



# UBC MD PhD

**UBC MD/PhD Program**  
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## Newsletter – 2019 Winter

<http://mdprogram.med.ubc.ca/mdphd/news/>

### Student Research Forum & Open House

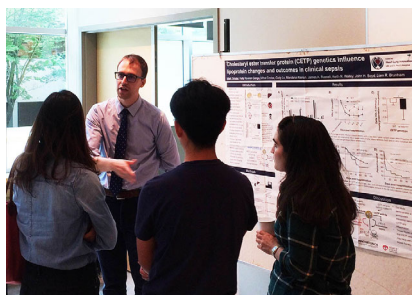
The 19<sup>th</sup> annual UBC MD/PhD Student Research Forum and Open House was held on Friday, 7 September 2018, 1:30-5:00 pm, at Michael Smith Laboratories, UBC Campus. This annual event is to showcase the research being done by our students, and to answer questions from prospective new students and from faculty interested in our program. Opening remarks by **Dr. Torsten Nielsen**, Director of the MD/PhD Program, set off the annual event.

Sincere thanks to our invited guest speaker, **Dr. François Bédard**, Department of Radiology, UBC. He made a fabulous presentation on his active research, discussed how he combines his clinical work and research, and shared his experience on a career path of a clinician scientist in medical imaging – including an important story about how chemistry and physics training can help in cancer care.



**Drs. François Bédard and Torsten Nielsen**

- Poster presentations describing active research by our current MD/PhD students included:  
**Daniel Kwon**, “Synthesis and evaluation of a Ga-labelled peptidomimetic inhibitor of matriptase for PET Imaging”  
**Mark Trinder**, “Diagnostic utility of next-generation sequencing for familial hypercholesterolemia” and  
“Cholesteryl ester transfer protein genetics influence lipoprotein changes and outcomes in clinical sepsis”  
**Cynthia Ye**, “Linkage analysis and whole genome sequencing analysis in familial isolated strabismus”



**Mark Trinder**



**Alvin Qiu**

- Student presentations:  
**Wissam Nassrallah**, **Adam Ramzy** and **Mark Trinder** talked about their experiences in their MD/PhD training.

Thanks also to **Alvin Qiu** and **Daniel Kwon**, our student representatives, for organizing the event.

## UBC's MD/PhD Program Admissions & Advisory Committee 2018-2019

The MD/PhD Admissions/Advisory Committee consists of four ex-officio members and seven appointed members. Ex-officio members hold standing spots on the committee because of their primary positions: the Assistant Dean of MD Admissions, the Assistant Dean of Graduate & Postgraduate Education, the MD/PhD Program Director and the MD/PhD Program Associate Director. Appointed members are composed of clinician-scientists, basic scientists, graduate program advisors, student research supervisors and one senior student representative. To ensure that the MD/PhD Committee may benefit from maximum faculty and program involvement, diverse ideas and a healthy turn-over rate, the appointed members' terms are for three years, renewable once. The full Committee meets at least twice a year to review the admissions process and to finalize the ranking of MD/PhD applicants, as well as to discuss program policy. Members of the Committee also frequently serve on MD/PhD students' Thesis Research Supervisory, PhD Comprehensive Examination and PhD Final Oral Examination Committees.



**Shahin Shirzad, MD**

Assistant Dean, Admissions, Undergraduate Medical Education, Faculty of Medicine, UBC



**Wendy Robinson, PhD**

Assistant Dean, Graduate & Postgraduate Education, Faculty of Medicine, UBC



**Torsten Nielsen, MD/PhD**

Director, MD/PhD Program, UBC

Professor, Department of Pathology & Laboratory Medicine, UBC



**Lynn Raymond, MD, PhD**

Associate Director, MD/PhD Program, UBC

Professor, Department of Psychiatry, UBC



**Shernaz Bamji, PhD**

Professor, Department of Cellular & Physiological Sciences, UBC

Scholar, Michael Smith Foundation for Health Research



**Julie Bettinger, PhD**

Associate Professor, Department of Pediatrics, UBC

Scholar, Michael Smith Foundation for Health Research



**Liam Brunham, MD/PhD** (Alumnus, UBC MD/PhD Program)

Assistant Professor, Department of Medicine, UBC

Principal Investigator, Centre for Heart and Lung Innovation, UBC & St. Paul's Hospital



