

Pair-o-Docs

Summer 2017

Volume 23

The official student newsletter of MD/PhD
program at the University of Toronto

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Message from the Director

The education of the next generation of physician scientists is central to the mission of the Faculty of Medicine at the University of Toronto. Our MD/PhD Program is a vital component of our education strategy.

As a physician scientist, I believe that discovery and innovation lie at the heart of improved health and cures for patients. My own career was nurtured by a previous generation of physician scientist educators. Our MD/PhD Program aims to continue this legacy of educating students in science and medicine so that they are well positioned for success as a physician scientist.

We live during a time of remarkable advances in the sciences that span the expanse of biomedical to health services research. Indeed, there has never been a time when it is so exciting to do science; never has there been such potential for discovery and application of these discoveries for the benefit of human health.

Within these pages you will find information relevant to those who seek entry into our MD/PhD Program, those who are currently students in our Program and our growing list of alumni.

A handwritten signature in black ink, appearing to read "Norman Rosenblum". The signature is fluid and cursive.

Norman Rosenblum, MD, FRCPC
Associate Dean, Physician Scientist Training Program

Incoming MD/PhD Students



Robert D'Cruz

I completed my undergraduate degree in biology at a small school in the United States called St. Bonaventure University, where I attended on a soccer scholarship and competed as an NCAA Division 1 student-athlete. In my later years of my undergraduate degree, I began to get involved and interested in research through working with some of my professors. After graduating in 2014, I came back home to Canada. I elected to continue doing research at the University of Toronto, where I completed a Master's degree with the Institute of Medical Science. Working and learning from clinician-scientists throughout my Master's experience drove me to pursue the MD/PhD program at the University of Toronto.

Research Interests

My past research focused on the molecular mechanisms of skeletal muscle atrophy. Moving forward, I am interested in understanding cellular signaling networks involved in renal development. As I continue in my academic and medical training, I look forward to working in the University of Toronto network. I am confident that the MD/PhD program here will nurture my interests and help prepare me as I move forward in my career.



Hannah Kozlowski

I completed my HBSc in Laboratory Medicine and Pathobiology with minors in Nanoscience and Immunology from the University of Toronto, Trinity College. During that time I was exposed to the power of the immune system and the complexity of our innate and adaptive responses to foreign microorganisms and our own dysfunctional cells. I began to explore this further by pursuing clinical research in transplant infectious disease and basic science research in HIV and Ebola. Although the body fascinated me, I was also interested to learn more about other research fields, particularly Nanoscience. I spent several months at the National University of Singapore taking Nanoscience courses and learning from experts in the field. Early on in my experiences I began to appreciate the relationship between medicine and research, and the unique role of a clinician-scientist. I believe the MD/PhD program at the University of Toronto is a great way for me to begin my career and has/will provide me with many opportunities to learn, develop and explore. Also, in the last few months I have realized and appreciated the power of mentorship even more than before. Outside of my aca-

demical life, I have been able to spend time doing things I enjoy: long distance running, traveling and baking.

Research background

My research interests revolve around nanodiagnostics, where we can use small particles to detect genetic material, or other molecules, in human samples to identify disease onset or outcome. I believe nanodiagnostics can be used to detect diseases sooner and improve clinical outcomes. Moreover, I believe this can be very important to developing inexpensive diagnostics for use in limited resource setting, such as third world countries.



Sivakami Mylvaganam

I grew up in Toronto and went to McGill University for an undergraduate degree in immunology. During my time there, I participated in a number of translational research projects in academic, pharmaceutical and public health settings. From these experiences, I developed an appreciation for how integrating basic science research and clinical medicine can have a positive impact. This inspired me to pursue an MD/PhD degree at the University of Toronto. Outside of academic life, I enjoy karate, reading and Indian classical music.

Research Interests

I am interested in how innate immune cells contribute to different disease processes.



Robin Oh

I completed a double specialist in Immunology and Physiology at the University of Toronto. Here, I learned about the complexities of molecular and genetic interactions that culminate to an overall physiological phenotype. I became interested in the MD/PhD program because I couldn't give up my love for research to pursue my dream of being a doctor. During my undergraduate studies, I fell in love with research through studying the role of Atypical Cadherin Fat on growth regulation and planar cell polarity in Dr. Helen McNeill's lab. The age-old questions in developmental biology are: How do cells know how big an organism should be, and how do they orient and organize themselves? For example, we never see a mouse the size of an elephant or an elephant the size of a mouse. Planar cell polarity refers to how cells know how to orient themselves amongst each other. Interestingly, the same genes involved in the processes that determine how our cells grow and orient themselves are often mutated in cancer.

Research Interests

Due to the way, our genes are programmed, several mutations must cooperate to set off the chain reaction that leads to cancer. If we can map and identify the complex interactions of gene mutations in cancers and their microenvironment, we can develop specific inhibitors that can potentially halt the start or metastasis of cancers. Previously, these studies took years because of the time it took to develop mouse models with multiple mutations. Now, with the advent of new technologies, these studies can be done within weeks in mouse and human models that directly mimic the tumor environment. For my PhD, I hope to tease out how dysregulation of signaling networks that interact with the Hippo pathway can lead to cancer pathogenesis and metastasis.



Kramay Patel

I completed my undergraduate degree through the Engineering Science program at the University of Toronto, graduating with a Bachelors of Applied Sciences (BASc), with a major in Biomedical Systems Engineering and a minor in Robotics and Mechatronics in 2016. During my undergraduate degree, I undertook research projects with the overall theme of improving trunk stability in individ-

uals with motor deficits caused by disease or traumatic injury. Through this experience, I had the opportunity to interact with both engineers and clinicians in a setting where the primary goal was to improve patient quality-of-life. I noticed that there was a stark difference in skillset and experience between the two professions and realized that there was a need for more individuals who could bridge the gap. I realized that there was a need for individuals who could not only identify clinical problems and frame them from a patient's perspective, but also have the technical skillset necessary to effectively approach and tackle these problems. I believe that clinician scientists are best suited to fill this gap and improve healthcare and its delivery, which is why I chose to pursue MD/PhD training. I chose to do so at the University of Toronto because of the immense diversity of research offerings here and a rich network of academic hospitals.

