

# *We Are Stem Cells*

ANNUAL REPORT 2018/19



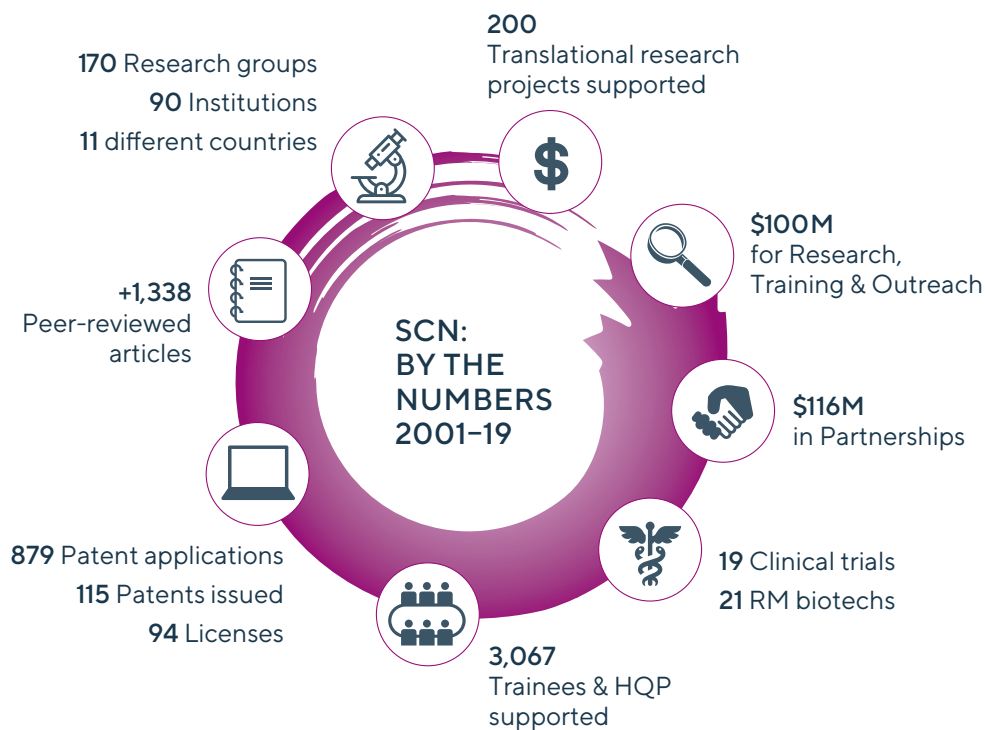
**Stem Cell Network**  
Réseau de **cellules souches**



## To capitalize upon Canada's competitive advantage in stem cell research for the benefit of Canadians.

The Stem Cell Network (SCN) is an incorporated non-profit that supports stem cell and regenerative medicine research, training and outreach activities across Canada, with the ultimate goal of advancing science from the lab to the clinic. SCN brings together a national community of researchers, trainees, representatives from industry, health charities, government and non-government organizations to build on Canadian leadership in stem cell research and improve the health and well-being of Canadians. Created as a Network of Centres of Excellence in 2001, SCN received \$83.3 million in federal funding over 15 years. In 2016, the Government of Canada provided an additional \$12 million over two years, and in 2017 extended funding by \$6 million, to March 31, 2019. Recently, the government once again partnered with SCN, providing \$18 million over three years (2019-22).

Over the past 18 years, the Stem Cell Network has catalyzed 19 clinical trials, 21 regenerative medicine start-up companies, and leveraged a further \$116 million in partner contributions. To date, SCN has invested over \$100 million into research, which has benefited 170 world-class research groups and more than 3,000 trainees across the country.



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(L) Andrew McKee (C) Dr. Michael Rudnicki (R) Cate Murray

## A MESSAGE FROM THE CHAIR OF THE BOARD OF DIRECTORS, SCIENTIFIC DIRECTOR & EXECUTIVE DIRECTOR

Dear Friends:

On behalf of the Stem Cell Network (SCN), we are pleased to provide the Government of Canada and the stem cell and regenerative medicine community with the 2018/19 annual report.

Inside the pages of this report, we have articulated the impressive work and outputs of the network over the past fiscal year. We continue to build on our accomplishments by supporting and training the next generation of researchers, informing policy and regulatory issues, sharing the latest stem cell advances with the public and by funding promising stem cell and regenerative medicine research.

Early in this fiscal year, SCN announced the outcomes of its 2018/19 peer-reviewed funding competition. A total of 24 new projects valued at \$4 million, were revealed at a press conference in Toronto, including: three clinical trials, seven disease teams and 14 impact projects. These projects advanced stem cell and regenerative medicine research in areas such as multiple myeloma, brain injury, sudden unexplained deaths in infants (SUDI), and delivered important results that added to scientific knowledge and pushed research closer to clinic. Partners from industry, not-for-profits, research institutions and other sources contributed more than \$11 million (a nearly 3:1 match in support), demonstrating the strength of the sector and its support for this leading-edge research.

In November 2018, SCN initiated efforts towards closing the gender gap and providing more opportunities for underrepresented woman in stem cell and regenerative medicine. As a starting point, SCN partnered with the Ontario Institute for Regenerative Medicine, BC Regenerative Medicine Network (BCRegMed) and ThéCell to hold a Women in Regenerative Medicine breakfast to serve as a stepping stone for future networking, mentoring opportunities and initiatives to celebrate and support women in regenerative medicine. Discussions and feedback from the breakfast have informed the direction of a long-term program aimed at ensuring that Canada's regenerative medicine culture and SCN community are welcoming and inclusive.



This past year has also been a transitional period for SCN, as we worked to secure funding to reach beyond March 2019. This work was informed by our Board of Directors, and leaders representing the scientific, health charity and industry communities across the country. During this period, SCN initiated its largest online social media campaign since inception to engage our community and encourage them to share their research successes and experiences as part of SCN's community. This online campaign proved to be an energetic platform for trainees to share knowledge, best practices and gain experience in non-traditional models of science communication. SCN also used this platform to share information and resources on the misconceptions of unproven stem cell treatments offered internationally and across Canada, as this issue is becoming more and more prevalent.

In March 2019 it was announced by the federal government that SCN would receive \$18 million over three years. This announcement signaled the Government of Canada's continued confidence in Canadian stem cell and regenerative medicine research and our vision to advance new therapies toward the clinic. We thank the Government of Canada and share our excitement in the future as we continue to provide unique training opportunities for the next generation and build clinical and commercial capacity across the nation.

We wish to extend our thanks to our volunteer committee members and peer reviewers who play an integral role in helping us meet our mandate. We are proud of our trainees, clinicians, researchers and policy experts who continue to push the boundaries in stem cell and regenerative medicine research to make a difference in the lives of Canadians and the health and economic well-being of our country.

Sincerely,



Andrew McKee  
Chair, Board of Directors



Dr. Michael Rudnicki, O.C.  
Scientific Director & CEO



Cate Murray  
Executive Director & COO

## A YEAR IN REVIEW

# 2018

### APRIL



SCN announces \$4M in new research funding

SCN hosts Twitter Live with Drs. Freda Miller and Anastassia Voronova

### MAY

SCN participates in BCRegMed and Ontario Institute for Regenerative Medicine symposia

525 students engaged in StemCellTalks events in Calgary, London, Vancouver and Edmonton

SCN joins Canadian Pavilion at International Society for Cell Therapy Conference in Montreal, QC

SCN hosts Twitter Live with Dr. Guy Sauvageau

### JUNE

SCN and JDRF host a Scientific Workshop in Toronto

SCN participates in Printing the Future of Therapeutics in 3D International Round Table

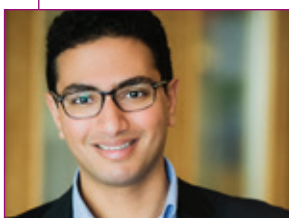
SCN hosts Twitter Live with Dr. Bernard Thébaud



### JULY



Dr. Julie Fradette and Tamer Mohamed appointed to SCN's Board of Directors



### AUGUST

SCN hosts Twitter Live with patient advocate Jennifer Molson



### SEPTEMBER



SCN Executive Director Cate Murray interviewed by national media on the growth of private clinics in Canada selling unproven stem cell therapies

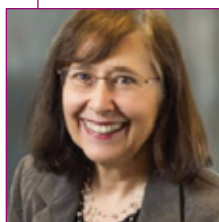


## OCTOBER

SCN launches  
#WeAreStemCells  
social media campaign

Dr. Fabio Rossi wins 2018  
Till & McCulloch Award for  
his *Cell Stem Cell* paper on  
muscle stem cell expansion

Dr. Connie Eaves inducted  
into the Canadian Medical  
Hall of Fame



## NOVEMBER

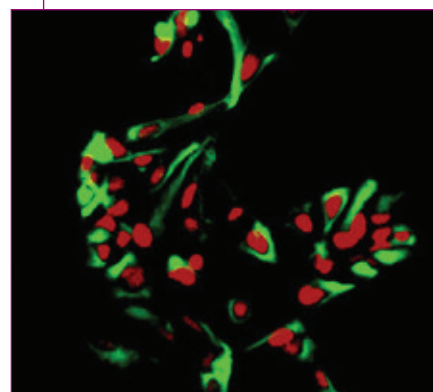
400+ attendees from  
Canada and abroad attend  
the Till & McCulloch  
Meetings in Ottawa,  
co-hosted by SCN and  
CCRM (Centre for  
Commercialization of  
Regenerative Medicine)

SCN and partners  
host inaugural Women  
in Regenerative  
Medicine breakfast

SCN hosts Twitter Live  
with Dr. Fabio Rossi

## DECEMBER

Results of SCN-supported  
clinical trial of blood stem  
cell expansion technology in  
treatment of blood cancer  
presented at American  
Society of Hematology  
conference



2019

## JANUARY



SCN hosts soft skills  
training webinar,  
attended by 60 people

SCN Scientific Director  
Dr. Michael Rudnicki  
publishes op-ed in the  
*Globe & Mail*

## FEBRUARY

Stem cell treatment for  
aggressive multiple sclerosis  
that was pioneered in  
Canada recommended as  
standard of care by American  
Society for Blood and  
Marrow Transplantation

239 students engaged  
at StemCellTalks event  
in Toronto



## MARCH

SCN receives \$18M in  
renewed funding over  
three years from  
Government of Canada

SCN 2018-19 research  
program comes to a close  
with 24 projects completed

Dr. Bartha Knoppers wins  
the Henry G. Friesen  
International Prize in  
Health Research

69 students engaged in  
*StemCellTalks* events in  
Guelph and Montreal

# RESEARCH ACHIEVEMENTS

The Stem Cell Network (SCN) is dedicated to advancing stem cell and regenerative medicine research from lab bench to bedside for the benefit of Canadians. As the only national network of its kind, SCN has a focus on providing support for translational research where there is a clear path to the clinic, commercialization or policy development.

With continued support for high-quality, innovative and leading-edge stem cell research from the Government of Canada in 2017, SCN launched a \$4 million, peer-reviewed funding competition for FY2018/19. This resulted in 24 new research projects: three clinical trials, seven disease teams and 14 impact projects. These innovative projects, from across the nation, contributed to 68 peer-reviewed articles and book chapters published in 2018/19, on conditions such as brain injury, multiple myeloma and liver disease, as well as important regenerative medicine policy concerns such as the marketing of unproven stem cell therapies.

These high-impact projects involved 119 scientists and 167 trainees located at 29 research institutions across Canada. Partners from industry, not-for-profits, research institutions and other sources contributed more than \$11 million (a nearly 3:1 match in support), demonstrating the strength of the sector and its support for this leading-edge research. The following pages provide a summary of activities and outputs achieved with SCN support.

