ACROSS THE LIFESPAN
Adult and Pediatric Biomedical Research

2019 ANNUAL REPORT
Research Institute of the McGill University Health Centre (RI-MUHC)

Our multidisciplinary research environment leverages discovery to improve human health across the lifespan.
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**Statistics**
Represent fiscal year 2019 (April 1, 2018 to March 31, 2019), unless indicated otherwise

**Research funds**
Grants, contracts (including indirect costs), studentships, salary awards from peer-reviewed agencies, and funding from university and hospital foundations
Administered at either the RI-MUHC or McGill University, for RI-MUHC researchers

**Researchers**
Individuals conducting active and independent research, who have received at least $5,000 in research funding during the fiscal year

**Staff**
Administrative and research staff based at MUHC locations

**Publications**
Selected from September 2018 to June 2019

**Counts**
Active researchers are counted as of April 2019
Research trainees are counted as of July 2018
Staff are counted as of April 2019. Excludes researchers and trainees as well as staff located at the Montreal Neurological Institute and McGill Campus

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Le Groupe Quadriscan
446 active members, including fundamental, clinical and evaluative researchers

1,184 research trainees, including 359 M.Sc. and 461 PhD candidates, 214 postdocs and 150 clinical research fellows

1,128 staff in research and administration

Over 1,900 peer-reviewed scientific publications

Over 2,000 scientific talks given by our researchers worldwide

Over 31,000 square metres of research space

412 research contracts and 406 agreements signed

32 invention disclosures

Ongoing research collaborations with 67 countries
EXECUTIVE MESSAGES

Message from Bruce Mazer and Louise Proulx

Research across the lifespan is one of the most defining features of the Research Institute of the McGill University Health Centre (RI-MUHC). We harness world-class strengths in child health research with top-flight research in related disciplines in adult medicine, surgery, nursing and rehabilitation. In 2018-2019 our successes included ground-breaking work relating to health outcomes in transplantation, infectious diseases, and unique patient self-monitoring applications, as well as fundamental research that stretches across the lifespan in oncology, respiratory medicine, neurosciences and metabolic disease.

Complementing our Glen site facilities, this fall we will inaugurate newly renovated, state-of-the-art research facilities at the Montreal General Hospital of the MUHC, including a one-of-a-kind Surgical Innovation Platform developed by the McGill Department of Surgery and our Injury Repair Recovery Program.

Read on to meet RI-MUHC scientists who are committed to innovation, attacking the most perplexing and complex health problems locally and globally.

Message from Indra Gupta

Child health research is a fundamental mission of the RI-MUHC. Many ground-breaking medical discoveries have had a significant impact on the diagnosis, treatment and care of children locally, nationally and internationally. With the arrival of new talent, the outlook for research at the RI-MUHC is full of promise. Together, clinicians and scientists will accelerate scientific advances and stimulate cooperation towards providing innovative therapies for children’s diseases.

We are thankful for the invaluable partnership and collaboration of the Montreal Children’s Hospital Foundation, which provides a new vision for funding and a sustainable environment for the advancement of the health of our children and beyond. Research is the hope of improving children’s health for a future filled with more smiles, laughter and play!
In 2018-2019, the Research Institute of the MUHC distinguished itself through interdisciplinary efforts that advanced our understanding of the biological and socioeconomic determinants of health and disease while furthering the goals and skills of over 1,200 trainees (M.Sc., PhD, postdocs and fellows). In parallel, it began charting a course to help it navigate the winds of change caused by Omics, artificial intelligence and the data revolution, etc.

We thank Dr. Bruce Mazer, interim executive director and chief scientific officer, Dr. Indra Gupta, interim deputy executive director, and staff for their collective accomplishment. We also recognize our foundations and governmental/non-governmental funders for supporting the pursuit of excellence and innovation.

With the recruitment process for a permanent leader under way, we’re setting our sights on a new year of exceptional research that capitalizes on curiosity, knowledge, collaboration and interaction with patients of all ages. This report presents a glimpse of what’s possible. Thank you for exploring it!

Disease does not discriminate based on age. From birth to end of life, humans must work diligently to maintain their health when confronted with any number of illnesses. Today, researchers at McGill University and the RI-MUHC are shifting the paradigm in the way we approach these challenges, from cancer to infectious and inflammatory diseases to cardiovascular disorders.

The work highlighted in this report provides outstanding examples of how our scientists are collaborating across fields and leveraging data to tackle some of humanity’s greatest health challenges across the lifespan. This important research is laying the foundation for more effective and personalized treatments. These, in turn, will reduce health care costs and ultimately keep Canadians healthier, longer.

McGill is proud to continue collaborating with the RI-MUHC to support this ground-breaking work.