Research Interests

My undergraduate research work specifically focused on (1) understanding the biomechanics and electrophysiology of the human trunk and its responses to dynamic environmental perturbations and (2) developing neuroprostheses to improve dynamic trunk stability using a technology called Functional Electrical Stimulation. In my fourth-year thesis project, I undertook the development of a novel, single neuron-based brain machine interface in a rodent model, which could be used to improve the efficacy with which individuals with neuro-motor deficits interact with their environments. Through my PhD, I hope to further explore this field of intracortical brain machine interfaces.

I also hope to work on utilizing electrical stimulation techniques such as deep brain stimulation to augment memory function in both, healthy individuals and those suffering from cognitive deficits due to disease or injury.



Anum Rahman

I completed my undergraduate degree in Human Biology (specialist) and my Masters in Medical Biophysics (both at University of Toronto). Under the supervision of Dr. John Sled at the Mouse Imaging Centre, I studied how the pulse wave reflection in the mouse umbilical artery can be used to detect changes in placental vascular morphology. During my time here, the implications for translating this knowledge from mouse studies to human pregnancies led me to pursue the MD/PhD program. Apart from my research interests, I enjoy cooking numerous curries and playing volleyball.

Research Interests

I am interested in maternal/fetal health and find the relationship between the intrauterine environment and fetal development fascinating.

Doubly Dedicated to Defeating Disease

By Liam Mitchell
Photo by Julia Soudat

Robert Vanner wants you to know, he hasn't cured cancer. But, he has identified how in a common type of brain cancer in children — medulloblastomas — some cells can actually thrive during chemotherapy, making it difficult to fight. He also identified a drug that, in mice, could suppress this chemo-loving feature, making it possible to kill the tumor once and for all. He did that while also going to medical school. Vanner is one of two students who will be graduating as a double doctor from the University of Toronto on June 6, having earned both MD and PhD degrees. He talked to Faculty of Medicine writer Liam Mitchell on what made him doubly dedicated to defeating disease.



Isn't medical school difficult enough? Why did you decide to also do a PhD while earning your MD?

Well, this wasn't about just taking on another challenge. While doing research in undergrad I realized the thrill of making a discovery and learning something completely new. I was hooked and at graduation was weighing my options between doing doctoral studies first or an MD/PhD program. I was drawn to medical school by the chance to work with patients and the different rewards it might offer, and I haven't been disappointed. I felt research could improve my patient care, but also my interaction with patients could make my research more focused and fulfilling.

Tell me about your research.

I worked in Dr. Peter Dirks' lab at The Hospital for Sick Children, which focuses on brain tumours and stem cells. Not all cancer cells behave the same, so we set out to define the different types of cells in a tumour and how they grow the disease. I worked on medulloblastoma, which is a common type of brain cancer in children. We found that most medulloblastoma cells divide quickly, at least once a day. Surprisingly, tumours also have a tiny fraction of cells that rarely divide — on the order of once every three weeks — and look like the stem cells that build the developing brain. Using powerful genetic mouse models, we showed that the slowly cycling stem cells were at the root of tumour growth. While chemotherapy would kill off the dividing cells, the stem cells were resistant and caused tumours to recur. By identifying a drug that also killed the stem cells, we could shrink away mouse tumours

and keep them from growing back. This work was published in the journal *Cancer Cell*.

So, what are the next steps?

There are members of the Dirks lab that are continuing to work on this. It's really thrilling to think that work I started is going to continue and hopefully lead to new research papers and hopefully new treatments.

But for now, you need to focus on your residency, right?

Yes, I am very excited to be starting residency in Internal Medicine in Toronto. Patient care will come first, but since returning to medical school I've been working on a new project studying the genetics of B-cell leukemia, and I'll be looking to use some of the new skills I've picked up to continue to be productive as a resident. After a clinical fellowship and postdoc, the dream is to have a lab making discoveries relevant to patients I'll be treating in clinic, likely as an oncologist.

How did you find your experience at U of T?

I feel very fortunate to have been part of a program with such an outstanding group of students, some of whom have become close friends. U of T has a well-supported MD/PhD program with a strong sense of community thanks to its students and program director, Dr. Norman Rosenblum, who is very supportive of trainees. The last 8 years have been a blast. 🍷

Congratulations!

MD/PhD colleagues who matched in 2017

Jared Wilcox
(Neurosurgery, McGill)

Robert Vanner
(Internal Medicine, University of Toronto)

Susan Armstrong
(Anatomical Pathology, University of Toronto)

—

Pair-O-Docs would like to congratulate the graduating Class of 2017 and wish them the best on their future academic endeavours!

—

PhDs completed

Kirill Zaslavsky, Department of Molecular Genetics (Prof. James Ellis). Alterations in transcription and connectivity in stem cell-derived neurons of children with neurodevelopmental disorders. March 2017.

Nardin Samuel, Department of Medical Biophysics (Profs. David Malkin & Thomas Hudson). Genetic and Epigenetic Crosstalk Define TP53-Mediated Human Cancer Susceptibility. August 2016.

Linda Vi, Institute of Medical Science (Dr. Benjamin Alman), The role of macrophages in bone development, repair and aging. August 2016.

Sean Nestor, Institute of Medical Science (Dr. Sandra Black), Automated Brain Mapping to Evaluate the Relationship between Neurodegeneration, Cerebral Small Vessel Disease and Structural Covariance Network Disruption in Alzheimer's Disease. July 2016.