## STEM CELL NETWORK'S 2018/19 FUNDING

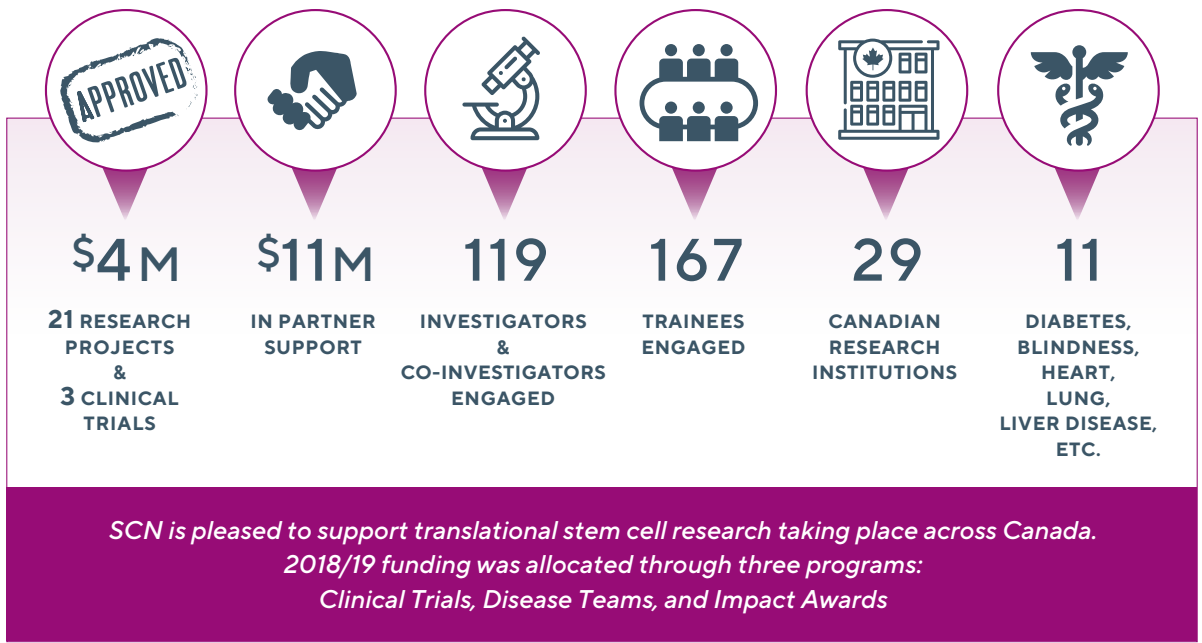
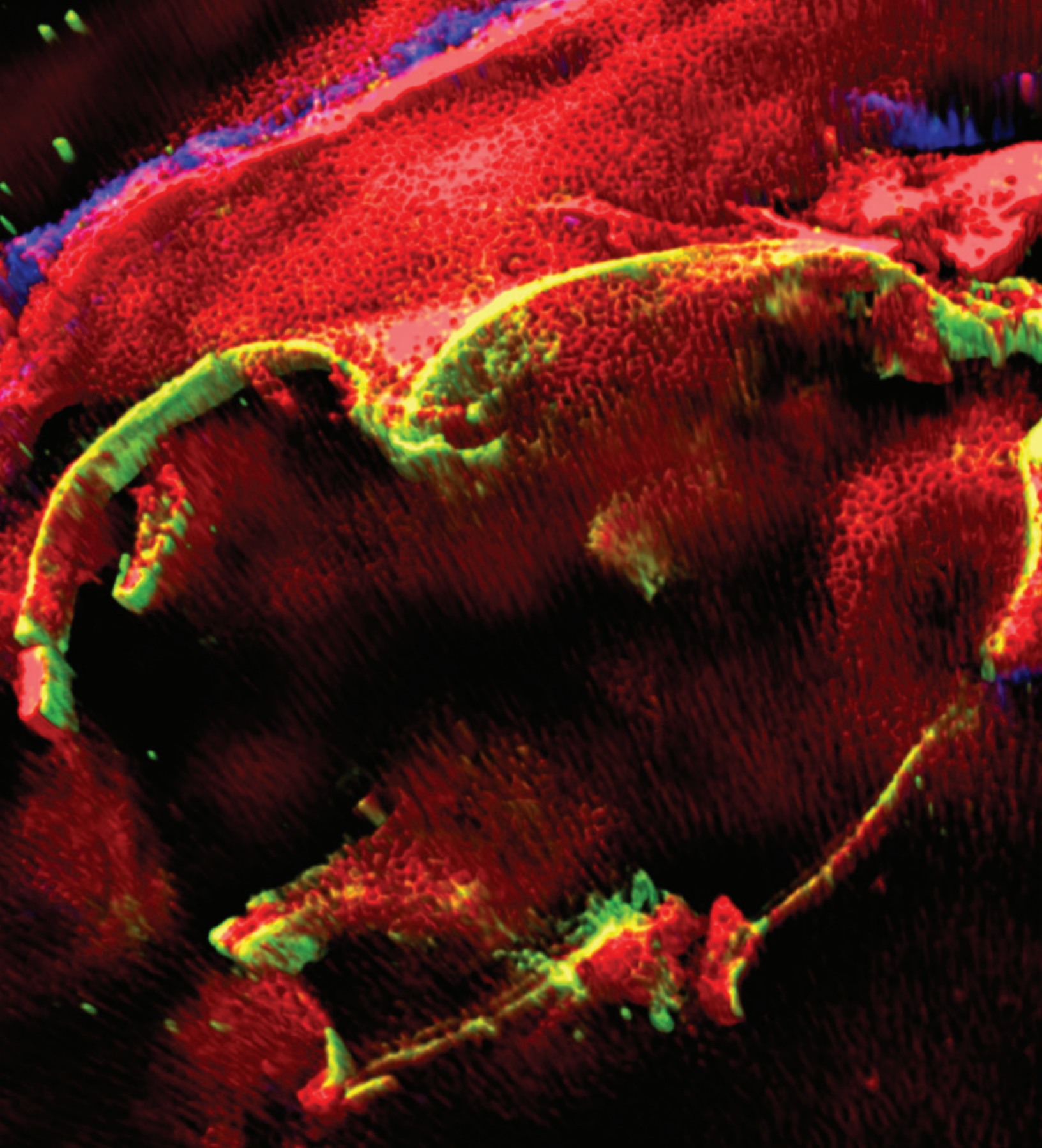


FIGURE 1: 2018/19 Research Program Summary





*Heart of gold* | Photo credit: Hesham Soliman  
Entry in the 2018 *Cells I See* art contest at the Till & McCulloch Meetings

## BREAKDOWN OF RESEARCH FUNDING PROGRAMS

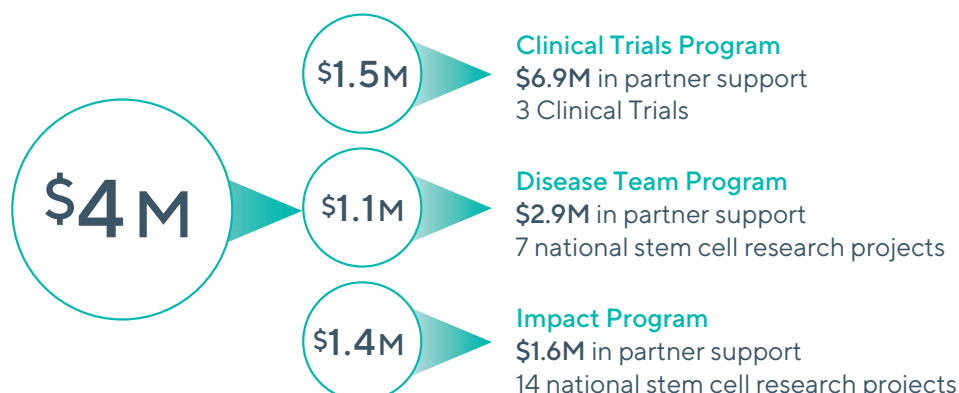


FIGURE 2: 2018/19 Research Program Summary Breakdown

## CLINICAL TRIALS

The Clinical Trials Program provided \$1.5 million for three trials. A total of 33 investigators (three Principal Investigators and 30 Co-Investigators) at nine institutions, together with 41 trainees, were engaged in these trials with the goal to determine the safety and efficacy of new stem cell treatments. This program supported phase I/II trials with the potential to be economically viable for healthcare systems and benefit patients. The funded trials focused on evaluating a stem cell therapy for diabetes, using expanded stem cells from cord blood in the treatment of multiple myeloma and assessing and enhancing cell therapy for heart repair.

PRINCIPAL INVESTIGATOR WITH CO-INVESTIGATORS	PROJECT TITLE / SCN FUNDS ALLOCATED
<b>Jean Roy, Hôpital Maisonneuve-Rosemont (HMR)</b> Guy Sauvageau (UMontréal), Jean-Sebastien Delisle (HMR), Richard Leblanc (HMR), Sandra Cohen (HMR), Silvy Lachance (HMR), Imran Ahmad (HMR), Émilie Lemieux-Blanchard (CRCHUM), Michael Sebag (MUHC), Sebastien Lemieux (UMontréal), Gabriel Tremblay (Geneconomic)	Allogeneic stem cell transplant using UM171 expanded cord bloods for patients with high-risk multiple myeloma  <b>\$500,000</b>
<b>James Shapiro, U of A</b> Peter Senior (U of A), Peter Light (U of A), Gregory Korbitt (U of A), Eugene Brandon (Viacyte Inc.), Howard Foyt (Viacyte Inc.), Sylvain Bedard (CEPPP), Bart Roep (U Leiden), Joanna Preston (TEC Edmonton), Chris McCabe (U of A)	Pancreatic Progenitor Cell Therapy: Solving Supply and Survival Issues of Islet Cell Transplantation for T1DM  <b>\$500,000</b>
<b>Duncan Stewart, OHRI</b> David Courtman (GMP Facility OHRI), Michael Kutryk (SMH), Chris Glover (UOHI), Hung-Ly Quoc (MHI), Alexander Dick (UOHI), Michel Lemay (UOHI), Kim Connelly (SMH), Howard Leong Poi (SMH), Josep Rodes-Cabau (U Laval), Dominique Joyal (JGH), Vincent Laroche (U Laval)	Enhanced Angiogenic Cell Therapy for Acute Myocardial Infarction (ENACT-AMI)  <b>\$500,000</b>

TABLE 1: Clinical Trials Summary Table



## DISEASE TEAM PROGRAM

The Disease Team Program, which supported projects that are developing novel cellular or stem cell-related therapeutic approaches to tissue repair and regeneration for specific diseases, provided \$1.1 million for seven projects. A total of 55 investigators (7 Principal Investigators and 48 Co-Investigators) at 18 institutions, together with 69 trainees, were engaged in these projects. Multidisciplinary teams supported through this program had a clear path to market or clinic. Research from this competition addressed blindness, brain trauma, septic shock, liver failure and type 1 diabetes.

