MURC

MULTIDISCIPLINARY UNDERGRADUATE RESEARCH CONFERENCE

2023 PROGRAM GUIDE

March 18, 2023

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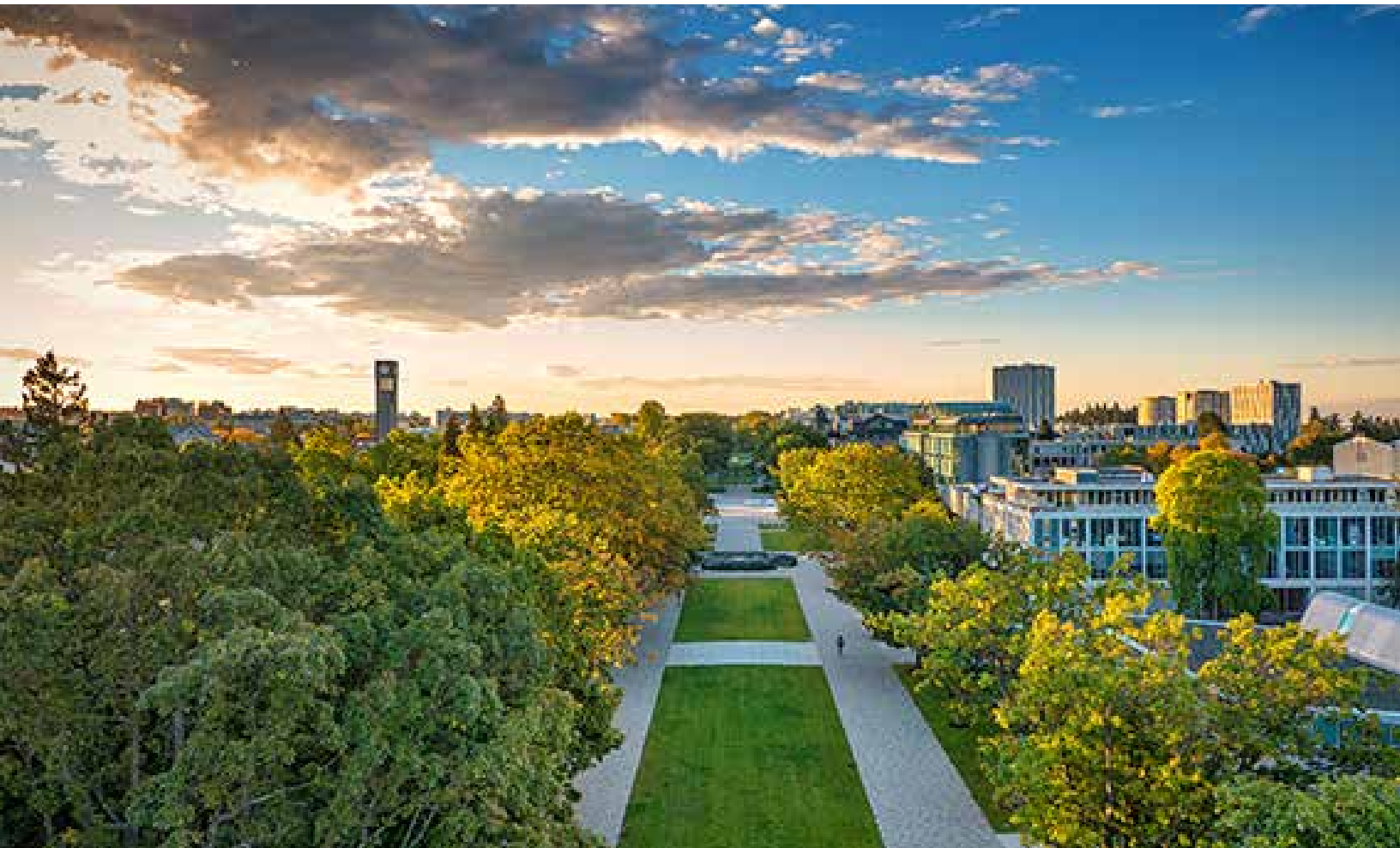
LAND ACKNOWLEDGEMENT

The lands of what is now known as British Columbia have been cared for and inhabited by Indigenous Peoples since time immemorial. We specifically acknowledge that UBC's Vancouver Point Grey campus is situated on the traditional, ancestral, and unceded territory of the Musqueam people, and UBC's Okanagan campus is situated on the traditional, ancestral, and unceded territory of the Syilx people. It is in this recognition of being on unceded land where we will ground our conversations of research further.

We also acknowledge that given the hybrid format of this year's conference, MURC participants will be joining this conference from many places, near and far, and we also acknowledge the traditional owners and caretakers of those lands.

Learn more: What is a land acknowledgement?

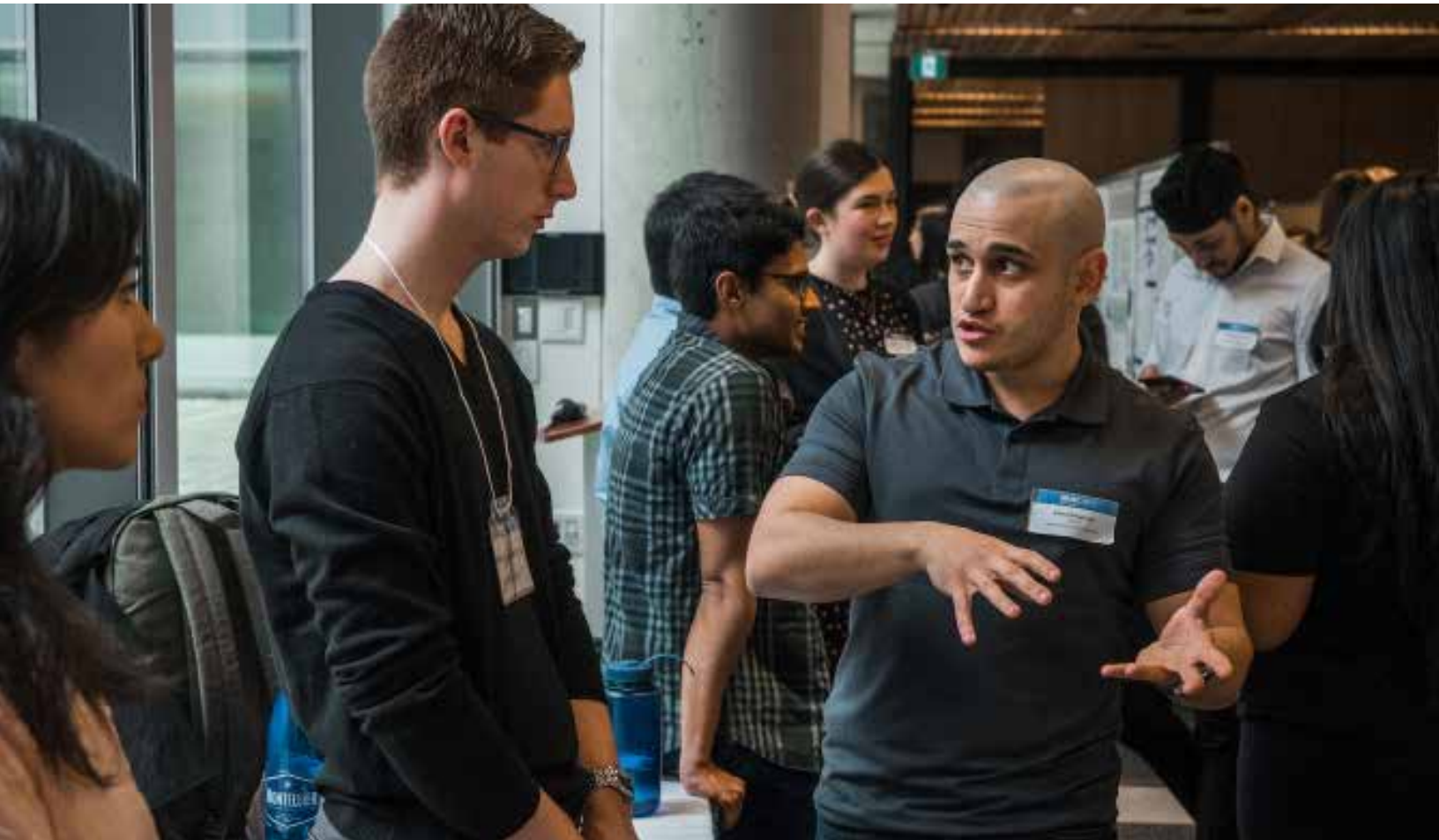


WHAT IS MURC?

The Multidisciplinary Undergraduate Research Conference (MURC) is an annual celebration of undergraduate research happening on the UBC campus. MURC will be presenting it's 20th annual conference this year. Here, at MURC, student researchers showcase their research in an oral or poster presentation format. Work presented at the conference includes undergraduate theses, directed studies and other faculty-supervised research projects.

Our theme this year is "Aspire and Inspire", which aims to draw inspiration from the generations before us, and aspire to pass knowledge onto future generations. By encouraging students to explore questions as holistic individuals, they are able to draw on diverse life experiences and collaborations to inspire innovative solutions. We hope to showcase multidisciplinary fields and diverse perspectives to promote the pursuit of research with an interdisciplinary lens.

MURC 2023 is excited to feature 322 presentations from 480+ unique presenters!



SCHEDULE

March 18, 2023

Get an overview of the day

Time	Event	Location
8:00 AM - 9:15 AM	Wave 1 Virtual Presentations	Online
9:00 AM - 9:45 AM	Registration	CIRS Lobby Area
10:00 AM - 10:45 AM	Opening Remarks Keynote: Dr Mika McKinnon	CIRS 1250
11:00 AM - 12:15 PM	Wave 2 Oral Presentations Wave 2 Poster Presentations	Oral: Ponderosa Commons North and Swing Space Posters: Ponderosa Ballroom
12:30 PM - 1:45 PM	Wave 3 Oral Presentations Wave 3 Poster Presentations	Oral: Ponderosa Commons North and Swing Space Posters: Ponderosa Ballroom
2:00 PM - 2:30 PM	AMA: Grad School and Beyond	Ponderosa Commons North 1009, 1011
2:45 PM - 3:30 PM	Panel: Best of Both Worlds - Exploring Integrative Research	Ponderosa Commons North 1001
3:45 PM - 5:00 PM	Wave 4 Oral Presentations Wave 4 Poster Presentations	Oral: Ponderosa Commons North and Swing Space Posters: Ponderosa Ballroom
5:15 PM - 6:30 PM	Wave 5 Oral Presentations Wave 5 Poster Presentations	Oral: Ponderosa Commons North and Swing Space Posters: Ponderosa Ballroom

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KEYNOTE SPEAKER

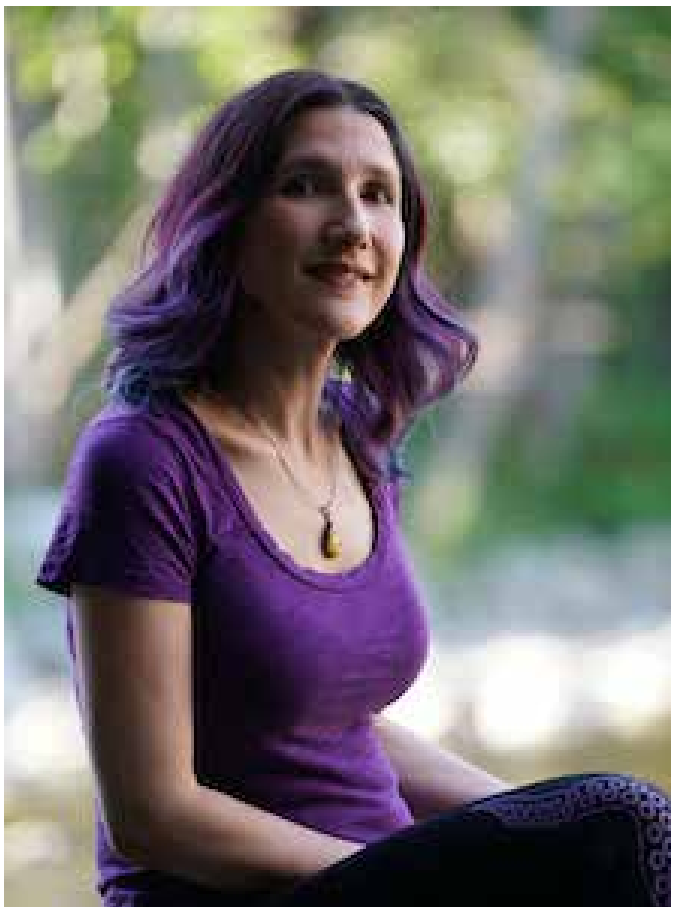
Professor Mika McKinnon

Mika McKinnon is geophysicist, disaster researcher, and science communicator. She specializes in sharing geoscience in novel and creative ways in media ranging from newspapers to video games.

McKinnon applies her expertise in disasters to both research and communication. She has consulted with Natural Resources Canada and with the American Federal Emergency Management Agency. She currently brings her hazards expertise to the NASA-funded team Project ESPRESSO by investigating landslides on asteroids and moons.

She also engages in more playful topics, encouraging people to rediscover their childhood love of rocks through "Rock Checks," #YouFindARock choose-your-one-adventures, and an annual competition @MineralCup that attracts over 100,000 votes.

McKinnon is an on-screen geophysics expert for documentary series including the Science Channel's Phantom Signals and the Discovery+ series I Got Lucky, and a behind-the-scenes consultant for movies and television shows including Moonfall, Star Trek Discovery, the Stargate franchise, Madam Secretary, No Tomorrow, and others. She has also demystified Earth science in many popular media articles for publications including BBC, Wired, Smithsonian, New Scientist, and Gizmodo.



PANELISTS

Gordon Tao

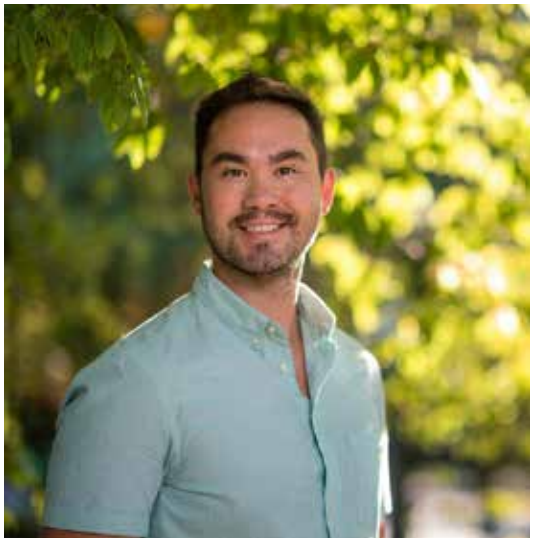
PhD Candidate

Gordon is a PhD candidate at the University of British Columbia in the Rehabilitation Sciences graduate program with Dr. William C. Miller supervising. He completed his BSc in Life Sciences at Queen's University and his MSc in Rehabilitation Sciences at McGill University. Gordon is passionate about the role of assistive technologies in supporting independence and improving quality of life. His research interests include digital media and virtual reality applications for health as well as stakeholder-driven evaluation of assistive technologies. His doctoral research focuses on the design of digital games for rehabilitation.

Jiayi Ji

PhD Candidate

Jiayi is a current Doctoral Candidate of business at the International University of Monaco. Her research is focused on the intersection of psychology / therapeutic practices and business, with respect to work burnout. In her corporate career, she developed an interest in how team dynamic and managerial style influenced the behavioral outcome of project managers. She hopes to empower individuals with the knowledge to become more mindful of the journey of stress and the ways of circumventing burnout.



