Dellcrest Centre, a place that helps children with mental health. They evaluated the effectiveness of co-parenting by watching family play and giving video feedback, and followed up with a care plan with suggestions. The results showed fewer conflicts between parents. Now, they have evidence to warrant further clinical research and apply for more Tri-Council grants.

They shared their work at the 18th World Congress of the World Association for Infant Mental Health in July 2023, held in Ireland. In addition, their collaboration led to a peer–reviewed publication in *Family Process*.



Holly Sparks DVM PhD
Assistant Professor of Veterinary
Medicine and Canada Research Chair
in Equine Regenerative Medicine,
University of Calgary

Establishing Non-Invasive Diagnostic Criteria for Tissue Pathology in Tendinopathy: Relevance to Equine & Human Disease

Tendon is a tissue that attaches muscles to bones. Tendinopathy, a painful condition where the tendon is repeatedly strained, becomes increasingly common in both humans and animals with age or athletic activity. Thankfully, if caught early, doctors can help prevent

serious and irreversible injuries caused by tendinopathy.

With the Banting-Mitacs Discovery Award, Dr. Sparks, a large animal surgeon and stem cell biologist, uses biomechanical measurements and non-invasive imaging to studiy tendons in athletes, mature athletes, and non-athletes. The data helps her understand how cells affect tendon health on the microscale. She is also examining how cell composition changes over time in injury-prone tendons. Her research is using horses as experimental models and will translate into insights to predict and prevent serious injuries in people.



Nicole Templeman PhDAssistant Professor of Biology,
University of Victoria

Limiting Insulin Levels to Enhance Oocyte Quality and Reproductive Function

As we age, our bodies go through changes and become more susceptible to chronic diseases. Dr. Templeman is studying how insulin, a hormone, affects the aging process in mammalian reproductive systems — an often-overlooked topic. Her goal is to understand the cellular and molecular details of how our metabolism, reproduction, and longevity are inter-connected.

Dr. Templeman's research has shown that producing too much insulin as we age can harm female fertility. By adjusting insulin levels in mice, she observed significant improvements in both metabolic health and fertility.

Her preliminary research above garnered support from the Canadian Institutes of Health Research and a Michael Smith Health Research BC Scholar Award. She then went on to receive the Banting Discovery Award–Jarislowsky Fellowship, which has played a pivotal role in supporting her research. Her work will not only help us understand aging better but also offer ways to improve health and fertility, bringing us closer to a healthier and longer life.

"The Award was instrumental in helping me to launch my career. It was my lab's first research funding (outside of my start-up funds) and supported the initial crucial steps of my first graduate student's PhD project, in addition to leading to additional funding opportunities."



Kim Tsoi MD PhD FRCPC
Assistant Professor of Surgery and
Canada Research Chair in
Translational Sarcoma Research,
Division of Orthopedic Surgery,
University of Toronto

Development of a Nanotherapeutic to Target Pro-Tumorigenic Immune Cells in Soft Tissue Sarcoma Lung Metastases

Soft tissue sarcoma (STS) is a rare and aggressive form of cancer that starts in connective tissues (e.g., muscles) and often spreads to the lung. Even when the primary tumour is successfully treated, nearly half of patients develop incurable metastasis.

To find an effective way to treat STS, Dr. Tsoi's research has four areas:

- Identifying immune cells that are present in lung metastasis
- Developing a therapy that targets those immune cells using nanotechnology, particularly tiny particles called liposomes
- Studying myxofibrosarcoma and undifferentiated pleomorphic sarcoma, which are two types of STS that tend to appear when the cancer returns after treatment
- Determining if genetic mutations can help identify areas with tumour cells, making it easier for surgeons to know how much tissue to remove

"The Banting-Mitacs Discovery Award provided key seed funding that is allowing me to generate the preliminary data for a larger operating grant."