We take this opportunity to congratulate our colleagues and friends at the RI-MUHC on yet another successful year. We look forward to continue pushing boundaries together for the people we serve.
Challenging the boundaries of pediatric and adult medicine, scientists at the Research Institute of the McGill University Health Centre (RI-MUHC) are on the front line of studies with a direct impact on patient populations. The result: longer, healthier lives for people with a wide range of conditions.

Biomedical research across the lifespan

Exploring the immune system to redefine aging and de-label allergies  
Understanding congenital heart disease across the lifespan  
Headway in the fight against cystic fibrosis  
Bridging the gap between pediatric oncologists and geneticists
Exploring the immune system to redefine aging and de-label allergies

“I hypothesize that the immune system’s aging is a major factor in why older people are likelier to get cardiovascular diseases and cancers,” says Dr. Christos Tsoukas, member of the Infectious Diseases and Immunity in Global Health (IDIGH) Program at the RI-MUHC. “But we often encounter people who develop cardiovascular disease at an early age, despite living healthily, and others who do everything wrong and live to a ripe old age. So my research team is trying to develop a definition of age according to a biological rather than a chronological clock.”

This research involves studying the mechanism of aging, and better defining the rate of aging according to epigenetic changes in DNA. Once biological age can be assessed, Dr. Tsoukas can apply it in his other studies into advanced aging occurring in people with human immuno-deficiency viruses (HIV) and other immunological complications that reduce the body’s capacity to fight chronic infections. “So one long-term objective of our research is to learn how HIV accelerates biological age as measured through a biological clock,” he says.

“My research team is studying the mechanisms of aging to develop a definition of age according to a biological rather than a chronological clock.”

—Dr. Christos Tsoukas
Dr. Moshe Ben-Shoshan (IDIGH Program) is transforming how we approach another common immunological condition in pediatric and adult populations: allergies. While almost ten percent of all Canadians, about 3.5 million people, believe they are allergic to penicillin, his research in the last five years with Dr. Tsoukas and others reveals that this number is a gross inflation. Only a small proportion of these individuals—perhaps five percent—are actually allergic, he finds, and most supposedly allergic responses are in fact responses to viral infections.

The “allergy” label bears significant consequences. “It means these patients are not treated with amoxicillin and penicillin, the main antibiotics used to fight infections. Instead, we use others that have more side effects, are more harmful and expensive, and less effective,” explains Dr. Ben-Shoshan. He has established a cross-Canada registry to collect and interpret data on the diagnosis and management of antibiotic allergies among children. This research has had an immediate impact on how such allergies are diagnosed and treated, and it is attracting international attention.

“We challenged all cases presenting with suspected reactions to amoxicillin and found that only two percent had immediate reactions, only four percent had delayed reactions, and all were very mild,” he says. “So we’ve promoted a paradigm shift in how to diagnose these allergies.”

Dr. Ben-Shoshan has also established registries of individuals with food allergies and those experiencing anaphylaxis. “The main knowledge gaps for allergies are related to epidemiology, and we were lacking good Canadian data, which led me to develop large registries of children with these allergies,” he says. “The data these registries reveal have direct clinical applications.”

DID YOU KNOW?
Reducing the number of people labelled with penicillin allergies can minimize detrimental clinical outcomes, optimize operating room time and save costs.
Understanding congenital heart disease across the lifespan

Not long ago, research in congenital heart disease (CHD) was confined to pediatrics, as few patients lived beyond childhood. “But while the last three decades have seen a rapidly growing population of adults with CHD, it remains a new field, with robust scientific inquiry lagging behind other cardiovascular specialties,” says Dr. Ariane Marelli, leader of the Cardiovascular Health Across the Lifespan Program. Having joined the MUHC in the late 1990s, in 2005 she established the McGill Adult Unit for Congenital Heart Disease Excellence, or MAUDE (named after CHD pioneer Maude Abbott), which laid the groundwork for the Quebec Congenital Heart Disease Database and the research that followed.

The Quebec Congenital Heart Disease Database draws on Quebec government data that captures every CHD patient in the province from 1982 to 2017, giving Dr. Marelli’s team longitudinal follow-ups from over 30 years—and making it the world’s largest database of its kind.

“Our initial studies after establishing the database were among the first in the world to document the change in prevalence and demographics in the CHD population,” Dr. Marelli notes.

Subsequently, her team explored specific challenges being faced by patients and their outcomes, then considered how to improve these outcomes by tracking how care was delivered in Quebec and how it could be enhanced. “We found we were able to improve patients’ lives significantly,” she says.