Colin Dring

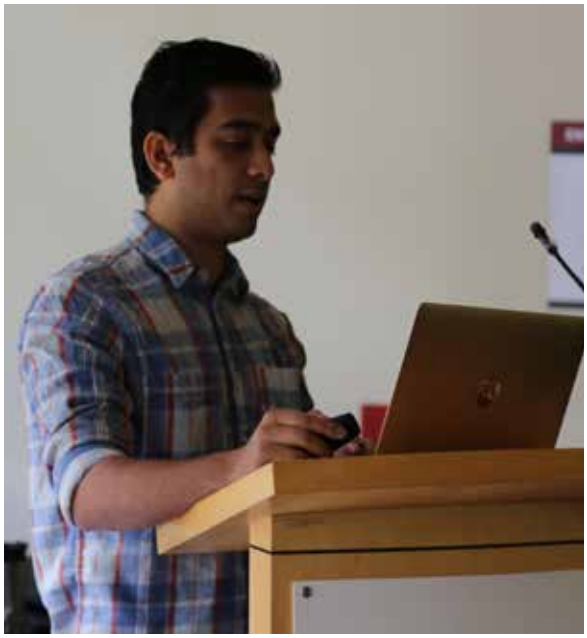
PhD Candidate

Colin Dring (he/his) works towards justice and sustainability in collaboration with different change makers. He is a community developer, a facilitator, a researcher, a connector, and is inquisitive by nature. He has over ten years of experience in the field of decolonizing food systems, agricultural policy, education, and community development. He holds degrees in rural planning, psychology, french literature, soil science, and is currently finishing his PhD in agricultural planning at UBC. Colin's work attempts to create decolonial and just futures in contexts of difference, complexity, and unpredictability.

ROGERS COLLABORATION

Rogers has kindly sponsored MURC 2023. With their support, we were able to put this conference together. We are grateful for their continued contribution in promoting undergraduate research here at UBC, especially as MURC celebrates 20 years of the annual conference this year.

ASK-ME-ANYTHING SESSION



Ritwik Bhattacharjee

PhD Candidate

Ritwik Bhattacharjee is a Ph.D. student in the Interdisciplinary Studies Graduate Program (ISGP). He is examining the psychopathologies of the Canadian settler-colonial lifeworld, through the twin lenses of critical social theory and critical Indigenous Studies. Prior to attending UBC, Ritwik was employed as the worldwide distribution manager at a British publishing company. He has obtained his BA (Hons) from Jadavpur University, Kolkata, and an MA in International Relations from Middlesex University, London. Ritwik is also a successful photography mentor with more than five years of teaching experience.

Adrienne Kinman

PhD Candidate

Adrienne completed her undergraduate degree in psychology and minored in molecular biology and behavioural science at McGill University. After which, she started her master's degree in the Graduate Program for Neuroscience in 2019 and transferred to the PhD program in 2021 where she is now a fourth year PhD Candidate, supervised by Dr. Mark Cembrowski. Adrienne's research uses calcium imaging in freely moving mice to investigate cell-type specific roles in different forms of memory. Her thesis work is centred around the cellular and behavioural investigation of a previously undescribed neural cell type involved in novelty recognition and memory.

FEATURED PROGRAMMING

BOOTHING

Want to learn more about research opportunities available at UBC and beyond? Stop by our boothing area to talk with local research-based companies, UBC programs, and student organizations to take your research to the next level! Boothing organizations include STEMCELL, the McCall MacBain Scholarships, the Canadian Journal of Undergraduate Research (CJUR), and more! Taking place from 10AM-6:30PM outside Ponderosa Ballroom, come visit the following organizations!

MURC'S MIX AND MATCH MINGLE

Get to know your fellow presenters at MURC 2023 for a chance to win a $20 gift card! When you check-in for MURC at our registration desk, you'll receive your name tag with a coloured dot in one corner. Find and talk to presenters with differently coloured dots to complete our prize draw form for one entry in the raffle!

PHOTO-BOOTH RAFFLE

Get ready to celebrate MURC's 20th anniversary with us! Stop by our photo booth outside Ponderosa Ballroom and capture your favorite memories with your fellow presenters! To enter our Photo-Booth raffle, post your pictures at the photo booth on your Instagram story and tag @ubcmurc for a chance to win a $25 Starbucks gift card. If your account is private, DM us with a screenshot of your story to be entered in the draw!

MURC 2023 RAFFLE

Love winning prizes? Come participate in our MURC 2023 raffle draw by collecting ticket entries as you attend our events! We have a full day planned ranging from a keynote speech, AMA session, panel session and presentations. Pool in all your tickets to participate in the raffle draw during the closing ceremony!

ACKNOWLEDGEMENTS

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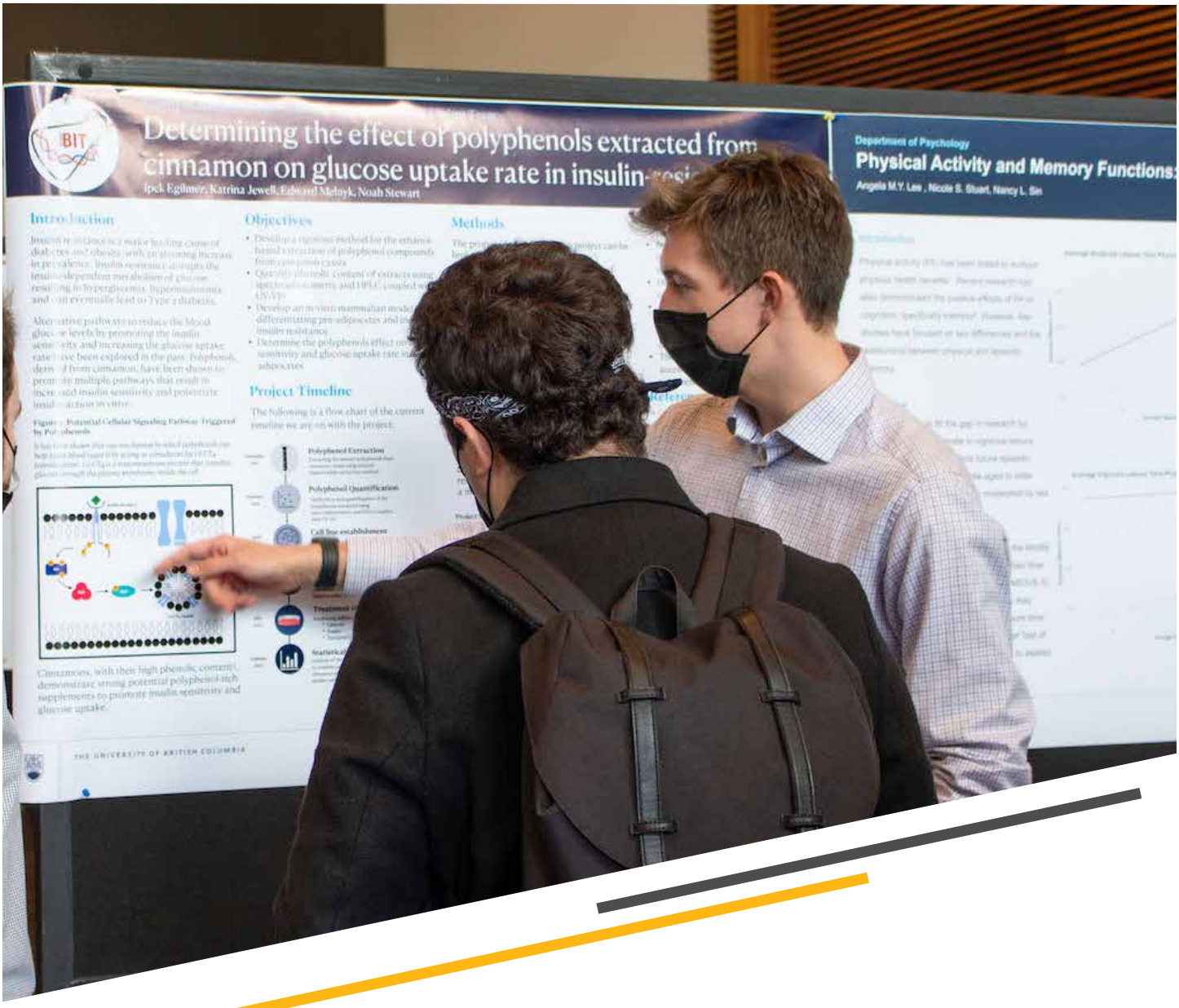


WAVE 1 VIRTUAL PRESENTATIONS

WAVE 1 VIRTUAL PRESENTATIONS

ROOM 1

Measuring Interdisciplinary Thinking Using Weekly Student Reflections	Amrit Pal Bhela
A Review of the Recent Innovations in Rural Electrification	Audria Liu

ROOM 2

Spatiotemporal prevalence of two Agriotes pest species at the UBC Farm	Nisa Chavez
Effects of the R550C Mutation on the Thermodynamics of cAMP Binding to HCN4 Channels	Min Song, Celine Yeung
The Distribution of Coefficients of Highly Symmetric Functions	Nia Tzvetkova
Implementation of the TLC-Act Drug Interaction Tool into Pharmacy Student Education as Part of Integration Activity Cases	Jessica Lee
How Climate Change and Population Growth will affect BC Parks Attendance	Dayna Weststrate

ROOM 3

Effect of food waste on rising generalists population	Kathy Liu
Assessing pathological consequences of degraded MUC2 in colitis models.	Arman Minhas

ROOM 4

Current UBC E2P PharmD student interest in POC testing education	Esther Ko
The Everyday Power Relations in Shenzhen's International Baccalaureate Schools: Personal Stories from the Students, Parents and Teachers	Kelly Li
Creating the market for China's Lithium-ion battery industry	Carl Chen
The Heart Remembers What the Mind Forgets: Episodic Memory for Emotional Content	Vanessa Wong, Fiza Mujib

ROOM 5

Local-born, second-generation Chinese-Canadians: How their Chinese literacies mediate their experiences of in-between-ness and Chinese-Canadian identity formation	Calista Lu
The effects of soy protein (SP) supplements on Bone Mineral Density (BMD) in vegan postmenopausal women in North America	Keren Xue
The effects of interleukin-1 receptor antagonist on antidepressant efficacy in a rat model of post-partum depression	Phoenix Au-Yeung
Mahalanobis distance-based Fuzzy C-Means algorithm in breast cancer image segmentation	Dresya Davis, Daniel Krasnov

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: Measuring Interdisciplinary Thinking Using Weekly Student Reflections

Presenter(s): *Amrit Pal Bhela*

Abstract

The need for interdisciplinary thinking is becoming a necessity in today's society due to the complex problems society faces. Interdisciplinary thinking is the idea of using knowledge from different disciplines to problem solve more effectively. For example, climate change and global pandemics require professionals from multiple disciplines to implement a multi-faceted approach. Problems like these have increased the urgency in higher education to instill individuals with the necessary skills and ways of thought so they can participate in interdisciplinary thinking. The Science One program at the University of British Columbia is one program that hopes to promote interdisciplinary thinking among students. This research study was conducted to assess whether students in this program are making interdisciplinary connections and if so, what types of connections are most common. Students responses were assigned a level between 1-4, with 1 being basic connections between disciplines and level 4 being complex connections. Additionally, the goal was to determine on what themes, students make the most interdisciplinary connections. Ultimately, it was determined although students in the Science One program make interdisciplinary connections, they mostly make level 1 and level 2 connections. After analyzing all student reflections only 6% and 1% were level 3 and level 4 connections respectively. The common themes on which students made interdisciplinary connections were integration, Euler's method, differential equations, thermodynamics and quantum mechanics. The findings show that making more complex interdisciplinary connections is difficult for first year students and instructors play a key role in helping students identify these connections.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: A Review of the Recent Innovations in Rural Electrification

Presenter(s): *Audria Liu*

Abstract

As Earth's temperature rises, many nations, including Canada, has been searching for new ways to reduce carbon emissions and slow down the rate of climate change. Most rural communities found on Canada's Remote Communities Energy Database use diesel as their main source of energy. Research has shown that there are other sources of energy that can replace diesel and no longer produce carbon emissions. This literature review delves into innovations of rural electrification focussing on new types of power and energy storage systems that were studied via simulations.

Searches were conducted on the UBC Library for articles using keywords such as "rural electrification", "modular reactors". By the end of the systemic review, five articles were chosen; all articles were studies based on simulations of proposed electrification systems and published within the years 2019-2022 to ensure relevancy. Proposed power sources included modular reactors and renewable energy systems (wind, solar power). Proposed energy storage systems included power to hydrogen to power (P2H2P) system, and lithium-ion batteries.

Result of the review indicated in simulation, modular reactors more cost efficient in comparison to the traditional use of diesel and emit no carbon gas emissions; however, hybrid modular reactor + renewable energy systems were the most cost efficient in simulation. For storage systems, a hybrid system of P2H2P and lithium-ion battery was the most cost efficient as it utilizes an optimal size of both storages and avoids diminishing return of pure P2H2P and pure lithium-ion battery systems.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: How Climate Change and Population Growth will affect BC Parks Attendance

Presenter(s): *Dayna Weststrate*

Abstract

BC Parks must provide British Columbians with opportunities for outdoor recreation while simultaneously protecting the natural environment. As a result of this dual mandate, park managers often find themselves on the front lines of Human-Wildlife Conflict issues. Thus, in decision-making processes, it is important for managers to know what factors underpin the volume of people that might be expected to attend on any given day. Our goal was to understand how environmental conditions and population growth will interact to shape BC Parks attendance over the next century. We modelled relationships between attendance and weather at over 250 provincial parks using a decade's worth of attendance records. We found that as temperatures increase over the year, parks generally have more visitors. With these findings, we generated projections of how BC Park attendance might be expected to change over the coming century. BC population is expected to grow substantially; even under a low population growth scenario, we can expect an increase of almost 600,000 residents by 2100. Over this same timespan, climate change in BC is projected to cause hotter summers, earlier springs, and later autumns. Our analyses showed that attendance is highly correlated to warm weather. Consequently, parks should anticipate a rise in visitors during the extended warm season. This information will provide BC Parks with key information required for management planning in the face of human-induced climate change, thus proactively conserving British Columbian wildlife and landscapes.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: Spatiotemporal prevalence of two Agriotes pest species at the UBC Farm

Presenter(s): *Nisa Chavez*

Abstract

The soil-dwelling larvae of Agriotes lineatus and Agriotes obscurus are major invasive pests in agricultural areas across the Lower Mainland of British Columbia. The larvae, known as wireworms, consume a broad assortment of vegetative material in the soil for several years before emerging as adults, damaging the below-ground plant structures of field crops and causing substantial economic losses. Wireworms are difficult to control due to their polyphagous feeding capabilities, prolonged occupation in cryptic subterranean environments, and limited management options, compelling integrated pest management programs to target the adult, aboveground stages of these pests. However, little information on the seasonal abundance and activity periods of these click beetle species are available across a range of environments which poses problems for the development and implementation of mitigation strategies. As such, we monitored Agriotes lineatus and Agriotes obscurus from April to September each year from 2018 to 2022 at the University of British Columbia Farm using pheromone-lured pitfall traps to describe their spatiotemporal patterns. In total, we captured 13,399 adult click beetles. The record for the highest yearly click beetle catch occurred in 2018, with decreasing abundance in subsequent years. The record for the highest monthly catch occurred in May, and the lowest occurred in August. Agriotes lineatus was more common than Agriotes obscurus and neither showed a preference for specific trap locations at the farm. This study informs the optimal timing and location of pest control strategies at the UBC Farm for adequate suppression of adult click beetles.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: Effects of the R550C Mutation on the Thermodynamics of cAMP Binding to HCN4 Channels

Presenter(s): *Min Song, Celine Yeung*

Abstract

Hyperpolarization-activated cyclic nucleotide-gated channel 4 (HCN4) is an ion channel expressed in the cardiac and nervous systems. HCN4 channels in particular are primarily localised in the sinoatrial (SA) node – the source of spontaneous pacemaker currents in the heart. The opening of HCN4 channels results in the net influx of sodium and potassium ions (referred to as the funny current), which results in the generation of electrical activity that propagates throughout the heart to cause contraction. The activity of HCN4 channels can be modulated in response to adrenaline. Adrenaline activates a signalling cascade leading to cAMP upregulation within cardiac pacemaker cells. When cAMP binds to its intracellular binding site on the HCN4 channel, it enhances the opening of the channel and upregulates the funny current, resulting in faster and stronger contractions.

A loss-of-function R550C mutation located in the C-linker region of the HCN4 channel has recently been discovered in two siblings diagnosed with benign myoclonic epilepsy and mild bradycardia. This study researched the effect of the R550C mutation on the energetics of cAMP binding to HCN4 channels. Using isothermal titration calorimetry, we investigated the thermodynamics of the binding of cAMP to HCN4 channels.