**Eric Jan, PhD**

Professor, Department of Biochemistry and Molecular Biology, UBC

Graduate Admissions Advisor, Department of Biochemistry and Molecular Biology, UBC



**Alice Mui, PhD**

Associate Professor, Department of Surgery, UBC

MD Undergraduate Education, UBC



**Millan Patel, MD**

Investigator, BC Children's Hospital

Clinical Assistant Professor, Department of Medical Genetics, UBC



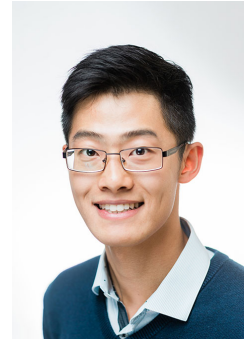
**Alvin Qiu**

Year 3, MD/PhD Student, UBC

# UBC MD/PhD PROGRAM

## MD/PhD Student Representative - Alvin Qiu

**Alvin Qiu**, Year 3 student, is our 2018-2019 student representative, supported by alternate student representative **Daniel Kwon**, and **Sandy Wright**, our student representative at the Southern Medical Program. The major responsibility of the student representative is to sit on the MD/PhD Admissions/Advisory Committee. Other duties include helping to organize the MD/PhD monthly student meetings/seminars and presenting at student events to promote the MD/PhD Program. Prospective applicants are welcome to contact any of our students to ask questions. <http://mdprogram.med.ubc.ca/mdphd/students/>



Alvin Qiu

### Message from Alvin:

Serving as the 2018/2019 student representative for the UBC MD/PhD Program has been an absolute pleasure this year. Thus far, I have had the distinct opportunity to represent my accomplished peers and promote our distinguished program at events like our annual Open House. Moreover, I have been able to tap into my secret passion in event-planning to host and organize social events for the current students. Undeniably, one of the greatest joys of acting as the student representative has been working alongside our Director, **Dr. Torsten Nielsen**, and Associate Director, **Dr. Lynn Raymond**; their wisdom and guidance have been invaluable. Of course, the support of our amazing Program Coordinator, **Jane Lee**, has always kept us all afloat.

As a quick personal background, I was born in Shanghai, China and grew up in Toronto, ON. Throughout my undergraduate degree, I was involved in research projects at the Princess Margaret Cancer Centre at the University of Toronto and the Montreal Neurological Institute at McGill University. I completed my BSc in Honours Anatomy and Cell Biology at McGill University prior to starting school here.

I humorously reflect on my earliest encounter with the term “MD/PhD” at the end of grade 9. Back then, I did not know the difference between an MD and PhD! Yet, I boldly presented my final summative project in Career Studies, a mandatory half-credit course for all Ontario high school students, on the possibility of completing an MD/PhD and becoming a clinician-scientist. My decision to pursue this demanding combined degree, in truth, is multifactorial. Partially, my involvement in undergraduate research had inspired me to pursue graduate training simply out of wonderment for the scientific discovery process and the quest to contribute new knowledge. Indeed, the ability to directly impact patients day-to-day led me towards medical training as well. Even in my limited clinical experiences to-date, I have seen preceptors struggle with accepting routine gaps persisting in clinical practice that desperately require solutions. Fortunately, by integrating scientific research with clinical medicine, there is the hope of altering disease outcomes for patients. As I have gotten to meet clinician-scientists in various fields, I continue to marvel at their unique positions in both the realms of medicine and science, further cementing my own belief that this career path, although challenging, is ultimately worthwhile.