Dr. Marelli’s research has provided data supporting the creation and promotion of clinical centres for adults with CHD in Canada and abroad, notably in the U.S., through her collaborations with the Centers for Disease Control and Prevention. “We’re seeing the first generation of many of these patients, so when they ask us what’s going to happen in the future, we can’t really answer that question,” says Dr. Marelli. “We’re following them for surveillance, for prevention, for complications and treatment of complications, in order to improve their quality of life.” She adds, “What we are learning from our research in this population is becoming widely applicable to a growing population of patients with a wide range of conditions that prevail over a patient’s lifespan.”
Headway in the fight against cystic fibrosis

Cystic fibrosis (CF) is a genetic disorder that affects one in 3,600 children born in Canada; currently, some 4,300 Canadians attend specialized CF clinics. That number is on the rise for a good reason: over half of the CF patients in Canada are now adults, thanks to therapeutic breakthroughs enabling patients to live much longer.

“CF is no longer solely a pediatric disease,” says Dr. Larry Lands, a member of the Translational Research in Respiratory Diseases Program and clinician-scientist whose thirty-plus years of ground-breaking research have contributed significantly to this development. Most recently, his team’s research contributed to the Quebec government’s implementation of newborn screening for CF in 2018 – becoming the last North American jurisdiction to do so.

Dr. Lands’s analysis of clinical activities demonstrated that screened infants from elsewhere in Canada were less sick in the six years following diagnosis than Quebec children were. “In Quebec we had been playing catch-up, diagnosing children after they had become sick rather than giving them preventative therapies,” he says. “I’m proud that Quebec children can benefit directly from our research, because early screening allows therapies to be put in place right away.”

Balancing an active fundamental research laboratory with clinical research, Dr. Lands continues to explore promising new treatments, inflammation, a major cause of disability and death in CF. This work is the fruit of his longstanding collaboration with RI-MUHC researchers Danuta Radzioch, PhD, and Elias Matouk, MD, whose development of a new target for cystic fibrosis was featured in the 2016–2017 RI-MUHC annual report.

“Cystic fibrosis is no longer solely a pediatric disease,” says Dr. Larry Lands—who is no longer solely a child health researcher—expanding his original scope as a pediatric researcher. A major ongoing project, now in Phase II clinical trials, involves fenretinide, a chemical compound related to vitamin A that could help reduce the frequency and severity of lung inflammation, a major cause of disability and death in CF. This work is the fruit of his longstanding collaboration with RI-MUHC researchers Danuta Radzioch, PhD, and Elias Matouk, MD, whose development of a new target for cystic fibrosis was featured in the 2016–2017 RI-MUHC annual report.

“It’s very exciting to see that cell culture work we began in the lab and carried through in animal models is now being evaluated in patients,” says Dr. Lands.
**Bridging the gap between pediatric oncologists and geneticists**

While approximately eight to ten percent of children who develop cancer have an underlying genetic syndrome, pediatric oncologists have had little guidance in identifying and responding to this genetic component.

Currently, the process for referring children for genetics evaluation depends on an institution’s policies and the oncologist’s level of experience. “This wide range creates an inequity in children being identified with a genetic syndrome,” says Dr. Catherine Goudie of the Child Health and Human Development Program. That’s changing, though, thanks to her collaboration with Dr. William Foulkes of the Cancer Research Program.

Now an assistant professor of pediatrics, Dr. Goudie was a hematology-oncology resident when she met Dr. Foulkes to discuss patients they shared at the Montreal Children’s Hospital of the MUHC. She then joined his research lab, where the blend of his genetics expertise and her pediatric oncology focus led to a novel idea: the creation of a guide to help pediatric oncologists refer children with cancer for genetic evaluation.

“We decided to produce an app for phones, tablets or computers,” says Dr. Foulkes. “Doctors could click on an icon and get a guideline to genetic syndromes and cancer.” Dr. Goudie led a global literature review on genetic predispositions to cancer in children and coordinated team efforts in research and algorithm development, enlisting collaborators from the Hospital for Sick Children and RI-MUHC. The result: MIPOGG, or the McGill Interactive Pediatric Oncogenetics Guidelines.

“MIPOGG fills the gap between pediatric hematologists-oncologists and geneticists,” says Dr. Goudie. Doctors answer focused “yes or no” questions related to the type of cancer, where the tumour is localized, the patient’s age and family history, and so forth. “Press ‘Submit,’ and right away you receive a recommendation for whether or not to refer the patient for genetic counseling and testing, along with an educational module explaining the recommendation,” explains Dr. Foulkes.

MIPOGG is already in demand. “We get emails from people around the world wanting to use it, and a group in the Netherlands has asked to use it at the national level,” says Dr. Goudie. “Responses like that are extremely motivating.”

Equally motivating is the mentorship story between two clinician-scientists that opened a bright future for pediatric cancer genetics research at the RI-MUHC.