PRINCIPAL INVESTIGATOR WITH CO-INVESTIGATORS	PROJECT TITLE / SCN FUNDS ALLOCATED
<b>Gilbert Bernier, Hôpital Maisonneuve-Rosemont (HMR)</b> May Griffith (UMontréal), Jean-Francois Bouchard (UMontréal), Flavio Rezende (HMR), Cynthia Qian (UMontréal), Mario Filion (INRS)	Macula transplantation for the treatment of retinal degenerative diseases  <b>\$200,000</b>
<b>Joanna Matsubara, UBC</b> Marinko Sarunic (SFU), Orson Moritz (UBC), Sean Lumb (UBC), Christopher Laver (UBC)	Treating advanced retinal degeneration – rebuilding multiple co-dependent retinal layers with stem cells  <b>\$100,000</b>
<b>Lauralyn McIntyre, OHRI</b> Shirley Mei (OHRI), Duncan Stewart (OHRI), Dean Fergusson (OHRI), John Marshall (SMH), Keith Walley (UBC), Claudia dos Santos (SMH), Brent Winston (U of C), Shane English (OHRI), Alexis Turgeon (U Laval), Geeta Mehta (U of T), Robert Green (DU), Alison Fox-Robichaud (Hamilton Health Sciences Corporation), Margaret Herridge (UHN), John Granton (U of T), Paul Hebert (CRCHUM), Kednapa Thavorn (OHRI), Timothy Ramsay (OHRI), David Courtman (GMP Facility OHRI), Dana Devine (CBS), Sowmya Viswanathan (UHN)	Cellular Immunotherapy for Septic Shock (CISS2): A Phase II Multicentre Clinical Trial  <b>\$200,000</b>
<b>Freda Miller, The Hospital for Sick Children (HSC)</b> Donald Mabbott (HSC), David Kaplan (HSC), Cindi Morshead (U of T), Jing Wang (OHRI), Ann Yeh (HSC), Douglas Munoz (Queens U), Paul Frankland (HSC), Wolfram Tetzlaff (UBC)	Pharmacological recruitment of endogenous neural precursors to promote pediatric white matter repair  <b>\$200,000</b>
<b>Massimiliano Paganelli, CHU Sainte-Justine</b> Elie Haddad (UMontréal), Christian Beausejour (UMontréal)	Safety and efficacy of stem cell-derived encapsulated liver tissue to treat liver failure without immunosuppression  <b>\$100,000</b>

TABLE 2: Disease Team Summary Table

continued on the next page

PRINCIPAL INVESTIGATOR WITH CO-INVESTIGATORS	PROJECT TITLE / SCN FUNDS ALLOCATED
James Shapiro, U of A Gregory Korbitt (U of A), Joanna Preston (TEC Edmonton), Peter Senior (U of A), Bruce Verchere (UBC)	Development of a novel stem cell-derived transplant modality for type 1 diabetes  <b>\$100,000</b>
Bruce Verchere, UBC Francis Lynn (UBC), Megan Levings (UBC), Tim Kieffer (UBC), Dina Panagiotopoulos (UBC), Brad Hoffman (UBC), Garth Warnock (UBC), Gregory Korbitt (UofA)	Genetic manipulation of hES-derived insulin-producing cells to improve graft outcomes  <b>\$200,000</b>

TABLE 2: Disease Team Summary Table

## IMPACT PROGRAM

The Impact Program supported translational, clinical translation, commercialization and public policy research. It provided \$1.4 million for 14 national projects. A total of 60 investigators (14 Principal Investigators and 46 Co-Investigators), at 18 institutions, together with 72 trainees, were engaged in these projects, which targeted diseases including muscular dystrophy, stroke, heart disease and lung disease. Commercialization topics included improved genetic engineering in human stem cells and a platform to rapidly characterize induced pluripotent stem cells. Public policy projects developed recommendations for Canadian stem cell policy updates and strategies to address the marketing of unproven stem cell therapies.

PRINCIPAL INVESTIGATOR WITH CO-INVESTIGATORS	PROJECT TITLE / SCN FUNDS ALLOCATED
<b>COMMERCIALIZATION</b>	
Derrick Rancourt, U of C	Enhancing the Efficiency of Genome Engineering in Human Pluripotent Stem Cells  <b>\$100,000</b>
Peter Zandstra, UBC Fiona Watt (King's College, London, UK), Davide Danovi (King's College, London, UK)	A robust, quantitative, and high-throughput assay to rapidly characterize human induced pluripotent stem cells  <b>\$100,000</b>

TABLE 3: Impact Summary Table

continued on the next page



PRINCIPAL INVESTIGATOR WITH CO-INVESTIGATORS		  		PROJECT TITLE / SCN FUNDS ALLOCATED
PUBLIC POLICY				
Timothy Caulfield, U of A Amy Zarzeczny (UofR), Barbara von Tigerstrom (UofA), Tania Bubela (SFU), Yann Joly (McGill), Zubin Master (Mayo Clinic), Jeremy Snyder (SFU), Ubaka Ogbogu (UofA)		The Next Step: Specific Strategies for Addressing the Marketing of Unproven Stem Cell Therapies  \$40,000		
Bartha Knoppers, McGill Rosario Isai (OHRI), Tim Caulfield (UofA), Amy Zarzeczny (UofR), Tania Bubela (SFU), Ubaka Ogbogu (UofA), Vardit Ravitsky (UMontréal)		Reforming Canadian Stem Cell Policy: Moving Beyond the Assisted Human Reproduction Act (AHRA)  \$39,736		
DISCOVERY TRANSLATION				
Florian Bentzinger, USherbrooke Eric Marsault (USherbrooke), Mannix Auger-Messier (USherbrooke), Nicolas Dumont (CHU-Sainte-Justine, UMontréal), Frederic Balg (USherbrooke)		Apelinergic Compounds for the treatment of muscular dystrophy  \$99,000		
Mick Bhatia, McMaster Rima Al-Awar (OICR)		Identification of kinases and their target substrates in early human PSC specification  \$100,000		
Nicolas Dumont, CHU Sainte-Justine, UMontréal Sylvie Girard (UMontréal), Cam-Tu Nguyen (UMontréal), Phillipe Campeau (UMontréal), Christian Beauséjour (UMontréal)		Targeting muscle stem cells to mitigate Duchenne muscular dystrophy  \$100,000		
John Hassell, McMaster Rima Al-awar (OICR)		HTR5A as a target for anticancer stem cell drug discovery  \$99,500		

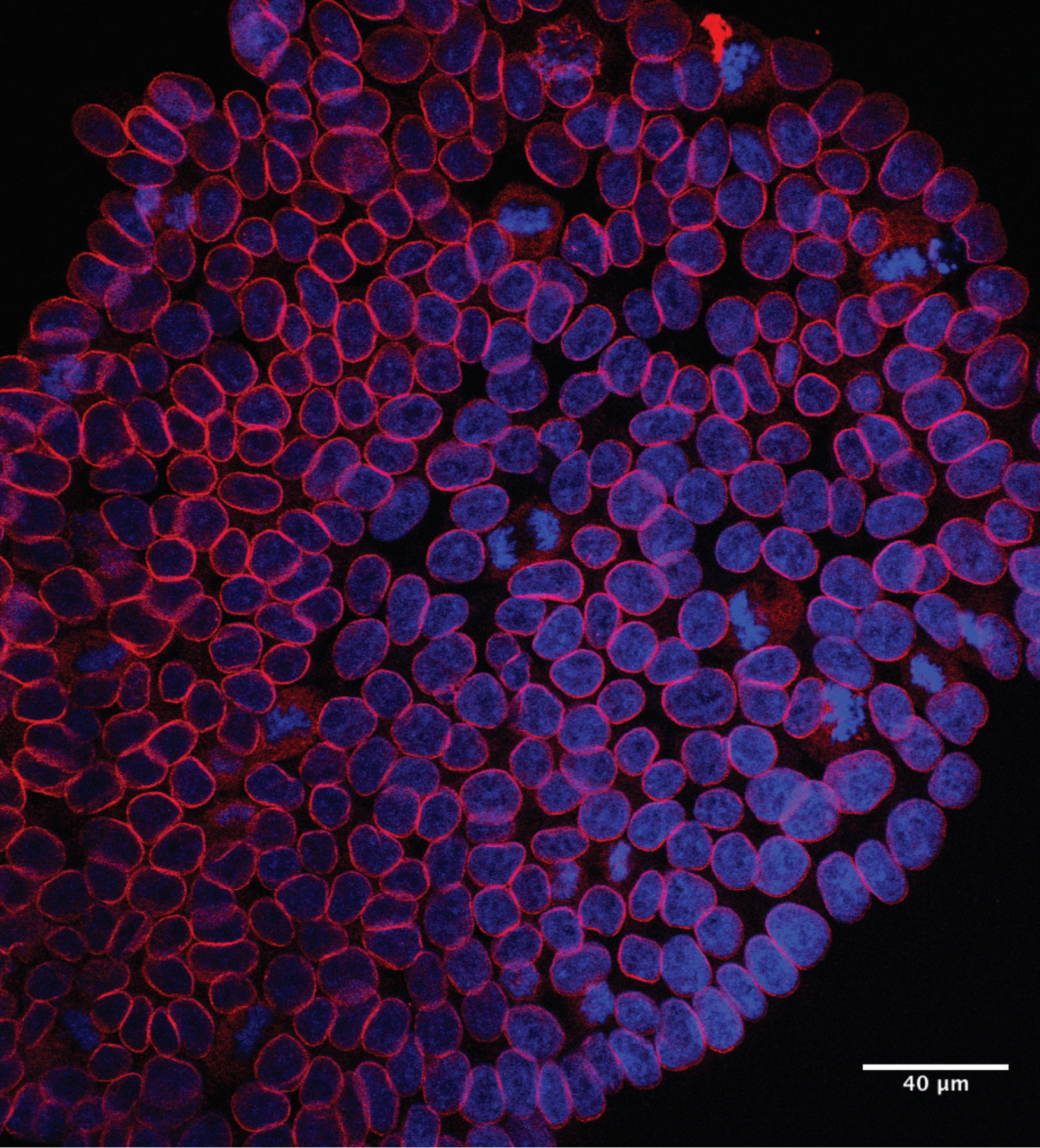
TABLE 3: Impact Summary Table

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PRINCIPAL INVESTIGATOR WITH CO-INVESTIGATORS		  	PROJECT TITLE / SCN FUNDS ALLOCATED
CLINICAL TRANSLATION & ACCELERATOR			
Timothy Kieffer, UBC Ali Rezania (Viacyte Inc.)			Assessment of Cell Maturation and Function in Subcutaneous Macroencapsulation Devices in Rodents  \$100,000
Zachary Laksman, UBC Glen Tibbits (SFU)			Using stem cells to test new drugs for atrial fibrillation  \$100,000
Lauralyn McIntyre, OHRI Shirley Mei (OHRI), Duncan Stewart (OHRI), Dean Fergusson (OHRI), John Marshall (SMH), Keith Walley (UBC), Claudia dos Santos (SMH), Brent Winston (U of C), Shane English (OHRI), Alexis Turgeon (U Laval), Geeta Mehta (U of T), Robert Green (DU), Alison Fox-Robichaud (McMaster), Margaret Herridge (U of T), John Granton (U of T), Paul Hebert (CRCHUM), Kednapa Thavorn (OHRI), Timothy Ramsay (OHRI), Sowmya Viswanathan (UHN)			Cellular Immunotherapy for Septic Shock (CISS): A Phase II Multicentre Clinical Trial  \$100,000
Bernard Thébaud, OHRI Mervin Yoder (Hospital for Children, Indianapolis), Dylan Burger (U of O)			Endothelial Progenitor Cell-derived Therapies for Neonatal Pulmonary Hypertension  \$99,905
Glen Tibbits, SFU Thomas Claydon (SFU), Zachary Laksman (UBC), Shubhayan Sanatani (UBC)			Developing an hiPSC-CM based protocol to investigate SIDS-implicated sudden cardiac arrest in infants  \$99,500
Eve Tsai, OHRI Xudong Cao (U of O), Ruth Slack (U of O)			Translating an animal endogenous stem/progenitor cell repair strategy for stroke to humans  \$100,000