This is my third year in the MD/PhD program. As such, I have completed the first two years of medical school, and have begun my first year of full-time PhD research. My doctoral work is under the supervision of **Dr. Martin Hirst** and **Dr. Torsten Nielsen** and is centred around the epigenomics of synovial sarcoma. Synovial sarcoma is a highly aggressive soft-tissue cancer that predominantly affects adolescents and young adults. This malignancy is characterized by a unique chromosomal abnormality that ultimately dysregulates critical genes via epigenetic modifications. The exact mechanisms of how these aberrant processes drive this cancer are poorly defined and controversial. By understanding the epigenomics of synovial sarcomas, we hope to guide the use of emerging epigenetic therapeutic agents in the treatment of this deadly disease.

## MD/PhD Student Representative – Alvin Qiu (con't)

Outside of medical school and the lab, I have been actively involved with the UBC Medical Journal (UBCMJ) and the Medical Education Committee (MEC) for the past several years. I have also had the pleasure of helping organize the Students in Health Annual Research Conference (SHARC)/FLEX Activity day for the past two years. My primary interests outside of school and the academic environment lie in piano, hiking, biking, swimming and snowboarding. Moving out west to Vancouver has incited a deep passion within me for the outdoors. Without a doubt, music and time in nature have been my outlets to unwind. I re-iterate my graduate student profile advice to be cognizant of the demands of academia, and balance it with a positive outlook to cherish life and live each day to its fullest. On top of this, I greatly value the support of **Mark Trinder**, **Wissam Nassrallah** and **Daniel Kwon**, the other students in my cohort and my very close friends; we continue to push each other to be the best versions of ourselves.

To those that read this, Happy New Year! I am looking forward to 2019!



From left: Mark Trinder, Wissam Nassrallah, Daniel Kwon, Alvin Qiu. A group Halloween costume in 2018 titled “Antibiotic Resistance.”

## Kudos

- **Philip Edgcumbe** won the Louis Lipsey Toohill Scholarship, for his outstanding academic achievement. In August 2018, Philip spoke to an audience of 700+ physicians and healthcare professionals at the Canadian Medical Association Health Summit about the challenges of scaling innovation in our healthcare system. We are excited to see Philip taking a leadership role in health policy conversations. Some of his talk has been posted [online](#) in the Day 1 highlights section.
- **Daniel Kwon** received a CIHR Travel Award to present in Chicago at the 104th Annual Meeting of the Radiological Society of North America, title of abstract “Synthesis and Evaluation of a 68Ga-DOTA Labelled Peptidomimetic Inhibitor of Matriptase for PET Imaging”. Daniel also received a Radiological Society of North America Student Travel Award for a top ranked abstract, and the Galloway Leukemia Research Fund Award (research into the causes of and cure for leukemia).
- **Wissam Nassrallah** represents the MD/PhD Program on the Faculty of Medicine Graduate Student Advisory Group. The purpose of the group is mainly to discuss issues directly related to graduate students, including development of graduate student focused initiatives.
- **Michael Skinnider** and **Jordan Squair** have identified a gene signature is linked to the severity of spinal cord injuries. The study “[Integrated systems analysis reveals conserved gene networks underlying response to spinal cord injury](#)” is published in the high impact open-access journal eLife.
- **Mark Trinder** won the Dorothy Helmer Scholarship in Medicine (research concerning infectious diseases).
- **Eric Zhao** is the recipient of the Lloyd Skarsgard Excellence in Research Award – for the top PhD student trained at BC Cancer who defended their PhD in 2018. Eric presented his PhD research “[Evolution and clinical relevance of mutational processes in cancer](#)” on Monday, 22 October 2018, at Gordon & Leslie Diamond Family Theatre, BC Cancer Research Centre. Eric’s research was hosted by the Graduate Program in Bioinformatics, supervised by **Dr. Steven Jones**. Eric is in the Class of 2020, and is currently completing his Med Year 3 curriculum.

**Congratulations!**



## Meet Our Incoming Students – September 2018



Andy An



Katrina Besler



Lianne Cho



Luke MacLean

Welcome to the Program!