The study confirmed that cAMP binds to R550C HCN4 channels with lower affinity compared to wild-type HCN4 channels. The results provide a molecular mechanism for the observed bradycardic effect of the R550C mutation in HCN4 channels. Future research directions include analysing other bradycardia-associated mutations and how they impact the thermodynamics of cAMP binding to HCN4 channels.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: The Distribution of Coefficients of Highly Symmetric Functions

Presenter(s): *Nia Tzvetkova*

Abstract

The functions we study exist in hyperbolic space. Hyperbolic space has a strange notion of distance — the closer shapes are to the boundary of the space, the further away they are from one another. Instead of looking at functions drawn on the regular flat plane, it is interesting to look at functions in hyperbolic space. Often these functions studied are highly symmetric: we can think of them as harmonies, and imagine decomposing them into their constituent "notes" that are described by key coefficients. The specific functions we are studying are a nice, smooth class called Maass forms. When examined in hyperbolic space, they are invariant under transformations that preserve shapes and areas. For elliptic curves, a special and more geometric cousin of Maass forms, it has been proven that these coefficients are perfectly distributed as a semicircle above the x-axis. It is conjectured that this applies to Maass forms as well, but this is very difficult to prove, and we use the theory of moments and analysis to obtain some positive results in this direction.

We have been focusing on being able to calculate a lower bound for how many of these coefficients aren't equal to zero, as well as lower bounds for subsets of the coefficients that are selected to obey some divisibility condition. Each new, more precise, result for these specific cases brings us closer to a bigger picture understanding of how Maass form coefficients are distributed.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: Implementation of the TLC-Act Drug Interaction Tool into Pharmacy Student Education as Part of Integration Activity Cases

Presenter(s): *Jessica Lee*

Abstract

As drug interactions can lead to significant adverse effects and hospital stays, pharmacists play a vital role in preventing interactions and ensuring optimal drug therapy. As such, the TLC-Act tool is being developed to provide a systemized way of managing drug interactions based on the best current evidence. Through using the TLC-Act, students may build on their skills to meet the Association of Faculties of Pharmacy of Canada Educational Outcomes for pharmacy degree graduates. These outcomes outline the expected skills graduates are to have in order to provide competent patient care. The TLC-Act tool was introduced to Entry-To-Practice PharmD students at UBC through a background activity that taught how to use the tool as a separate entity. In this current follow-up project, the main focus is to integrate the TLC-Act as part of patient cases to practice using the tool in case-based learning. Pharmacist facilitator TLC-Act guides which included step-by-step walkthroughs of how to use the tool were created to lead students through ten patient cases involving disease states such as diabetes and epilepsy in year 2 of the program. These facilitator guides will be used by instructors to guide students through using the TLC-Act to formulate a patient-specific recommendation and manage drug interactions in these cases. This will allow students to enhance their drug interaction clinical thought process. Once implementation of the TLC-Act facilitator guides is complete, its usefulness as an integrated part of the case thought process will be evaluated as both a teaching and learning tool.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: Effect of food waste on rising generalists population

Presenter(s): *Kathy Liu*

Abstract

Rapid urban development and expansion has fostered and proliferated an extensive amount of generalist predators such as crows. The rising population of generalists put increased predation pressure on nestlings and young, leading to decreasing bird diversity and abundance in the urban bird composition. In this paper, we will delve into anthropogenic factors, specifically food waste, that provide food source for crows, thus contributing to their rapid increase in population. Rising food waste abundance in urban cities can sustain large populations of generalists who feed broadly, ultimately increasing their fitness which indirectly put higher predation pressure on nestlings and young bird species. We seek to employ online database to extract datasets on urban food waste abundance in Vancouver, then use statistical tools to graph and analyze the effect of food waste abundance on bird community composition. The expected results are that vast food waste indirectly act as one of the main anthropogenic factors that contribute to the declining abundance of nestlings and young, leading to decreased bird diversity in urban community. In other words, birds are forced to move outwards into rural areas for survival. Based on the expected results, this research offers scientific evidence and reasoning behind cause of food waste that indirectly impact the abundance and composition of bird community. The results of the experiment can inform city decision makers to reduce food waste through sustainable approaches.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: Assessing pathological consequences of degraded MUC2 in colitis models.

Presenter(s): *Arman Minhas*

Abstract

By supplying nutrients and reducing inflammation, mucus is essential in regulating physiological activity of gut microbiota. MUC2, a glycoprotein secreted by goblet cells, forms polymers that comprise the foundation for mucus. Furthermore, MUC2 possesses O-linked glycosylation sites enabling attachment of structurally diverse oligosaccharides (O-glycans). Mucus function deficiencies are often prevalent in inflammatory gastrointestinal diseases, but disease characteristics depend on the type of dysfunction. Previous research demonstrated MUC2 KO mice develop colitis within the first 6 weeks of life. Contrarily, O-glycan KO mice, which contain degraded MUC2, develop colitis much earlier. Given this, it is still unknown whether degraded MUC2 has a pathological function. It is probable that removal of O-glycans influences the microbiota metabolism since microbes can now access thousands of core amino acids that were previously inaccessible due to connected glycans. We hypothesize that MUC2 plays a pathological role in saturating the lumen with millions of MUC2-derived amino acids, which induces an excess of inflammatory amino acid metabolites. We will investigate this by contrasting the colitis development in WT, MUC2 KO, O-glycan KO and MUC2:O-glycan KO mice using histological methods. Additionally, 16S sequencing on fecal samples and a comparison of luminal metabolites from WT and mutant littermates by Gas Chromatography-Mass Spectrometry will be utilized to examine how metabolic functions of microbiota are altered by the compound loss of MUC2 and O-glycan. The results will elucidate how MUC2 metabolism affects microbial metabolic activity in addition to its glycans, providing novel insight that can guide therapeutic strategies for gastrointestinal diseases.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: Current UBC E2P PharmD student interest in POC testing education

Presenter(s): *Esther Ko*

Abstract

Point-of-care (POC) testing refers to a form of testing in which the analysis is done at the point of care – at the time and place of patient care as opposed to within a laboratory. Results are available quickly and can be used to aid in determining diagnoses or creating treatment plans. Given the benefits they bring to the patient care process and their growing popularity amongst patients, pharmacy students must also be equipped with knowledge of POC testing devices to ensure they are prepared for future practice.

Currently, only two POC tests are covered within the University of British Columbia (UBC) Entry-to- Practice PharmD (E2P PharmD) curriculum. Throughout the four-year program, detailed education and hands-on experience is only provided on blood glucose monitors. The purpose of our study was to receive feedback and assess student interest on further integration of POC testing education into the current curriculum.

All 33 students that participated in our survey responded that they would like to see more POC testing education within the curriculum. When asked why, students expressed a lack of familiarity/knowledge and motivation to provide better patient education. Many students shared various experiences where they were unable to answer questions or provide satisfactory instructions on how to use POC testing devices on rotations. Overall, our results showed that students are motivated to learn more if provided with the opportunity. The findings of this report may inform future decisions on further integration of POC testing education into the UBC E2P PharmD program.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: The Everyday Power Relations in Shenzhen's International Baccalaureate Schools: Personal Stories from the Students, Parents and Teachers

Presenter(s): *Kelly Li*

Abstract

The goal of this essay is to investigate the everyday power relations in Shenzhen's International Baccalaureate Schools. In the current academic field of IB studies, there is a lack of research on the micro-level experiences of IB educators, students and parents. As an IB student myself, I will be recording my own IB study experiences at school in order to fill in the current research gap. My first research question is what are the everyday power relations that shape the inclusion and exclusion in Shenzhen's International Baccalaureate Schools? I will be using a research method called autoethnography, which uses my personal experience to describe and interpret the cultural, social, educational, and political phenomena and practices happening around me. My second research question is what would be some possible ways to create a more inclusive and equitable IB school in China? The objective of this essay is to not only record the personal stories and experiences but also figure out a way to create real, equitable global education embedded in nation-states.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: Creating the market for China's Lithium-ion battery industry

Presenter(s): *Carl Chen*

Abstract

From 2017 to 2021, China's lithium battery industry tripled in output, the exponential growth suggests that China was able to facilitate industrial development without precedent elsewhere. In addition to innovative subsidies and tariffs that implicate direct government support, the Chinese government utilized its top-down system advantage to mobilize cross-sector cooperation. The subtle yet coordinated strategy facilitated the growth of the lithium-ion battery industry while minimizing the damage to existing corporate champions. This study conducts documentary analysis of Chinese government policies at both the national and regional levels, in the original Mandarin language text. Analyzing and combining data under the principle of traced sales against production figures, the study examines how the government takes advantage of the popularity of electric bicycles, low-speed electric vehicles (LSEVs), and electric three-wheelers possessed at the grass-root level, then how the government utilizes niche industrial strategies to strengthen its lithium-ion battery output. It was found that the government effectively created a market for the country's small lithium-ion batteries by forcing these manufacturers away from lead-acid batteries. This exemplifies the Chinese national government's ability to curtail certain sectors for industrial development in others. This approach demonstrates how complex, sometimes conflicting, policy initiatives guided the growth of the Chinese lithium-ion industry.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: The Heart Remembers What the Mind Forgets: Episodic Memory for Emotional Content

Presenter(s): *Vanessa Wong, Fiza Mujib*

Abstract

Emotional events tend to be better remembered than neutral events, and this memory difference tends to be larger in females than males. However, convincing evidence for this claim is available mainly from research on autobiographical memory, but the results from investigation focused on episodic memory remain unclear. A study with UBC undergraduate student volunteers was designed to explore such evidence in episodic memory. Participants were presented with negative, neutral, and positive pictures and asked to rate the valence of pictures. After a brief delay filled with unrelated tasks, participants were required to recall the previously presented pictures to the best of their ability. Their responses were transcribed and scored to assess memory for gist and details. We hypothesize that memory performance would be higher for emotional pictures compared to the neutral pictures, and the difference would be higher for the details. We also hypothesize that there would be sex differences at remembering emotional pictures.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: Local-born, second-generation Chinese-Canadians: How their Chinese literacies mediate their experiences of in-between-ness and Chinese-Canadian identity formation

Presenter(s): *Calista Lu*

Abstract

To the public, it may seem that Chinese-Canadians can be roughly grouped together into this single category that symbolizes their status as the largest visible minority group in Canada. However, from a sociological standpoint, this is simply not the case. First-, second-, and third-generation Chinese-Canadians have very different experiences and connections to their ethnic home country and their country of nationality. With a peak in Chinese immigrants arriving in the 1980s and 1990s and settling in Canada to start their families, I argue that the local-born, second-generation of Chinese-Canadians is a particularly salient area to study as the current adolescents and young adults. Being local-born signifies that for this group of Chinese-Canadians, English may be their dominant language and they have from limited to fluent proficiency in their families' "native" tongue. In my literature review, I seek to identify how Chinese literacy mediates local-born, second-generation Chinese-Canadians' experiences of in-between-ness from Chinese and Western culture and impacts their formation of ethnic identity. Though the literature clearly implicates that greater Chinese language proficiency leads to higher ethnic identity (Costigan et al., 2009; Chow, 2018; Cui, 2013), research is far more muddled for second-generation Chinese-Canadians whose language skills can neither be neglected nor considered fluent. Thus, findings from my work will have significant meaning for the study of Chinese immigrant families and ethnic identity formation in Canada, and perhaps most importantly, the Chinese-Canadian families and their understanding of themselves and one another.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: the effects of soy protein (SP) supplements on Bone Mineral Density (BMD) in vegan postmenopausal women in North America

Presenter(s): *Keren Xue*

Abstract

The impacts of vegan diets on bone health have been intensively discussed recently. Vegans may experience low Bone Mineral Density (BMD) at the lumbar spine and femoral neck, thus more prone to fractures, likely due to low body mass index (BMI), reduced protein, calcium, vitamin D and B12 intake. Age and hormonal also changes exacerbate bone loss in postmenopausal women. Therefore, research has shown supplements may be an effective solution to prevent and reduce bone issues in this population. While supplements are shown to improve BMD, current literature is limited on the effectiveness of soy protein (SP) supplements in vegans. This project investigated the effects of SP supplements on BMD in vegan postmenopausal women in North America. I expect to observe SP supplements with isoflavones will have a dose-dependent protective effect on BMD.

UBC Library and Pubmed databases were used with the keywords: "postmenopaus", "isoflavones", "bone", "osteoporo" and "BMD". 48 articles were screened to 7 peer-reviewed english articles relevant to the research question.

There was an emergent dose-dependent effect of isoflavones for SP supplementation. The dose of isoflavone between 110-165mg/d had protective effects on BMD predominantly on the femoral neck, total hip and spine; doses near 90mg/d isoflavone had no-to-low protective effects on BMD; while Isoflavones < 90mg/d had no effect.

These results demonstrate a dose-dependent effect of isoflavones, which will help to improve bone health for vegan postmenopausal women. Longer-term studies will lead to reduced preventable bone issues and updated dietary recommendations for vegan women.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: The effects of interleukin-1 receptor antagonist on antidepressant efficacy in a rat model of post-partum depression

Presenter(s): *Phoenix Au-Yeung*

Abstract

During the perinatal period, up to 20% of women experience depression. However, the efficacy of selective serotonin reuptake inhibitors (SSRIs), a commonly prescribed class of antidepressants, is currently limited in treating postpartum depression (PPD). PPD can be modelled in rats by administering high dosage corticosterone (CORT) through the post-partum period, which has been shown to cause depressive-like behavior such as increased passive coping. Our lab has previously found an association between limited fluoxetine efficacy and increased levels of hippocampal Interleukin-1β (IL-1β). We hypothesize that blocking IL-1β will improve the efficacy of fluoxetine (FLX), an SSRI, in reducing depressive-like behaviour in our rat model of PPD.

To model PPD, rat dams were treated with daily injections of either CORT or oil for 21 days during the postpartum starting on postnatal day (PND) 2 along with either FLX or dextrose (DEX). Moreover, starting on PND 9, either Anakinra (KIN), an inhibitor of IL-1β, or saline was administered. Maternal care behavior was measured in the early postpartum by measuring the time dams spent nursing their offspring. In the late postpartum, the forced swim test (FST) was used to measure active versus passive coping.

Our preliminary data demonstrates a partial interaction effect between FLX and KIN that decreases passive coping behaviour and increases active coping behaviour in both CORT and OIL treated groups. This study offers insight into new potential immunological pathways to improve SSRI efficacy in treating PPD. Further research is needed to evaluate the relationship between neuroinflammation and antidepressant efficacy in PPD.

Wave 1 | Virtual Presentations

ZOOM | 8:00AM – 9:15AM

Title: Mahalanobis distance-based Fuzzy C-Means algorithm in breast cancer image segmentation

Presenter(s): *Dresya Davis, Daniel Krasnov*

Abstract

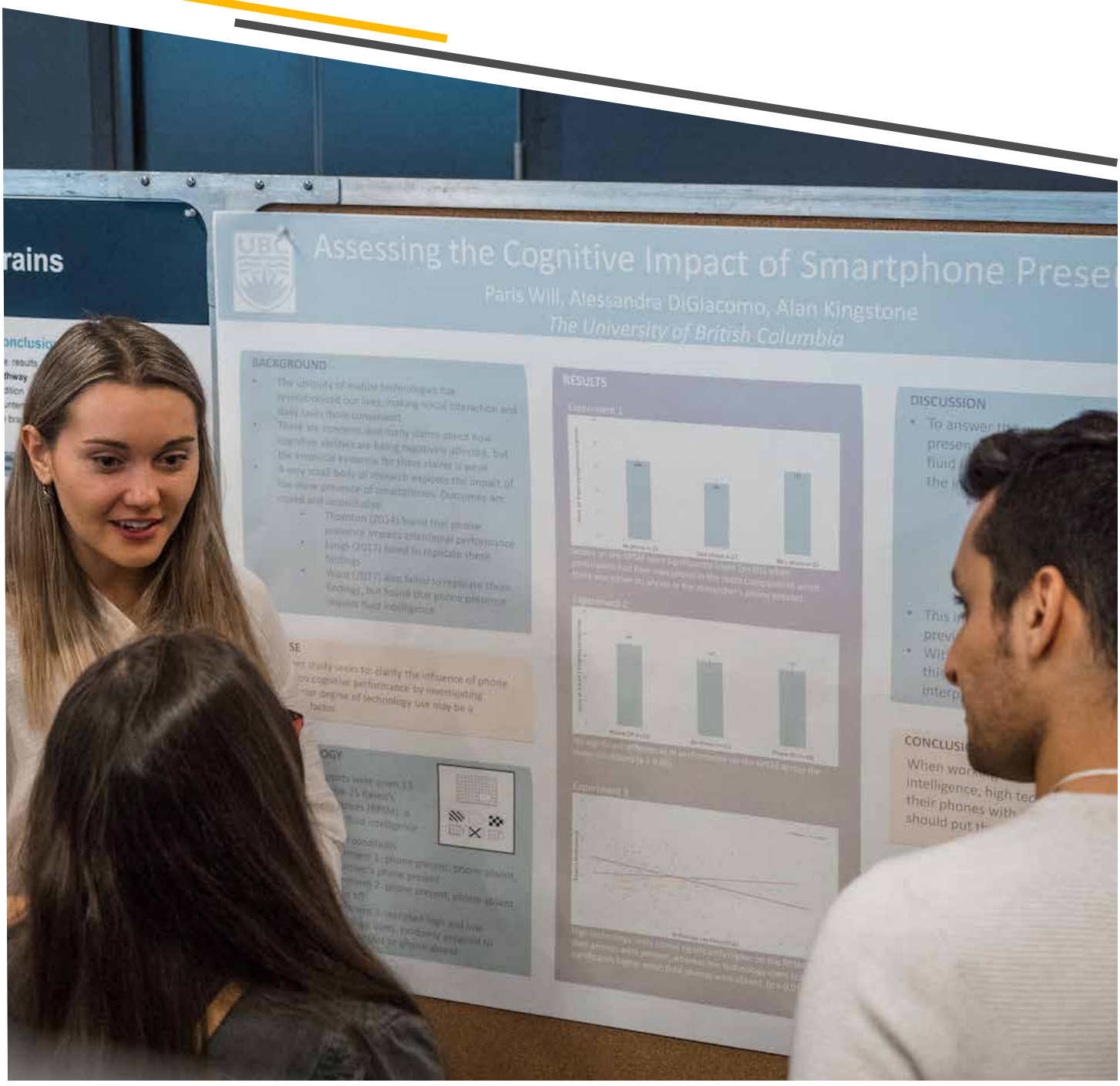
Background: Breast cancer is the second leading cause of cancer deaths in Canadian women. Early detection reduces treatment costs and offers a favourable prognosis for patients. Classical methods, like mammograms, rely on radiologists to detect cancerous tumours, which 1) makes them susceptible to errors, 2) are labour-intensive, and 3) depletes healthcare resources. Recent research supplements classical methods with automated mammogram analysis, including those based on Fuzzy C-Means (FCM) clustering. However, base FCM relies on the Euclidean distance, which is not optimized for the non-spherical clusters.