Robyn Elphinstone, Laboratory Medicine and Pathobiology (Dr. Kevin Kain). Investigating Mediators of Endothelial Dysfunction as Potential Therapeutic Targets in Severe Malaria. June 2016.

Lianne Rotin, Institute of Medical Science (Dr. Aaron Schimmer). Preclinical evaluation of synergistic drug combinations in acute myeloid leukemia. June 2016.

Xin (Kevin) Wang, Department of Laboratory Medicine and Pathobiology (Dr. Michael Taylor). Unmasking novel epigenetic mechanisms of medulloblastoma pathogenesis. June 2016.

Class Council Update



JIEUN KIM, CO-PRESIDENT



TIM RAPPON, CO-PRESIDENT



Photos: Ben Ouyang

It's been a year full of important milestones for the MD/PhD program and for our Class Council. In September, we welcomed our first incoming class under the new Foundations Curriculum. On top of adjusting to life as medical students, our six first-years have already made a significant contribution through their volunteering and spirit to our MD/PhD community. In October, we hosted our 3rd biennial MD/PhD Mentorship Symposium (MMS), which was a great success with 7 mentors and over 30 students participating. Our very own Dr. Norman Rosenblum and Dr. Sharon Straus delivered powerful keynotes packed with advice on building strong mentoring relationships. We had an excellent lunch catered by the Faculty Club and four rounds of mentor speed-dating to close out the Symposium. Thanks to the excellent work of the MMS Organizing Committee, the Symposium has fostered several continuing mentoring relationships.

Other highlights of the past year include a wonderful potluck and board game night in November organized by your hard-working social reps Nick and Swapna and Medical Student Research Day, spearheaded by Siraj and Tina. Other Class Council members made very important, yet less visible contributions: Robyn, our returning 2nd year rep, worked with UME leadership to advocate on behalf of next year's 2nd years who will transition into the new curriculum; Ben, our Pharm-You-See rep, has worked hard to sell 1st edition copies of Pharm-You-See and was instrumental in negotiating a new

contract with the MD/PhD Program at Cincinnati for a 2nd edition; Tina, our mentorship and CITAC rep, ensured the smooth functioning of our flagship longitudinal mentorship program; lastly, our newsletter editors, Ilya and Kirill, worked to update the design and shepherded the year-long process of assembling this very document. Beyond Class Council, we'd also like to take a moment to thank this year's student seminar presenters for sharing their amazing work and to recognize our faculty speakers for sharing their career advice and pearls of wisdom.

Looking ahead, we're excited to welcome our incoming class of 2017. We extend a big thank you to our amazing interview volunteers who have provided invaluable support throughout the process and worked tirelessly to answer questions and follow up with our offers. We have also been working closely with the organizing committee to plan our 2nd biennial MD/PhD Program Retreat, which will take place September 23rd-24th at YMCA Geneva Park. We are excited to announce our Keynote speaker for the retreat, Dr. Jason Berman, and our faculty facilitators: Drs. Gillian Hawker, Nicola Jones and Steven Chan.

In closing, we're also doing some spring cleaning of our own: we have started the process of revising the Class Council Constitution to better align roles on class council with our program's strategic priorities. It promises to be an exciting few months, and we look forward to working with all of you to provide the best possible MD/PhD student experience. 🌈

Message from the CITAC President



The Clinician Investigator Trainee Association of Canada is a national organization representing the needs of MD/PhD and Clinician Investigator Program (CIP) trainees. It is active in advocating for the sustainability of clinician-investigator training and providing educational and mentorship opportunities to its members. The annual CITAC conference will be held November 20–22, 2017 at Chestnut. All MD/PhD and CIP trainees are encouraged to join CITAC as members on our website www.citac-accfc.org

The clinician-scientist training pipeline in Canada is under threat. CIHR cancelled funding for MD/PhD programs in 2015 and slashed support for early career clinician-scientists. In many ways, one can be forgiven for feeling a bit pessimistic after having committed so much to the pursuit of this career. However, the pessimism is short-sighted and, I believe, will be short-lived.

Last year marked a year of several accomplishments for CITAC. In a collaborative effort with UBC, we completed the first-ever survey of Canadian MD/PhD alumni and the results are encouraging. Much like their counterparts in the US, Canadian MD/PhD programs are remarkably efficient at generating aca-

ademic researchers. Our work with the Mach-Gaensslen Foundation, which sponsors research fellowships for medical students and tracks outcomes, highlighted the importance of integrating research experience into medical training. In addition, our institutional rep initiative has paid dividends in allowing us to get a detailed view at the nature of MD/PhD training programs nationwide. We found that there is a large variety in the way different programs are structured and funded, and we were able to identify several important needs of trainees. Please visit our website at www.citac-accfc.org for more information.

This year, we have three goals:

Advocacy for sustainable clinician-scientist training in Canada

We hope to build on the data we have gathered by working with key stakeholders (AFMC, CSCI, CFMS, RCPSC) towards building a sustainable pipeline for clinician-scientist training in Canada. Over the years, the clinician-scientist in Canada has become a rarer breed, with MD/PhD graduates making a smaller proportion of each graduating class and at a rate that is 10 times less than that in the US. The fact that close to 2/3rds of Canadian MD/PhD graduates go on to establish careers as academic scientists highlights the critical contribution of MD/PhD programs to biomedical research. The temporary disorientation with respect to clinician-scientist training provides us with an opportunity to establish a national committee to work toward restoring funding, expanding clinician-scientist training capacity across Canada, and improving the training pathway at both the undergraduate and post-graduate levels.

Increasing Membership Engagement

Our surveys gave us important insight into the needs and outcomes of MD/PhD trainees. However, they are a snapshot in time. A key goal is to implement a longitudinal survey of trainees at various stages of training. This will allow us to understand how the goals, needs and motivations of trainees change as they move through this training pathway and help inform design of curricula.