**Andy An** is completing his research with **Dr. Robert Hancock** (Microbiology & Immunology). His research will focus on understanding the mechanisms of endotoxin tolerance in sepsis. Bacterial sepsis is best known for its hyperinflammatory phase – the “cytokine storm” – but new research has shown that immediately after or even concurrently with hyperinflammation, there is an immunosuppressive phase which persists long after the patient recovers from sepsis. This immunosuppression is suggested to be responsible for a higher risk of secondary infections, hospital readmissions, and mortality. One explanation for this immunosuppression is endotoxin tolerance, a phenomenon where monocytes and macrophages in septic patients no longer properly respond to infectious stimuli after repeated exposure to endotoxins such as LPS, resulting in a defective innate immune response. Andy is interested in the biological pathways involved in endotoxin tolerance, which may pave the way for determining new biomarkers to rapidly diagnose sepsis, as well as the epigenetic regulation of this process to determine why immunosuppression persists after recovery. Outside of school, Andy enjoys photography, pottery, playing volleyball, and creating educational medical videos on YouTube.

**Katrina Besler** is completing her research with **Dr. Gordon Francis** (Experimental Medicine). Katrina grew up in Port Coquitlam, BC, and completed her BSc. Honours in Molecular Biology and Biochemistry at Simon Fraser University in 2018. Her undergraduate thesis examined inflammatory signaling in endothelial cells as a mechanism in transplant vasculopathy. Katrina continues to study arteries at the Centre for Heart Lung Innovation, where her PhD project focuses on atherosclerosis. Atherosclerosis is the leading cause of death in Canada and the world, in the form of heart disease and stroke, and involves the formation of cholesterol-rich plaques in the arteries. The Francis lab recently discovered that the majority of cells making up these plaques are derived from smooth muscle cells (SMCs). Cholesterol-loaded SMCs are deficient in a key enzyme, lysosomal acid lipase (LAL), which results in a reduced ability of these cells to export cholesterol. Katrina will investigate the effect of increasing LAL activity in SMCs on the progression and regression of atherosclerosis in mice. She hopes that research in this field will lead to new and better treatments and outcomes for patients with atherosclerosis and other conditions. Outside of academics, Katrina enjoys being with her family and friends, playing softball, attempting to play instruments, and admiring nature.

**Lianne Cho** is completing her research with **Dr. William Honer** (Neuroscience). Lianne completed her undergraduate degree at Brown University (Providence, RI), where she studied affective processing in the Clinical and Affective Neuroscience Lab. She also conducted research in Toronto and the Bronx (New York, NY), which led her to appreciate how the distinct characteristics of a population inform what is needed to build an effective healthcare system for a particular community. At UBC, Lianne aims to study the relationship between early life experiences and mental illness as part of the Hotel Study, which examines multimorbidity in those who are marginally housed. Lianne is interested in research that combats the idea that there is a universal approach to health. By investigating how life experiences, social environments, and cultural elements interact to inform well-being, her objective is to contribute to the advancement of personalized mental healthcare. Outside of academics, Lianne enjoys dancing, baking, and spending time with loved ones.

**Luke MacLean** is completing his research with **Dr. Antony Hodgson** (Biomedical Engineering). Luke completed his undergraduate degree in honours mechanical engineering with a minor in biomedical engineering at McGill University. At that time, he worked amongst three lab groups involved in carbon nanotube nanocarrier design, control systems for automated 3D cell culturing and motion-capture for biomechanical posture modelling. He then completed an MHSc degree in clinical engineering at the University of Toronto where his research was focused in surgical tool design and surgical robotics. He designed and built a prototype for supporting the open-chest of newborn patients in critical care post-unsuccessful sternal closures. He also supported the development of a custom neuro-bipolar for the da Vinci Surgical system, a sound coordinating unit for anesthesia equipment, and a stand-alone mechatronic platform for endoscopic ear surgery. At the same time, he worked as a clinical engineer at Toronto General Hospital where he wrote the laser safety manual for the UHN, and developed a software tool for tracking medical equipment. At UBC, he will continue to focus on translating mechanical engineering into the surgical sphere. In particular, he will be developing computer-navigation and robotic-guidance to support orthopaedic surgery procedures. In his free time, Luke enjoys running, playing intramurals, skiing, playing guitar and any opportunity for travel.

