# UBC MD/PhD Newsletter

## Winter 2024

## INTRODUCTION

**Happy 2024 everyone!** Hope you all had a good start to the year. To start off our 2024 at the MD/PhD program, we want to provide you with some brief summaries and highlights regarding things that have been going on and things that you can look forward to.

As promised in our last newsletter, here are our **new students** who joined the program last year. Please welcome…

## WELCOME INCOMING STUDENTS

Catie Futhey

Curtis Leclerc

Andrew Dissayanake

Kiera Lee

2775 Laurel street, Gordon and Leslie Diamond health care Centre, Vancouver, BC V5Z1M9
Email: md.phd@ubc.ca, Website: www.med.ubc.ca/mdphd

# STUDENT BIOGRAPHIES

**Catie Futhey, Class of 2029**
**Education**: BSc (Neuroscience), McGill University
**Field of study**: Neuropathology of Cognitive Impairment in Chronic Schizophrenia and Alzheimer's Disease
**Supervisors**: Dr. Veronica Hirsch-Reinshagen & Dr. Mark Cembrowski
**Hosting department and work location**: Neuroscience

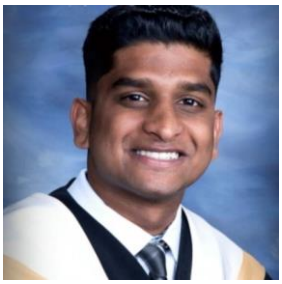
**Catie** grew up in Uxbridge, Ontario and completed her BSc in Neuroscience at McGill University. Here, her research with Dr. Jack Antel and Dr. Luke Healy investigated the roles of Vitamin D and sex differences in Multiple Sclerosis pathophysiology, sparking a passion for the neuro-immune crosstalk in the human brain. She then worked under the supervision of Dr. Manish Sadarangani in COVID-19 clinical research at BC Children's Hospital. Catie's PhD will be co-supervised by Dr. Veronica Hirsch-Reinshagen and Dr. Mark Cembrowski and will focus on the neuropathological underpinnings of Alzheimer's Disease (AD) and schizophrenia. She will explore potential novel biomarkers for subtypes of astrocytes, aiming to elucidate distinct roles for subpopulations of this critical glial cell. Using an innovative approach which allows for protein expression analysis while maintaining the brain's spatial anatomical integrity, she will compare the distribution of various markers of neuroinflammation, synaptic loss, and glial cell subtypes. Outside of research, Catie loves playing and writing music as a singer/songwriter, some of which she has recorded and released onto streaming platforms. She also enjoys running and hiking.

*Catie was featured in a new article that talks about research work and her experience as an MD/PhD student. You can find the full article here:*https://www.centreforbrainhealth.ca/news/trainee-profile-catie-futhey/

**Curtis Leclerc, Class of 2029**
**Education**: BSc (Kinesiology), MSc (Kinesiology), University of Manitoba
**Field of study**: Stereotactic Ablative Radiotherapy (SABR)
**Supervisor**: Dr. Robert Olson
**Hosting department and work location**: Interdisciplinary Oncology Program, BC Cancer Centre for the North (Prince George)

**Curtis** grew up in a small community in Northern Manitoba called The Pas. He completed his Bachelor's in Kinesiology at the University of Manitoba in 2020. During his undergraduate degree, Curtis worked in the Chronic Disease Prevention and Physical Activity Lab with Dr. Todd Duhamel where he found an interest in research investigating how lifestyle factors such as physical activity, sedentary behavior, and frailty can shape one's health. Following his undergrad, Curtis went on to complete a Master's of Science degree under the supervision of Dr. Gordon Giesbrecht. Curtis' MSc research focused on human responses to work in extreme environments. His thesis investigated the use of external cooling devices in preserving brain tissue after cardiac events such as a heart attack or stroke (a technique termed "Therapeutic Hypothermia"). Under the supervision of Dr. Robert Olson, Curtis is entering a new field where his PhD project will focus on a form of cancer treatment termed Stereotactic Ablative Radiotherapy. Curtis will be involved in the implementation of international clinical trials investigating the outcomes of patients receiving specialized radiotherapy treatments, with a particular emphasis on factors such as quality of life after treatment and the utility of using biomarkers to predict outcomes post SABR. He hopes that his research will lead to practical improvements in cancer care and make a real difference in patients' lives. Curtis will be breaking new ground, as our first MD/PhD student based in the Northern Medical Program! Outside of research, Curtis loves the outdoors and enjoys staying active while fishing, golfing, and hiking. Curtis is also an avid sports fan with a love for hockey