TABLE 3: Impact Summary Table

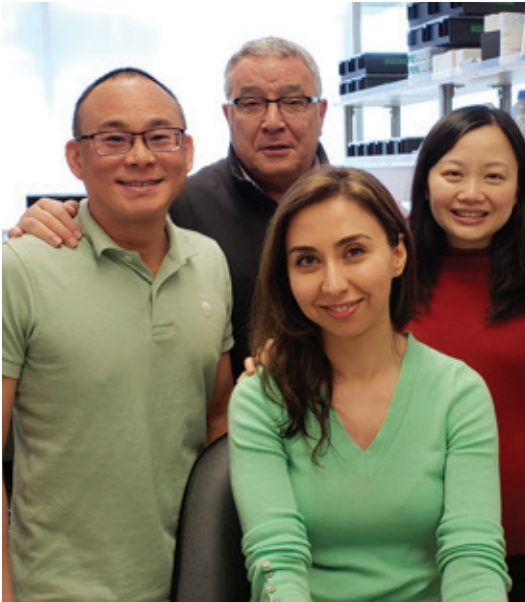




*Loop through the cells* | Photo credit: Radhika Rao  
Entry in the 2018 *Cells I See* art contest at the Till & McCulloch Meetings



## COMMUNITY PROFILES



### Getting to the heart of sudden unexplained death in infants

**Glen Tibbits**  
Simon Fraser University  
Impact Program: Clinical Translation and Accelerator  
Award recipient

(L-R) Eric Lin, Glen Tibbits, Sanam Shafaattalab, Alison Li

About one in every 2,000 infants in Canada dies quietly in their sleep with no known cause. These sudden unexplained deaths in infants (SUDI; formerly called SIDS) are devastating to families and have perplexed the medical community for decades. Recent research, however, points to cardiac arrest as a potential cause in certain cases.

Dr. Glen Tibbits, at Simon Fraser University and BC Children's Hospital Research Institute, received an SCN Impact Program award to explore this further. His goal was to develop a platform that could show that sudden cardiac arrest is a likely cause of specific infant deaths for which no cause could be identified, despite exhaustive post-mortem examinations (referred to as "autopsy-negative").

He partnered with other researchers in British Columbia, Alberta and Ohio to develop a platform to assess genetic factors that may be contributing to incidences of SUDI. Tibbits and his team previously found a genetic variant in a number of "autopsy-negative" infants. However, it was unknown whether this could be a critical factor in their death. Using an array of techniques, including human induced pluripotent stem cells and genome-editing, the team was able to grow sheets of heart tissue comprised of beating cardiac cells. The heart cells carrying the mutation beat abnormally when stimulated to contract at higher rates, much like the heart would when under stress. Such arrhythmias can be life-threatening in newborns and indicate a probable cause for SUDI among those who carry the genetic mutation.

*"While we're still a long way from removing the risk of SUDI altogether, this discovery will help us identify screening methods and strategies that families and health practitioners can use to help reduce the incidence of SUDI among those who carry the genetic variant."*

The platform also has broader applications for the future, including using it to help identify other genetic anomalies that may be contributing to the sudden cardiac arrest in infants or even adults.



## Choosing Canada for its diversity and career opportunities

Anastassia Voronova  
University of Alberta

When Dr. Anastassia Voronova first set foot in Canada, back in 2007, it was intended to be a short stay, just long enough to fulfill a requirement of her master's program to conduct research outside her home country of Estonia. She landed in Ottawa for a two-month fellowship – all the time she needed to decide Canada would become her permanent home.

After finishing her PhD at the University of Ottawa, Voronova moved to Toronto, where she did post-doctoral training under the leadership of esteemed stem cell researcher Dr. Freda Miller at The Hospital for Sick Children. The Miller lab studies the mechanisms of brain repair, particularly how that repair can be stimulated with drugs after damage caused by disease or as a side effect of cancer radiation and chemotherapy. With Stem Cell Network support, this work has entered into early phase clinical trials and is now poised to begin another pilot clinical trial in pediatric multiple sclerosis. As a key member of the lab, Voronova conducted research that helped better understand the pathways involved in brain development, which could be activated in regenerative medicine strategies.

As a result of this work, Voronova has now established her own lab at the University of Alberta, where she continues to study neural stem cells and the brain. As an early career researcher and an immigrant to Canada, she is excited about her prospects and the goals that are within her grasp, and she looks forward to being part of new research opportunities offered by the Stem Cell Network, thanks to the recent funding renewal from the Government of Canada.

*“What I really appreciate in Canada is the huge diversity and equity,”  
she said in an interview with the University of Alberta.*

*“I look around and I see so many women who are successful professors.  
As a scientist in Canada, I don't have to think about my nationality or gender.  
I can focus on what I love and do best—science.”*



## A new clinical protocol for multiple myeloma

**Jean Roy**  
Hôpital Maisonneuve-Rosemont  
Clinical Trials Award recipient

Multiple myeloma is the second most common blood cancer, affecting 2,900 Canadians annually. The disease attacks plasma cells, a type of blood cell formed in the bone marrow that produces antibodies and fights infections. As the disease develops, the abnormal plasma cells multiply and can prevent other blood cells from functioning normally. There is no cure for multiple myeloma, but it is treatable. However, the current treatment method using stem cell transplants can have adverse side effects, such as graft-versus-host disease and relapse.

Dr. Jean Roy at Hôpital Maisonneuve-Rosemont is pursuing better ways to make stem cell transplants for high-risk myeloma patients safer and more effective through his SCN-funded clinical trial. The protocol uses a small molecule, UM171, discovered at the Université de Montréal and licensed by the Montréal-based company ExCellThera, which can increase the number of stem and immune cells in cord blood, thus resulting in better transplant outcomes.

A key part of early phase clinical trials is determining the safety of a new treatment, but also identifying the best protocol for delivery to patients. In the case of this trial, it was determined very early that a change was needed in the preconditioning regimen (the preparation a patient needs to go through before a stem cell transplant can be performed) to ensure the new cells could engraft properly and manage the disease. This was critical information that enabled successful transplants to subsequent patients.

*"We're really encouraged by the preliminary findings of this SCN-funded trial; the patients had no immune complications and tolerated the transplant well. We are optimistic about the promising results and future outcomes for these patients."*

This clinical trial resulted in important insights with a more effective treatment protocol, and shortened hospital stays compared to the use of regular cord blood transplants. The team will continue to monitor the patients and open the clinical trial to additional multiple myeloma patients, regardless of their risk stage.





## An advocate like no other

**Connie Eaves**  
Distinguished Scientist,  
Terry Fox Laboratory, BC Cancer Agency

Volumes could be written about the scientific achievements of Dr. Connie Eaves. Her contributions to the understanding of blood and breast cancer are extensive and the knowledge she generated permeates current research and developing therapies around the globe. Her accolades include major prizes such as induction into the Canadian Medical Hall of Fame and, most recently, the Canada Gairdner Wightman Award. A closer look at the Gairdner award reveals that it was conferred not only for scientific excellence, but also for Eaves' "dedicated advocacy for early-career investigators and women in science."

This special notation is hardly surprising to anyone who knows Eaves. As one of the Stem Cell Network's most longstanding members and its former Deputy Scientific Director, Eaves places training at the forefront of every strategic planning discussion she participates in. She has done more than just forge a path for women in science, she goes a step further and speaks for all those who typically don't have a place at the table. It was also Eaves who brought trainee talks to the plenary stage at the annual Till & McCulloch Meetings. These advocacy efforts contributed greatly to the development of SCN's robust training platforms.

Over the course of her career, Eaves has trained and mentored more than 100 graduate and postgraduate students, many of whom now work in senior leadership positions around the globe, and who follow Eaves' trailblazing examples through advocacy and support efforts of their own.

*"What I find absolutely endearing about Connie is how she strikes a balance between actively supporting women in science while treating all her trainees fairly. She helped me develop into a critical thinker and continues to empower me to be a fearless strong advocate for women in science."*

– Dr. Sneha Balani, Associate Product Manager, STEMCELL Technologies Inc.

*"During my PhD, Connie had the uncanny ability of knowing when I needed a boost and when I needed knocking down a peg (or two!). Despite being incredibly busy, she always made time for us and made an incredible learning environment sheltered from the rat race of academic science."*

– Dr. David Kent, Cambridge Stem Cell Institute, University of Cambridge



## Stanching the tide of unproven stem cell therapies

**Tim Caulfield**  
University of Alberta  
Impact Program: Public Policy Award recipient

It is estimated that the global market for unproven stem cell therapies runs into the hundreds of millions of dollars each year. In Canada, at least 43 unlicensed clinics sell various skin, pain, joint and other, disease-focused, treatments to consumers, none of which are substantiated by rigorous science. Current regulatory loopholes allowing “minimally manipulated” stem cell treatments enable such clinics to flourish, while a vastly larger number of similar companies in the U.S. engage in a wide range of marketing practices to lure Canadian patients south of the border.

Timothy Caulfield, a health law professor at the University of Alberta, has tracked and criticized the practices of such clinics for nearly two decades. In 2018, he received an SCN award to address a need for recommendations on how Canada should respond to the challenges and risks posed by unregulated clinics.

*“The marketing of unproven stem cell therapies is loaded with false claims and celebrity endorsements that pose a real danger to consumers, and it’s becoming more pervasive as the number of clinics increases. It’s important that the scientific community speaks out against it, and the work I’ve done with SCN support has supplied critical data and tools to make this possible.”*

Caulfield’s team reviewed current laws and enforcement options that apply to marketing of unproven stem cell therapies in Canada. Their work is informing a call to action for the provincial medical colleges and a set of recommendations for governing bodies such as Health Canada that could be immediately implemented to curb unlicensed activities. More public-facing activities included the creation of a plain language Fast Facts document for publication online, several interviews in Canadian and American news media, and a feature within a social media initiative that uses art to talk about science.

Conversations continue with regulatory and policy entities, with promising signs that greater action to protect patients and consumers is imminent.



## Morphocell Technologies' big vision on tiny new liver tissues

**Massimiliano Paganelli**  
 CHU Sainte-Justine  
 Disease Team Program Award recipient

One in ten people in Canada has a liver disease, and many of these diseases progress to liver failure. Liver transplant is the only therapeutic option for liver failure, but finding a compatible donor in time remains a major challenge.



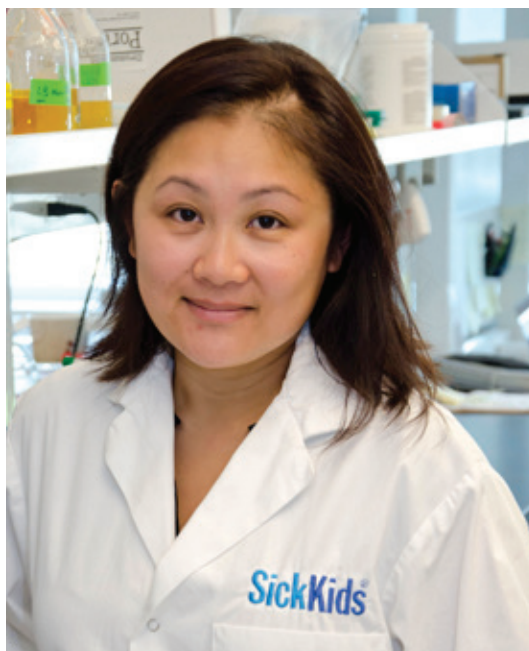
In Montréal, Dr. Massimiliano Paganelli is working to improve liver failure survival rates, and possibly remove the need for a transplant for some patients altogether. In 2018, he founded Morphocell Technologies to advance technology first developed with the help of the Stem Cell Network. The technology, ReLiver™, has shown immense promise in animal models to restore liver function and regenerative capacity, and the company is seeking to initiate human clinical trials within the next few years.