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**A bright future for pediatric cancer genetics research at the RI-MUHC**

Catherine Goudie, MD, and William Foulkes, MD, PhD, demonstrate their app, MIPOGG
RESEARCH HIGHLIGHTS

Canadians aging well
- Baseline data report (2010-2015) released this year for ground-breaking, 20-year Canadian Longitudinal Study on Aging
- Christina Wolfson, PhD, is co-principal investigator

Regulatory mechanism for sleep
- New mechanism for regulating sleep, discovered in fruit flies, involves glial cells in the brain and their ability to manage a common ingredient in energy drinks
- Don Van Meyel, PhD, collaborated with Florida Atlantic University scientists
- First co-author: research associate Emilie Peco, PhD (Current Biology)

Youth, depression and cannabis
- Gabriella Gobbi, MD, PhD, demonstrated that young people consuming cannabis are at risk of developing depression and suicidal behaviour (JAMA Psychiatry)
- Highlights the need for initiatives educating teenagers on risks of cannabis use and skills to resist peer pressure

SELECTED PUBLICATIONS


Prize-winning patient empowerment app

- The Opal patient portal app gives patients access to contextualized medical data and personalized educational material (opalmedapps.com)
- Developed by Opal Health Informatics Group, co-led by John Kildea, PhD, the late Laurie Hendren, PhD, and Tarek Hijal, MD
- Multiple honours include Prix d’excellence, Réseau de la Santé et des Services sociaux and honourable mention, Institute for Patient- and Family-Centered Care

New stem cell sheds light on body’s defense mechanisms

- RI-MUHC and Lunenfeld-Tanenbaum Research Institute team discovered “revival stem cell” in the gut epithelium
- Understanding these cells—and signals underlying their potent regenerative potential—could lead to novel therapeutic options for illnesses affecting the gut
- Alex Gregorieff, PhD, is co-lead study author (Nature)

SELECTED PUBLICATIONS


**SELECTED PUBLICATIONS**


**Sandra D. Isidean, Yishu Wang, Marie Hélène Mayrand, Sam Ratnam, François Coutlée, Eduardo Luis Fabiano Franco, Michal Abramowicz.** Assessing the time dependence of prognostic values of cytology and human papillomavirus testing in cervical cancer screening. *International Journal of Cancer* 144(10):2408-2418, 2019.


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**RESEARCH HIGHLIGHTS**

**Infertility treatment and pregnancy complications**
- Researchers at ICES, RI-MUHC and St. Michael’s Hospital found that women who become pregnant using infertility treatments, such as in vitro fertilization, have a higher risk of serious complications in pregnancy
- Identifying women at risk could help avert negative outcomes
- **Natalie Dayan, MD**, is lead study author (**CMAJ**)

**Minimizing complications from surgery in elderly patients**
- International study led by the RI-MUHC and Lady Davis Institute (Jewish General Hospital) evaluated the relationship between frailty and risk of mortality, following transcatheter or surgical aortic valve replacement
- Use of frailty as a risk predictor and therapeutic target could empower clinicians in caring for most vulnerable patients
- **Jonathan Afilalo, MD**, is lead study author (**JACC: Cardiovascular Interventions**)

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Poster presentations at the Glen site

Cardiovascular Research Day 2019
**SELECTED PUBLICATIONS**


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**Genetic factors in pregnancy loss revealed**

- **Rima Slim, PhD,** discovered genes whose mutations explain why some women repeatedly lose pregnancies.
- **First step towards finding a way to help these women achieve their dream of creating a family.**

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**RI-MUHC ANNUAL REPORT 2019**

**New approach to genetic kidney disease in children**

- **Paul Goodyer, MD,** spearheads North American efforts to develop a novel drug for nephropathic cystinosis—especially prevalent in Quebec.
- **Strategy bypasses mutation and reverses disease phenotype.**
- **Clinical trial approved by Health Canada.**

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**Rise in suicidal behaviour in children and teens**

- **Over 100 Canadian and U.S. news outlets interviewed Brett Burstein, MD, about finding a steep increase in children’s suicidal behaviour between 2007 and 2015 (JAMA Pediatr.).**
- **Underlines critical need to increase resources for mental health services.**
Metabolic Disorders and Complications Program (MeDiC)

RESEARCH HIGHLIGHTS

Artificial pancreas regulates glucose levels

• Ahmad Haidar, PhD, led a team of MeDiC and Child Health and Human Development Program (CHHD) researchers to develop an artificial pancreas
• Dual-hormone, electromechanical system delivers insulin and pramlintide to regulate glucose levels in type 1 diabetes
• Achieved better glucose control than a first-generation, insulin-alone system in clinical trial