# STUDENT BIOGRAPHIES



**Andrew Dissayanake, Class of 2030**

**Education**: BSc (Arts and Science), McMaster University
**Field of study**: Epidemiology
**Supervisor**: Prof. Anne Gadermann
**Hosting department and work location**: School of Population and Public Health

**Andrew** completed his undergraduate degree in the Arts and Science program at McMaster University. During his studies, he actively engaged in research work at prestigious institutions, including the Hospital for Sick Children, Northern Ontario School of Medicine, and the Keenan Research Centre for Biomedical Science. Throughout his academic journey, Andrew explored a diverse range of research topics, covering areas such as physician retention in rural communities, genetic correlates of neuropsychiatric burden in Alzheimer's disease, psychometric measurement, polygenic architecture of irritability, and most recently, the examination of ethnic and racial disparities in access to mental health care within Canada. His primary passion lies in understanding and addressing barriers to providing timely and culturally competent care for racial and ethnically minoritized youth. Apart from his academic pursuits, Andrew enjoys both playing and watching various sports like tennis, basketball, and swimming. Additionally, he finds relaxation and fulfillment in activities such as skiing, reading, and cooking

**Kiera Lee, Class of 2030**

**Education**: BSc (Life Science), Queen's University
**Field of study**: The epigenetics of synovial sarcoma
**Supervisor**: Dr Martin Hirst
**Hosting department and work location**: Interdisciplinary Oncology, Michael Smith Laboratories

**Kiera** was born and raised in Toronto, ON. Kiera completed her BSc Honours at Queen's University, where she worked in the lab of Dr Katrina Gee. During her undergrad, she spent her summers working as a lifeguard on Toronto Island or doing research at Mount Sinai Hospital in the Lab of Dr Carol Swallow. In her summer research, Kiera discovered her passion for cancer research and began to see the unique interplay between clinical practice and research that can improve the lives of patients. Following her undergraduate degree, Kiera began her MSc at UBC under the supervision of Dr Torsten Nielsen and Dr Martin Hirst, investigating the epigenomics of synovial sarcoma. Kiera rolled her MSc into her PhD for the MD/PhD program to continue to uncover the epigenetic mechanisms of pathogenesis in synovial sarcoma and reveal therapeutic avenues for patients. Kiera enjoys travelling, biking, skiing, hiking, and any opportunity to lie outside in the sun.

# PROGAM UPDATES

## Policy Change

For our next Admissions cycle, we are changing our Referee and Reference Letter submission policy. Previously, applicants' referees needed to submit their letters for the application to be complete within a week of the October application deadline (i.e. a week from when applicants submit their application). We will be extending that deadline by at least a month (details will be posted on our application site in summer 2024).

# PROGAM UPDATES

## Open house and Admissions 2024

Our program hosted our annual open house webinar event on Tuesday, 12th September, 2023. It was attended by 70+ interested potential applicants who got to ask our program directors, and current MD/PhD students direct questions about the program. We also had the privilege of hearing from our invited speaker, current committee member, as well as a program alumnus – **Dr. Paul Yong**.

This open house and other outreach efforts have contributed to our program receiving more than 65 applications for the upcoming MD/PhD 2024 Admissions cycle.

For more information, please follow our Research Forum & Open House webpage: https://mdprogram.med.ubc.ca/mdphd/mdphd-program-research-forum-and-open-house/ In August 2024 this will carry an update about the date of and program for the September 2024 UBC MD/PhD open house event!

**Dr. Paul Yong** completed a MD/PhD degree in Experimental Medicine in 2006 and completed Residency in Obstetrics & Gynaecology in 2011 at UBC. He became an Associate Professor in the UBC Department of Obstetrics and Gynaecology, Division of Gynaecologic Specialties, in 2012, after completing a fellowship in endometriosis, pelvic pain, and advanced laparoscopic surgery. To date he's received research funding from the Canadian Institutes of Health Research, the Canadian Foundation for Women's Health, the Women's Health Research Institute, and the University of British Columbia. Paul has also been awarded infrastructure funding from the Canadian Foundation for Innovation with matching funds from the BC Knowledge Development Fund. In 2015, he obtained the VCHRI Mentored Clinician Scientist Award.