Aim: We seek to apply FCM and Mahalanobis-distance-based FCM (FCM-M)to detect cancerous tumors in mammograms. To our knowledge, FCM-M has yet to be applied to mammograms. The objectives of the research are: a) to tune a Mahalanobis distance-based FCM algorithm to separate breast tumours in mammograms, and b) to evaluate the effectiveness of FCM-M compared to base FCM in this novel application.

Methods: We replace Euclidean distance with the Mahalanobis distance function to improve segmentation quality. We aim to improve runtime through parallelization. The algorithm will be tested using images from breast cancer datasets to evaluate its effectiveness to base FCM.

Results: The optimized FCM-M decreased computational efforts compared to the original FCM-M, with average runtime per iteration at 46.6s and 24m 25s, respectively. In examining the output images, FCM-M captures the elliptical structure of the tumor better than FCM. To further evaluate the segmentation quality, we will apply the following metrics: the partition coefficient index, classification entropy index, and the subarea coefficient index.

WAVE 2
ORAL & POSTER PRESENTATIONS



WAVE 2 ORAL PRESENTATIONS

PONDEROSA COMMONS NORTH AND SWING SPACE

PCN 1009

Novel Vibrio Natriegens Low-Cost and Minimal Cell-Free Protein Synthesis system for Industrial-Scale Biomanufcaturing	Michaela Samanta
Metric Search Application On Ranking List Compatibility	Wayne Guo
Eat, Fly, Love: Unraveling the mysteries of maternal diet, Drosophila oocyte ageing, and metabolomics	Hannah Illing
Climate adaptation (The consequences of climate change on High-rise RC construction)	Noor Hamdona

PCN 1011

South Asian Immigrant Parents Involvement in their Canadian Born Children's Homework and its impact on Relationship Development	Navneet Bhangu
Triangle Packings & Transversals In Tripartite Graphs	Amaury De Burgos
Is wider really better? Lessons learned from a global review of wildlife overpasses	
Is wider really better? Lessons learned from a global review of wildlife overpasses	Liam Brennan
TV Study: TV programs Tailored to People Living with Dementia	Carly Wang, Diane Pan

SWNG 105

Synaestivum: Engineering for Heat-Resilient Wheat Crops	Anjali Parthasarathy, Brenda Ma, Piyush Aswasthi, Alice Hong
Applications and Emotions: Perspectives of Older Adults on Social Robotics	Jaya Kailley
Experiences of the Synergy Tool utilization among long-term care providers and leadership: an interpretive descriptive inquiry.	Bahar Ahmadi

Task-based Brain Networks Detectable by Fmri	Tyrone Ly
The Influence of User Personality and Attitudes on Interactions with Social Robots: A Systematic Review	Mahala English

SWNG 107

Online Accessibility Information for Canadian National Parks: A Study of Website Accessibility Content and Visitor Experiences	Anna Riminchan
Social Support as a Moderator of Core Belief Disruption and the COVID-19 Pandemic-related Posttraumatic Growth	Jasmina Cui
Anatomical Relations of Median and Anterior Interosseus Nerve Branching to Muscles of the Anterior Forearm and the Palmar Cutaneous Branch of the Median Nerve	Emily Covell
A Qualitative Review of Participant Experience and Input to Refine Research Prioritization in Infant Exploration	Zein Hedayati
Alpine Plant Responses to Increases in Human Trampling Disturbance in the Nch'kay Region (Garibaldi Provincial Park)	Carly Hilbert

SWNG 109

The Development of a Care Pathway for Developmental Hip Dysplasia (DDH) in Sri Lanka	Duneesha De Silva
The Silent Struggle of Muslims Suffering from Substance use Disorders	Alaa Yehia
Effects of a High Sucrose Diet on Anxiety- and Depressive-like Behaviours in Male Rats	Lily Chen
A White-Only Fishery: How Did Colonial Policymaking Impact the Economic Well-Being of Indigenous Communities in Northern British Columbia?	Wuyang Ren

PCN 1002

Emotional impact and attitudes of self-rehoming versus shelter relinquishing in pet owners	Meghan Lok
Understanding the self-collection preferences of women living in Rwanda	Varun Nair
Identification of H3K27me3 and H3S10T11phos as Potential Biomarkers in Pediatric Osteosarcoma	Sebastian Kondratowski
The Role of Nostalgia and its Associations with Eudemonic Wellbeing during the COVID-19 Pandemic	Jack Yeung

SWNG 110

A Place to Create: A case study of community arts practice in Vancouver	Teodora Rawsthorne Eckmyn
Robustness Testing for Achilles Tendon Rehabilitation Device Using Biomechanical Simulation	Xavier Lam
Differentially expressed circulating miRNAs in patients with mild cognitive impairment to severe Alzheimer's disease (AD)	Emily Chen, Charvi Saboo, Daniyal Imran Aleem, Jennifer Law
Umsmothering Girlhood: Healing the Sisterhood Wound	Liva Behji

WAVE 2 POSTER PRESENTATIONS

PONDEROSA BALLROOM

microRNA Expression in Healthy Human Placentas - A Comparison Study	Fidan Sadig
Say NOx to Parkinson's Disease: Investigating nitrogen oxide-induced nitrosative stress at the environmental-physiological interface as a potential pathogenic pathway	Jennifer Lim
Anatomical Variations of Pancreatic Duct Pattern: a Cadaveric Study	Sanam Ashrafzadeh
Forbidden sour candy: Effects of ocean acidification on articulated coralline calcification and its defense against isopod herbivory	Ethel Wai
Levels of SUSD4 and SEZ6 in Post-Mortem Brain Tissue of Patients with Schizophrenia and Bipolar Disorder	Si-ah Choi
Plasma Lipid Abnormalities in Muscular Dystrophy: a systematic review and meta-analysis	Xindi Wang
Are iPSC a viable option in evaluating the effect of TKI resistance in chronic myelogenous leukemia patients?	Jessica Boucher
The Impact of Mental Health Awareness Campaigns on Young People: A Systematic Review	Cindy Zhang
Development of Anti-Inflammatory Coatings for Biomedical Devices	Paniz Ghavimi
The Effect of Acute Physical Activity on Short-Term Memory	Kseniia Voronkova
Development and validation of a tool for Semi-Personalization in Auditory Virtual Environments	Kimia Nouhi
The Scourge of Party: Politics and Dynamics of Discipline Inspection in China	Guoliang Zhang
Reporting of determinants of health inequities and participant characteristics in randomized controlled trials of juvenile idiopathic arthritis in Canada: A scoping review	Niloo Gheshlaghi
Reporting of determinants of health inequities and participant characteristics in randomized controlled trials of systemic lupus erythematosus in Canada: A scoping review	Vanay Verma
How Copper-A(beta) Interaction is Toxic to the Brain - An Alzheimer's Study	Ada Lin

WFDC1 and FGF1 are potential predictive biomarkers for High Grade Serous Ovarian Cancer	Finkle Gupong, Harper Rapkin, YunYun Wei, Tia Murdoch
Perception of retinal images: Can artificial intelligence help us discover new diagnostic features?	Christina Yuan
Hi-ChIP Analysis of H3K27Me3 Interactions in Progenitor and Differentiated Hematopoietic Cells	Joud Touqan
Survey of Primate populations under increasing survival pressures in the forests of Central Kalimantan	Leanne Li
Investigating the Relations Between Face Memory and Premature Birth in Adulthood	Fengting Yan
Effects of a maternal high-sucrose diet on corticosterone levels in maternal serum and amniotic fluid	Marwa Idrissi
Understanding Public Perceptions of Back Alleys in Vancouver, BC	Lily Du
Characterization of lower urinary tract function in the context of ambulatory urodynamic monitoring in a porcine model of spinal cord injury	Ashnoor Arora
Does Dog Impulsivity Assessment Scale (DIAS) predict behavioural persistence in an extinction learning task?	Steve Shan
The Gut-Brain Axis: Characterising the Effect of Inflammatory Bowel Disorder (IBD) on Sexual Behaviour	Cal Rosete
The effect of the dispersion on the autofluorescence of cellulose nanocrystals	Cindy Lam
Measuring the activity of a steroid-synthesizing enzyme in the avian brain	Emma Lam
Clinical interpretation of rare human gene variants in Drosophila. Autism and beyond.	Bea Liston, Graeme McIntosh, Saharah Bains, Bill Wang
Towards developing kinematic cervical spine motion corridors for direct frontal head impacts	Sabiha Sultana
Ceramides: a potential cause of amyloid-beta plaques in Alzheimer's disease?	Julia Groening

How Canada government's policies affected the change in NEET (not in employment, education or training) rate of Canadian post-secondary students of different genders during the covid-19 pandemic.	Crystal Pan
Social Media for Dementia Risk Reduction: Identifying Ethical Concerns Among Research Professionals and Community Members	Grayden Zaleski
Understanding the Complex Dynamic encompassing the Northern Pacific Marine Food Web, including the vitality of its Apex Predators	Antonio Dias
Characterization of skeletal muscle type-2 innate lymphoid cell infiltrates in a mouse model of Duchenne muscular dystrophy	James Wu, Omar Husain, Pamela Peng, Clayton Lee
Unraveling the genetic mechanism of asexual seed production in Crepis	Max Gray
Access to Pediatric Urology Care: A Pilot Study in British Columbia	Aygun Ibrahimova
The Association Between Hormonal Contraceptive Use and Symptoms of Psychopathology	Nicholas Latimer
Polygenic risk score associates with rate of cognitive decline in Alzheimer's disease	Darren Christy
Investigating How the Brain Generates Spontaneous Thought During Meditation	Douglas Forrest
Mapping Forest Succession in Pacific Spirit Park	Eric Lee, Tatum Narode
Thermally Activated Delayed Fluorescence and Mechanochromism from Naphthalimide-Azatriangulene Derivatives	Ying Cai
Opinion Formation in a Twitter Network Model	Nate Holers
Effect of loss-of-function Plcb4 on skin pigmentation in mice	Amy Luty
Qualitative Research Methods Used to Explore Sexual and Reproductive Health in Adolescents: A Scoping Review	Shiva Esfandnia
The effect of gut metabolites on cancer: Intermittent fasting-mediated changes in ursodeoxycholic acid, deoxycholic acid, and isovaleric acid	Rosey Qiu, Chenny Chen, Bernice Yue, Jessie Luo, Leili Hamidi
The Novel Application of Collagen Fingerprinting for the Identification of Archaeological Flatfish from the Northeast Pacific	Jay Hilsden

Effects of Wood Smoke on Human Airway Epithelial Cells	Nataly El-Bittar
Immune Cell-Tumor Cell Neighbor Pair Analysis to Guide Individualized Lung Cancer Treatment in Canada	Puneet Arora, Ava Keshavarzsafiei
Identification of Chinese Bronze Age bone tools from Huanbei using peptide mass fingerprinting	Pengpeng Chen
Why do Corporations Transition to Net Zero? A Case Study of Maple Leaf Foods	Clarrie Dee

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Novel Vibrio Natriegens Low-Cost and Minimal Cell-Free Protein Synthesis system for Industrial-Scale Biomanufcaturing

Presenter(s): *Michaela Samanta*

Abstract:

Industrial biomanufacturing technology has remained relatively constant. There are a few options outside of the standard system E. Coli, B. subtilis, and P. pastoris. Batch or fed-batch fermentation remains the gold standard. These technologies while reliable, run into huge roadblocks with difficult-to-produce or toxic proteins. Cell-Free Protein Synthesis (CFPS) has emerged as a solution for the production of these proteins in high yields. CFPS is relatively expensive and relies on E. Coli extracts. Despite being the fastest-growing industrial microbe, E. Coli still grows relatively slowly (~60 min doubling time on glucose and ~80 min on glycerol respectively in minimal media). It contains a significant amount of endotoxins which need to be removed thus significantly increasing downstream processing costs. In addition, sterility is a major concern as the media used can be easily contaminated. Vibrio natriegens has emerged as a potential replacement for E. Coli since it has a doubling time half of E. Coli, fewer endotoxins and requires a simple high-salt media that reduces the chance of contamination. However, industrial V. Natriegens CFPS is relatively untested and unexplored because of its infancy. We have demonstrated for the first time that a low-cost, minimal industrial V. Natriegens system is possible with projection to achieve the same quantitative result as a commercial CFPS system in foreseeable future. By relying on de-novo biosynthesis we are able to generate the necessary components for CFPS in-vitro with low-cost chemical substrates as initial step in the production of a V. Natriegens system suitable for industrial usage.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Metric Search Application On Ranking List Compatibility

Presenter(s): *Wayne Guo*

Abstract:

The compatibility matching for individuals is a complex question. One of the methods to do so is by acquiring individual information and comparing the similarity between this information. In this project, we use a metric, Kendall-Tau distance, to measure the similarity between individuals based on their ranking for items in a list. (e.g., their favourite sports, music, etc.) To increase the performance of the search process, we applied a tree-based searching structure, Cascading Metric Tree (CMT), on this metric. The tree is built on ranked lists from all the users; when a query target and a radius are provided, it can return users within the radius of the target. We will test the scaling of this searching method on a synthetic dataset by varying parameters such as list length, population size, and target set size. We expect the algorithm to query the best matching people for the user in a practical time, given reasonable parameters. We further provided more use cases of this search structure on Kendall-Tau distance, such as roommate and beverage matching, and offered new insight into the application of a distance metric and a search structure.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Eat, Fly, Love: Unraveling the mysteries of maternal diet, Drosophila oocyte ageing, and metabolomics

Presenter(s): *Hannah Illing*

Abstract:

Mature female oocytes are unique cells as they are transcriptionally inactive, yet translation continues. With ample nutrients and mates female flies continuously make new eggs. When flies are starved and separated from males, they store their eggs. Both translation levels and the egg viability decline as storage time increases but mRNA levels remain constant. This project aims to both characterise the metabolic environment inside mature eggs as they age and examine the effect of maternal diet on oocyte quality. Mass spectrometry was used to measure metabolite levels in mature fly eggs after different storage periods. To address the second aim, flies were fed amino acid deficient diets and their egg laying and hatch rates were measured over different storage periods. It was found that metabolomes of eggs stored for 12-days compared to 1-day had some metabolites significantly upregulated, suggesting signs of RNA breakdown and oxidative stress increased with duration of oocyte storage. Additionally, it was found that flies altered the number of eggs produced based on the availability of dietary amino acids. When fewer amino acids were available the fly produced fewer eggs, but eggs of the same quality as when on a full diet, even after storage. Future work should investigate how oxidative stress impacts translation, specifically rRNA and ribosomal proteins to understand the cause of translational decline in ageing oocytes. Ageing in oocytes is key to understanding maternal age-related inherited diseases including chromosomal abnormalities seen in both humans and flies.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Climate adaptation (The consequences of climate change on High-rise RC construction)