Alanna Weisman MD, PhD FRCPC

Assistant Professor of Endocrinology, University of Toronto

Impact of Social Determinants of Health on Disparities in Insulin Pump Use in Ontario

Dr. Weisman is a clinician-scientist and an endocrinologist at the Leadership Sinai Centre for Diabetes. She focuses on making advanced diabetes technologies (e.g., insulin pumps, glucose monitors) more accessible across Canada, even in underserved communities.

With the Banting-CANSSI Discovery Award in Data Science, Dr. Weisman used Ontario healthcare data to see if socioeconomic factors such as gender and income affect who can use insulin pumps for type 1 diabetes. If a disparity exists for a certain factor, she wants to understand how people's health is impacted as a result.

Dr. Weisman is also leading studies to determine if people with type 1 diabetes can meet their glycemic control targets. In addition, she is looking into how government programs can help more people with type 1 diabetes get insulin pumps.

Her research program is supported by Diabetes Canada, JDRF Canada, CIHR, and the University of Toronto Banting and Best Diabetes Centre.

"The Discovery Award allowed me to directly build on my prior research findings by conducting the next project that was conceived as a result of my previous findings."



Left to right: Patience Fakembe, Joyeuse Senga, Dr. Alanna Weisman, Devrim Eldelekli



Mihai Duduță PhDAssistant Professor of Mechanical & Industrial Engineering, University of Toronto

Smart micro-catheters based on electro-mechanical artificial muscles

Minimally invasive medical procedures require sophisticated equipment such as small flexible insertion tubes called catheters to avoid damaging delicate organs like the heart and brain. With the help of the University of Toronto 100th Anniversary Discovery of Insulin Banting Award, Dr. Duduță partnered with Dr. Patrick Nicholson MD to develop a special robot-controlled catheter. This catheter is super flexible and can be precisely guided, making it ideal for real-world, delicate operations.

The success of their prototype has been reported in a paper published in Robotics and Automation Letters, where they shared all the technical details and testing results. Dr. Duduță has also showcased his innovation at the 2024 IEEE-RAS International Conference on Soft Robotics, highlighting its potential to improve health outcomes.

"The award from the Banting Research Foundation catapulted my profile to receive other research funds. My team is now using interdisciplinary approaches to develop soft, stretchable robotics. Eventually, we can radically change almost all segments of the economy: from healthcare, to agriculture, manufacturing and beyond."

Dr. Duduță's research in Canada was supported by grants from the Natural Sciences and Engineering Research Council of Canada Discovery Grant, Idea to Innovation, the Canadian Foundation for Innovation, the New Frontiers Research Fund and War Amputees Foundation.



Amy H. Lee PhDAssistant Professor of Molecular
Biology and Biochemistry, Simon
Fraser University

Integrated Omics and Functional Analyses to Expand the Repertoire of Surveillance and Drug Targets in Pseudomonas Aeruginosa

Infectious diseases account for three of the top ten causes of death worldwide, and antibiotic resistance makes them even more dangerous. Dr. Lee uses systems biology to understand how antibiotic-resistant bacteria interact with our bodies.

With the Banting Discovery Award, Dr. Lee focused on Pseudomonas aeruginosa, often found in the lungs of people with cystic fibrosis. In an experimental model, she first found six new unknown proteins that make the bacteria more harmful or resistant to antibiotics. She then confirmed the findings with samples from people with cystic fibrosis.

Dr. Lee's research will help make better tools to diagnose and drugs to treat bacterial infections. Dr. Lee's work has even earned her awards and invitations, such as the Research Canada's Parliamentary Health Caucus Luncheon, where her talk was "Game-Changing Research and Innovation in Antimicrobial Resistance (AMR) and Emerging Pandemic Threats".

Her work has also merited the esteemed Simon Fraser University Faculty of Science Early Career Faculty Research Award.

Luka Milosevic PhD

Assistant Professor of Biomedical Engineering, University of Toronto, Scientist at the Krembil Research Institute and Co-Director of CenteR for Advancing Neurotechnological Innovation to Application (CRANIA)

Physiologically informed and data-driven methods for advancing neuromodulation therapies in dystonia.