In addition, while we are beginning to understand MD/PhD trainees better, we have little information about our members in Clinician-Investigator Programs. We will seek to gather data on CIP

program outcomes, and toward understanding the concerns of CIP trainees. This will allow us to serve our CIP members better and establish an evidence basis from which we can advocate for their needs. If you are a CIP and are interested in contributing to this initiative, please do not hesitate to get in touch.

Lastly, we encourage everyone to visit our newly-redesigned website at www.citac-accfc.org and register as a member. The clinician-scientist trainee community is highly dispersed across Canada, and having a central hub is indispensable for all of us to stay connected.

Exploring the engagement of clinician-scientist with biotech/pharma

There is tremendous opportunity for those with dual training in science and medicine to work at the intersection of clinical practice and research innovation. While most MD/PhD training occurs within the walls of academic health science centres, this year we aim to establish an initiative exploring how clinician-scientists engage with biotechnology industry. We have dedicated a working group within our executive team tasked with crafting workshops for our AGM and setting a foundation for a networking hub for clinician-scientists and industry.

The enthusiasm of everyone on the CITAC executive is what I believe will make these goals possible. Throughout my time with various student organization, I have not yet come across a team of more motivated, pleasant and hard-working individuals.

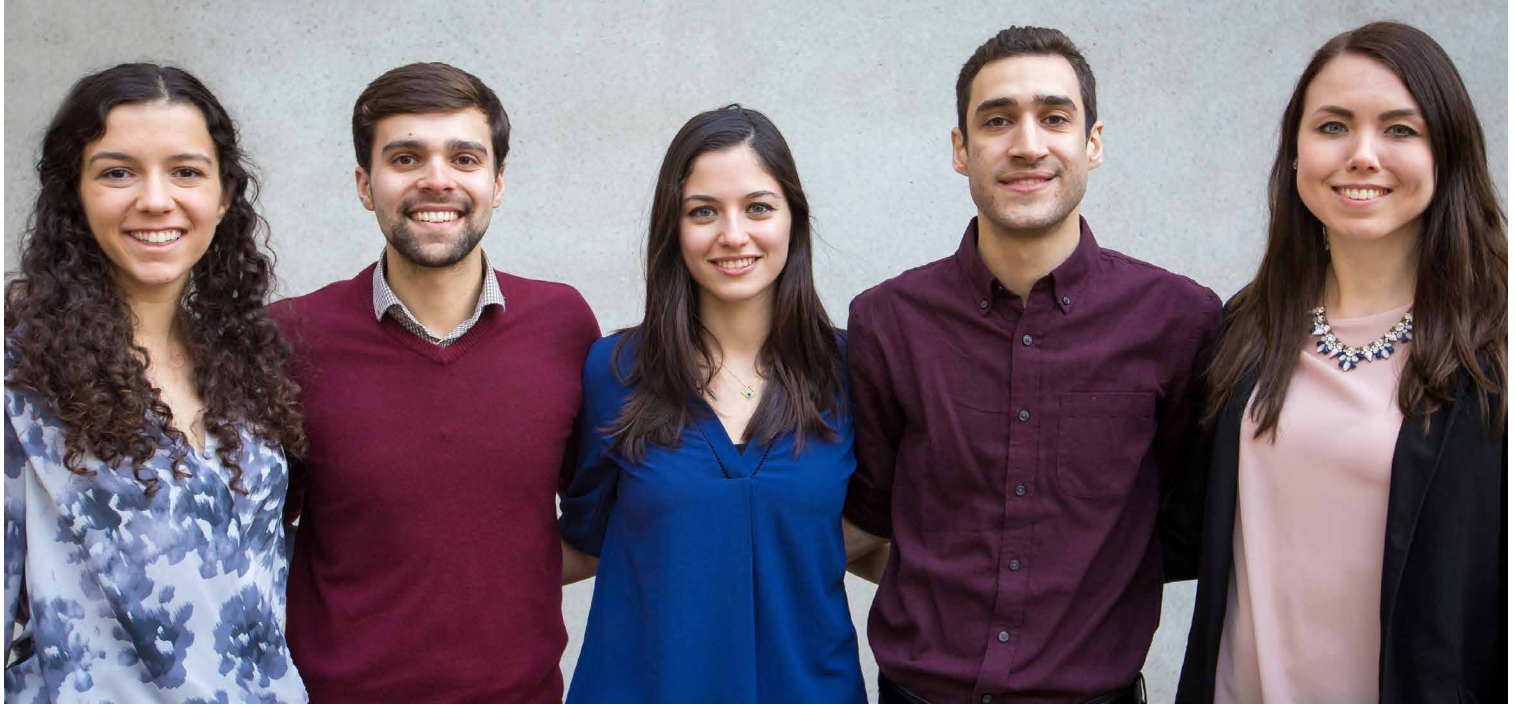
I am excited for the year ahead and hope you can will be with us for this journey. If you would like to contribute to any of these goals, do not hesitate to reach out. I hope to see you at our AGM in November 2017.

Sincerely,

A handwritten signature in black ink that reads "Kirill Zaslavsky". The signature is fluid and cursive.

Kirill Zaslavsky





Leadership in the MD/PhD Program

Deciding to commit 7-10 years of one's twenties to the MD/PhD program is not a choice made lightly. A wise mentor once said that one has to "have the fire in the belly" to succeed. Indeed, one quickly learns that charred intestines are pathognomonic for University of Toronto MD/PhD students. In addition to maturing into highly motivated and successful researchers, many students in the program become deeply involved with leadership locally, nationally, and internationally.