Presenter(s): *Noor Hamdona*

Abstract:

With land prices rising in urban areas, tall buildings are a popular solution to meet high housing and commercial space demands in Canadian cities. While attractive for increasing density, tall buildings are highly susceptible to damage after extreme natural disasters, such as earthquakes. The numerous people and businesses affected by damaged tall buildings during natural disasters significantly reduces a city's resiliency. Furthermore, with the global initiatives to reduce our carbon footprint, new structural systems must also be developed that use greener and more sustainable construction while still being resilient to natural disasters. This project will develop new structural systems, devices, and construction methods to create more sustainable and resilient tall building systems. Using computer simulations, we will investigate the performance of buildings that use alternative materials (i.e., timber, steel, green concrete), alternative construction methods (e.g., modular construction), and alternative structural systems. In this Presentation I will be assessing the use of hybrid tall building systems. Specifically, she will compare the structural performance (seismic and wind) and carbon footprint of tall buildings which use gravity framing of different construction methods (i.e., timber, steel) with a cast-in-place concrete core wall lateral system. While GBA+ analysis is essential when designing buildings themselves, our research is on methods and design guidelines around materials and structural systems used to construct buildings.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: South Asian Immigrant Parents Involvement in their Canadian Born Children's Homework and its impact on Relationship Development

Presenter(s): *Navneet Bhangu*

Abstract:

I aim to understand how South Asian immigrant parents with second generation, Canadian born children have been involved in their children's homework and how that has shaped the parent-child relationship. The family plays a significant role in nurturing and developing children to succeed in society. With immigrant families making great sacrifices to settle in the diaspora for more opportunities, it is important to understand their experiences. I hypothesize that parents' educational background will influence their involvement in homework and ultimately their relationship with their child. Educational background reflects cultural capital, and higher education will allow parents to navigate their children's homework and western education better. This will result in a better understanding between both parent and child that may ultimately foster a strong parent-child relationship. The study population will include two groups: The first group is South Asian immigrant parents of second generation Canadian-born children. The second group is second generation South Asian young adults in their early 20s. I will interview each group to understand their experiences with parents, children and homework. I will be gathering data through conducting interviews because it is most appropriate when getting information of past and present actions as I will not be observing study participants first-hand.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Triangle Packings & Transversals In Tripartite Graphs

Presenter(s): *Amaury De Burgos*

Abstract:

The field of graph theory studies abstract structures, called graphs, that represent networks of connections. They can be visualized as drawings consisting of points and lines. Our research concerns itself with graphs that have additional structure which divides the graph into three non-overlapping sides. These graphs are called tripartite graphs.

Within these graphs, the connections between the points and lines can form triangles. Our research studies how many triangles can be packed into such a graph, how many lines are needed to touch all triangles in the graph, and the conditions under which these two quantities are equal. The sides of a tripartite graph can be considered complete or incomplete. In 2012, Lakshmanan et al. proved that if a tripartite graph has all its sides complete, then the number of triangles that can be packed into it is equal to the number of lines needed to touch all triangles. We proved that the same condition holds for tripartite graphs with only two complete sides.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Is wider really better? Lessons learned from a global review of wildlife overpasses

Presenter(s): *Liam Brennan*

Abstract:

It is now well evidenced that wildlife crossing structures paired with exclusion fencing reduce wildlife vehicles collisions while facilitating wildlife connectivity across roadways. Ideal dimensions of overpasses and underpasses vary by species, but scientists generally suggest that overpasses for large mammals should be approximately 50 m wide. We sought to assess how these recommendations manifested in practice – where agencies use this information to design and build structures while also balancing cost and logistical challenges – and the degree to which built structures conform to current recommendations. Using a novel measurement technique, (based on satellite imagery) we analyzed the dimensions of overpasses located in North America, Europe, Asia, and Oceania. Most structures located in North America and Europe did not meet their respective dimensional expert guidelines. We investigate reasons explaining the non-compliance and provide recommendations for future overpass designs. For 12 overpasses located in western North America, we gathered data from management agencies and qualitatively observed that wider overpasses (40-60m, in or near compliance with expert guidelines) were associated with a more diverse set of species use and had nearly twice the average crossing rates when compared to non-compliant, narrow overpasses. We conclude that wide overpasses (~50 m) continue to present ecologically sound and cost-effective solutions for decreasing the barrier of roadways, especially when targeting width-sensitive species and large assemblages of mammals. Future research should explore specific instances when underpasses and narrower overpasses present more cost-effective ecological solutions, or how these structures can complement wide overpasses in successful wildlife crossing systems.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: TV Study: TV programs Tailored to People Living with Dementia

Presenter(s): *Carly Wang, Diane Pan*

Abstract:

Smart TV - referring to interactive TV programs - has been increasingly discussed for use among older adults. These interactions may include following TV instructions or activities, interacting with others via TV, or touching and selecting program options. This study investigated the psychosocial needs of long-term care residents living with dementia, where fulfilling their needs fell short, and how Smart TV catered towards people living with dementia could assist staff and families in these needs. This Smart TV program used fewer words and was slower-paced. It included videos promoting ADLs (activities of daily living) that included: encouraging water intake or nighttime self-care. Focus groups were conducted among staff between two LTC sites in Vancouver, and these interviews were coded for thematic analysis. The study found that staff reported psychosocial needs of the residents often centred around comfort, attachment, inclusion, occupation and identity. This aligns with the needs that Tom Kitwood had initially identified in "Person-Centred Care," as one of the first in his field to define it, especially regarding the needs of people living with dementia. However, previous research lacked insight into applying Kitwood's model of psychological needs among non-English speaking clients. For this reason, this study was centred around cross-cultural topics (seasons, babies) or specific cultures (80s North American nostalgia or Cantonese self-care videos). Thus, the study reveals that staff reported Smart TV had helped remedy client agitation, and initiate conversation and bonding among clients living with moderate to severe dementia and staff in diverse linguistic and cultural settings.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Synaestivum: Engineering for Heat-Resilient Wheat Crops

Presenter(s): *Anjali Parthasarathy, Brenda Ma, Piyush Aswasthi, Alice Hong*

Abstract:

Agricultural supply chains are strained due to key crops failing from record-breaking temperatures. Common wheat (Triticum Aestivum) is an international staple food, and yield loss has significant consequences for global food security. Through the use of synthetic biology, we at UBC iGEM aimed to develop a wheat strain permissive to new climates.

Our genetic circuitry combines 1-aminocyclopropane-1-carboxylate deaminase (ACCD) and sedoheptulose-1,7-bisphosphatase (SBPase) into a functional, co-expressed system. ACCD catalyzes the breakdown of a precursor to the biosynthesis of ethylene (plant stress hormone). SBPase is a Calvin-Cycle enzyme central to carbon fixation and photosynthetic capacity. These genes were cloned into plasmids with heat-inducible promoters, followed by transfection into isolated wheat protoplasts for heat shock to simulate temperature stress.

Results indicated increased fluorescence for both ACCD and SBPase-containing protoplasts at higher temperatures. The system was designed such that if genes were expressed, protoplasts would fluoresce thereby demonstrating the functionality of our plasmids. The fluorescence maximized at 37C, and was negligible until 30C, implying that the genes of interest would be upregulated only under increased temperatures. This has the potential to provide wheat with increased resilience to higher temperatures by increasing photosynthetic capacity. Wet-lab results were supported by bioinformatic exploration, mathematical modeling, and hardware prototyping. Gene choice was supported by differential/pathway analysis, validating ACCD as a differentially expressed gene with a plant development role. Introducing this heat-resistant wheat strain could support agricultural systems struggling to adapt to extreme climate fluctuation, easing pressure on food supply chains in an increasingly interconnected world.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Applications and Emotions: Perspectives of Older Adults on Social Robotics

Presenter(s): *Jaya Kailley*

Abstract:

Social robot adoption by older adults and people living with dementia is limited by several barriers, including a lack of emotional connection with social robots and perceptions of stigma around social robot use. This work aimed to address these barriers by engaging end-users in discussions on factors that could affect emotional connection to a social robot and considerations around using a social robot in public. We conducted seven 90-minute online workshops with older adults with (n=2) and without dementia (n=25) and care partners (n=17). The audio and chat responses from the workshops were transcribed verbatim and qualitative content analysis was performed on the transcripts. In their discussions on features and applications, participants highlighted preferred forms of communication with a robot and ways in which a robot could support connection between people. For example, participants suggested that robots could improve the quality of communication between care partners and the person for whom they care. While many agreed that a social robot should match their level of emotion and interactivity, participants had different preferences for social robot emotional range and display features. Finally, several participants suggested that using a robot around other people could help raise awareness of aging and dementia, while others shared concerns about stigma and attracting negative attention from an audience. Incorporating these findings into the design and implementation of social robots will result in devices that are better suited to the needs of older adults, people living with dementia, and care partners.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Experiences of the Synergy Tool utilization among long-term care providers and leadership: an interpretive descriptive inquiry.

Presenter(s): *Bahar Ahmadi*

Abstract:

Background: Healthcare providers are experiencing challenges with providing residents of long-term care (LTC) homes a safe, secure, and caring environment. This is due to the increasing resident complexity, acuity, and dementia rates in addition to inadequate staffing levels. The work demands in many LTC homes place a heavy burden on the psychological health of healthcare providers and leaders, their ability to deliver quality and safe care to residents, and has led to high attrition rates among care home staff. This project implemented and evaluated the Synergy Tool, a resident-centered model of care aimed at understanding and operationalizing resident needs while fostering effective workload management. This study explored the experiences of long-term care staff and leaders with the Synergy Tool utilization and impact.

Methods: This study gathered qualitative data from four focus groups with LTC leaders (n= 7) and healthcare providers (n=7) in two LTC homes. The focus groups were audio-recorded, transcribed verbatim, and uploaded to NVivo for content analysis.

Results: A total of five themes emerged from the data. The positive experiences are better care planning, better assessments, and improved staffing allocation. The negative experiences included extra workload and burnout among health care providers relating to the Synergy Tool utilization.

Conclusion: Although long-standing structural inadequacies created some barriers in implementing the Synergy Tool, the Tool resulted in positive changes in care delivery and workload management. Introducing new interventions to the LTC sector requires resources and support that enable their successful implementation.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Task-based Brain Networks Detectable by fMRI

Presenter(s): *Tyrone Ly*

Abstract:

Functional magnetic resonance imaging (fMRI) is a non-invasive technology used for indirect measurement of changes in brain activity. Because fMRI is sensitive to changes in blood-oxygen levels, its measurements can reflect the demand of brain cells for oxygen consumption. Currently, this technique is still rarely used in clinical diagnosis and treatment planning for neurocognitive disorders despite its capability of enhancing the reliability and precision of these assessments.

Previous research has mostly focused on either detecting resting-state brain networks or activation of individual brain regions during task performance. However, evidence suggested that there exists a consistent set of networks – groups of interconnected regions – in the brain that is detectable by fMRI when any task is carried out. Broadening our understanding about activation of these networks in task performance can open a window into brain diseases and individual differences in brain dysfunction. From this knowledge, underlying biological causes can be identified and effective treatments can be developed.

Thanks to Open Science, task-based fMRI data are nowadays publicly available through open repositories and will be downloaded for usage in this study. A computerized method called Constrained Principal Component Analysis will be applied on these data to generate corresponding graphical representations of changes in blood-oxygen level in the brain over time during task performance. Using classification algorithms on these graphs, functional networks that were activated can be identified and characterized. This will allow us to make meaningful connections with individual differences in demographics, personality, behavior, cognitive performance, and symptoms of mental illnesses.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: The Influence of User Personality and Attitudes on Interactions with Social Robots: A Systematic Review

Presenter(s): *Mahala English*

Abstract:

Social robots are robots that can interact and communicate with people in accordance with social norms. They are increasingly implemented in various environments including healthcare, education, and the service industry. Individual differences, such as personality dimensions and attitudes towards robots, are considered important factors in human-robot interaction (HRI). Understanding the role of individual differences, and their impact on lived experience, is crucial for designing interactions that are better tailored to users. To address this gap, we conducted a systematic search of the literature, yielding 56 articles, from which we extracted relevant findings. As some of the studies included qualitative outcomes, we used a mixed methods meta-aggregation, in which findings were grouped into categories to form more general synthesized findings. We found evidence that user traits and attitudes are correlated with social HRI outcomes, including preferred distance from the robot, preference in robot personality, and users' impressions of robots and behavior towards robots. Our analysis also revealed limitations which prevents us from drawing unambiguous conclusions, such as disparate interaction outcome measures and lack of comparison between different robots. We propose that these findings can guide the development of research hypotheses to extend knowledge and to provide clarification where the existing literature is ambiguous or contradictory.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Online Accessibility Information for Canadian National Parks: A Study of Website Accessibility Content and Visitor Experiences

Presenter(s): *Anna Riminchan*

Abstract:

Green spaces, such as parks, are an important component of healthy lifestyles, promoting mental well-being, reductions in stress, increases in happiness and positive physical health outcomes (Bedimo-Rung et al., 2005; Buckley, 2020). Many individuals with disabilities wish to visit parks, seeking adventure and enjoyment in nature (Chikuta et al., 2019). However, accessibility can be a challenge for people with cognitive, sensory, or physical impairments, at national parks, including those in Canada (Burns et al., 2009; Perry et al., 2018).

Park websites can help people with disabilities understand and visualize the accessibility of a given park before visiting (Park et al., 2022; Tsai et al., 2010). However, little is known about the quality of accessibility information for Canadian national park websites. A content analysis of the websites of six national parks in British Columbia and Quebec was conducted to assess the content and quality of online accessibility information, and perspectives of people with disabilities about these websites.

The results show high variability in the quantity and quality of accessibility information for parks across Canada. High-scoring websites had clear and easily navigable information for multiple disability types, photos/videos and disability-specific park maps and information. Interviews with park visitors provided recommendations for improving website content.