Parkinson's disease is a complex and challenging neurodegenerative disorder that causes problems such as shaky muscles, stiffness, and difficulty with balance. Dystonia is another disorder that leads to involuntary muscle movements and abnormal postures.

Dr. Milosevic received a Banting-Dystonia Discovery Award to study how the brain works in people with Parkinson's and dystonia. He found that in dystonia, a certain part of the brain is not as active as it should be, which might explain the uncontrollable movements. Dr. Milosevic also discovered some unique signals in the brain that are linked to motor symptoms and can help understand these disorders better. These findings can help improve treatments such as deep brain stimulation for both Parkinson's and dystonia in the future.

"Since receiving the Banting-Dystonia Discovery Grant in 2022, I have received further funding to support this work including:

2023 – Canadian Institute of Health Research Project Grant. 5-year operating grant. \$841,500; Parkinson Canada Pilot Project Grant. 2-year operating grant. \$75,000. Role: Principal Investigator

2022 – Natural Sciences and Engineering Research Council of Canada Discovery Grant. 5-year operating grant. \$197,500; New Frontiers in Research Fund Exploration Grant. 2-year operating grant. \$250,000; Canadian Foundation for Innovation John Evans Leadership Fund. 5-year infrastructure and equipment grant. \$508,110."



Left to right: Dr. Luka Milosevic and Dr. Leon Steiner



Left to right: David Crompton, Tony Franco, Dallas, Leavitt, Srdjan Sumarac, Yijinmide Buren, Kiah Spencer, Maz Scherer

Ian Patterson PhD

Assistant Professor of Biological Sciences, Brock University

Exploiting Insect-Specific Viruses to Prevent Transmission of Arthropod-Borne Viruses

Diseases spread by insects, like mosquitoes, are expected to increase due to climate change. Mosquitoes can carry various viruses, some only harmful to insects, while others can make humans sick. Some insect-specific viruses may also be beneficial because they can infect mosquitoes first to confer immunity against harmful viruses. Negeviruses are one such example.

The Banting Discovery Award–Jarislowsky Fellowship supported Dr. Patterson to develop effective methods to infect mosquitoes with negeviruses. Then, he modified these viruses to produce proteins that can fend off harmful viruses in both mosquitoes and humans.

This research opens a new way to stop mosquitoes from spreading dangerous diseases. Dr. Patterson is becoming a leader in this field and has received additional support from a NSERC Discovery Grant for his work.



Left to right: Irene Brundula, Anneliese von Eicken, Dr. Ian Patterson, Assmaa El Khal.

Silvia Pozzi PhD

Assistant Professor, Department of Psychiatry and Neuroscience, Faculty of Medicine, Université Laval

Understanding Schwann cells/motor neurons cellular communication during Amyotrophic Lateral Sclerosis

Amyotrophic lateral sclerosis (ALS) is an incurable and deadly disease that affects the brain and spinal cord.

With the Banting Discovery Award–Jarislowsky Fellowship, Dr. Pozzi has been studying how motor neurons communicate with other cell types during ALS. By understanding these communication pathways, she aims to find new ways to treat and prevent the disease.



Left to right: Gloria Nwamaka Edozie (M.Sc. student), Jasmine Bélanger (Research Assistant), Amélie Poulin-Brière (PhD student), Dr. Silvia Pozzi, Ariane Gosselin (M.Sc. student), Marion Boyer, M.Sc. (PhD student), Shanna Pigeyre (M.Sc. student).

Thanks to the award, Dr. Pozzi set up her own lab and supported a talented Master's student, who developed the experimental methods and was inspired to pursue a

PhD in the same area. The early results were promising, and have shaped Dr. Pozzi's future research plans, including a project supported by the Canadian Institutes of Health Research (CIHR).

"It is worth noting that this prestigious award marked a pivotal moment in my early career trajectory. Thanks to the Banting Discovery Award, indeed, I was able to significantly bolster my candidacy for a Canada Research Chair in Central and Peripheral Cellular Networks in ALS, an honor I received in 2023."