Helping young people cope with diabetes stigma

• Kaberi Dasgupta, MD, with national team including MeDiC colleagues and Meranda Nakhla, MD (CHHD), created a Virtual Patient Network (youngdiabetes1.ca) for youth with type 1 diabetes to exchange experiences and strategies
• Peer-to-peer network provides platform to reduce stigma and live with type 1 diabetes

SELECTED PUBLICATIONS


Patient co-author Michael Wright, Dr. Kaberi Dasgupta and research assistant Debbie Chan

MeDiC Program Research Day 2019
Infectious Diseases and Immunity in Global Health Program (IDIGH)

RESEARCH HIGHLIGHTS

“Bubble boy” symptoms discovered in adults

• Don Vinh, MD, discovered a new disease, “combined immunodeficiency,” and its genetic cause in an adult Quebec patient
• Link to “Bubble Boy disease” in children opens the door to potential treatment
• First study author (JEM): research associate Lucie Roussel, PhD

Arthritis drugs potentially safe for expectant mothers

• Évelyne Vinet, MD, PhD, and colleagues showed that pregnant women may use certain rheumatoid arthritis drugs without increased health risks to the unborn baby (Arthritis Rheumatol.)

Equitable access to treatment for low-income HIV patients

• Jean-Pierre Routy, MD, demonstrated the need to consider socio-economic factors to better control the HIV epidemic in Canada
• First study author (JIAS): postdoc Vikram Mehraj, PhD

SELECTED PUBLICATIONS


Injury Repair Recovery Program (IRR)

RESEARCH HIGHLIGHTS

Prehabilitating patients for surgery
• Francesco Carli, MD, who leads the MUHC Peri-Operative Program (POP), has shown that strengthening a patient’s physical, nutritional, medical and mental conditions before surgery can shorten recovery time and improve outcomes.

Revolutionary app monitors wound care
• Gregory Berry, MD, worked with Swift Medical to develop Swift Skin and Wound, an app that measures and charts wound progression.
• Accurate wound tracking allowed for objective evaluation of treatment strategies and greater patient engagement.

SELECTED PUBLICATIONS


rimuhc.ca/IRR
Translational Research in Respiratory Diseases Program (RESP)

RESEARCH HIGHLIGHTS

Anti-TB drugs can increase risk of TB re-infection

- Irah King, PhD, Maziar Divangahi, PhD, and Dick Menzies, MD, investigated whether changes in composition of microbes living in our gut may influence tuberculosis (TB) infection
- Results show that anti-TB drugs cause changes in gut microbiota, compromising immunity
- First study author (Mucosal Immunology): postdoc Nargis Khan, PhD

New means to fight “un-killable” bacteria in healthcare settings

- Dao Nguyen, MD, identified a new cellular target to weaken the bacterium P. aeruginosa – a severe threat to patients with cystic fibrosis
- Promising cellular target could expand utility of antibiotics and make new ones more effective
- First study author (PNAS): postdoc Dorival Martins Jr., PhD

SELECTED PUBLICATIONS


Hedi Zhao, Vanessa Moarbes, Véronique Gaudreault, Jichuan Shan, Haya Aldossary, Louis Cyr, Elizabeth D. Fixman. Sex Differences in IL-33-Induced STAT6-Dependent Type 2 Airway Inflammation. Frontiers in Immunology 10:859, 2019.


Trainees at Respiratory Research Day 2019
FOCUS ON OUR TRAINEES

What is our new generation of researchers achieving today?

**Two awards at 2019 International AIDS Society Conference on HIV Science**

Stéphane Isnard, PhD, postdoctoral fellow  
Supervisor: Jean-Pierre Routy, MD, Infectious Diseases and Immunity in Global Health Program

The only Canadian to receive an award at this “gold standard” conference, Stéphane Isnard earned both the Dominique Dormont Award and Lange/van Tongeren Prize for Young Investigators for his top-scoring abstract in the Basic Science track. His work is on gut permeability in human immunodeficiency virus (HIV).

**First author of study published in Mucosal Immunology**

Nargis Khan, PhD, postdoctoral fellow  
Supervisor: Maziar Divangahi, PhD, and Irah King, PhD, Translational Research in Respiratory Diseases Program

Nargis Khan holds a CIHR fellowship supplemented by the FRQS. She is first author of the study featured on page 19 of this report, showing that anti-tuberculosis (TB) drugs caused changes to gut microbiota—the diverse community of microbes living in our intestines—and increased susceptibility to *Mtb* infection (*Mucosal Immunology* 12, 772–783, 2019).