The long years in the program provide an opportunity to launch and complete large-scale, multi-year projects. The IMAGINE clinic for vulnerable populations in downtown Toronto was co-founded by our alumnus Sagar Dugani and still runs to this day. Ayan Dey co-founded and served as President of the Immigrant and Refugee Equitable Access to Community Healthcare (IREACH) initiative from 2012 to 2016. Currently, Ayan is running a 'Rehabilitation through Photography' workshop aimed at improving rehabilitation outcomes for patients and is interested in pursuing a career centered on neurerehabilitation.

Several students are involved in editing and producing medical textbooks that are sold internationally. Tina Binesh and Sydney McQueen are current editors-in-chief of the Toronto Notes, a medical guide selling close to 9000 copies annually. The proceeds fund student initiatives and numerous charities. Kirill Zaslavsky and Ilya Mukovozov han-

dle the business side of Toronto Notes by acting as production managers. In addition, MD/PhD students have co-created and co-edited other revenue-generating student publications – the Essentials of Clinical Examination Handbook (Kirill Zaslavsky) and Pharmacology You See (Janine Hutson, Sagar Dugani, and other past students). These initiatives require not only an aptitude for medicine and editing, but also promote the development of business skills. Students have been involved in the creation of not-for-profit corporations and the negotiation of international distribution deals with textbook publishers such as McGraw-Hill and Thieme.

Academically, MD/PhD students are active on a variety of topics. At least one of our students is involved in organizing the annual medical student research day. Another has recently co-chaired the annual research day for the department of IBBME. In 2012, Jon Fuller co-organized the first conference of its kind on the history of medicine in Toronto. He has also organized several workshops and is working on a podcast about philosophy of medicine. This year in June, he organized a philosophy of medicine roundtable in Toronto.

Numerous trainees also assume roles in local and national student leadership. Jieun Kim and Tim Rappon are currently MD/PhD class presidents. Jared Wilcox, Kevin Wang, Kirill Zaslavsky, and Josh Abraham have all served or are serving terms as President of the Clinician Investigator

Organizers of the Medical Student Research Day 2017. MD/PhD students Tina Binesh (middle) and Siraj Zahr (2nd from the right) alongside MD colleagues.

Trainee Association of Canada (CITAC), which represents clinician investigator trainees (MD/PhD students and residents in Clinician Investigator programs). Patrick Steadman, Sara Mirali, Tina Binesh, and Ayan Dey have also served in various roles with the organization, from developing policy recommendations to representing the organization internationally.

As one can imagine, this enthusiasm translates to a vibrant and active class council. In past years, the council has helped organize the MD/PhD longitudinal mentorship program and a mentorship symposium, providing opportunity for students to meet with established clinician-scientists, a key ingredient to success in this challenging career.

The interest in leadership has roots before entry into the program. Kramay Patel, a 1st year out of UofT engineering, has been President of Robotics for Space Exploration, a UofT engineering team, as well as president of the Sustainable Engineers Association. Hannah Kozlowski led the etiquette club at University of Toronto. Irene Harmsen served as Co-President of the Canadian Undergraduate Conference on Healthcare, as well as the executive member of the Triathlon Club at the University of Ottawa.

It is a privilege to spend a near-decade surrounded by these individuals. The boundless enthusiasm, energy, and creativity are infectious. The future is bright. 🌈

Pair-o-Docs

from left to right: Jieun Kim, Curtis Woodford, Robyn Elphinstone, Jon Fuller, Kirill Zaslavsky, Florence Wu. Not pictured: Amanda Khan, Natasha Lane



Going Back to Grade 20

Life in 2nd year medicine after finishing the PhD

By Kirill Zaslavsky with contributions from Robyn Elphinstone
Photo by Ben Ouyang

As I sit in class, I contemplate the 38 years of collective graduate school experience concentrated at the back row of the classroom. In our group of 8, our projects have spanned cancer research, infectious disease, stem cell biology, neuroscience, cancer, surgical engineering, health services research, and philosophy of medicine. Yet, we are all humbled by the breadth of medicine before us, how little of it we know and how much there is still to learn.

While the PhD can sometimes be an isolating experience, coming back to medical school is anything but. Navigating the regular flow of exams, lectures, assessments and small-group sessions with 250 other students stands in stark contrast to the sometimes haphazard schedule of (failed) experiments and the reading of esoteric papers. The kindness and welcoming of our classmates has made this transition easy, and I feel tremendously lucky to be starting clerkship with them in the fall.

Prior to the PhD, it is hard to appreciate what a privilege it is to participate in small-group learning with just 5-6 other students. The preceptors for these sessions are rare individuals that are experts in their fields and are eager to teach, often devoting hours of their time every week to making sure students understand the material. For those of us that worked

as teaching assistants during the PhD, it is hard not to feel deeply grateful for the effort that they put in.

The PhD changes you. You become more critical. While there are some statements in medical school that are presented as facts, having gone through the process of fact creation makes you more apt to critically appraise them. Every day, you will be reminded that you have joined a profession that requires lifelong learning, that what is true today may not be true tomorrow, and that you have the experience and confidence to effect to these changes. There are research questions to be answered in every lecture.

As I think back now, I can only somewhat remember what it felt like to leave the class and begin graduate school. The feelings of uncertainty, doubt, and the nagging thoughts that your life is standing still while everyone else is moving forward have faded. In the long run, the PhD and the lessons you derive from it are completely worth it. The experience and life skills that you gain are incredibly valuable, and nothing quite beats the feeling of completing a project from start to finish. Figuring out a puzzle that nobody else has. And at the end of it all, it is good to be back.