SCN grants enabled Paganelli and his team at CHU Sainte-Justine to develop tiny liver organoids, grown from induced pluripotent stem cells. These mini-organs are encapsulated in a special biomaterial to form a tissue that performs like a human liver. When transplanted into a patient, the ReLiver™ tissue replaces some of the lost function of the diseased liver, while accelerating its regeneration and healing. The tissue's intrinsic properties remove the need for immunosuppression, which is required after a transplant to prevent the body from rejecting the new organ, thereby reducing the risk of secondary complications.

*"Five or even three years ago, this kind of research would have been seen as high risk. Not all research funders would have taken that risk, but the Stem Cell Network saw the potential and provided critical support to advance the technology. As a result, I can foresee a future where this work can have a real, positive impact on the lives of patients."*

In addition to the planned clinical trials, Morphocell is also using ReLiver™ to test new generations of drugs to reduce the time and costs of drug development. The company is one of 21 new biotechs to have emerged from SCN-supported research and is one of 13 companies currently working as partners on SCN projects across the country.





## Plotting a path to career success

**Amy Wong**  
The Hospital for Sick Children

Not every PhD graduate will – or wants to – establish a lab or take up a career position at an academic institution. It's known to be a path with only a small – as low as three percent – chance of success. But Dr. Amy Wong knew very early that research was the work she was best suited to, and encouragement from mentors helped solidify that choice. So, she thought strategically about the kind of training and experience she would need to achieve one of those rare placements.

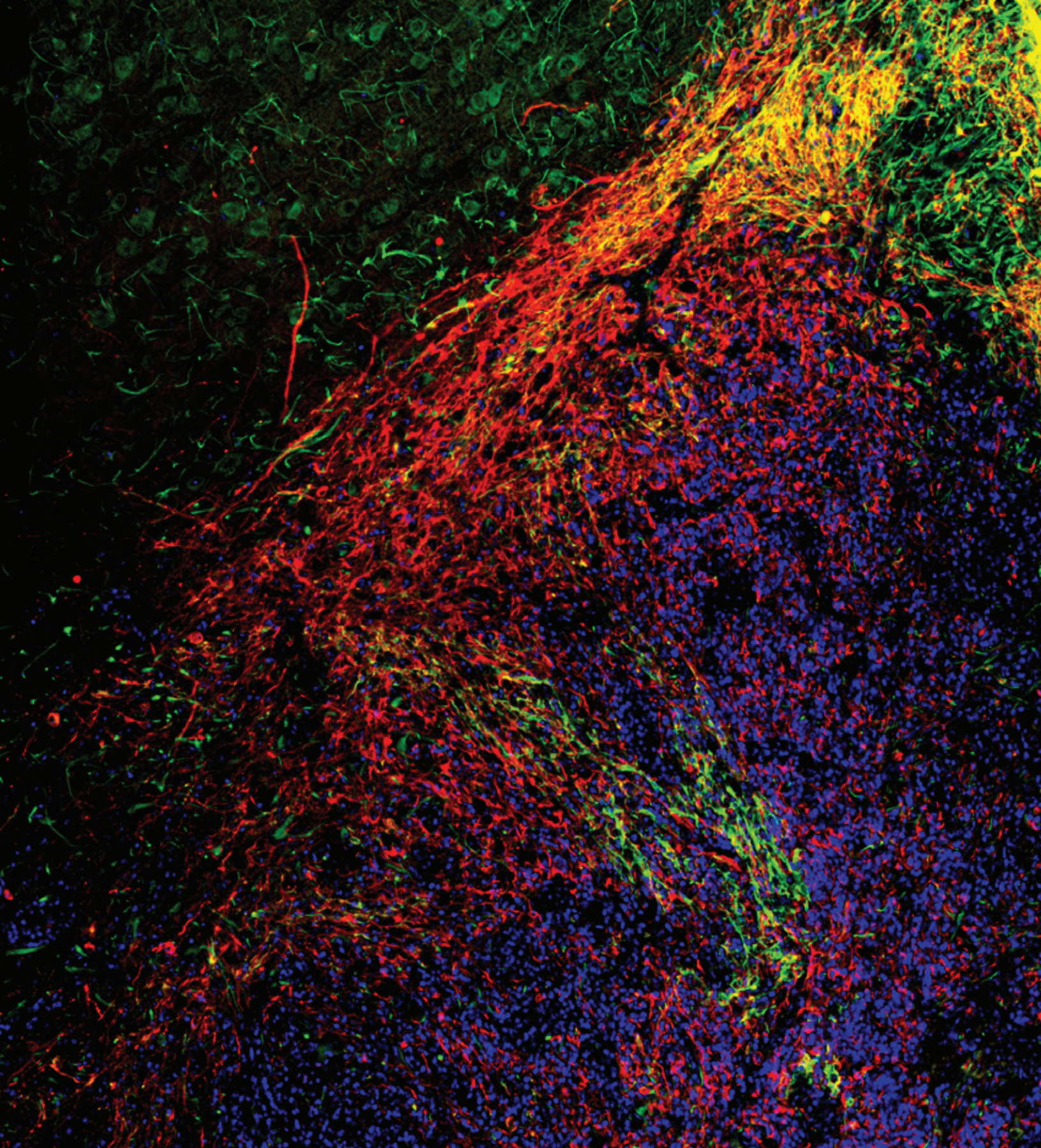
This prompted her to study under the guidance of two leading Toronto researchers, Drs. Janet Rossant and James Ellis. Each had expertise in areas Wong identified as necessary to further her interest in lung diseases – particularly the development of cystic fibrosis, the leading cause of respiratory-related deaths in children.

Through her association with these two labs, Wong identified a method to produce airway epithelial cells (the protective cells lining our entire airway) that exhibit the genetic mutation found in cystic fibrosis, so that the disease could be better understood. She was also introduced to the Stem Cell Network and its rich variety of skills development opportunities. She took part in everything she could, from technical lab training to soft skills workshops to networking events. Her engagement led to an appointment as Chair of SCN's Trainee Communications Committee. These experiences proved to be invaluable additions to her CV, giving Wong an advantage. She was then able to leverage these experiences into the position she attained at The Hospital for Sick Children in early 2019.

*"I'm hugely thankful to the Stem Cell Network for the opportunities it offers to young investigators. SCN helped me gain the skills and confidence I needed to achieve my goal of running my own lab."*

Now, she is busy turning that success into new research to further her quest of better treatments for lung diseases, and providing opportunities for a new cohort of young researchers who will look to her for guidance.





*Go with the flow* | Photo credit: Samantha Payne  
Entry in the 2017 *Cells I See* art contest at the Till & McCulloch Meetings



## TRAINING

Training the next generation of highly qualified personnel (HQP) who will lead and grow Canada's stem cell and regenerative medicine sector has been part of SCN's mandate since inception. In 2018/19, 370 leading-edge learning opportunities were provided with SCN support (see Table 4, on facing page).

SCN's training program is not only offered through workshops and conferences but also comes through hands-on job experience. In 2018/19, 167 individual trainees (55% female; 40% male and 5% prefer not to answer) worked on SCN-funded projects.

These early-career investigators are learning from, and working with, talented scientists in leading-edge research activities across the nation to benefit the health of Canadians. This important work is contributing to the development of novel therapies for disease treatments such as diabetes, vision loss, multiple myeloma and brain injury.

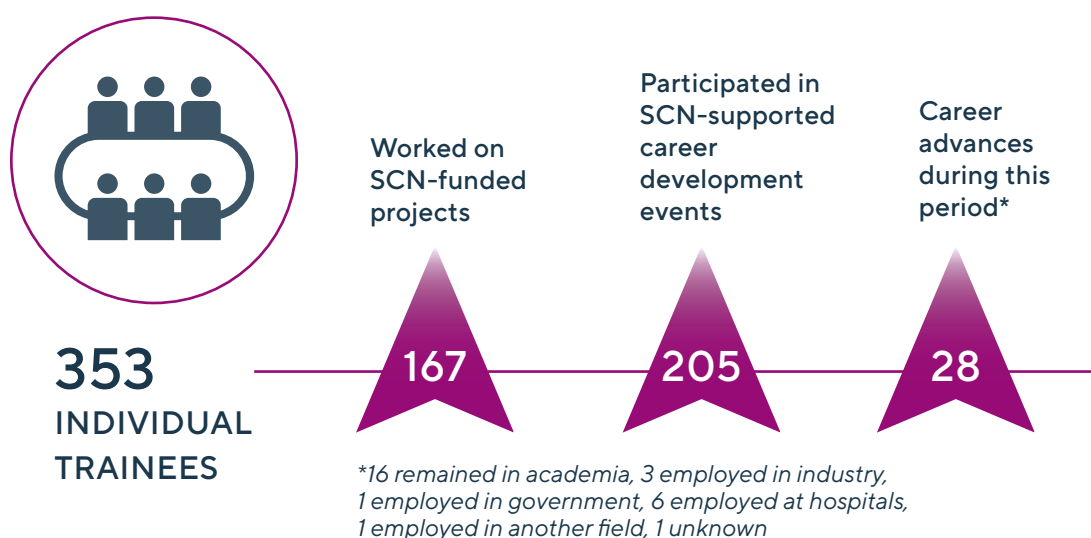


FIGURE 3: SCN Training 2018/19

To ensure that the training needs of young investigators are met, SCN engages its Trainee Communications Committee (TCC) to plan and develop the annual training program offered at the Till & McCulloch Meetings (TMM). This past year, the TCC worked collaboratively to create a robust suite of workshops, including grant writing and peer review, science communications, ethical, legal and social implications and Meet the Experts sessions. In 2018/19, the 12-member committee was chaired by Dr. Amy Wong from The Hospital for Sick Children and supported by Dr. Kelly McNagy, a leader in stem cells and inflammatory diseases, from the University of British Columbia.

STEM education and skills continue to play a vital role in Canada's workforce, enabling it to adapt to market needs and compete on an international level. SCN's specialized training and skills development program will strengthen Canada's competitive edge today and tomorrow.



## TRAINING WORKSHOPS & OPPORTUNITIES SUPPORTED BY SCN

In 2018/19, SCN supported nine workshops, courses or other events that provided 370 key training opportunities, including 10 travel awards to international conferences to HQP from across the country.