**Human Frontier Science Program (HFSP) Long-Term Postdoctoral Fellowship**

Claire Gizowski, doctoral student  
Supervisor: Charles Bourque, PhD, Brain Repair and Integrative Neuroscience (BRaIN) Program

Ranked first of 626 in the CIHR postdoctoral competition, Claire Gizowski will be forging ahead with a prestigious international fellowship instead. The HFSP funds frontier, potentially transformative research addressing an important problem or barrier to progress in a life sciences field. Her project aims to better define the mechanisms by which the brain measures internal body temperature.

**Marika Zelenka Roy Innovation Prize, McGill Clinical Innovation Competition**

Liam Carroll, Master’s student  
Supervisor: Shirin Abbassinejad Enger, PhD, Cancer Research Program

With Gustavo Kertzscher, PhD (Arhus University, Denmark), Liam Carroll and his supervisor developed BetaSense, a high-performing detector that could allow nuclear medicine imaging techniques to be performed non-invasively in a greater number of clinics. The detector will enable non-invasive dynamic positron emission tomography (PET), leading to early diagnosis of cancer and neurodegenerative diseases and earlier cancer treatment outcomes.

Liam Carroll explains high-performing detector, BetaSense
Rigorous scientific training and career development is an integral part of our mission at the RI-MUHC

Prepared our trainees for careers in science and beyond, the Desjardins Centre for Advanced Training (DCAT) is the only centre within a Quebec health research institute that offers structured career support alongside graduate or postdoctoral training.

Through year-round events and training sessions, DCAT helps RI-MUHC trainees

• Explore different careers
• Set career goals
• Make faster career transitions

Where are some of our recent trainees now? Here are only a few, succeeding in high-profile sectors on and off the beaten path!

Christina Sooklall, M.Sc.
RI-MUHC trainee from 2015 to 2018

To launch her consulting career, Christina Sooklall combined research on online patient communities during her M.Sc. with a Graduate Certificate in Business Administration, offered by DCAT with the John Molson School of Business at Concordia University. She now works as a Business Technology Analyst with Deloitte.

Martin Rupp, DPharm, PhD
RI-MUHC trainee from 2014 to 2018

Acting on DCAT’s advice to secure an internship at the end of his doctoral work, Martin Rupp gained valuable industry experience to complement his research in drug discovery. This led to his most recent position of Medical Affairs Fellow in Oncology at Pfizer Canada.

Saber Ghadakzadeh, MD, M.Sc., PhD
RI-MUHC trainee from 2014 to 2018

Dr. Saber Ghadakzadeh brings a wealth of clinical and translational research experience, together with project management skills, to Imagia Cybernetics Inc. as Clinical Research Liaison. DCAT supported Dr. Ghadakzadeh by providing him with access to the RI-MUHC’s professional and business networks.

We thank Desjardins for their generous support in enhancing career development opportunities for our trainees.
Awards and Recognition

ALAN BARKUN
Visiting Clinical Professorship Award, Canadian Association of Gastroenterology
Gene and Lyn Overhold Lecturer, American Society for Gastrointestinal Endoscopy

MARCEL BEHR
Fellow, American Academy of Microbiology

SASHA BERNATSKY
Knowledge Translation Practice Award, The Arthritis Alliance of Canada, sponsored by Amgen Canada

JAMES BROPHY, NADA JABADO, LILY HECHTMAN
Fellows, Canadian Academy of Health Sciences

THERESA GYORKO, NITIKA PANT PAI, AMRITA DAFTARY
Nominated to first Canadian Women in Global Health List in 2018, Canadian Society for International Health

CAROLYN FREEMAN, ISSAM EL NAQA (University of Michigan) and postdoc MARTIN VALLIÈRES
Physics in Medicine & Biology (PMB) citations prize

LUCY GILBERT, KRIS JARDON, and MUHC colleague XING ZENG
Discovery of the Year 2018 People’s Choice Award, Québec Science magazine

PHIL GOLD
Grand officier, Ordre national du Québec
Honorary doctorate, University of British Columbia

LAURIE HENDREN (IN MEMORIAM)
2019 Dahl-Nygaard prize, senior researcher category, Association Internationale pour les Technologies Objets

LAURIE HENDREN, JOHN KILDEA, TAREK HI贾AL
Coup de Coeur des ministres honour, Réseau de la Santé et des Services sociaux, for patient empowerment app, Opal

NADA JABADO
Pediatric Academic Leadership–Clinician Investigator Award, Pediatric Chairs of Canada

BARTHA KNOPPERS
Henry G. Friesen International Prize in Health Research, Friends of Canadian Institutes of Health Research

EMILY MCDONALD
Prix Jeune femme en sport, santé et mieux-être, Women’s Y Foundation

THOMAS MANIATIS
Chair, Royal College Specialty Committee in Internal Medicine

DICK MENZIES
Distinguished Lecturer Award in Respiratory Sciences, Canadian Thoracic Society and Institute of Circulatory and Respiratory Health, Canadian Institutes of Health Research