With the support of the Banting-Mitacs Discovery Award, she has found that the genetic background of mitochondria controls metabolism in our bloodstream and heart. This discovery opens up new ways to find specific markers for diseases, helping us understand and treat them better.

Dr. Dunham-Snary's research is supported by the Canadian Institute of Health Research and gives us important insights into how mitochondria and chronic metabolic conditions interact.



Kimberley Dunham-Snary PhD

Assistant Professor of Biomedical and Molecular Sciences, Canada Research Chair in Mitochondrial and Metabolic Regulation in Health and Disease, Queen's University

Mitochondrial-Metabolomic Fingerprinting in Cardiometabolic Disease

Mitochondria are tiny organelles inside our cells that turn our food into energy. They also play a key role in chronic metabolic diseases such as type 2 diabetes, but we have yet to fully understand how.

Currently, Dr. Dunham-Snary is using a special mouse model to study how problems with mitochondria affect insulin, lipids (like fats), and inflammation, all linked to early heart and metabolic diseases. Set up in 1925, our Discovery Endowment Fund has grown to more than \$5 million and is the source of funding for our Discovery Awards.

Financial Health

As at June 30		
	2023	2022
	\$	\$
Assets		
Cash and cash equivalents	31,781	89,044
HST recoverables	9,263	10,491
Investments, at fair value	5,333,435	5,152,477
Artwork	20,000	60,000
Total Assets	5,394,479	5,312,012
Liabilities and Fund Balances		
Liabilities		
Accounts payable and accrued liabilities	49,121	111,935
Total Liabilities	49,121	111,935
Fund balances		
` General Fund	961,205	874,030
Restricted Fund Endowment Fund	106,140	174,796
Endowment Fund	4,278,013	4,151,251
Total Fund Balances	5,345,358	5,200,077
	5,394,479	5,312,012

The Balance Sheet is an excerpt of the audited financial statements by Baker Tilly WM LLP, Chartered Professional Accountants. Detailed FY2023 Financial Statements are available upon request.

Financial Health

CONDENSED STATEMENT OF REVENUE AND EXPENSES AND CHANGES IN FUND BALANCES

Year	Δnc	hal	luna	30
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Teal chaca dulic 50	2023	2022
	\$	\$
REVENUE		
Investment income, net	368,597	(495,063)
Donations	62,374	238,845
Gain on disposal of assets	53,740	-
Total Revenue	484,711	(256,218)
EXPENSES		
Grants awarded to new investigators	178,339	291,626
Academic grants		7,500
Program Development	37,231	83,166
Professional fees	8,108	27,394
Office, general and administrative	115,752	107,654
Total Expenses	339,430	517,340
Excess (deficiency) of revenue		
over expenses for the year	145,281	(773,558)
Fund Balances, beginning of year	5,200,077	5,973,635
Fund Balances, end of year	5,345,358	5,200,077

The Condensed Statement is an excerpt of the audited financial statements by Baker Tilly WM LLP, Chartered Professional Accountants. Detailed FY2023 Financial Statements are available upon request.

Board Ambassadors

Catharine Whiteside, CM MD PhD

Board Chair & President Emerita Professor and Former Dean of Medicine, University of Toronto

Molly Verrier

Vice-Chair Associate Professor Emeritus Former Chair of Physical Therapy and Rehabilitation Science, University of Toronto

Shanon Grauer

Board Secretary Chair, Governance Committee Counsel, INQ Law Retired Partner, McCarthy Tétrault Adjunct Professor, Health Policy, Management and Evaluation, University of Toronto

Gerald Lokash

Treasurer Retired C.A./Chartered Professional Accountant and Business Advisor

Richard Nunn

Chair, Audit, Finance & Investment Committee Senior Client Service Partner, Deloitte

Sheelagh Whittaker

Chair, Partnership & Business Development Committee Former CEO, Canadian Satellite Communications Inc.