TRAINING AND DESCRIPTION	DATE	ATTENDEES
<b>UBC Cell Sorting Course</b> Trainees learned how to use cell sorters and how to troubleshoot issues with sorting samples. The training was hands-on through interactive discussion and practice.	April 11–13, 2018	6
<b>RNA-Seq Analysis Workshop</b> Participants gained a more in-depth understanding of the design and analysis of OMICS projects by focusing on RNA-seq, which is being widely adopted in the stem cell community.	May 7–9, 2018	18
<b>Comprehensive Course on Fluorescence Microscopy</b> This comprehensive five-day course took trainees through all aspects of fluorescence microscopy using dynamic presentations, hands-on training and experience on a variety of microscopes, and independent practice sessions.	June 11–15, 2018	7
<b>UBC Flow Cytometry Workshop</b> This intensive workshop advanced participants' skills in flow cytometry through hands-on experience and provided an introduction to mass cytometry (CyTOF).	July 10–13, 2018	13
<b>Intro to IP &amp; Entrepreneurship Workshop</b> This workshop introduced participants to intellectual property (IP) and entrepreneurship in the commercialization of biotherapeutic technologies.	September 14, 2018	50
<b>Scientific Storytelling Workshop</b> The workshop exposed students to best practices in scientific communication and specific techniques for scientific storytelling to lay audiences, with a guided look at how best to structure and present their science in an engaging way.	November 11, 2018	36
<b>Grant Writing and Peer Review Workshop</b> Trainees were provided with tips for writing and preparing their own grants, and gained exposure to how a review panel evaluates grant applications.	November 11, 2018	37
<b>The 2018 Till &amp; McCulloch Meetings</b> Students learned about the latest techniques and trends within the field from accomplished Canadian and international speakers. Selected students also had the opportunity to present their work in plenary sessions.	November 11–14, 2018	166
<b>Research Canada Workshop – Research Advocacy for Trainees: Encounters of the Political Kind</b> Participants learned how to become effective advocates for their own research and were taught best practices for sharing their work and communicating their professional research needs with parliamentarians.	November 14, 2018	27

TABLE 4: 2018/19 Training Workshops and Opportunities Supported by SCN

## TRAINING PROGRAM IN REGENERATIVE MEDICINE

In a field that has witnessed immense change over its short history, the Training Program in Regenerative Medicine (TPRM) is a concrete example of innovation at work. Twenty years ago, Drs. Atul Humar and Gary Levy, current and former directors of the Multi Organ Transplant Program at Toronto General Hospital, respectively, created the year-long academic training program as a means to build a qualified workforce of knowledgeable personnel who could develop and practice in regenerative medicine and advance the biotechnology and pharmaceutical industries. The ultimate goal, of course, was to reduce the costs of transplant medicine through this promising new field and improve the lives of hundreds of thousands of Canadian patients.



At the time, there was no other program in the world like it – and there still isn't. One of the hallmarks of the program is that it is open not only to students at affiliated departments within the University of Toronto, but also to any graduate student at institutions across Canada and other regions globally. Through partnerships with these universities – and with entities such as the Stem Cell Network, which has provided funding to support travel and other program costs for more than 10 years – more than 80 visiting students from Canadian locations outside Toronto, as well as India, Japan and Egypt, have taken part in the program.



*"The lecturers in this course were from a variety of different fields and they presented in a readily understandable way, which was exactly what I was looking for to enhance my learning. It gives you the bigger picture and adds important and different perspectives to the work you're doing."*

– Filip Stojic,  
PhD student, Morshead lab, University of Toronto

"This is the future of medicine," said Humar, who assumed the role of sole Director for TPRM following Levy's retirement from the program in 2016. "When we created it, we saw how it could bring an important aspect to the research, particularly in organ failure and transplant medicine, which were of primary interest to us. But we also saw it as a way to establish connections with people involved in regenerative medicine around the world and in this respect, the program has been very successful."

*“The course caters to a variety of students from different research backgrounds and it integrates so many aspects of science into one course. I am a person who truly believes in translational medicine and you really need all the disciplines to work together to address some of the issues we’re facing in medicine.”*

– Ayesha Noman,  
MSc student, Trung Le lab, University of Toronto



Apart from its international appeal, another hallmark of TPRM is its approachability and breadth. The program provides overview training on a range of topics relevant to regenerative medicine, including clinical transplant medicine, stem cell therapeutics, commercialization and economics, as well as ethical and social issues. Students participate in live or webcasted lectures and journal club meetings, and attend a final two-day symposium at the end of the academic year, where they present their research and have the opportunity for in-person networking with other participants.

“From the Stem Cell Network’s perspective, this is an ideal course because it engages students from coast to coast while also providing key learning on a range of topics that Canadian researchers and clinicians are globally competitive in,” said Cate Murray, Executive Director and COO of the Stem Cell Network.

Up to 40 participants can join the program each year, making it one of the larger graduate courses available, and demand remains high. In some labs, it has become the equivalent of a prerequisite for any student wishing to develop a career in translational-focused regenerative medicine.

The secret to this high demand, suggests Humar, is adaptability. “The technology has really advanced over 20 years, and in response to that we have had to continually update the course. I remain continually fascinated and engaged by the field and by the challenges and rewards of maintaining this cutting-edge program. It’s been a pretty amazing journey.”



## COMMUNITY OUTREACH & ENGAGEMENT

Informing the public about the potential of stem cells while debunking myths and misconceptions involves many people contributing time, expertise and their passion for science. The Stem Cell Network actively supports outreach, engagement and communications activities through its funded research, particularly in the public policy domain, by providing information to health charity partners for dispersal to their communities, and by providing tools, training and financial incentives for early-career researchers to engage with the public.

### STEMCELLTALKS

SCN and Let's Talk Science have partnered together for many years to bring knowledge of stem cells to high school and undergraduate students across Canada. This is done through *StemCellTalks*, a national stem cell biology outreach initiative, where high school students spend a day with scientists who are experts in stem cell and regenerative medicine to learn about the field. In 2018/19, SCN supported nine *StemCellTalks* events (see table for dates and locations), where more than 900 high school students across the nation learned about stem cells and the potential they have for treating diseases such as macular degeneration, diabetes and multiple sclerosis.

SITE AND DATE	THEME	PARTICIPANTS
<b>MAY 2018</b>		
Calgary, AB	Multiple Sclerosis	158
London, ON	Sports Injuries	58
Vancouver, BC	Stem Cells and Diabetes	220
Edmonton, AB	The Nervous System	89
<b>OCTOBER 2018</b>		
Ottawa, ON	Stem Cells 101: Science Café	40
<b>FEBRUARY 2019</b>		
Toronto, ON	Macular Regeneration	239
<b>MARCH 2019</b>		
Guelph, ON	Translational Medicine	50
Montreal, QC	Vision	19
<b>APRIL 2019</b>		
Hamilton, ON	Islet Cell Transplantation for Diabetes	87
		<b>TOTAL: 960</b>

TABLE 5: 2018/19 Stem Cell Talks Locations and Themes

## TILL & MCCULLOCH MEETINGS

The Till & McCulloch Meetings (TMM) are an annual highlight for Canada's stem cell and regenerative medicine community. TMM gathers stem cell scientists, clinicians, ethicists and policy experts as well as industry representatives from Canada and abroad. The event showcases Canada's place in the global stem cell ecosystem and provides a tremendous opportunity for attendees to network and hear about the latest scientific advancements.

In 2018, TMM was held in the nation's capital in partnership with the Centre for Commercialization of Regenerative Medicine (CCRM) and with the support of 28 sponsors, representing industry and NGOs. The program attracted more than 480 delegates from across Canada and internationally, resulting in the highest number of attendees since the Meetings' inception. More than half of the delegates in attendance were trainees, who engaged in valuable professional development activities through poster and oral presentations, workshops and learning about career opportunities in and outside of academia.

Established in 2005, the coveted Till & McCulloch Award is presented annually to a Canada-based researcher who has made an exceptional contribution to global stem cell research in that year. Dr. Fabio Rossi at the University of British Columbia, was selected as the awardee based on his impactful publication in *Cell Stem Cell* for identifying a key mechanism driving muscle repair.



*"I'm extremely honoured to have been selected for this award and to be included among such a distinguished list of Canadian scientists. Drs. Till and McCulloch are role models in stem cell research and I was elated to acknowledge their pioneering work by giving a lecture in their name."*

– Dr. Fabio Rossi

The 2019 Till & McCulloch Meetings are scheduled to be held in Montréal, Québec, November 4–6.

## WOMEN IN REGENERATIVE MEDICINE BREAKFAST

Women occupy fewer leadership roles and get less recognition than their male counterparts across nearly all professional sectors, including the sciences. One way to bridge this gap is to facilitate greater networking and opportunities for mentorship. In the spirit of this aim, on November 12, the Stem Cell Network with support from the Ontario Institute for Regenerative Medicine, BCRegMed and ThéCell, held a Women in Regenerative Medicine breakfast to serve as a stepping stone for future networking, mentoring opportunities and initiatives to celebrate and support women in regenerative medicine.

Nearly 75 people were in attendance for this inaugural event, the majority of whom were trainees, who joined 18 invited leaders seated at round tables across the room. The morning kicked off with keynote speaker Leanna Caron, a global business executive in the regenerative medicine sector. Caron shared her personal experiences while noting the different challenges she's had to overcome as a woman in business.

Following the presentation, attendees then had an opportunity to learn and engage with the leaders at their tables to discuss the opportunities they've had as women and the resources that could assist woman in the field, such as access to mentorship, professional development and more open conversation.

SCN received excellent feedback, which generated momentum for a second breakfast on May 14, 2019 in Vancouver, in partnership with BCRegMed. The discussions from these events will be used to develop a long-term program aimed at ensuring that the culture within Canada's regenerative medicine community is welcoming and inclusive.

### Partnerships & Support

Partnerships with other organizations have always been integral to the Network's activities. In 2018/19, SCN partnered with a number of organizations to provide support for stem cell and regenerative medicine collaborations, outreach and training opportunities at various events and workshops. In 2018/19, SCN supported:

**International Society Cell & Gene Therapy Conference**  
*May 2-5, 2018, Montreal, QC*

**2018 BC Regenerative Medicine Research Symposium**  
*May 9, 2018, Vancouver, BC*

**OIRM Stem Cell and Regenerative Medicine Symposium**  
*May 9, 2018, Toronto, ON*

**Aspect Biosystems – Printing the Future of Therapeutics in 3D**  
*June 10-12, 2018, Vancouver, BC*

**JDRF-SCN Scientific Workshop:  
Moving the Science into a Therapy for Type 1 Diabetes**  
*June 11-12, 2018, Toronto, ON*

**Canadian Science Policy Conference**  
*November 7-9, 2018, Ottawa, ON*



## ONLINE ACTIVITY

Web-based communications continue to be a powerful source of information. SCN works diligently to ensure its online activities reflect current best practices and up-to-date information regarding scientific advancements, workshops, training opportunities and much more. At the end of 2018/19 SCN had over 1,400 subscribers to its monthly *CellLines* newsletter and had just over 19,000 Twitter followers.

In an effort to reach out and inform the community of the potential of stem cells and the latest research advancements, SCN created a new series of successful Twitter Live interviews on different stem cell and regenerative medicine related topics, featuring a patient advocate and SCN-funded researchers from across the nation.

### Twitter Live Interviews



	<p><b>April 4, 2018</b></p>  <p><b>From postdoc to academic</b>            Dr. Freda Miller,            The Hospital for Sick Children            Dr. Anastassia Voronova,            University of Alberta</p> <p><b>501 views</b></p>	<p><b>May 3, 2018</b></p>  <p><b>Better treatments for patients using cord blood</b>            Dr. Guy Sauvageau,            ExCellThera</p> <p><b>526 views</b></p>
<p><b>June 7, 2018</b></p>  <p><b>Research for lung and brain repair in premature babies</b>            Dr. Bernard Thébaud,            Ottawa Hospital            Research Institute</p> <p><b>428 views</b></p>	<p><b>August 23, 2018</b></p>  <p><b>A patient's perspective on risks and rewards in aggressive multiple sclerosis clinical trials</b>            Jennifer Molson</p> <p><b>469 views</b></p>	<p><b>November 13, 2018</b></p>  <p><b>An award-winning approach to neuromuscular diseases using stem cells</b>            Dr. Fabio Rossi,            University of            British Columbia</p> <p><b>607 views</b></p>

## #WeAreStemCells

Coinciding with Stem Cell Awareness Day in early October, SCN launched its largest-ever social media and outreach campaign, #WeAreStemCells, to inform the public about the potential of stem cells and to engage the stem cell community in promoting the importance of stem cell and regenerative medicine research and long-term funding in Canada.