MADHUKAR PAI
Participant, first UN High Level Meeting on Tuberculosis

NITIKA PANT PAI
Member, College of New Scholars, Artists and Scientists, Royal Society of Canada

LOUISE PILOTE
Member, Scientific Advisory Committee on Health Products for Women, Government of Canada

ROBYN TAMBLYN
Laureate 2018, Justice Emmett Hall Memorial Foundation and Peggy Leatt Award, University of Toronto

GEORGE THANASSOULIS
John J. Day M.D. award of excellence, Heart and Stroke Foundation

ÉVELYNE VINET
50th Anniversary Young Investigator Award, Laurentian Rheumatology Conference

DAVINIA WITHINGTON
Dr. R.A. Gordon Research Award, Canadian Anesthesiologist Association
Salary Awards

FONDS DE RECHERCHE DU QUÉBEC-SANTÉ (FRQS)

SUPPORT FOR RESEARCH IN TECHNOLOGY ASSESSMENT AND EVIDENCE-BASED MEDICINE IN UNIVERSITY HOSPITALS
James Brophy

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Edward Ruthazer
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Kaberi Dasgupta
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Vidal Essebag
Lorenzo Ferri
Patricia Fontela
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Ariane Marelli
Paul Martineau
Suzanne Morin
Dao Nguyen
Tuong-Vi Nguyen
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Ronald Postuma
Janet Rennick
Jason Shahin
Yoanna Skrobik
Benjamin Smith
Jonathan Spencer
Evelyne Vinet
Donald Vinh
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NEW INVESTIGATOR
Jonathan Afilalo
Geneviève Bernard
Per Jesper Sjöström

NEW INVESTIGATOR: COMMUNITY-BASED PRIMARY HEALTH CARE
Patricia Li

KRESCENT NEW INVESTIGATOR
Ruth Sapir-Pichhadze

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Marina Klein
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Mark Lathrop
Leonard Levin
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William Muller
Madhukar Pai
Guy Rouleau
Ernest Seidman
Michael Sullivan
Silvia Vidal

Tier 2
Brian Chen
Kolja Eppert
Reza Farivar-Mohseni
Ahmad Haidar
Dennis Jensen
Irah King
Marc Martel

McGILL UNIVERSITY

JAMES McGILL PROFESSOR
Michal Abrahamowicz
Douglas Arnold
Sasha Bernatsky
Louis Collins
Alan Evans
William Foulkes
Paul Goodyer
Michael Kramer
Nancy Mayo
Peter McPherson
Morag Park
Michael Petrides
Louise Pilote
Bernard Robaire
Rima Rozen
Jan Seuntjens
Eric Shoubridge
Wayne Sossin
Stefano Stifani
Robyn Tamblyn
Jacquetta Trasler

WILLIAM DAWSON SCHOLAR
Jacek Majewski
Maya Saleh
Peter Siegel

KILLAM SCHOLAR
Gary Armstrong
Boris Bernhardt
Simon Ducharme
Richard Hoge
Jason Karamchandani
Benjamin Lo
Bratislav Misic
Madeleine Sharp
**FUNDING SUMMARY**

We are proud of our researchers’ success in funding competitions and grateful to the wide range of organizations, including many not named here, whose support totalled $204 million this year.

<table>
<thead>
<tr>
<th>Organization</th>
<th>2018–2019 $</th>
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<tr>
<td>Canadian Institutes of Health Research</td>
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<td>Fonds de recherche du Québec—Santé</td>
<td>12,074,002</td>
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<td>Canada Foundation for Innovation</td>
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<td>Ministère de l’Éducation et de l’Enseignement supérieur du Québec</td>
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<td>Canada Foundation for Innovation—Research Hospital Fund</td>
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<td>National Institutes of Health</td>
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<td>McGill University Health Centre (MUHC) Foundation</td>
<td>5,881,739</td>
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<tr>
<td>The Montreal Children’s Hospital Foundation</td>
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<tr>
<td>Brain Canada Foundation</td>
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<td>Génome Québec and Genome Canada</td>
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<td>Research Support Fund (Government of Canada)</td>
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<td>Natural Sciences and Engineering Research Council of Canada</td>
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<td>The Montreal General Hospital Foundation</td>
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<td>Canada Research Chairs</td>
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<td>International Progressive MS Alliance</td>
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<td>Ministère de la Santé et des Services sociaux</td>
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</table>