## Congratulations to our program director!

This October, our program director, **Dr. Torsten Nielsen** was inducted into the Canadian Academy of Health Sciences', a national group that brings together Canada's top-ranked health and biomedical scientists and scholars to make a positive impact on the health concerns of Canadians. These Fellows are drawn from all disciplines across our nation's universities, healthcare and research institutes and evaluate Canada's most complex health challenges to recommend strategic, actionable solutions.

# PROGAM UPDATES

## Turnover of Committee Members

We would like to give a very big thank you to our committee members, Drs. **Thalia Field** and **Karen Cheung**, who recently completed their 3-year terms. Thank you for your hard work and support!

And would like to give a very warm welcome to Drs. **Lara Boyd** and **Sarah Gray** who joined the committee in July 2023. Welcome to the team!

**Professor**, Department of Physical Therapy, Faculty of Medicine, UBC

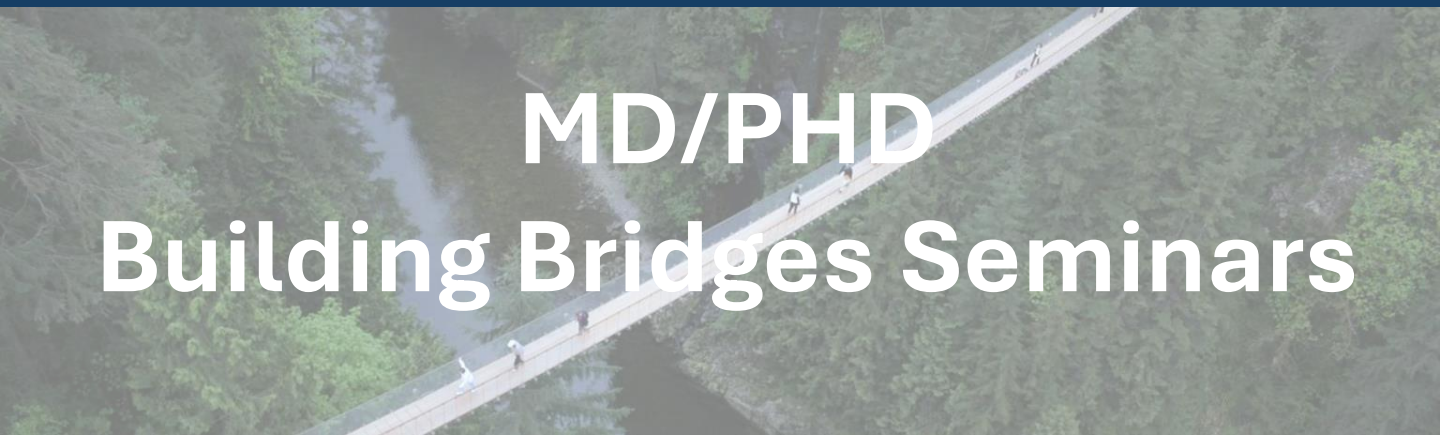
**Professor**, Northern Medical Program
**Research Lead**, Division of Medical sciences

**Dr. Boyd** is a Neuroscientist and Physical Therapist at the University of British Columbia. She is a professor who has held a Canada Research Chair, a Michael Smith Foundation for Health Career Scientist award and been a Peter Wall Early Career Scholar. Dr. Boyd directs the Brain Behaviour Lab at the University of British Columbia. Her TEDx talk “After this your brain will not be the same” has over 25 million views. Dr. Boyd is an expert in mapping how behaviours, environments and experiences affect brain health and learning using techniques such as magnetic resonance imaging and non-invasive brain stimulation.

To date this work has largely examined the impact of exercise and learning on neurobiology. In 2020 she became a Wall scholar turning her attention to developing understanding of the importance of the arts for brain health.

**Dr. Gray** joined the Northern Medical Program in 2007 and became a Canada Research Chair in the Integrative Physiology of Diabetes and Obesity in 2013. She completed a PhD in endocrine physiology at the University of Victoria, followed by postdoctoral training in at the University of Cambridge, and the University of British Columbia. She is a life science researcher examining the biological mechanisms of metabolism as it relates to obesity and type 2 diabetes and teaches endocrine physiology in the UBC undergraduate medical program. Dr. Gray’s research group at UNBC provides training opportunities in lab-based science for research fellows, graduate students and undergraduate students based in Northern B.C.