SCN implemented this five-month campaign with print materials, online advertising, videos, and tweets, which were primarily shared through its social media accounts on Twitter, Facebook and LinkedIn. An online webinar about effective networking on social media was offered to help build skills and further leverage the campaign's goals.



To build momentum and generate audience engagement, the campaign first encouraged the community to share facts and successes relevant to the research by sharing tweets, photos, and videos, using the hashtag #WeAreStemCells and the tagline:

*"An investment in stem cell research is an investment in the future.  
This is our science. It's Canada's time."*

As the campaign progressed, SCN increased messaging about the importance of continued funding in stem cell and regenerative medicine research in Canada. SCN developed a postcard and a letter-writing campaign and created an online petition, all addressed to federal Ministers Bill Morneau and Kirsty Duncan, which allowed more than 22,000 Canadians to show their support for stem cell research funding to benefit the lives of patients and their families worldwide.

The response to #WeAreStemCells from the public, researchers, clinicians, trainees, patient advocates and partners within Canada and internationally was overwhelming, making it the Stem Cell Network's most successful outreach campaign since its inception. It helped secure \$18 million in renewed funding from the federal government, announced in the March 2019 budget.



FIGURE 4: #WeAreStemCells Highlights

*"SCN has encouraged meaningful integration of basic science, clinical research and ethical, legal and social issues. It has helped Canadian researchers to 'punch above our weight' and produce important research with both national and international relevance."*

– Amy Zarzeczny,  
Associate Professor, University of Regina

*"ExCellThera has greatly benefited from the leadership, research support and networking opportunities provided by the Stem Cell Network over the past decade ... ExCellThera is poised to become Canada's leading cell therapy company and we are grateful to the support from the SCN in making our vision an emerging reality."*

– Guy Sauvageau,  
Scientific Founder and CEO, ExCellThera

*"It is only through the commitment of organizations like SCN that I've been able to prepare and network for a successful career after graduate school."*

– Samantha Yammine,  
PhD Candidate, University of Toronto



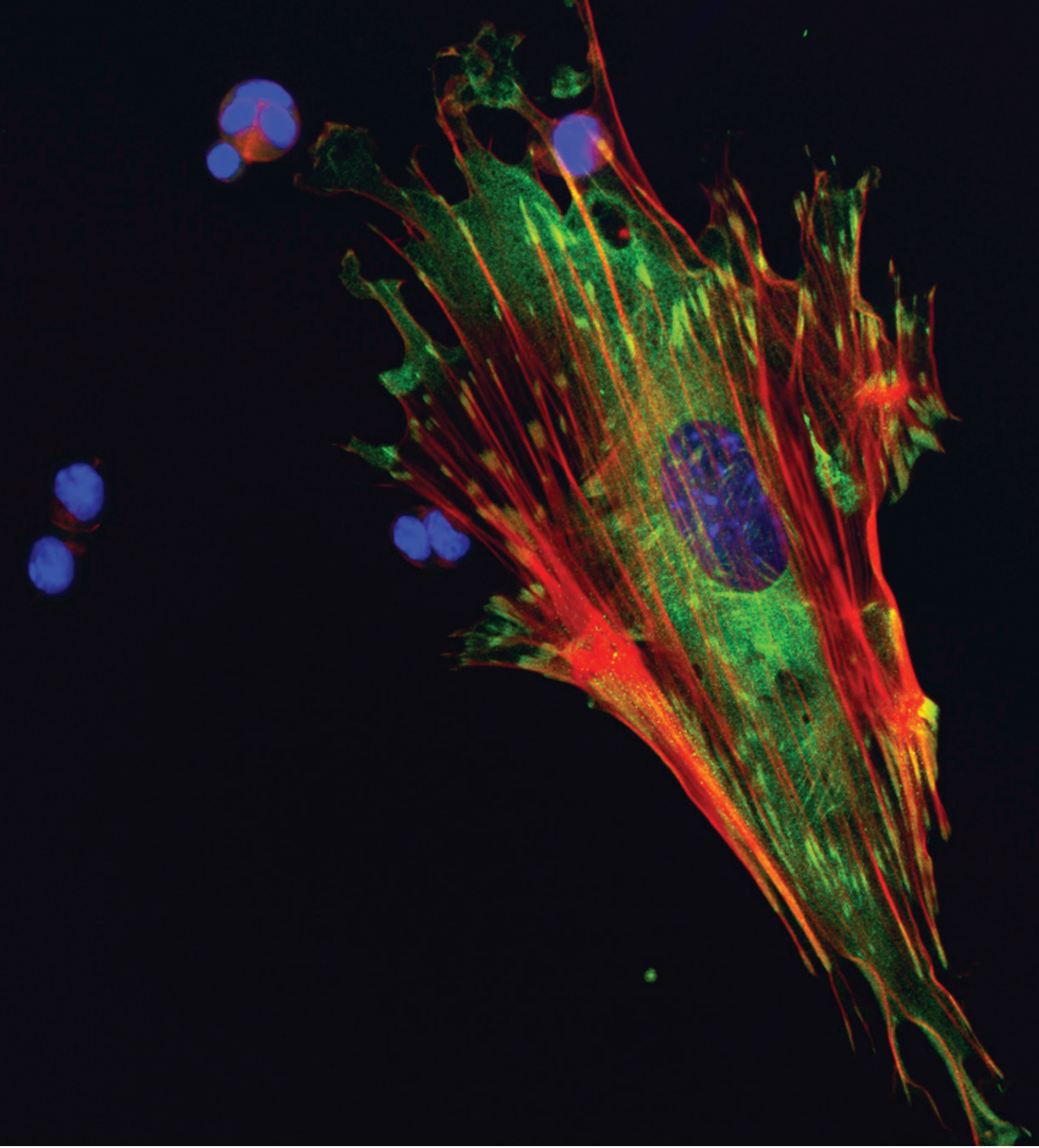
## A LOOK AHEAD

On March 19, the federal government reaffirmed its confidence in stem cell and regenerative medicine with an investment of \$18 million to the Stem Cell Network over a three-year period.

We are excited about the future and thrilled to continue to work with the community to build national capacity and accelerate the clinical translation of stem cell-based therapies while training a new generation to take on the opportunities and challenges that exist within regenerative medicine.

SCN's community is filled with passionate and dedicated people who are driven by scientific excellence and a desire to improve the health of all people. Over the next three years, SCN will provide the experienced leadership needed to bring this community together. In doing so, Canada will remain globally competitive and generate the knowledge, technologies and medicines that will make a difference in how disease and illness are treated. We aim to set the stage for a future that will see innovative stem cell-based research providing not only novel approaches for health care but also generating economic and social benefits that will be invaluable for our nation's well-being and prosperity.

*Tomorrow's health is here!*



*Stretching!...On a hard morning* | Photo credit: Yannick Benoit  
Entry in the 2018 *Cells I See* art contest at the Till & McCulloch Meetings

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### JOSHUA DIEROLF

PhD Candidate, University of Western Ontario

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### ERIKA KLEIDERMAN

Academic Associate, McGill University

### KELLY MCNAGNY

Professor, University of British Columbia

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PhD Candidate, McGill University

### SUMAIYAH REHMAN

Post-Doctoral Fellow, Princess Margaret Cancer  
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Post-Doctoral Fellow, Massachusetts Institute of  
Technology

## TRAINING & EDUCATION COMMITTEE (TEC)

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### HAROLD ATKINS

Scientist, Ottawa Hospital Research Institute

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University of British Columbia

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Principal Scientist, STEMCELL Technologies

### ERIKA KLEIDERMAN

Academic Associate, McGill University

### KELLY MCNAGNY

Professor, University of British Columbia

### AMY WONG

Research Associate, The Hospital for Sick Children

### AMY ZARZECZNY

Assistant Professor, University of Regina



**STEM CELL NETWORK**

**FINANCIAL STATEMENTS**

**MARCH 31, 2019**

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## STEM CELL NETWORK

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MARCH 31, 2019

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## INDEPENDENT AUDITORS' REPORT

To the Members of Stem Cell Network:

### Opinion

We have audited the financial statements of Stem Cell Network (the "SCN"), which comprise the statement of financial position as at March 31, 2019, and the statements of revenue and expenditures, changes in net assets and cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the SCN as at March 31, 2019, and its results of operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations (ASNFPO).

### Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the *Auditors' Responsibilities for the Audit of the Financial Statements* section of our report. We are independent of the SCN in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

### Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with ASNFPO, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing these financial statements, management is responsible for assessing the SCN's ability to continue as a going concern, disclosing, as applicable, matters related to a going concern and using the going concern basis of accounting unless management either intends to liquidate the SCN or to cease operations, or has no realistic alternative to do so.

Those charged with governance are responsible for overseeing the SCN's financial reporting process.

### Auditors' Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.





## INDEPENDENT AUDITORS' REPORT (continued)

### Auditors' Responsibilities for the Audit of the Financial Statements (continued)

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the SCN's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the SCN's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors' report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditors' report. However, future events or conditions may cause the SCN to cease to continue as a going concern.
- Evaluate the overall presentation, structure, and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during the audit.

We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

*Logan Katz LLP*

Chartered Professional Accountants  
Licensed Public Accountants

Ottawa, Canada  
June 27, 2019

# STEM CELL NETWORK

## STATEMENT OF FINANCIAL POSITION

AS AT MARCH 31, 2019

	2019	2018
<b>ASSETS</b>		
<b>CURRENT ASSETS</b>		
Cash	\$ 673,472	\$ 412,363
Accounts receivable	43,744	42,955
Harmonized sales taxes recoverable	36,631	29,372
Prepaid expenditures	235,632	87,006
	989,479	571,696
<b>RESTRICTED CASH EQUIVALENTS (Note 2)</b>	50,000	50,000
<b>PROPERTY AND EQUIPMENT (Note 3)</b>	14,660	5,062
	\$ 1,054,139	\$ 626,758

<b>LIABILITIES AND NET ASSETS</b>		
<b>CURRENT LIABILITIES</b>		
Accounts payable and accrued liabilities (Note 4)	\$ 12,808	\$ 50,229
Deferred revenue	-	34,441
	12,808	84,670
<b>DEFERRED CONTRIBUTIONS (Note 5)</b>	241,524	87,006
<b>NET ASSETS</b>		
Invested in property and equipment	14,660	5,062
Unrestricted	735,147	400,020
Externally restricted (Note 2)	50,000	50,000
	799,807	455,082
	\$ 1,054,139	\$ 626,758

Economic dependence (Note 8)

Financial instruments (Note 9)

ON BEHALF OF THE BOARD:

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**STEM CELL NETWORK****STATEMENT OF REVENUE AND EXPENDITURES****YEAR ENDED MARCH 31, 2019**

	<b>2019</b>	<b>2018</b>
<b>REVENUE</b>		
Innovation, Science and Economic Development Canada Grant (Note 5)	\$ 5,845,482	\$ 6,135,878
Networks of Centres of Excellence Grant	25,000	-
Annual conference sponsorship and registration	432,328	279,048
Contributed services in-kind (Note 7)	71,280	71,342
Interest	18,119	8,105
	<b>6,392,209</b>	<b>6,494,373</b>
<b>EXPENDITURES</b>		
Administration and general support (Notes 6 and 7)	508,155	467,380
Amortization	4,990	4,532
Annual conference (Note 6)	623,317	582,393
Business development	10,953	13,743
Communication and outreach (Note 6)	552,823	410,028
Research programs (Note 6)	4,198,991	4,560,386
SCN board and committees	6,720	45,698
Training program (Note 6)	120,289	120,342
Workshops	21,246	76,493
	<b>6,047,484</b>	<b>6,280,995</b>
<b>EXCESS OF REVENUE OVER EXPENDITURES</b>	<b>\$ 344,725</b>	<b>\$ 213,378</b>