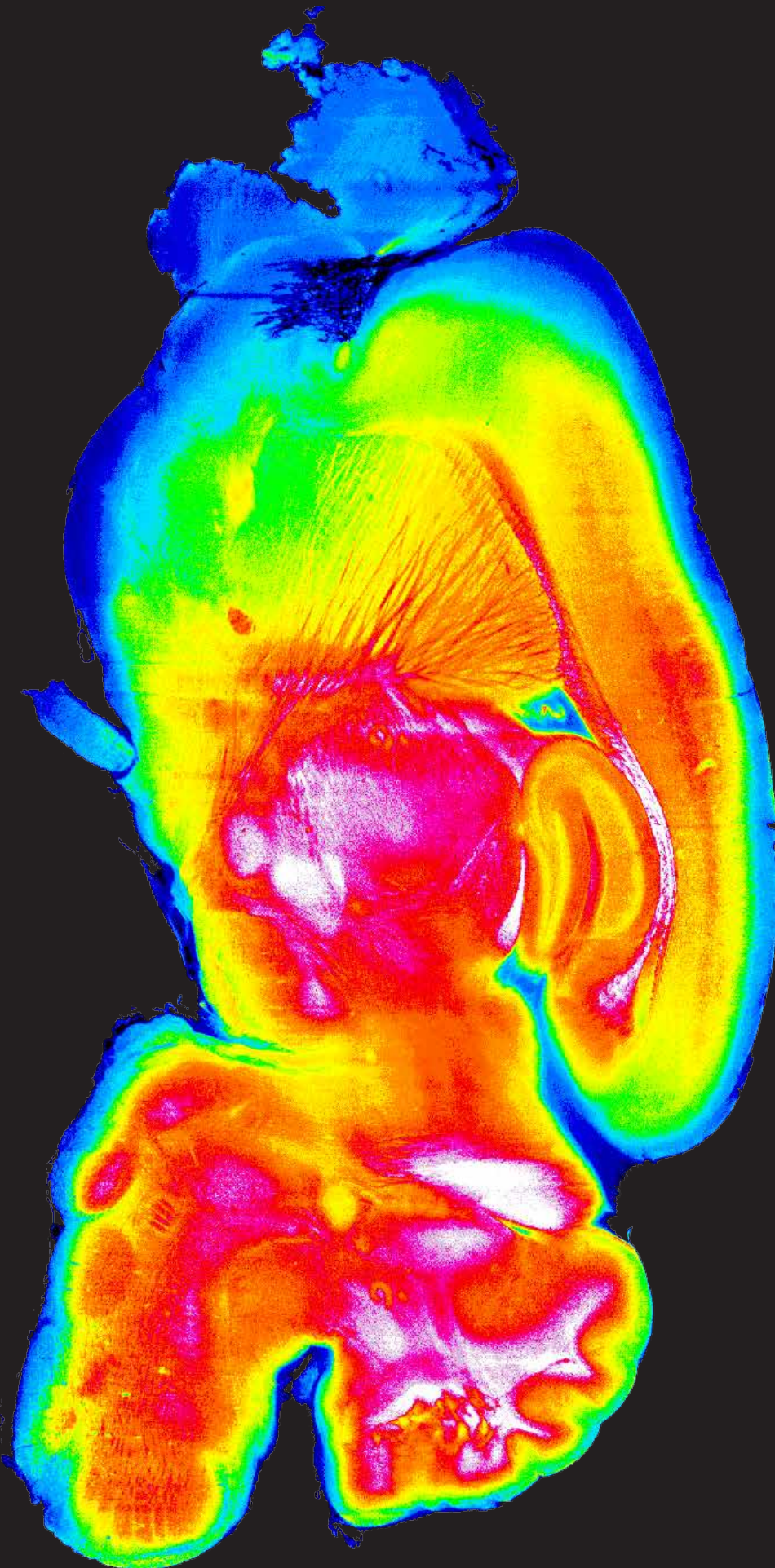


Fourth Annual Dramatic Data Showcase

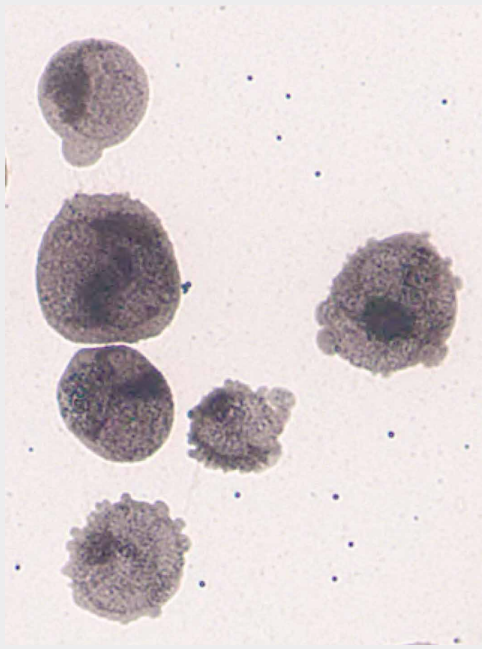
Is a picture really worth a thousand words? The question has never been precisely answered.

We asked our colleagues to provide some primary data for this year's showcase to get a clearer idea.

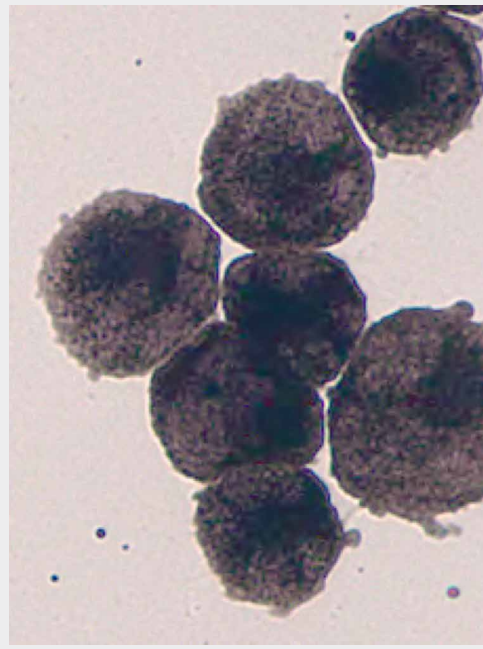
On this page and the next are some brief tidbits from the exciting research University of Toronto MD/PhD students are engaged in.