## PhD Comprehensive Exams

Congratulations! **Paulina Piesik** and **Jennifer Ji** passed their comprehensive examinations and have been admitted to candidacy. Our updated policy states that students will follow the comprehensive examination guidelines of their hosting department for completion of their exam and advancement to candidacy, without additional or alternate regulations being imposed by the MD/PhD Program.

	Exam date	Research supervisor	Research topic
 <b>Paulina Piesik</b>	13 August 2018	<b>Dr. Jan Dutz</b> Experimental Medicine	Using the skin immune system to treat inflammatory disease.
 <b>Jennifer Ji</b>	28 September 2018	<b>Dr. David Huntsman</b> Pathology & Laboratory Medicine	Targeting the epigenome-metabolome interactions in clear cell renal cell carcinoma.

## PhD Defense – Jordan Squair

**Jordan Squair** successfully defended his [PhD dissertation](#) on 4 September 2018, and therefore has completed the graduation requirements for the PhD portion of his studies with our combined program, over a year ahead of schedule! Jordan started in the program in August 2015, with a MSc degree already in hand, and because he has now finished his PhD work so early, this gives him "bonus time" before his return to medicine in Med 3 in spring 2020. Jordan is currently enjoying that time by undertaking additional postdoctoral training at the École Polytechnique Fédérale de Lausanne in Geneva, Switzerland, in a world-renowned lab. Congratulations!

Research supervisors: **Dr. Andrei Krassioukov** and **Dr. Christopher West**

Hosting department: Experimental Medicine Graduate Program

Dissertation title: “A translational approach to understanding and treating autonomic dysfunction after spinal cord injury”

### ABSTRACT

Spinal cord injury leads to immediate and permanent motor, sensory, and autonomic dysfunction. It is becoming increasingly recognized that autonomic dysfunctions are a top priority for individuals with spinal cord injury, lead to accelerated chronic health conditions, and impair quality of life. Fundamentally, autonomic dysfunctions after spinal cord injury, and cardiovascular dysfunction in particular, are caused by disconnection of descending sympatho-excitatory axons originating in the rostral ventro-lateral medulla and projecting to sympathetic pre-ganglionic neurons in the spinal cord. In this thesis, we develop a clinically relevant rodent model to study autonomic dysfunction after spinal cord injury, investigate the impact of neuroprotective pharmacology on autonomic function, and deploy a framework built around systems genetics to better understand how to target conserved molecular responses. Additionally, we use data from a multi-centre clinical trial to test whether optimization of cardiovascular parameters can be used as an immediately implementable ‘neuroprotective’ strategy to improve neurologic outcomes. We show that autonomic dysfunction including autonomic dysreflexia and cardiac dysfunction can be modelled in the rodent, and follow a severity-dependent pattern that is directly associated with the number of descending sympatho-excitatory axons. To help preserve these axons after injury, we show that one of the most promising neuroprotective drugs (minocycline) administered one hour after injury can improve autonomic function compared to saline controls. Next, we identify an evolutionarily conserved gene subnetwork that can be leveraged to identify novel treatments and biomarkers. Finally, we show that optimizing cardiovascular parameters leads to improved neurologic outcomes in humans with acute SCI. Overall, the work presented in this thesis provides key mechanistic and translational data that 1) increases our understanding of autonomic dysfunction after spinal cord injury and 2) provides tools to discover and translate novel therapies to the clinic.

## MD/PhD Social

The MD/PhD group and their families had a wonderful time in the afternoon of 26 August 2018. Our Program Director, **Dr. Torsten Nielsen**, kindly offered to host our annual summer social at his beautiful home in North Vancouver. We had a catered party with great food and a chance to swim in his warm pool. This annual event is to welcome our incoming students and serves as a great opportunity for our significant others to join us for fun. Some of the students also did the Grouse Grind that afternoon, and the group pictures turned out really well! Thanks everyone, for making this event so memorable!