This study highlights the importance of high-quality online accessibility information for visitors of national parks and illustrates the challenges they may face when planning a visit. Furthermore, the voices of visitors with disabilities provide direction for future online content improvement.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Social Support as a Moderator of Core Belief Disruption and the COVID-19 Pandemic-related Posttraumatic Growth

Presenter(s): *Jasmina Cui*

Abstract:

The COVID-19 pandemic has for many people undermined and challenged many key areas of life, including the core beliefs that people hold. These fundamental assumptions about life include human nature, religious and spiritual beliefs, relationships with others, the meaning of life, and personal strengths and weaknesses. At the same time, some people may experience growth after similar adverse events. The challenge of core beliefs has consistently been positively linked to post traumatic growth (PTG), referring to positive psychological changes that may occur due to a highly challenging event or experience. However, little research has examined whether COVID-19-related challenges will also be associated with PTG. Challenges from the pandemic may have rebuilt their core beliefs through coping processes and led to psychological growth (e.g., improving interpersonal relationships, appreciating life, and exploring new possibilities). Additionally, it is possible that such links are moderated by different availability of social support people had during the COVID-19 pandemic as many social connections were limited due to social distancing measures. We analyzed data collected from 88 participants who reported on their core beliefs, PTG, and social support during the pandemic (2021). Participants who report more core beliefs disruptions showed greater PTG scores. The interaction between social support and disruptions of core beliefs was not significant in predicting PTG scores. Results of this study give important insight into the role of core beliefs changes in stressful events that are not holistically traumatic but might also offer a chance to grow.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: A Qualitative Review of Participant Experience and Input to Refine Research Prioritization in Infant Exploration

Presenter(s): *Zein Hedayati*

Abstract:

Early infant development is closely tied to play, yet not much is known about the neural processes going on during infant learning during free play in a naturalistic environment. In a recent study led by Dr. Lauren Emberson (2022), infant neural responses during free play in an infant-directed environment were examined to provide insight into the neural-cognitive aspects of naturalistic play during infant development. As an extension of this project, this study intends to take the sociocultural factors of naturalistic infant play into account by considering parent perspective on the collected behavioral infant data. In the study led by Dr.Emberson, behavioral variables such as infant vocalization and infant mouthing were coded and analyzed. This study uses aspects of cognitive interviewing to further our understanding of infant behavior and provide parental context to the coded behaviors. Participant input in research has been found to be essential to align the goals of a study with community interest. In accordance with this finding, we also aim to understand participant experience in the previous study to enhance the next steps of our research on infant play and exploration. To accomplish this, data from the initial study was used to provide context for in-depth parent interviews that provided qualitative data regarding social and cultural factors that impact infant play. By conducting these interviews, we hope to gain a further understanding of the sociocultural aspects of infant learning and play.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: The Development of a Care Pathway for Developmental Hip Dysplasia (DDH) in Sri Lanka

Presenter(s): *Duneesha De Silva*

Abstract:

Developmental dysplasia of the hip (DDH) is the most common pediatric hip condition with incidence ranging from 1-3% worldwide. In Sri Lanka, there is no formal care algorithm that physicians use to assess for DDH which may lead to later diagnosis requiring more invasive treatments and potential long-term adverse health outcomes. The goal of a care pathway is early detection and diagnosis. We demonstrate the use of Delphi multi-phase methodology for DDH care pathway development in Sri Lanka. In Phase I, orthopaedic surgeons, pediatricians, neonatologists, and radiologists from across Sri Lanka were surveyed regarding DDH screening practices. A multidisciplinary expert panel composed of 15 members affiliated with three national Sri Lankan organizations was established to take part in the consensus building process. A knowledge base was built through a preliminary survey, literature review and presentations, in anticipation of the consensus building process. During Phase II, expert panel members participated in a modified Delphi process by answering surveys and participating in discussion to reach consensus on statements regarding best practices for DDH. We expect to reach consensus on statements in the coming months. In Sri Lanka, there is a need for DDH care pathway specific to regional contexts as well as increasing awareness among physicians about DDH care practices. Care pathway development is effective when cultural practices in healthcare are acknowledged and strategies to facilitate engagement are country specific. This methodology may be applicable to other countries and conditions that may benefit from care pathway establishment.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: The Silent Struggle of Muslims Suffering from Substance use Disorders

Presenter(s): *Alaa Yehia*

Abstract:

This study explores the effectiveness of self-help groups that integrate the Islamic perspective for Muslims with substance use disorders (SUDs). British Columbia, specifically the Lower Mainland, is the location where this mode of treatment is being proposed due to the increase in drug-related deaths. Participants were recruited using convenience and snowball sampling. Mosques and Islamic Organizations in Canada were informed about the project and the organizations connected the co-investigator with individuals who interacted with Muslims who struggled with SUDs. Of the five Muslim community leaders who responded, all were male and none shared the same profession or role within the Muslim community. Semi-structured interviews were conducted with Muslim community leaders. Participants were asked open-ended questions related to how they addressed SUDs in their communities. An inductive thematic analysis approach was used to determine the main themes discussed. Using NVivo, an initial coding scheme was created based on open coding in the first two interviews to identify the themes that emerged. Six main themes were coded for: addiction stigma, faith, community, education, identity, and love. The two themes that were mentioned the most often by participants were addiction stigma and faith. The analysis revealed that the Muslim community leaders believe that self-help groups may not be beneficial due to the stigma surrounding addiction. Additionally, there was a consensus that religion needs to be integrated regardless of the mode of treatment. Understanding the perspectives of community leaders on SUDs within a Muslim-Canadian context can aid in providing comprehensive care to Muslim Canadians.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Effects of a High Sucrose Diet on Anxiety- and Depressive-like Behaviours in Male Rats

Presenter(s): *Lily Chen*

Abstract:

Globally, many people consume added sugars such as sucrose at high levels, surpassing the recommended amount (<5% of daily calories) by 3-5 fold. High sucrose consumption is correlated with impaired cognitive function and mental health. In rats, withdrawal from extended access to sucrose increases anxiety-like behaviours on the elevated plus maze (EPM). Moreover, rats with a high sucrose intake and rats withdrawn from chronic access to sucrose show increased depressive-like behaviour on the forced swim test (FST). These past studies are limited because sucrose is often given in unrealistically high amounts or in the drinking water, which can alter other nutrient consumption. Thus, in this study, we investigated the behavioural effects of a human-relevant level of sucrose intake in the diet. We hypothesized that a high-sucrose diet is a stressor that alters anxiety- and depressive-like behaviours in adult male rats. We fed adult male Long-Evans rats either a high-sucrose diet (26% kcal sucrose, n=8) or an isocaloric and macro/micro-nutrient matched control diet (1% kcal sucrose, n=8). Then, while maintaining them on the diet, we conducted the EPM and FST to assess anxiety- and depressive-like behaviors, respectively. Diet groups did not alter food intake or body mass. Behavioural data is currently being analyzed. We predict that a human-relevant level of sucrose intake will increase anxiety- and depressive-like behaviours in male rats. This study will bring insight on whether a human-relevant level of sucrose intake induces anxiety- and depressive-like behaviour, and, overall, provide insight into the relationship between nutrition and mental health.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: A White-Only Fishery: How Did Colonial Policymaking Impact the Economic Well-Being of Indigenous Communities in Northern British Columbia?

Presenter(s): *Wuyang Ren*

Abstract:

For centuries, Canada's economic thinking has been dominated by the colonial notion of the staple theory, which can be best summarized by the argument that Canada should specialize in producing natural resources. As this theory is constructed upon the assumption that Canada is an unclaimed land that can be relentlessly developed by settlers, it rejects Indigenous peoples' rights and traditions. While Indigenous peoples have always been vital actors in establishing British Columbia's industrial, resource economy, many economic policies informed by the staple theory were designed to exclude them from it. Extensive research has investigated the impacts of such discriminatory policies on Indigenous communities using qualitative methods, but there have been fewer studies that quantify their impacts on the economic wellbeing. This project will study the effects of the 1912 Memorandum of Understanding between the Province of BC and the Federal Government of Canada (MOU), which aimed to create a white-only fishery. Specifically, I will use data from the 1911 and 1921census to conduct a before-and-after and difference-in-differences analysis that estimates how it has disadvantaged Indigenous communities from the historical Indian Reserves in northern BC. I hypothesize that the 1912 MOU resulted in a drop in income of Indigenous communities that used to rely on fishery, widening the inequality between Indigenous and non-Indigenous populations. This research will help further elucidate the role that Canadian economic policies play in marginalizing Indigenous peoples, which will also contribute to the reconciliation discourse by developing a more thorough narrative of the country's colonial history.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Emotional impact and attitudes of self-rehoming versus shelter relinquishing in pet owners

Presenter(s): *Meghan Lok*

Abstract:

One-third of animals that enter Canadian animal shelters are surrendered by their owners. To maintain a manageable capacity in animal shelters, organizations aim to employ strategies that reduce the intake of animals. Previous studies demonstrate that relinquishing an animal to a shelter is a difficult decision, often due to a strong emotional attachment to the animal and concern for its welfare in the shelter. Alternatively, some pet owners rehome through self-rehoming methods, which can include contacting personal networks or publicly advertising on social media and services such as Craigslist or AdoptaPet.com. While reducing shelter intake is a benefit of self-rehoming, the emotional impact of self-rehoming remains unknown. Thus, the purpose of this study is to explore how the emotional impact of self-rehoming differs from relinquishing to a shelter. Our mixed-methods survey targets public members who have rehomed at least one animal in the past five years. The survey contains open-ended questions analyzed using inductive coding and multiple choice questions on the degree of emotional distress based on the Pet Bereavement Questionnaire (PBQ), as well as the rehoming decision-making process. While data collection is ongoing, we predict a stronger, negative emotional impact for relinquishing an animal to a shelter. If the findings support this hypothesis, it could encourage the implementation of accessible interventions and self-rehoming methods, which may result in reduced emotional impact for pet owners going through the rehoming process. In addition, promoting self-rehoming could divert animals away from shelters, sparing resources for animals already in the shelter system.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Understanding the self-collection preferences of women living in Rwanda

Presenter(s): *Varun Nair*

Abstract:

Purpose

This study aimed to understand the preferences of and amenability factors for women in urban and rural Rwanda towards self-collection for cervical cancer screening.

Methods

We recruited Rwandan women ≥ 18 years speaking Kinyarwanda or English from one urban and one rural clinic. We conducted a cross-sectional 51-question survey from June 1-9, 2022 investigating demographics and attitudes towards self-collected cervical cancer screening. We stratified responses by clinic site and performed descriptive statistics on this stratified dataset.

Results

In total, 374 Rwandan women completed the survey (urban n=169 and rural n=205). The mean age was 33.09 years for urban and 32.89 years for rural respondents. The majority of respondents at both sites had a primary school or less education and were in a relationship. Both urban and rural respondents were open to self-collection; however, rates were higher in the rural site (79.9% urban and 95.6% rural; p-value<0.001). Similarly, women in rural areas were more likely to report feeling unembarrassed about self-collection (65.3% urban, 76.8% rural; p-value<0.001). Both urban (87.6%) and rural (90.2%) respondents were similarly unafraid of social stigma around cervical cancer. Notably, almost all respondents (97.6% urban and 98.5% rural) stated they would go for a cervical cancer pelvic examination to a nearby health center if their self-collected results indicated any concern (p-value=0.731).

Conclusion

Rwandan women largely support integrating self-collection-based cervical cancer screening. Further research should investigate how to implement self-sampling screening services. Expanding cervical cancer screening in Rwanda will help the global goal to eliminate cervical cancer.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Identification of H3K27me3 and H3S10T11phos as Potential Biomarkers in Pediatric Osteosarcoma

Presenter(s): *Sebastian Kondratowski*

Abstract:

The most common primary bone tumour, osteosarcoma, is often defined as genetically non-recurrent and heterogeneous. Chemotherapy after diagnosis is often followed by resection and an assessment of treatment response, which helps inform further therapeutic choices. Identifying potential biomarkers that may affect survival could fuel clinical trials attempting to improve outcomes. Relative to conventional genetics, little is known about osteosarcoma epigenetics. We aim to characterize the methylation and phosphorylation status in osteosarcoma using histone markers found in primary diagnostic biopsies and their paired metastases. We constructed two tissue microarray sets from 58 primary cases, and 20 related metastatic neoplasms, with tissue blocks available from 2002-2021. Clinical charts were reviewed for post-therapy response, development of metastasis, and overall survival. We evaluated 6 histone H3 residues using immunohistochemistry, including H3K4me3, H3K9me3, H3K27me2, H3K27me3, H3S10T11phos, and H3S28phos. Tumours were scored with low (<25%) or high (≥25%) nuclear staining of tumour cells. Diagnostic biopsies that showed low H3K27me3 nuclear staining were associated with poor treatment response (≤90% necrosis) at the time of definitive excision ($P<0.05$). Loss of H3S10T11phos expression at the first metastasis compared to the primary tumour was also observed ($P<0.05$). Survival trends were also observed with loss of H3S10T11phos in the primary tumour. This pilot study identified H3K27me3 and H3S10T11phos as potential biomarkers for osteosarcoma which may predict a poor neoadjuvant response and signify changes to gene expression in metastases, respectively. Although studies with a larger cohort are needed, these results support the expanded evaluation for risk stratification of other histone markers.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: The Role of Nostalgia and its Associations with Eudemonic Wellbeing during the COVID-19 Pandemic

Presenter(s): *Jack Yeung*

Abstract:

Nostalgia is a sentimental longing for one's past, often including contents such as personally meaningful recollections of childhood or social relationships. Historically considered a pathology, increasing attention is given to positive aspects of nostalgia including nostalgia's ability to induce positive affect. However, nostalgia can be associated with both positive and negative experiences. In fact, nostalgia could be a coping mechanism, which can accompany negative affect during the process of dealing with a difficult encounter but may eventually be associated with meaningful experiences. Furthermore, while some prior findings report that nostalgia is associated with lower hedonic wellbeing, it is unclear whether nostalgia–wellbeing associations differ between hedonic and eudemonic facets of well-being. The purpose of this research was to examine if nostalgia is correlated with higher wellbeing, especially its eudemonic aspects. The data utilized in this project were collected as part of an intensive longitudinal study including a Canada-wide adult sample (N=97, Mage= 44.52, SDage= 18.60, 81% female; data collected from April to October of 2021) collected during the Covid-19 pandemic. A regression analysis was conducted to analyze relationships between two operational definitions of nostalgia and two dimensions of eudemonic well-being (Purpose in Life and Self- Acceptance). Contrary to our predictions, no significant associations were found between reported frequency of nostalgia and ratings of eudemonic wellbeing. Further research may provide clarifications as to whether nostalgia is associated with greater life satisfaction and/or purpose.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: A Place to Create: A case study of community arts practice in Vancouver

Presenter(s): *Teodora Rawsthorne Eckmyn*

Abstract:

Arts and culture, and by extension, artists' communities, arts spaces, and other artistic resources, are essential ingredients in the social inclusivity and connectivity, political and civic engagement, and community resilience of urban worlds. In the City of Vancouver, these urban arts networks exist within the context of an evolving and intensifying housing crisis manifest in issues of unaffordability, instability, and displacement from urban spaces - commercial, retail, industrial, residential, etc. Considering these intersecting urban dynamics, this research seeks to illuminate trends in how the spatial, material, and labour aspects of artistic practice are impacted by urban issues, as well as trends in the strategies and practices that artists individually and collectively employ to live and practice within the increasingly spatially and economically volatile and inequitable urban context of Vancouver. This research is carried out through a case study of a local, community-based arts collective, including members of the collective and of the local arts community in which the collective is embedded. The research employs mixed methodologies including multiple focus groups with different groupings of collective participants, collective mapping activities which seek to illuminate important spatial trends and locations in the local experiences and networks of artists, observation of participants' art spaces, and participant observation of various events organized and facilitated by the collective. The research finds that artists rely upon a complex and heavily interconnected system of institutions, actors, resources, networks, urban forces that intersect to constitute and enable this local community arts within the specific context of urban Vancouver.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Robustness Testing for Achilles Tendon Rehabilitation Device Using Biomechanical Simulation

Presenter(s): *Xavier Lam*

Abstract:

Five to ten people per 100,000 rupture their Achilles tendon annually. The Achilles tendon is critical for everyday movements such as walking and running as it transmits forces from lower limb muscles to the foot. Thus, after a rupture, at-home rehabilitation is necessary to quickly heal and strengthen the Achilles tendon. However, at-home rehabilitation programs rely on subjective patient tolerance to the exercises, leading to a poor 50% success rate. A proposed new telerehabilitation system, PhysViz, aims to solve this problem with quantitative load data and patient feedback. The device features a load cell tethered from the waist to foot that measures forces transmitted through the Achilles tendon during plantarflexion. While PhysViz provides quantitative data for at-home use, it does not have the same level of control as laboratory interventions. Thus, we performed a sensitivity analysis to assess whether Achilles tendon strain remains within 5% of a gold-standard laboratory Biodex dynamometer over a range of ankle joint angles. To perform the sensitivity analysis, we developed a musculoskeletal model of the PhysViz rehabilitation exercise in Opensim. When locking the ankle at various angles with a fixed 80% muscle activation of Gastrocnemius and Soleus muscles, we found Achilles tendon strain varied by <5% from -9 to 9 degrees. When incorporating the PhysViz, we found the Achilles tendon strain was within 5% of baseline from -5 to 10 degrees. These results demonstrate that the PhysViz system will require care for use in at-home Achilles tendon rehabilitation in order to produce maximal effect.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Differentially expressed circulating miRNAs in patients with mild cognitive impairment to severe Alzheimer's disease (AD)

Presenter(s): *Emily Chen, Charvi Saboo, Daniyal Imran Aleem, Jennifer Law*

Abstract:

Background:

Alzheimer's Disease (AD) is the most common type of dementia, affecting 5.8 million people in the United States alone. Neuropathological examination is the gold standard for AD diagnosis. MicroRNAs (miRNAs) are a class of small non-coding RNAs, that regulate gene expression and function. Several studies have shown that miRNAs levels are altered in AD, suggesting it is a potential diagnostic biomarker.

Objectives: To identify differentially expressed miRNAs in mild cognitive impairment (MCI) and AD patients' fluid samples (cerebrospinal fluids or blood (serum/plasm)) through a literature search; and categorize them based on disease severity (MCI to severe AD).