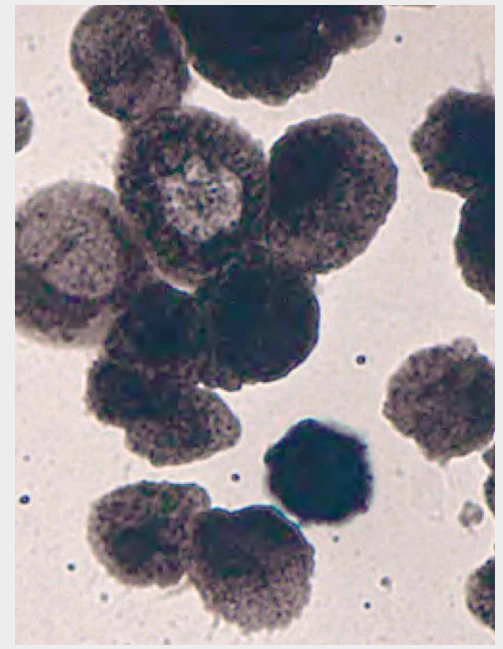
Pair-o-Docs



1 Control shRNA



2 TAZ-shRNA1



3 TAZ-shRNA2

Knocking down the cardiolipin remodeling enzyme tafazzin (TAZ) and thereby altering mitochondrial phospholipids increases non-specific esterase activity (dark blue stain) in leukemia cells. This suggests that, altering mitochondrial phospholipids induces leukemia cell differentiation. **AYESH SENEVIRATNE**

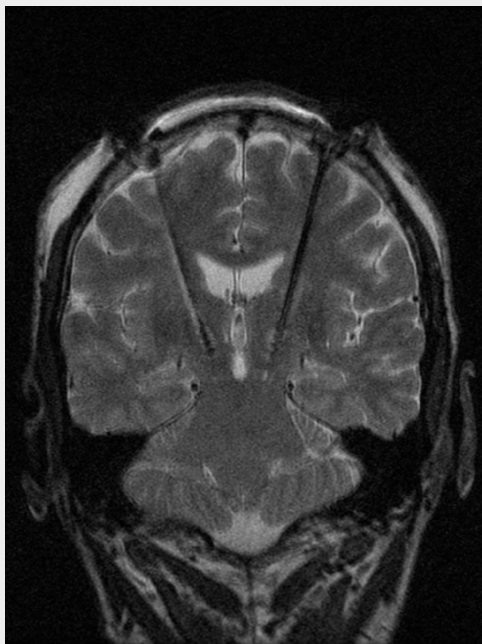


Figure 1

Coronal high resolution T2-weighted magnetic resonance image (MRI) of deep brain stimulation (DBS) electrodes. Image taken on post-operative day 1 following the implantation of bilateral leads in the subthalamic nucleus (STN) for the treatment of tremor-dominant Parkinson's disease.

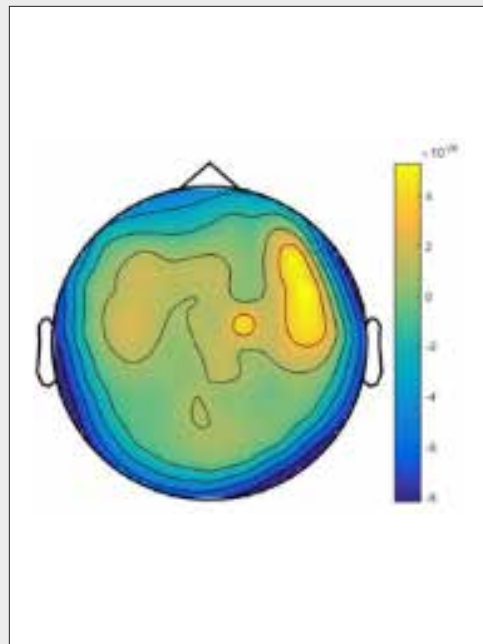


Figure 2

Cortical response to subthalamic nucleus (STN) stimulation in a patient with Parkinson's disease. Cortical activity recorded by magnetoencephalography (MEG) with deep brain stimulation (DBS) ON versus OFF. Frequency difference topoplots represent net beta-band (13-30 Hz) brain activation in MEG sensor space, whereby red regions represent an increase in power from the DBS OFF state.

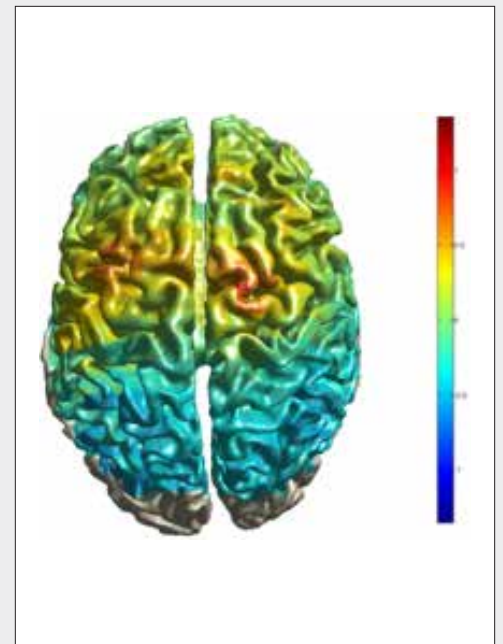


Figure 3

Source localization of cortical changes induced by subthalamic nucleus (STN) deep brain stimulation (DBS) as measured by magnetoencephalography (MEG). Surface localization illustrating motor activation with DBS ON. The MRI-derived surface model was estimated from T1-weighted structural volumetric images. **IRENE HARMSEN**

Alumni Q&A

Interview by Kirill Zaslavsky
and Ilya Mukovozov



Rohit Bose

Grad year:
2008

Department during PhD studies:
Molecular Genetics

Title of PhD Project:
Cell and Tissue Polarity Regulation by Signaling Pathways

Residency Program:
Weill-Cornell (Internal Med), and Memorial Sloan Kettering Cancer Center (Med Onc)

Current Status:
Instructor at Memorial Sloan Kettering Cancer Center (Applying for PI jobs now)

How did you choose your PhD project?
First project in my lab was going nowhere, so I joined a fellow grad student who needed assistance on a cell polarity project.