Dr. Gray’s research focuses on how hormones regulate energy metabolism. Energy balance is achieved by balancing the amount of energy we take in (appetite) vs the energy we burn (metabolism, physical activity and thermogenesis). These processes are regulated by hormones, which when disrupted contributes to increased adipose tissue that functions improperly. Her lab uses molecular biology and physiology in an integrative approach to study the foundational physiological processes regulating energy metabolism. This information provides insights into why changes in adipose tissue function, as seen in obesity, increase the risk for metabolic disease, such as diabetes.



# MD/PHD Building Bridges Seminars

Our seminar series aims to illustrate 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 for clinician-scientists. Here are the presenters we had over the last few months:

## BUILDING BRIDGES SPEAKERS

***Date:*** *11 September 2023****, Invited speaker:*** *Dr. Michelle Wong, MD, FRCPC*
***Assistant Dean Student Affairs Fraser,*** *MD Undergraduate Program, Clinical*
***Associate Professor,*** *Faculty of Medicine, University of British Columbia*
Dr. Wong is a Hematopathologist at RCH and also currently one of the Student Affairs Deans in the UBC Medical School. She presented the supports that are available from Student Affairs to MD/PhD students followed by a talk from our Associate Director, Dr. Liam Brunham.

***Date:*** *23 October 2023****, Invited speaker:*** *Dr. Haakon Nygaard MD, PhD*
***Associate Professor,*** *Division of Neurology, Department of Medicine, Faculty of Medicine*
***Director****, UBC Hospital Clinic for Alzheimer and Related Disorders*
To better understand the healthy brain, Dr. Nygaard leads a project to sequence the genomes of centenarians in search for a genetic cause of dementia-free aging. As both a clinician and a scientist, Dr. Nygaard hopes to bridge the gap between basic science and clinical neurology to facilitate novel therapeutic development in Alzheimer's disease. He talked about his training background, career path and current work. He also shared his recommendations for clinician-scientist trainees.

***Date:*** *18 December 2023,* ***Invited speaker****: Dr. Julia Naso, MD, PhD*
***Clinical Assistant Professor****, Department of Pathology & Laboratory Medicine, UBC, Vancouver General Hospital*
Dr. Naso recently returned to Vancouver after completing a fellowship in Pulmonary Pathology at Mayo Clinic Rochester. She did her residency training in Anatomical Pathology through UBC, and is a graduate of our MD/PhD program, with her PhD in the Genome Sciences and Technology program (supervised by Marco Marra) and her undergraduate training at the University of Alberta in Molecular Genetics. She is presently supported by UBC to develop an independent research program in thoracic malignancies, while also serving as a consultant pathologist at VGH. Her research interests include translating novel molecular testing approaches into clinically available tests that aid in the diagnosis and characterization of lung cancers. Dr. Naso talked about her training background, career path and current work. She also shared her recommendations for clinician-scientist trainees.

# BUILDING BRIDGES SPEAKERS

***Date:*** *27 November 2023,* ***Student speakers:*** *Maryam Vaseghi-Shanjani, MSc (Medical Science) and Lianne Cho, BSc (Neuroscience)*
Maryam and Lianne's presentation were to all our current MD/PhD students, who present to their peers as part of our seminar series at least once during their time in our program.

**Maryam** is a year 5 MD/PhD student and Vanier Scholar at the University of British Columbia (UBC). For her PhD, Maryam is working in Dr. Stuart Turvey's lab to study single-gene defects that result in primary immunodeficiencies. Her talk was titled: The discovery and characterization of novel monogenic causes of allergic diseases in humans.

**Lianne** is a year 5 MD/PhD student supervised by Dr. William Honer. Lianne is studying the relationships between early life experiences, trauma, substance use, and mental illness as part of the Hotel Study, which examines multimorbidity in those who are precariously housed. Lianne is interested in exploring different ways of knowing, and in investigating how life experiences, social environments, and cultural elements interact to inform well-being. Her talk was titled: Characterization of depression among homeless and precariously housed adults.