Donald Guloien

Trustee Founder of Guloien Capital Past President and Chief Executive Officer of Manulife

Alain Beaudet, MD PhD

Trustee Former President, Canadian Institutes of Health Research (CIHR) Former President & CEO, Fonds de la recherche en santé du Québec (FRSQ)

Andrea Donlan

Trustee VP, MacMillan Vantage Policy Group Board Chair, Goodwill-Amity Group (Hamilton)

Andrew Morriseau

Trustee Chair, Anishnawbe Health Foundation Communication Manager, Native Women's Association

Dr. Marc Pouliot

Trustee
Discovery Awardee (2000)
Professor, Department of
Microbiology-Infectious Diseases and
Immunology, Laval University

Jesse Vincent-Herscocivi

Trustee CEO, Axelys

2023 Discovery Award Selection Panel

Dr. Cindi M. Morshead

Panel Co-Chair Professor & Chair, Division of Anatomy and Department of Surgery, University of Toronto

Dr. Anthony O. Gramolini

Panel Co-Chair Professor, Department of Physiology, Ted Rogers Centre for Heart Research Translational Biology and Engineering Program, University of Toronto

Dr. Patricia Brubaker

Co-Scientific Officer Professor, Departments of Physiology and Medicine, University of Toronto

Dr. Walid A. Houry

Co-Scientific Officer Professor, Departments of Biochemistry and Chemistry, University of Toronto

Dr. Ali Abdul-Sater

2018 Discovery Awardee Associate Professor, Faculty of Health, York University

Dr. Mahavir Agarwal, MD

Associate Professor, Department of Psychiatry, University of Toronto Medical Head, Clinical Research, Schizophrenia Division, Centre for Addiction & Mental Health

Dr. Brian Ballios, MD PhD

Assistant Professor, Department of Ophthalmology & Vision Sciences, The J. Ardeth Hill – Fighting Blindness Canada Professor in Ocular Genetics Research, University of Toronto

Scientist, Krembil Research Institute, and Staff Physician, Sunnybrook Health Sciences Centre

Dr. Angelo Canty

Associate Professor, Department of Mathematics and Statistics, McMaster University

Dr. Amy Greer

Canada Research Chair in Population Disease Modeling and Associate Professor in the Department of Population Medicine, Ontario Veterinary College, University of Guelph

Dr. Salim Timo Islam

2018 Discovery Awardee Associate Professor, Microbiology & Biotechnology, Armand-Frappier Santé Biotechnologie Research Centre, IRNS

Dr. Linglong Kong

Associate Professor, Mathematical and Statistical Sciences, CRC Chair in Statistical Learning, University of Alberta

2023 Discovery Award Selection Panel

Dr. Linda Li

Professor & Harold Robinson-Arthritis Society Chair in Arthritic Diseases CRC, Department of Physical Therapy, University of British Columbia

Dr. Daniel Moore

Associate Professor, Muscle Physiology, Faculty of Kinesiology and Physical Education, University of Toronto

Dr. Aaron W Reinke

Associate Professor, Department of Molecular Genetics, University of Toronto

Dr. Jonathan Rocheleau

Professor, Institute of Biomaterials & Biomedical Engineering, University of Toronto

Dr. Anurag Tandon

Associate Professor, Tanz Centre for Research in Neurodegenerative Diseases, University of Toronto

Dr. Shreejoy J. Tripathy

Assistant Professor, Department of Psychiatry, University of Toronto Scientist, Krembil Centre for Neuroinformatics at the Centre for Addiction and Mental Health

Dr. Anne Wheeler

Assistant Professor, Department of Physiology, University of Toronto Scientist, Neurosciences & Mental Health, The Hospital of Sick Children

Looking Ahead

The Banting Research Foundation remains steadfast in its commitment as a key catalyst for advancing health and biomedical discovery research in Canada. To support the career development of Discovery Awardees, we launched a mentorship program and a postdoctoral fellowship program. Yet, these accomplishments are just the beginning.

To enhance our funding programs, we aim to expand our support network and form new partnerships.

As a not-for-profit organization, we rely on donations to sustain our programming. If you wish to contribute to groundbreaking research for a healthier society, please click on the button below to donate. Thank you for being with us!

Support discovery