Briefly, what was your PhD project about?
I studied how epithelial cell and tissue polarity is regulated by the TGF β and Wnt signaling pathways

Did your PhD project influence your choice of specialty and if so, how?

Yes, after studying cancer signaling pathways, I decided on medical oncology.

What appeals to you most about your career?
As a physician-scientist, I like attempting to advance a field of medicine. It also gives hope to patients and the public-at-large that we are not content with the status quo in fields such as oncology.

What did you find most challenging during the program?
Going back to medical school while still working in the lab.

What did you find most enjoyable during the program?
Monthly seminars and dinner afterwards. It's important for trainees to share their experience which is distinct from most other medical or graduate students.

What did you find the most valuable during the program?
Experience of senior MD/PhD trainees, as well as prior graduates of the program.

What do you feel is valuable for MD/PhD trainees to learn during their degree that they do not get exposure to?
Personally, I don't think more is needed. MD/PhD trainees will be exposed to a huge range of things over a long period of time.

For students in their first year, what are important qualities of a good supervisor?
Success of prior trainees is something that can be tangibly ascertained. Your 'chemistry' and gut feeling about a potential supervisor are equally important intangibles. I have been fortunate to choose superb PhD and postdoc supervisors.

Do you feel you have changed as a person throughout the MD/PhD program and if so, how?
I'm way way older and super satisfied.

Knowing what you know now, how would you advise your younger self if you were starting the program today?
I think it's important for each student to find their own way, make their own mistakes. So I wouldn't advise people per se, but rather share my own experiences, and let others draw their own conclusions from that. 🌈

Awards

Alainna Jamal was awarded the 2017 Mary Cassidy Award in recognition of outstanding contribution to extracurricular activities in the Faculty of Medicine.

Amanda (Amy) Khan is the 2017 recipient of the Mary Cassidy Award, in recognition of outstanding contribution to extra-curricular activities in the Faculty of Medicine.

Amanda (Amy) Khan is the 2016 recipient of the Ankle Award, awarded to a medical student who has completed a project that represents creative, or “outside the box” thinking with an outcome or outcomes related to improved health systems, patient care, research results or new ways of completing tasks that enhance medical practice, for her project, “Defining the Safe Limits of Force in Laparoscopic Surgery.”

Amanda (Amy) Khan was awarded the 2016 Peri-operative Services Innovation Grant from the Hospital for Sick Children, Toronto.

Amanda (Amy) Khan was selected as one of Canada’s Most Powerful Women: Top 100 by the Women’s Executive Network (WXN).

Sean Nestor was awarded the Siminovitch-Salter Award for his PhD Thesis.

Ayesh Seneviratne has been awarded a three year CIHR Doctoral Research Award for his project, “Role of Tafazzin in Hematopoiesis and Leukemogenesis.”

K. Josh Abraham is the 2016 recipient of the Mr. Robert and Ms. Francine Ruggles Innovation Award for his outstanding research productivity and innovation.

K. Josh Abraham earned 1st place prize for top basic science abstract selected for oral presentation at UME’s 2016 Medical School Research Day and the 1st place poster prize at Lab Medicine and Pathobiology (LMP) Graduate Research Conference, Toronto, ON.

K. Josh Abraham is the 2017 recipient of the Adel S. Sedra Distinguished Graduate Award.

Caitlin Chrystoja is the recipient of a 2016 CIHR Vanier Award.

Robert Civitarese received a 2016–17 Ontario Graduate Scholarship.

Ayan Dey received the 2016 Dr. Harvey Moldofsky Scholarship for merit in psychiatric/neuroscience research. He also received the Heart and Stroke Foundation Canadian Partnership for Stroke Recovery 2016 Trainee Award for the project “Functional Neuroimaging of vascular cognitive impairment due to Cerebral Small Vessel Disease.”

Nicholas Howell received the 2016 Nishant J. Fozdar Memorial Award by the Faculty of Medicine.

Sachin Kumar received the Michael Gregg Memorial Award through the UME.

Natasha Lane was awarded the 2016 Ted Goldberg Award for Academic Excellence and Promise in Health Services Research.

Natasha Lane was awarded 1st Place in Oral Presentation Competition and 2nd Place in Poster Competition at the Four City Geriatric Research Day.

Chris McFaul received an NSERC CGS-M.

Sydney McQueen received “Best Poster Award” at the Medical Student Research Day (MSRD) at the University of Toronto.

Ben Ouyang received a CIHR Vanier and a Cecil Yip Doctoral Research Award.

Siraj Zahr received a CIHR CGS-M award, and a poster prize at Medicine By Design 2016 Inaugural Symposium.

Tim Rappon is the 2017 recipient of the Canada Vanier Graduate Scholarship

Alainna Jamal is the 2017 recipient of the Canada Vanier Graduate Scholarship

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Pair-o-Docs

A blue-tinted photograph of the University of Toronto campus and downtown skyline. The image shows a mix of modern high-rise buildings and older, more traditional university buildings. In the foreground, there's a large, open area that looks like a sports field or a courtyard. The sky is a clear, deep blue.

Pair-o-Docs is annual the newsletter of the MD/PhD Program at the University of Toronto. Vol. 23 was produced by Kirill Zaslavsky and Ilya Mukovozov, who are current students in the program.