Methodology: Electronic databases PubMed and Web of Science Core Collection were searched independently for original investigations published in English language for a 5-year period from October 2017 to October 2022. Medical subject headings (MeSH) or keywords search was undertaken with a combination of words "miRNAs", "Alzheimer's disease", "human participants", and "cerebrospinal fluids or serum or plasma". Title and abstract screening were conducted after excluding duplicates and other types. Full text articles that fulfilled the study inclusion criteria will be used for data extraction.

Results: A total of 611 articles were identified. 436 articles remained after duplicates were removed. 379 articles were subjected to title and abstract screening after excluding 80 other types. 112 articles were selected for data extraction-based study inclusion criteria. Detailed findings will be presented using a PRISMA flow diagram and the deregulated miRNAs and their direction of regulation with respect to samples and disease stage will be reported.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Umsmothering Girlhood: Healing the Sisterhood Wound

Presenter(s): *Liva Behji*

Abstract:

Within our androcentric (that is, male-dominated) culture, patterned emotional violence between women has become imprinted into a socially constructed definition of womanhood that is assumed to be normal and natural. The widespread perpetuation of these patterns only reifies the assumption that women lack the capacity to have fortifying and fulfilling relationships with one another, failing to account for the sustained logic that informs how women actively reproduce behaviour underpinned by androcentric agendas with inwardly harmful effects. My research draws on auto-ethnographic analysis, grounded in six months of participant-observation fieldwork, as well as four semistructured interviews with participants in a series of sisterhood circles - intentional and restorative gatherings of self-identified women. Exploring these regenerative circles and the process of bringing light and language to previously unarticulated experiences, this violence is conceptualised as a situational and relational process, rather than an inevitable facet of identity. By viewing the sisterhood wound as a category of analysis, androcentrically-instilled alienation and disconnection between women begins to dissolve, initiating a medicinal return to unity.

Wave 2 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 11:00AM – 12:15PM

Title: Alpine Plant Responses to Increases in Human Trampling Disturbance in the Nch'kay Region (Garibaldi Provincial Park)

Presenter(s): *Carly Hilbert*

Abstract

With the recent increase in recreational visits to the Coastal Mountains in British Columbia, off-trail trampling of alpine plants is more likely to happen. However, the lack of literature on the effects of trampling on alpine ecology is alarmingly limited. In addition to warming, trampling presents a new threat to delicate alpine ecology. To investigate the effect, a trampling study was established in the summer of 2022 in the Nch'kay region (Garibaldi Provincial Park, British Columbia) as a new chapter of the Internation Tundra Experiment (ITEX). 14 sites were selected based on plant communities, orientation and elevation along three popular hiking routes. Every transect had a disturbed (trampled) and undisturbed (untrampled) counterpart. The plant communities studied included mountain heather (Cassiope mertensiana, Phyllodoce empetriformis, Phyllodoce glanduliflora), alpine blueberries (Vaccinium ovalifolium), and sedges (Carex spp.). Both growth proxies, which include the height and maximum diameter, and reproductive proxies, which include fruits, flowers and buds, were recorded. Standardised photos were taken for greenness tests. Tea bags were buried at select transects to measure litter decomposition. While research is still undergoing for greenness and litter decomposition, we found that trampling and elevation affect each species differently. With a hierarchical linear model, we found significant effects of disturbance and elevation on the plant's maximum diameter, with disturbance being more pronounced at lower elevations for some species, but the reverse is true for others.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: microRNA Expression in Healthy Human Placentas - A Comparison Study

Presenter(s): *Fidan Sadig*

Abstract:

microRNA are small non-coding RNA molecules that play a role in gene modification. The ones expressed in the placenta - a vital organ developed during pregnancy to facilitate nutrient, oxygen, and waste exchange - can serve as biomarkers to indicate disorders or an optimal progression. However, there is a lack of reference microRNA profiles of healthy pregnancies for comparisons to monitor the changes. The aim of my project was to expand the microRNA transcriptome by analyzing their expression in 30 healthy human placenta samples and to compare the results with publicly available data. 17 microRNAs were found to be differentially expressed across trimesters. The variation in expression observed was significantly influenced by trimester, but not sex. There were 386, 398, and 44 differentially expressed microRNA when compared between trimesters 2 and 1, 3 and 1, and 3 and 2 respectively. When compared to a public dataset, only one microRNA showed a similar pattern of expression. Furthermore, the leading variable impacting expression in the public dataset was a technical one-batch effect. This lack of reproducibility majorly exists due lack of standardized methods for placental processing and analysis.According to recent research, placental microRNAs also pass into the mother's blood, and a simple non-invasive blood test from the mother can give information about the microRNA levels for pregnancy assessment. My project adds to the knowledge of microRNA expression in the healthy placenta, with the ultimate goal to detect changes specifically in early pregnancy to ensure healthy progression for both fetus and mother.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Say NOx to Parkinson's Disease: Investigating nitrogen oxide-induced nitrosative stress at the environmental-physiological interface as a potential pathogenic pathway

Presenter(s): *Jennifer Lim*

Abstract:

As the global demand for industrial and agricultural activity increases, so does the concern for the health implications of toxic constituents found in ambient air pollution (AAP). While cardiovascular and respiratory health problems due to AAP are relatively well-documented, the role that environmental pollutants play in neurodegenerative diseases is unclear. A common neurodegenerative disease, Parkinson's Disease (PD) is marked by degeneration of dopaminergic neurons coupled with the accumulation of alpha synuclein protein aggregates. The current literature suggests that traffic-based pollutants, namely nitrogen oxides, may disrupt the natural antioxidant system by facilitating the formation of reactive nitrogen species (RNS), which are highly reactive, short-lived intermediates, synthesized by various enzymatic reactions within the body. Dysregulated levels of RNS can induce cellular strain and/or damage through what is known as nitrosative stress (NS). RNS can impose NS by participating in various pathogenic mechanisms: protein modification, mitochondrial damage, and apoptosis. These mechanisms may lead to the dysfunction and degeneration of dopaminergic neurons and disrupt protein interactions that can lead to aggregation and accumulation. NS plays a critical role in PD pathogenesis, and understanding the environmental facilitation of RNS formation is instrumental. This poster contributes to the current discourse by highlighting NS-induced neurotoxicity and neuroinflammation. Furthermore, it aims to address current literature gaps by elucidating the environmental-physiological interface - a site of interaction between the environment and the body. In-depth exploration between AAP, NS, and PD pathogenesis offers valuable insight into therapeutic targets, and ultimately underscores environmental health as a powerful determinant of human health.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Anatomical Variations of Pancreatic Duct Pattern: a Cadaveric Study

Presenter(s): *Sanam Ashrafzadeh*

Abstract:

The main pancreatic duct and accessory pancreatic duct work hand in hand to secrete the pancreatic juices into the second part of the duodenum. The common bile duct, descending from the gallbladder, converges with the main pancreatic duct and drains a mixture of pancreatic juice and bile into the duodenum via the major duodenal papilla while the accessory pancreatic duct drains independently into the minor duodenal papilla. During fetal development, there can be variations in ductal fusions leading to pancreas divisum. The aim of this study was to gain a perspective into what percentage of a given population displays pancreatic duct variation and explore what these variations are. This objective was achieved by the dissection of the pancreas of 19 (10 female, 9 male) embalmed cadavers donated to The University of British Columbia. It was found that only 78.9% (15/19) of the specimens had a present APD. 31.6% (6/19) of the specimens had communicating APD and CBD. 63.2% of the specimens had MIP present (12/19). 73.7% of the specimens had communicating MPD and CBD. All specimens had MAP present (19/19). 68.4% (13/19) of the specimens were considered variations. These results can be used to create a database that can be used to further investigate pancreatic duct patterns' relationship with pancreatic diseases.

This study aids in the understanding of the anatomical variations of pancreatic duct communications as it is crucial for evaluating, understanding and treating duodeno-pancreatic diseases.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Forbidden sour candy: Effects of ocean acidification on articulated coralline calcification and its defense against isopod herbivory

Presenter(s): *Ethel Wai*

Abstract:

Low oceanic pH levels caused by rising atmospheric carbon dioxide (CO2) continue to threaten our marine ecosystems. This results in the endangerment of many calcified organisms. Corallines, a group of calcified red algae, are extremely vulnerable in such environments due to their easily dissolved high-magnesium calcite contents. This study will explore the effects of ocean acidification on two species of coralline algae that differ morphologically, Corallina chilensis and Calliarthron tuberculosum. The change in weight and calcium carbonate content was measured after acid treatment to mimic the effects of ocean acidification. Samples of corallines after acid exposure were then fed to the isopod, Cirolana harfordi, to evaluate if the change in calcification influenced grazing. When corallines were placed in acidic treatments for longer time periods, they exhibited greater amounts of calcium carbonate degradation. C. chilensis was found to be more susceptible to degradation in acidic environments, resulting in lower calcified content after exposure compared to C. tuberculosum. This supported the theory that responses to acidic environments were likely dependent on differing morphologies. No significant correlation was found between calcification and consumption in the two species. However, when calcification was disregarded, C. chilensis displayed a higher degree of consumption (20% ± 15%) suggesting there may be other species-specific attributes defending against herbivory. The relational ambiguity between ocean acidification, herbivory and calcification continues to be complex and requires further research.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Levels of SUSD4 and SEZ6 in Post-Mortem Brain Tissue of Patients with Schizophrenia and Bipolar Disorder

Presenter(s): *Si-ah Choi*

Abstract:

Schizophrenia (SCZ) is a debilitating psychiatric illness. Symptoms, which include psychosis, negative symptoms, and cognitive impairment, typically first present during late adolescence or early adulthood. Bipolar Disorder (BD) presents itself through recurring episodes of mania, hypomania, and/or depression. While extensive research has started to uncover the biological mechanisms that underlie schizophrenia and bipolar disorder, further studies are needed to deepen our understanding and produce effective treatments for these debilitating disorders. Recent studies have investigated the role of the complement immune system in the central nervous system, with additional examination of relationships between psychiatric disorders and certain complement system regulator proteins, such as Sushi Domain Containing 4 (SUSD4) and Seizure Related 6 (SEZ6). In this study, mRNA levels of SUSD4 and SEZ6 complement system inhibitors were measured in post-mortem human brain tissue of patients with SCZ, BD, or neither. Levels of mRNA were measured using qPCR. A hyperactive immune system due to decreased inhibition, SCZ, and BD have all been shown to be related to increased synaptic pruning and synapse loss. Therefore, it was hypothesized that there will be lower levels of both SUSD4 and SEZ6 in patients with SCZ or BD, compared to individuals with neither disorder. Independent t-tests have revealed that there are significantly lower levels of SEZ6 mRNA in SCZ brain tissue compared to the control. Finally, the implications of these results on future research will be discussed.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Plasma Lipid Abnormalities in Muscular Dystrophy: a systematic review and meta-analysis

Presenter(s): *Xindi Wang*

Abstract:

Background: Muscular dystrophies are a group of inherited neuromuscular disorders caused by mutations in more than 40 genes. Dyslipidemia has been found in several muscular dystrophies such as Duchenne muscular dystrophy and limb-girdle muscular dystrophy type 2B. However, the possible association between plasma lipids and other types of muscular dystrophies has not been investigated. Herein, we performed a systematic review and a meta-analysis to compare plasma lipid profiles between patients with different types of muscular dystrophies and non-muscular dystrophic controls.

Methods: 3 databases, MEDLINE, EMBASE, and Cochrane Central Register of Controlled Trials were used. Studies reporting plasma/serum lipid profiles were included. From the included papers, a meta-analysis of cross-sectional studies comparing plasma/serum levels of total cholesterol, high-density lipoprotein, low-density lipoprotein, and total triglycerides between patients with muscular dystrophies and controls was performed.

Main results: Out of 750 initial studies, seventeen met our eligibility criteria and were included and meta-analyzed. Muscular dystrophic individuals had significantly higher levels of plasma total cholesterol (Hedges' g with 95% confidence interval [CI], 0.80 [0.03 – 1.56]; p = 0.04) compared to controls. Plasma levels of high-density lipoprotein, low-density lipoprotein, and total triglycerides did not significantly differ between muscular dystrophic individuals and controls. Meta-regression analysis revealed the percentage of the male gender to significantly influence the results (beta = 0.05; 95% CI, -0.02 to 0.11; p = 0.043).

Conclusion: We found evidence that overall, muscular dystrophy is associated with higher plasma total cholesterol. However, further longitudinal research is required to understand this topic better.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Are iPSC a viable option in evaluating the effect of TKI resistance in chronic myelogenous leukemia patients?

Presenter(s): *Jessica Boucher*

Abstract:

Induced pluripotent stem cells (iPSC) can be used as models to better understand disease mechanisms to enable the desired effects on specific cell types and tissues. The treatment for chronic myelogenous leukemia (CML) is tyrosine kinase inhibitor (TKI), however patients have experienced a resistance to the therapy. Due to the rarity of CML cells for research, CML derived iPSC are used in place of true CML cells to see whether iPSC can be used in TKI resistance research. CML derived iPSCs (iCD34+) showed similar adhesion, independent proliferation, and kinase inhibitor resistance properties. These similarities compared to true CML cells makes them an effective tool in aiding research of TKI resistance in CML. Since iPSC show similar properties to original CML cells, several clones of CML derived iPSCs can be used as a model to decipher all the mechanisms leading to leukemia stem cells (LSC), this is vital as LSC are the leading factor in TKI resistance.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: The Impact of Mental Health Awareness Campaigns on Young People: A Systematic Review

Presenter(s): *Cindy Zhang*

Abstract:

Mental health issues are prevalent among young people. The World Health Organization (WHO) reports that 10% of children and adolescents worldwide experience a mental disorder, yet most do not seek or receive care. Media mental health campaigns (MMHCs), defined as marketing efforts to raise awareness of mental health issues through mass media, are an effort to address this growing concern. While previous research has evaluated the outcomes of specific MMHCs, there is limited data synthesizing the overall effects of MMHCs. This study addresses the knowledge gap by reviewing the existing literature on the impact of MMHCs on young people. A search was conducted on MEDLINE, EMBASE, PsychINFO, Web of Science, and Google Scholar for studies published between 2004-2020 on MMHCs with results specific to people aged 10-24. Out of 20902 total studies identified and screened, 18 studies were included in the review. The following data was extracted from each study: characteristics and descriptions of the campaign, evaluation design and sampling, and summary of impact. The review identified evaluations of 15 MMHCs from 8 different countries. Outcome evaluation methods commonly comprised of surveys and quantitative data. MMHCs were generally associated with positive changes in the attitudes, beliefs, and intentions of young people (ie. reduced stigma) and positive changes in behaviours (ie. increased help-seeking behaviours). The inclusion of few studies in the review indicates a need for ongoing evaluations of MMHCs to inform good practices in their development and distribution.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Development of Anti-Inflammatory Coatings for Biomedical Devices

Presenter(s): *Paniz Ghavimi*

Abstract:

The use of vascular grafts and artificial valves is rapidly increasing, meeting the needs, in particular, of an aging population. The presence of any implanted biomaterial that's exposed to blood, triggers a host response. This response seeks to eliminate foreign material from the body through the activation of innate immunity, inflammation, and coagulation. The result is not only damage to the medical device and loss of its function, but possibly widespread harm to the host. The goal is to reduce the adverse response of the host toward the implanted biomaterial. The objective of this project is to reduce inflammation triggered by the device by coating its surface with a protective layer. Thrombomodulin (TM) is a naturally occurring anti-inflammatory, anticoagulant protein, that consists of 5 functional domains. This research study focused on the lectin-like domain of TM (TM-LLD), which has anti-inflammatory and anti-complement properties. To immobilize the TM-LLD onto the biomaterial surface, TM-LLD was subcloned into the cDNA expression vector. Following the transfection of the vector into mammalian cells, purification of the recombinant TM-LLD by affinity chromatography was done. Functional assays confirmed that the recombinant TM-LLD reduced complement activation via the classical and lectin pathways. Further, studies will validate whether TM-LLD also interferes with leukocyte adhesion and later its biocompatibility onto a biomaterial surface will be assessed. Overall, it is promising that TM-LLD will prove to be a useful biomaterial coating component to minimize the inflammation and coagulation that commonly occurs with blood-exposed devices.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: The Effect of Acute Physical Activity on Short-Term Memory

Presenter(s): *Kseniia Voronkova*

Abstract:

There is a strong correlation between physical activities and long-term memorization. After determining a lack of research about memory abilities in a more condensed period, this paper examines the effect of acute exercises on short-term memory. In the case of implementing periodic physical exercises while memorizing the content of detailed pictures, data retrieval might be distracted by an abrupt transition to a motor activity. To test the hypothesis, the experiment represents a between-subject pre-test post-test design with the division of the population into two groups – control and experimental – and random assignment to the same task with difference in conditioning. Consistent with the hypothesis, the present study finds a lower memorization performance of the experimental group assigned to do jumping jacks for 50 seconds, than the control group undergoing no interruption within the first Round of data collection among the students at the University of British Columbia taking a PSYC 217 2022W1 course (n = 32). Experimental Round 2 supports past research findings about improved memorization due to the repetition of the exercise inclusion compared with the static group. By documenting the spontaneousness versus predictability of the physical activity required during the short memory-related task, the research does not recommend integrating an unfamiliar exercise circuit into a quick study session within a limited time because of its distracting effect.