# STEM CELL NETWORK

## STATEMENT OF CHANGES IN NET ASSETS

YEAR ENDED MARCH 31, 2019

	2019				2018	
	Invested in Property and Equipment	Unrestricted	Externally Restricted	Total	Total	
<b>BALANCES AT BEGINNING OF YEAR</b>	\$ 5,062	\$ 400,020	\$ 50,000	\$ 455,082	\$ 241,704	
Excess of revenue over expenditures	-	344,725	-	344,725	213,378	
Amortization of property and equipment	(4,990)	4,990	-	-	-	
Acquisition of property and equipment	14,588	(14,588)	-	-	-	
<b>BALANCES AT END OF YEAR</b>	\$ 14,660	\$ 735,147	\$ 50,000	\$ 799,807	\$ 455,082	

**STEM CELL NETWORK****STATEMENT OF CASH FLOWS****YEAR ENDED MARCH 31, 2019**

	<b>2019</b>	<b>2018</b>
<b>OPERATING ACTIVITIES</b>		
Excess of revenue over expenditures	\$ 344,725	\$ 213,378
Adjustments for:		
Amortization	4,990	4,532
Recognition of deferred contributions	(5,845,482)	(6,135,878)
Changes in non-cash operating working capital:		
Accounts receivable	(789)	119,071
Harmonized sales taxes recoverable	(7,259)	(29,372)
Prepaid expenditures	(148,626)	(43,221)
Accounts payable and accrued liabilities	(37,421)	(388,467)
Deferred revenue	(34,441)	14,441
	<b>(5,724,303)</b>	<b>(6,245,516)</b>
<b>FINANCING ACTIVITIES</b>		
Proceeds from deferred contributions	6,000,000	5,205,468
<b>INVESTING ACTIVITIES</b>		
Acquisition of property and equipment	(14,588)	-
<b>INCREASE (DECREASE) IN CASH</b>	<b>261,109</b>	<b>(1,040,048)</b>
Cash position at beginning of year	412,363	1,452,411
<b>CASH POSITION AT END OF YEAR</b>	<b>\$ 673,472</b>	<b>\$ 412,363</b>

# STEM CELL NETWORK

## NOTES TO FINANCIAL STATEMENTS

YEAR ENDED MARCH 31, 2019

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### GENERAL

The Stem Cell Network ("SCN") was established on November 19, 2001 as an independent not-for-profit corporation and accordingly, is exempt from income taxes. The mission of SCN is to be a catalyst for enabling translation of stem cell research into clinical applications, commercial products or public policy.

As of March 19, 2019, SCN was approved for Innovation, Science and Economic Development Canada ("ISED") funding of \$18,000,000 for fiscal years 2020 to 2022 inclusive.

### 1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

These financial statements have been prepared in accordance with Canadian accounting standards for not-for-profit organizations ("ASNFPO") and include the following significant accounting policies:

#### Revenue Recognition

SCN follows the deferral method of accounting for contributions. Restricted contributions are recognized as revenue in the year in which related expenditures are incurred. Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

#### *Grants*

Grant revenue represents funds received from the federal government for specific initiatives administered by SCN. Grant revenue is recognized as revenue when costs are incurred in relation to the specific initiatives. Grant funds that have not been fully spent at year end are reported as deferred contributions.

#### *Annual conference sponsorship and registration*

Registration fees and sponsorships to events, including the conference, are recognized as revenue in the year the event is held.

#### *Interest*

Amounts received for interest income are recognized as revenue when received or receivable if the amount can be reasonably estimated and collection is reasonably assured.

#### Contributed Services In-Kind

Because of the difficulty of determining their fair value, contributed services are not recognized in the financial statements unless a fair value can be reasonably estimated, the services are used in the normal course of operations and the provider of the services has explicitly defined the value of the services to SCN.

## STEM CELL NETWORK

### NOTES TO FINANCIAL STATEMENTS

YEAR ENDED MARCH 31, 2019

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#### 1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)

##### Research Programs Expenses

Costs relating to research programs are recorded as expenses when they become payable. The research grants are determined to become payable at the time when the board of directors approves the grant and the grant recipient investigator has submitted a signed acceptance of award and related documentation formally acknowledging the grant. Research grants that have been identified as payments in future periods are disclosed as commitments.

Should the recipients of the grants not fulfill their obligations, the funding will need to be returned to SCN. The return of funding is accounted for as a reduction to the research grant expenditure when it is determined by the board to become repayable.

##### Allocation of Expenses

SCN allocates subcontractors and salaries and benefits to applicable programs based on an estimate of the percentage of time spent on the program.

##### Cash and Cash Equivalents

Cash and cash equivalents include cash on hand, cash held on deposit with a Canadian chartered bank and highly liquid investments with original maturities of twelve months or less, including cashable guaranteed investment certificates. The fair value of cash equivalents approximates the amounts shown in the financial statements.

##### Foreign Currency Transactions

SCN uses the temporal method to translate its foreign currency transactions.

Monetary assets and liabilities are translated at the rate of exchange in effect at year end. Other assets and liabilities are translated at their historic rates. Items appearing in the statement of revenue and expenditures are translated at average year rates. Exchange gains and losses are included in the statement of revenue and expenditures.

##### Property and Equipment

Property and equipment are recorded at cost. Amortization is provided using the straight-line basis over the following periods:

Computer equipment	3 years
Furniture and fixtures	3 years

Amortization of an asset commences in the month of acquisition. No amortization is recorded in the month of disposal.



## STEM CELL NETWORK

### NOTES TO FINANCIAL STATEMENTS

YEAR ENDED MARCH 31, 2019

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#### 1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)

##### Financial Instruments

###### *Measurement of financial instruments*

SCN initially measures its financial assets and liabilities at fair value. SCN subsequently measures all its financial assets and financial liabilities at amortized cost.

Financial assets measured at amortized cost include cash, accounts receivable, and restricted cash equivalents.

Financial liabilities measured at amortized cost include accounts payable and accrued liabilities.

###### *Impairment*

Financial assets measured at amortized cost are tested for impairment when there are indicators of impairment. The amount of the write-down is recognized in the statement of revenue and expenditures. The previously recognized impairment loss may be reversed to the extent of the improvement, directly or by adjusting the allowance account, provided it is no greater than the amount that would have been reported at the date of the reversal had the impairment not been recognized previously. The amount of the reversal is recognized in the statement of revenue and expenditures. The accounts receivable is netted by an allowance for doubtful accounts of \$Nil (2018 - \$Nil).

###### *Transaction Costs*

Transaction costs are financing fees or costs that are directly attributable to the financial assets or financial liabilities origination, acquisition, issuance or assumption. Transaction costs relating to financial assets or financial liabilities that are carried at amortized cost or cost are netted against the carrying value of the assets or liabilities and then recognized over the expected life of the instrument using the effective interest method. All other transaction costs are recognized in the statement of revenue and expenditures in the period incurred.

##### Use of Estimates

These financial statements have been prepared by management in accordance with ASNFPO and accordingly, require management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amount of revenues and expenditures during the reporting period. Actual results could differ from these estimates. The significant estimates in the financial statements include the estimated useful lives of property and equipment, allowance for doubtful accounts, the potential recovery of research grants awarded, the amount of certain accrued liabilities and the allocation of salaries and benefits to applicable programs.

## STEM CELL NETWORK

### NOTES TO FINANCIAL STATEMENTS

YEAR ENDED MARCH 31, 2019

#### 2. RESTRICTED CASH EQUIVALENTS

Restricted cash equivalents are amounts invested in a non-redeemable guaranteed investment certificate (GIC) which is held by SCN's bank as collateral for their credit card account. The non-redeemable GIC bears interest at 0.5% and matures on March 19, 2020.

#### 3. PROPERTY AND EQUIPMENT

	2019			2018	
	Cost	Accumulated Amortization	Net	Net	
Computer equipment	\$ 42,326	\$ 37,622	\$ 4,704	\$ 5,062	
Furniture and fixtures	10,240	284	9,956	-	
	\$ 52,566	\$ 37,906	\$ 14,660	\$ 5,062	

#### 4. ACCOUNTS PAYABLE AND ACCRUED LIABILITIES

SCN does not have any government remittances owing at year end.

#### 5. DEFERRED CONTRIBUTIONS

Innovation, Science and Economic Development Canada ("ISED")

SCN was approved for ISED funding for \$6 million under the terms of the ISED program, ending March 31, 2019.

ISED funds are managed in accordance with the funding guidelines contained in the funding agreement between ISED and SCN, whereby the funding transits directly to SCN.

The changes in the deferred contributions balance for the period are as follows:

	2019	2018
Balance at beginning of period	\$ 87,006	\$ 1,017,416
Restricted contributions received	6,000,000	5,205,468
Amount recognized as revenue	(5,845,482)	(6,135,878)
Balance at end of period	\$ 241,524	\$ 87,006

## STEM CELL NETWORK

### NOTES TO FINANCIAL STATEMENTS

YEAR ENDED MARCH 31, 2019

#### 6. ALLOCATION OF EXPENSES

Subcontractors and salaries and benefits of \$891,161 (2018 - \$648,348) have been allocated as follows:

	2019			2018
	Subcontractors	Salaries and benefits	Total	Total
Administration and general support	\$ 945	\$ 347,316	\$ 348,261	\$ 296,409
Annual conference	-	31,796	31,796	24,589
Communication and outreach	114,636	167,072	281,708	159,562
Research	3,779	193,821	197,600	143,199
Training program	-	31,796	31,796	24,589
	\$ 119,360	\$ 771,801	\$ 891,161	\$ 648,348

#### 7. IN-KIND CONTRIBUTIONS

Under an agreement, the Ottawa Hospital Research Institute ("OHRI") provides administrative support services as well as office space and furniture without charging SCN. The value of the in-kind contributions received for services is estimated to be \$71,280 (2018 - \$71,342) and is recorded in administration and general support expenditures.

#### 8. ECONOMIC DEPENDENCE

SCN received ISEDC funds under a one year funding agreement. Revenues pertaining to this grant account for 91% (2018 - 94%) of SCN's revenue.

#### 9. FINANCIAL INSTRUMENTS

##### Risks

It is management's opinion that SCN is not exposed to significant credit risk, interest rate risk or concentrations of risk through its financial instruments. The following analysis provides a measure of SCN's credit exposure as at the statement of financial position date:

##### *Currency Risk*

Currency risk is the risk that the fair value of future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates.

SCN holds activities in foreign countries and as such is exposed to the fluctuations of foreign and Canadian currencies.

**STEM CELL NETWORK****NOTES TO FINANCIAL STATEMENTS****YEAR ENDED MARCH 31, 2019**

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**9. FINANCIAL INSTRUMENTS (continued)**Risks (continued)*Liquidity Risk*

Liquidity risk is the risk that an entity will encounter difficulty in meeting obligations associated with financial liabilities. SCN is exposed to this risk mainly in respect of its accounts payable and accrued liabilities. SCN manages its liquidity risk by monitoring its requirements through use of budgets and cash forecasts.

Credit Facility

SCN has access to \$50,000 secured credit on a credit card, bearing interest at 19.99% per annum, for which the balance is required to be fully paid on a monthly basis. The credit used at March 31, 2019 amounts to \$Nil (2018 - \$Nil).





**Stem Cell Network**  
Réseau de **cellules souches**