**Our Worldwide Network**

Ongoing research collaborations with **67 countries**
<table>
<thead>
<tr>
<th>Organization</th>
<th>Amount</th>
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<tbody>
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<td>McGill University</td>
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<tr>
<td>U.S. Department of Defense</td>
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<td>Terry Fox Foundation and Research Institute</td>
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<td>Public Health Agency of Canada</td>
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<td>Cancer Research Society</td>
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<td>CQDM</td>
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<td>Amyotrophic Lateral Sclerosis Society of Canada</td>
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<td>Ministère de l’Économie et de l’Innovation</td>
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<td>MS Society of Canada</td>
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<td>Michael J. Fox Foundation</td>
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<td>Canadian Cancer Society (CCS) and CCS Research Institute</td>
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<td>Bill &amp; Melinda Gates Foundation</td>
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<td>Muscular Dystrophy Association</td>
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<td>Cystic Fibrosis Canada</td>
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<td>MITACS</td>
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<td>Fondation de l’Ataxie Charlevoix-Saguenay</td>
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<td>Foundation for Innovative New Diagnostics</td>
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<td>Canadian Partnership Against Cancer</td>
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<td>Heart &amp; Stroke</td>
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<td>JDRF</td>
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<td>Networks of Centres of Excellence of Canada</td>
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<td>American Association for Cancer Research International–Canada</td>
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<td>Costello Bequest Foundation</td>
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<td>Bladder Cancer Canada</td>
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<td>AllerGen</td>
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<td>Merck &amp; Company, Inc.</td>
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<td>The Kidney Foundation of Canada</td>
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<td>Structural Genomics Consortium</td>
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<td>Industry (various)</td>
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<tr>
<td>Other granting agencies</td>
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<tr>
<td>Other revenues</td>
<td>6,306,583</td>
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Oversight

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Catriona McDonald
Jaime Pimstone
Cinzia Raponi
Sonia Rea
Together we have the means to leverage discoveries that improve the health of patients across their lifespan.

At the Research Institute of the McGill University Health Centre (RI-MUHC) we are deeply grateful to our donors and volunteers, and to the foundations and auxiliaries affiliated with the MUHC.

McGill University Health Centre (MUHC) Foundation

A $15 million donation by the Doggone Foundation helped launch the McGill Interdisciplinary Initiative in Infection and Immunity (MI4). Researchers at the RI-MUHC, McGill and affiliated research partners are now leveraging the power of translational research to battle infectious and immune-related diseases.

Dr. Bruce Mazer, Dr. Marcel Behr, Paul Marchand, Susan Avon, Dr. Don Sheppard

The Cruess Campaign, launched in June 2017, contributed $11 million for excellence in research at the RI-MUHC, including the establishment of the prestigious Trottier-Webster Innovation Award.

Claire Trottier, Norman Steinberg, Julie Quenneville, Dr. Pierre Gfeller, Lucy Riddell, Drs. Richard and Sylvia Cruess

muhcfoundation.com

The Montreal Children’s Hospital Foundation

Funding research in the Child Health and Human Development Program is a Montreal Children’s Hospital Foundation priority. We thank our partners, the Fondation Charles-Bruneau and Sarah’s Fund for Cedars, for their far-reaching support of research in pediatric cancer (Dr. Nada Jabado’s laboratory and team).

Fondation Charles-Bruneau: Pierre Bruneau (left), Simon-Luc (patient, second right) and his family, and Dr. Nada Jabado (right)

Sarah’s Fund for Cedars (left to right): Christina Miller, Jeff J. Shamie, Dr. David Mitchell, Lorena Cook, Sarah Cook and Stephanie Butt

fondationduchildren.com/en
charlesbruneau.qc.ca/en
sarahsfund.ca/en/about-the-fund
The Montreal General Hospital (MGH) Foundation

In 2018 the MGH Foundation awarded close to 80 grants, for a total of $1.5 M, at the Annual MUHC Research Institute Awards Gala. The MGH Foundation is pleased to help young researchers pursue their innovative projects. In many instances, initial support enables recipients to qualify for even more prestigious grants or to secure public funding. The MGH and McGill University are known around the world, allowing us to attract foreign researchers for the benefit of the community at large.

codelife.ca

The Auxiliary of the Montreal General Hospital

Working closely with the MGH Foundation, the MGH Auxiliary volunteers raise funds for the care and comfort of patients and for medical research and medical equipment at the MGH site of the MUHC.

mghauxiliary.ca

Cedars Cancer Foundation

The annual Cedars Run for Ovarian Cancer, under the leadership of Dominique Dagenais and Max Joly-Smith, is dedicated to supporting The D0vEE Project under the leadership of Dr. Lucy Gilbert. The D0vEE Project is committed to raising awareness of ovarian and endometrial cancers, advocating for early diagnostic testing, and supporting ovarian cancer patients and their families.

Inset: Dominique Dagenais and Dr. Lucy Gilbert

cedars.ca