## MD/PhD "Building Bridges Seminar Series" - ALL ARE WELCOME

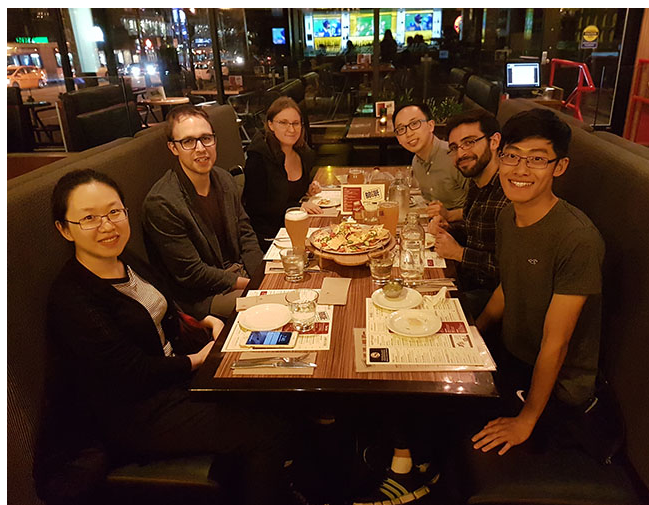
Our seminar series aims to illuminate the relationship that exists between clinical practice and medical research, allowing MD/PhD and other interested students to hear about different career tracks and various ways to combine clinical and research work.

In addition to speaking about their active research, the invited speakers discuss their experiences and training backgrounds, share their advice with prospective clinician-scientists, and give their opinions on career development options. All faculty, clinical investigator trainees of all stripes, students in the Faculty of Medicine and prospective applicants to our program are welcome. Our usual venue is at the Medical Student Alumni Centre, 6:00-7:00 pm, web link at <https://meet.vc.ubc.ca/webapp>.

Invited speakers:

- 15 October 2018. **Dr. Blair Leavitt**,  
Department of Medical Genetics, UBC
- 26 November 2018. **Dr. Haakon Nygaard**,  
Fipke Professor in Alzheimer's Research,  
Faculty of Medicine, UBC

Thanks go to the speakers for sharing their clinical and research experiences with us. For information on upcoming seminars, please visit our webpage at <http://mdprogram.med.ubc.ca/mdphd/seminars/>



The students often organize social events, here is a photo taken after the 15 October seminar.



## CSCI/CITAC Annual Conference and Young Investigators Forum

Our program funded five MD/PhD students to present their outstanding research at the Canadian Society for Clinical Investigation (CSCI) / Clinician Investigator Trainee Associate of Canada (CITAC) Young Investigators Forum, which was held 18-20 November 2018, in Toronto, Ontario.



**Wissam Nassrallah** (first row, left), “Neuroprotective effect of sigma-1 receptor on synaptic function and calcium handling in Huntington Disease”

**Alvin Qiu** (first row, right), “The SS18-SSX oncoprotein is directed by DNA methylation state to evict polycomb in primary synovial sarcomas”

**Daniel Kwon** (second row, left), “Synthesis and evaluation of  $^{68}\text{Ga}$ -labelled marimastat for PET imaging of matrix metalloproteinase activity in Ewing sarcomas”

**Mark Trinder** (second row, right), “Mutation status is an independent risk factor for cardiovascular disease in familial hypercholesterolemia”

**Kevin Fan** (third row, left), “Tumour-immune landscape and response to checkpoint inhibitors in diverse metastatic cancers”

Special congratulations go out to **Alvin Qiu** for winning a poster presentation award. He was also our institutional representative for UBC at the meeting.

## Comments and Suggestions

We welcome comments and suggestions to the UBC MD/PhD Program and to our newsletters. Please send comments to the MD/PhD Program office, 2894 Detwiller Pavilion, 2255 Wesbrook Mall, UBC, Vancouver, BC, Canada V6T 2A1. Phone: 1-604-822-7198 Fax: 1-604-822-7917 Email: [md.phd@ubc.ca](mailto:md.phd@ubc.ca) Website: <http://www.med.ubc.ca/mdphd>

Edited by Jane Lee, Program Coordinator, MD/PhD Program, UBC