Pictured below is a photo from one of our student socials that are hosted by the program after the Building Bridges Seminars (dinner & networking event open to all current MD/PhD students):

# STUDENT LIASON

**Shayda Swann**, Year 5 student, is our 2023-2024 student liaison, supported by alternate student representative **Saif Dababneh**. The major responsibility of the student liaison is to sit on the MD/PhD Admissions/Advisory Committee. Other duties include helping to organize the MD/PhD monthly student meetings/seminars, student socials, attending national MD/PhD meetings and presenting at student events to promote the MD/PhD Program.

## Message from Shayda

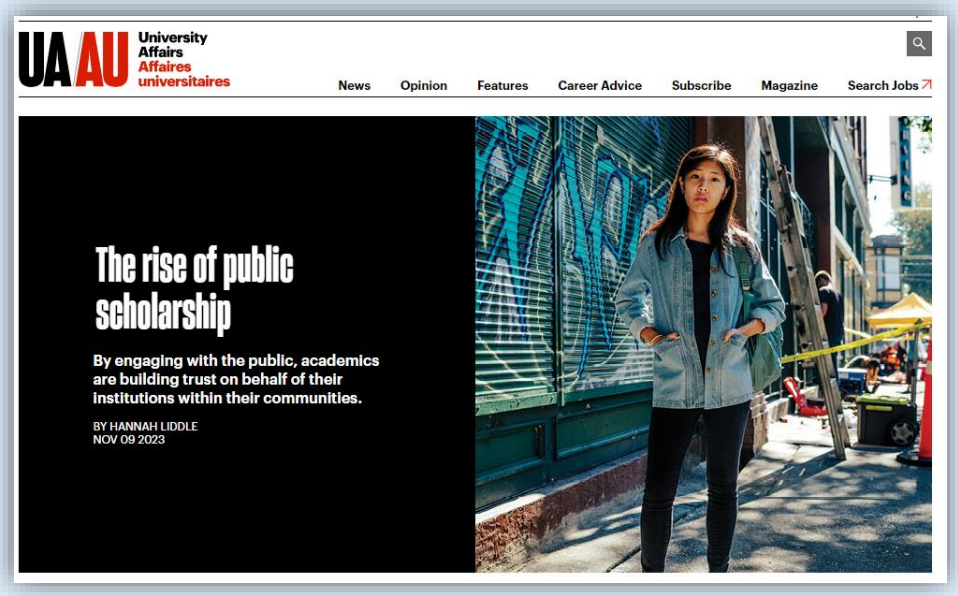
Hi everyone! I'm Shayda, a fifth-year MD/PhD student and this year's Student Liaison. Originally from Montana USA, I now call Vancouver home where I live with my husband and our blind cat, Fergie.

My love for research began during my undergraduate years at Simon Fraser University, where I completed a Bachelor of Science in Health Sciences. Starting my research career in wet lab basic science work, first studying drug delivery mechanisms to treat *Vibrio cholera*, I later transitioned to HIV immunology and cure research. This work, with Drs. Mark Brockman and Zabrina Brumme, solidified my interest in everything HIV related, from its basic pathophysiology to potential cure strategies, to how HIV stigma continues to affect people living with HIV today. I continued this work after graduation with the BC Centre for Excellence in HIV/AIDS, where I was employed as a Research Assistant and helped to establish the first HIV wet lab in Vancouver's Downtown Eastside.

Now as a UBC MD/PhD student, I've continued my passion for HIV research with a project focused on how HIV affects women's hormones and health outcomes as they age. I also study aging experiences that are unique to women, such as menopause. In this capacity, I've been incredibly fortunate to work with a team of supervisors and mentors, including Drs. Melanie Murray, Helene Cote, Angela Kaida, and Elder Valerie Nicholson. You can read all about our study on our website. I am also honored to work with a team of Community Research Associates (women living with HIV who are partners in our study) to conduct this research and share our results with the HIV community through numerous knowledge translation and exchange activities. For example, I recently collaborated with these community partners to organize a knowledge sharing retreat with our study participants. My goal as a future clinician-scientist is to continue working with women living with HIV and other equity-deserving populations as an Infectious Disease specialist.

Prospective applicants are welcome to contact not only Shayda, sswann19@student.ubc.ca, but any of our students to ask questions at: http://mdprogram.med.ubc.ca/mdphd/students/

# STUDENT ACHIEVEMENTS




**Lianne Cho,** a year 5 MD/PhD student, was featured in a new article that talks about her Public Scholars Initiative work, along with other projects across the country. You can find the full article here:

https://www.universityaffairs.ca/features/feature-article/the-rise-of-public-scholarship/

Our recent 2023 graduates, **Jordan Squair** and **Michael Skinnider**, published the research article below in the journal *Science*. *Science* has been at the center of important scientific discoveries since its founding in 1880—with seed money from Thomas Edison. Today, *Science* continues to publish the very best in research across all fields, with articles that consistently rank among the most cited in the world

NEUROSCIENCE

## Recovery of walking after paralysis by regenerating characterized neurons to their natural target region

Jordan W. Squair[1,2,3]*†, Marco Milano[1,3]†, Alexandra de Coucy[1,3], Matthieu Gautier[1,3], Michael A. Skinnider[1,3], Nicholas D. James[1,3], Newton Cho[1,3], Anna Lasne[1,3], Claudia Kathe[1,3], Thomas H. Hutson[1,3,4], Steven Ceto[1,3], Laetitia Baud[1,3], Katia Galan[1,3], Viviana Aureli[1,2,3,5], Achilleas Laskaratos[3,5], Quentin Barraud[1,3], Timothy J. Deming[6], Richie E. Kohman[4], Bernard L. Schneider[1,7,8], Zhigang He[9], Jocelyne Bloch[1,2,3,5], Michael V. Sofroniew[10]‡, Gregoire Courtine[1,2,3,5]*‡, Mark A. Anderson[1,3,4,5]*‡

https://www.science.org/doi/abs/10.1126/science.adi6412?af=R&utm_source=sfmc&utm_medium=email&utm_campaign=SCIeToc&utm_content=alert&et_rid=40174630&et_cid=4910273

**Michael Skinnider** also submitted a prize winning essay to *Science* titled “From single cells to neural circuits”. Full article can be viewed here

https://www.science.org/doi/10.1126/science.adk3912?utm_source=sfmc&utm_medium=email&utm_content=alert&utm_campaign=SCIeToc&et_rid=40174630&et_cid=4966393

NEUROSCIENCE

## From single cells to neural circuits

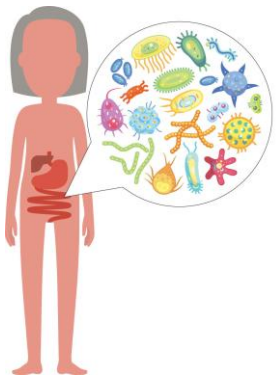
Neural circuits are mapped in high throughput with single-cell genomics

*By* **Michael A. Skinnider**[1,2]

# STUDENT ACHIEVEMENTS


**Maggie Chopra**'s abstract was ranked one of the top entries in an abstract competition for the 2023 Till & McCulloch Meetings (TMM2023), Canada's premier stem cell and regenerative medicine research event. Maggie was invited to give a 12-minute oral presentation of her research in a plenary session at this event in October 2023, thanks to generous travel support provided by BCRegMed. Hosted annually by the StemCell Network, this event brings together stem cell and regenerative medicine scientists, clinicians, bioengineers, and ethicists, as well as representatives from industry, government, health, and non-profit sectors from Canada and abroad. Maggie's talk was titled "Early-life gut microbiome metabolites shape the epigenome of blood progenitors and alter immune development and susceptibility to allergic asthma".

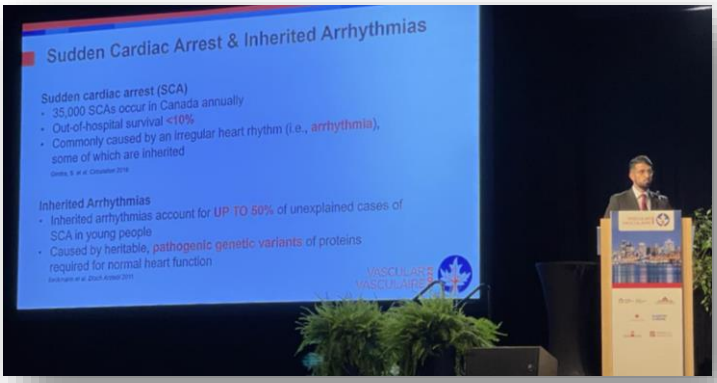
**A description of the work she shared at the meeting is described below:**



*The prevalence of allergic diseases has risen significantly in recent years, now affecting approximately 30% of the global population. Increasing evidence suggests that early-life environmental factors such as antibiotic use and birth via caesarian section may, in part, drive allergic disease. However, a predisposition towards allergies may be established earlier during fetal life. Preliminary data from our lab suggests that children who develop allergies later in life show unique immune cell signatures at time of birth. In mouse models, we have previously shown that perinatal vancomycin treatment (from pregnancy through weaning) depletes short-chain fatty acid (SCFA)-producing bacteria and enhances allergic inflammation in the offspring, which is reversible by SFCA supplementation. This suggests microbiome-derived metabolites influence immune development early in life and may skew fetal/neonatal hematopoiesis, imparting long-term impacts on offspring immunity. To probe SCFA's role in the allergic response, we conducted bone marrow (BM) transplant experiments and discovered that total BM from offspring with perinatal vancomycin exposure transplanted into normobiotic mice transferred the Th2 skewed immune phenotype and exacerbated allergic lung inflammation. ChIP-Seq and single-cell RNA-seq methods revealed unique regulatory states and transcriptomic signatures in hematopoietic stem and progenitor cells, reversed by SCFA supplementation. Our results suggest that the gut microbiome changes epigenetic programming and gene expression in blood progenitor cells, affecting long-term lung immune responses. Upcoming co-housing experiments where we transfer offspring from vancomycin treated mothers to normal cages (and vice versa) will elucidate whether the microbiome influences hematopoiesis prenatally and determine how modifiable these signatures are after birth.*

# STUDENT ACHIEVEMENTS

Our current, Alternate Student Liaison, **Saif Dababneh**, was selected as a top 2 finalist for the CCS Cardiovation Competition, at Vascular 2023 in Montreal, one of Canada's largest cardiovascular conference. The competition was based on novel innovations that have the potential to significantly improve cardiovascular care. Saif's innovation was titled "DEVELOPING A HUMAN STEM CELL-DERIVED HEART MODEL TO CHARACTERIZE A NOVEL ARRHYTHMIA SYNDROME". Saif pitched his innovation to a panel of “Dragons” including Dr. Chi-Ming Chow, Dr. Sonia Anand, Dr. Jasmine Grewal, Dr. Subodh Verma, and Dr. Hassan Mir.




**Abstract**: *Sudden cardiac arrest (SCA) is a devasting heart event with a 10% survival rate. In young persons and athletes, inherited arrhythmias may account for up to 50% of unexplained SCA cases. In 2021, a distinct inherited arrhythmia syndrome, called calcium release deficiency syndrome (CRDS), was described in patients carrying loss-of-function RyR2 variants. These patients present with SCA but appear normal on the exercise stress test. As a newly discovered arrhythmia syndrome, there is a tremendous gap in knowledge about disease mechanisms, diagnostics, and appropriate treatments, which must be addressed to avoid preventable morbidity and mortality. We have developed, to our knowledge, the world’s first human stem-cell based heart model to understand the molecular mechanisms of this disease, perform “clinical trials in a dish” to identify candidate treatments, and test out various electrical stimulation protocols that could be applied in clinical electrophysiology labs.*


**Catie Futhey**, a year 2 MD/PhD student, was featured in a new article that talks about research work and her experience as an MD/PhD student. You can find the full article here:

https://www.centreforbrainhealth.ca/news/trainee-profile-catie-futhey/

## STUDENT ACHIEVEMENTS

**Elizabeth Gregory** embarked on an external research rotation this past summer at the Weill Cornell School of Medicine in New York. There, she worked with Dr. Conor Liston, one of her supervisory committee members and a leading researcher in transcranial magnetic stimulation for psychiatric conditions, which is the focus of her PhD thesis.

*"I was lucky to work closely with researchers who are experts in cutting-edge techniques in this field of work, including neuroimaging and electrical field modelling. I am looking forward to ongoing collaborations with this group as I continue through my PhD. I am very grateful to the MD/PhD program at UBC for their support and encouragement in this undertaking"*

Elizabeth was awarded a **Brain Canada rising stars trainee award** in October: See the details here: https://braincanada.ca/announcements/twenty-one-grants-awarded-to-support-trainees-across-canada/

# STAY TUNED FOR OUR SUMMER 2024 NEWSLETTER

THE UNIVERSITY OF BRITISH COLUMBIA

### Comments and Suggestions

We welcome questions, comments and suggestions about our newsletters and our program. Please send comments to the MD/PhD Program office at: md.phd@ubc.ca