Keywords: short-term memory (STM), acute exercise, physical activity, effect.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Development and validation of a tool for Semi-Personalization in Auditory Virtual Environments

Presenter(s): *Kimia Nouhi*

Abstract:

An essential prerequisite for the survival of humans is the ability to detect and localize objects in our environment. One recent avenue that has broadened our ability to investigate these processes has involved the development and implementation of virtual reality (VR) paradigms. Yet, the utility of VR often remains limited to visual experience, neglecting other sensory modalities, such as hearing. One obstacle in the development of auditory VR is the individualization of sound signals as they enter our ears. To localize sounds, we rely on features of the sounds that change depending on our unique own head and ear shape. This experiment aimed to develop and validate a method of generating semi-personalized virtual auditory environments that remain perceptually faithful to the intended real-world experience. We have participants localize virtual auditory cues across eighteen pre-existing virtual environments (white noise bursts). Localization accuracy was then compared between real-world targets and virtual targets to assess the efficacy of each of the virtual worlds. We find that our task was able to identify one or more virtual environments that match real-world localization performance thus providing an immersive and realistic experience. This work has implications and benefits for researchers, clinicians, VR creators and other AVE users. Our findings can further be integrated with artificial intelligence for better performance in those models.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: The Scourge of Party: Politics and Dynamics of Discipline Inspection in China

Presenter(s): *Guoliang Zhang*

Abstract:

In March 2018, the 13th National People's Congress approved National Supervision Law and amended China's constitution to establish a new state agency across the country: National Supervisory Commission (NSC). Since then, state agencies for dealing with corruption, malfeasance, and dereliction of duty have been consolidated from the previous dual-track system in which the people's procuratorates worked jointly with the Party's Commission of Discipline Inspection (CDI) to a unified and further empowered state agency. By integrating forces of discipline inspection from several powerful state agencies and party organs (anti-corruption bureau, anti-dereliction of duty and infringement of citizen's rights department, corruption prevention department in procuratorate, and Ministry of supervision into CDI), the NSCs are now able to supervise and discipline both party members and non-party public officials in China. While many scholars have argued that the NSCs' unchecked and unaccountable power is likely to impede judicial independence and weaken the rule of law in China, it remains unclear about how the NSCs interfere with legal procedures in implementing the Party's discipline inspection and how these formidable officials in the NSCs interact with and exploit officials from other state agencies. Based on field interviews with officials from NSCs and law enforcement agencies in China, we find that NSCs are increasingly becoming a delicate mechanism that maintains the party's rule through relentless punishment of any cadre whose political loyalty is questioned, not promoting democracy, anti-corruption, or the rule of law.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Reporting of determinants of health inequities and participant characteristics in randomized controlled trials of juvenile idiopathic arthritis in Canada: A scoping review

Presenter(s): *Niloo Gheshlaghi*

Abstract:

It is important to consider inclusion and diversity in rheumatology research. We reviewed and synthesized randomized controlled trials (RCTs) for juvenile idiopathic arthritis (JIA), the most common type of arthritis among children and adolescents, in Canada with the aim of characterizing participants and identifying how determinants of health inequities are reported. To do so, we searched Medline (1990 to July 2022), Embase (1990 to July 2022), and CENTRAL (inception to July 2022) for articles meeting all of the following criteria: Canadian RCTs evaluating pharmacological or non-pharmacological interventions on JIA populations. Data extraction was guided by the Campbell and Cochrane Equity Methods Group's PROGRESS-Plus framework on determinants that lead to health inequities (e.g., Place of residence; Race; Occupation; Gender/Sex; Religion; Education; Socioeconomic status; and Social capital). Of 4,074 unique records, 5 were deemed eligible for inclusion. From these determinants of health inequities, Gender/Sex and Age were the only that were reported in all studies with most participants being female and 12.6 years old on average. In addition, Race, Socioeconomic status, Education and Features of relationships were each reported once in three different studies. Lastly, Place of residence, Occupation, Religion, Social Capital and Time-dependent relationships were not reported at all. This scoping review suggests limited reporting on determinants of health inequities in RCTs for JIA in Canada and a need for a reporting framework that reflects typical characteristics of juvenile patient populations. Establishing a standardized reporting criteria for equity factors in RCTs is important for informing accessible research for patients with JIA.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Reporting of determinants of health inequities and participant characteristics in randomized controlled trials of systemic lupus erythematosus in Canada: A scoping review

Presenter(s): *Vanay Verma*

Abstract:

Health inequities can impact disease progression and treatment; thus, it is important to consider inclusion and diversity in rheumatology research. We reviewed and synthesized randomized controlled trials (RCTs) for Systemic Lupus Erythematosus (SLE) in Canada to characterize participants and identify how determinants of health inequities are reported. Adequate representation in rheumatology research is critical for SLE patients due to the ongoing care required for patient improvement. We searched MEDLINE (Ovid 1990 to September 2021), Embase (1990 to September 2022), and CENTRAL (inception to September 2022). Eligible studies were: 1) published in English or French; 2) published between 1990 and September 2022; 3) conducted in Canada; 4) an RCT design; 5) assessing patients with SLE; 6) evaluating SLE-specific interventions; and 7) assessing participants greater than 18 years old (adult populations). Data extraction was guided by the PROGRESS-Plus framework which measures health inequities. Of 1901 unique records, 5 were selected for inclusion. Of these five studies, gender, sex and age were reported with most participants being female (ranged from 83% to 100%). Reported mean ages of participants ranged from 31 to 47.7 years. Place of residence (n=4) and race (n=3) were reported in studies while socioeconomic status and social capital were only reported in one study. Language, culture, occupation, religion, education, features of relationships and time-dependent relationships were not reported. This scoping review suggests limited reporting on determinants of health inequities in RCTs for SLE in Canada and a need for a reporting framework to better reflect the SLE population.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: How Copper-Aβ Interaction is Toxic to the Brain - An Alzheimer's Study

Presenter(s): *Ada Lin*

Abstract:

A hallmark of Alzheimer's Disease is the formation of beta-amyloid (Aβ) plaques, which are believed to be toxic to neurons and ultimately lead to memory loss. Plaques are the result of aggregating Aβ peptides over time. This neurodegeneration is further exacerbated by the interaction between Aβ and copper in the brain, since this interaction produces reactive oxygen species (ROS), causing oxidative stress (Ox-stress) and damaging brain tissue. The goal of this project was to first find out if and how this copper- Aβ interaction damages neurons, specifically how ROS is produced by copper- Aβ interaction, and secondly how copper might impact Aβ aggregation. Recent studies using mice or cell-free systems have shown that copper- Aβ interaction produces ROS and alters how Aβ aggregates. To mimic the human brain more closely, this experiment was conducted using 3D neurospheres, which are formed by combining astrocytes and neurons derived from human induced pluripotent stem cells. The neurospheres for this experiment were treated with copper and Aβ. Redox sensitive proteins and immunofluorescence were used to study Ox-stress as well as the aggregation of Aβ. Results show that the spheres treated with copper suffered severe Ox-stress, and that copper decreased the amount of Aβ deposits. Finding out how these metal ions interact with Aβ in this human cell culture model will help provide knowledge for developing chelating compounds for preventing copper-induced ROS production, or therapeutic strategies for preventing Aβ aggregation.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: WFDC1 and FGF1 are potential predictive biomarkers for High Grade Serous Ovarian Cancer

Presenter(s): *Finkle Gupong, Harper Rapkin, YunYun Wei, Tia Murdoch*

Abstract:

The most common type of ovarian cancer is high grade serous ovarian cancer (HGSOC), which accounts for 75% of all cases. By symptom onset, patients are often diagnosed with a high stage cancer and have a poor prognosis. Current treatments are not effective for all patients, and the reason why some respond and others do not is unknown.

Our study aims to identify potential predictive biomarkers that could be used to improve the treatment outcomes of HGSOC.

Twenty-one genes for ovarian cancer biomarkers were analyzed using a Kaplan-Meier estimate. The plots illustrated survival analysis among 1029 HGSOC patients, and genes with a significant P-value of less than or equal to 0.05 were examined further to determine their potential in HGSOC therapeutics.

Out of all the twenty-one genes investigated for serous ovarian cancer, it was found that WFDC1, FGF1, HGF, NGF, and IFNGR-1 each demonstrated significant correlation with outcome. Specifically, WFDC1, commonly known as He4 was found to yield a P-value of 0.008. Similarly, FGF1 also showed a profound correlation with ovarian cancer presenting a P-value of 0.0000018.

The use of biomarkers may allow for earlier diagnosis and more effective treatment of ovarian cancer. FGF1 and WFDC1 may be good targets as predictive biomarkers for HGSOC and thus further investigation is warranted.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Perception of retinal images: Can artificial intelligence help us discover new diagnostic features?

Presenter(s): *Christina Yuan*

Abstract:

Medical images are a rich source of health information. Diagnosticians are trained to sift through them to detect subtle signs of pathological processes. Retinal images are routinely used in ocular disease diagnosis and management. Might there be signs of pathology within retinal images, beyond eye diseases, hiding in plain sight, but currently overlooked? Convolutional neural networks (CNN) trained on retinal images can classify sex, a trait invisible to the diagnostician. Recent work in interpreting a CNN model has elucidated features within fundus images relevant to sex classification. We investigated whether human observers can be trained to recognize "invisible" patient traits from fundoscopic images, such as sex. We examined diagnosticians (Expert, N=23) and a comparison group of adults 18-50 years-old (Non-expert, N=31). In the pre-training phase, baseline sex recognition was assessed via a 2-alternative forced-choice (2-AFC) task between male-female retinal image pairs without feedback. Then followed a training phase and practice trials with feedback. Finally, a post-training 2-AFC sex recognition test and a novel object memory test (NOMT) of object recognition ability were completed. Pre-test results are consistent with chance-level performance, as expected, mean=52% for both Experts and Non-experts. Post-test performance significantly improved for Experts mean=66.1% ($d= 2.38$, $p<<0.01$) and Non-experts mean=66.2% ($d=1.67$, $p<<0.01$). NOMT test performance was not related to improvements in fundus classification. Together, results demonstrate that diagnosticians can be trained to recognize novel retinal features suggested by artificial intelligence. Future work with this approach can be extended to discover signs of systemic and neurodegenerative disease in retinal images.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Hi-ChIP Analysis of H3K27Me3 Interactions in Progenitor and Differentiated Hematopoietic Cells

Presenter(s): *Joud Touqan*

Abstract:

Histone modifications are posttranslational modifications that can induce changes in chromatin folding and promote cell differentiation. Previous studies have found that primitive human hematopoietic cells display a distinct repressive H3K27me3 signature, which is retained by mature lymphoid cells but not monocytes and erythroblasts. The contraction in H3K27Me3 density is predicted to be involved in myeloid lineage differentiation from progenitor cells, where the punctate pattern ascribed to progenitor cells is maintained in lymphoid lineages. To obtain more evidence for loss of H3K27Me3, this project will assess the three-dimensional conformation of differentiated and progenitor blood cells. Chromosome conformation capture combined with chromatin immunoprecipitation (Hi-ChIP) was applied to enrich long and short-range genomic interactions mediated by H3K27Me3 in Jurkat cells . Understanding the process of hematopoiesis lineage restriction could help us model heritable blood disorders, develop new targeted drugs, and utilize this system to create unprecedented developments in the field of stem cells.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Survey of Primate populations under increasing survival pressures in the forests of Central Kalimantan

Presenter(s): *Leanne Li*

Abstract:

Hunting and deforestation for agricultural lands and resource extraction is posing a major threat to many mammal populations throughout the tropics. Primates are especially vulnerable to these threats due to their heavy reliance on forested habitats, larger body size, and slow reproductive rates, with several primate taxa already pushed to extinction. Despite the growing body of research on primates in the forests of Borneo, an area of rich biodiversity, the population distribution and richness for many primate species in Central Kalimantan remain unknown. This study aims to determine population abundances and distribution for all primate species present in the Batikap Protection Forest in Central Kalimantan, Borneo. To do this, 30 camera traps were deployed across a grid system at 1000m intervals. Images of animals were captured through motion activation, with a total of 23206 images obtained between 2019 to November 2021. All images were then analyzed using an independence threshold of 30 minutes, reducing the total number of animal detections to 1623. Within those images, 7 primate species were identified, with the highest number of detections being Macaca nemestrina (n=98), followed by Presbytis rubicunda (n=45). Hylobates muelleri (n=2) and Presbytis frontata (n=1) accounted for the least number of detections. The information gained from this study can help monitor how primate populations are faring under increasing survival pressures from anthropogenic activity and add to our knowledge of how forest management and conservation efforts can be modified to better help maintain and improve primate populations in the forests of Borneo.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Investigating the Relations Between Face Memory and Premature Birth in Adulthood

Presenter(s): *Fengting Yan*

Abstract:

There is an ongoing debate about the maturation of face recognition abilities. Premature birth is known to negatively impact many aspects of cognitive and neural development, thus, we explored whether face memory differed for adults who were born prematurely versus full term. If the brain reaches adult-like facial recognition ability early in childhood, as suggested by the early maturation hypothesis, then neurodevelopmental disruptions that are prominent in persons born prematurely may have lasting effects and we would expect premature birth to lead to impaired face memory in adulthood. In contrast, if the ability to recognize faces continues to develop long-term as a result of consistent experiences with and exposure to faces, as suggested by the late maturation hypothesis, then we would not expect premature birth to significantly impact this ability. In the present study, students enrolled in undergraduate Psychology courses at UBC (N = 927; 8.8% preterm; 75.4% women; 23.1% White) answered demographic questions (i.e., gestation, birth weight, ethnicity) and completed a face memory assessment. Through an analysis of variance, we found no behavioural differences in face memory – an important ability for human social cognition and evolution – for adults born preterm versus full term. Consistent with previous findings, face memory was, however, related to ethnicity, such that White participants had better memory for White faces than participants of other races. Future work can expand upon our findings to consider additional factors and neural responses that are linked to both prematurity and face recognition.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Effects of a maternal high-sucrose diet on corticosterone levels in maternal serum and amniotic fluid

Presenter(s): *Marwa Idrissi*

Abstract:

The World Health Organization recommends that no more than 10% of total caloric intake should come from free sugars, including sucrose (table sugar). However, Canadian free sugar consumption accounts for 13.3% of total caloric intake on average, up to 25%. In rats, maternal high-sucrose intake starting from pre-pregnancy until lactation, decreases corticosterone, a glucocorticoid, in maternal serum and increases corticosterone in the blood of female adult offspring. However, it remains unclear whether a maternal high-sucrose diet during only gestation affects corticosterone in the maternal serum and amniotic fluid. This project will investigate whether a maternal high-sucrose diet during pregnancy affects corticosterone in the maternal serum and amniotic fluid. I hypothesize that a maternal high-sucrose diet is a stressor that alters corticosterone in the maternal serum and amniotic fluid. We fed 32 female Long-Evans rats either a control diet (1% sucrose) or a high-sucrose diet (26% sucrose), starting from the first day of pregnancy (Embryonic day 0, E0). Both diets are isocaloric and nutrient-matched. On E19, we collected the maternal serum and amniotic fluid. We used a highly specific and sensitive liquid chromatography-tandem mass spectrometry assay to quantify corticosterone levels in the samples. I predict that a maternal high-sucrose diet will decrease corticosterone in the maternal serum and increase corticosterone in the amniotic fluid. This project will bring insight on whether a high-sucrose diet during pregnancy is sufficient to induce a change on corticosterone in the maternal serum and amniotic fluid, and overall, on how a diet impacts physiology, specifically steroids.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Understanding Public Perceptions of Back Alleys in Vancouver, BC

Presenter(s): *Lily Du*

Abstract:

Understanding public perception of back alleys in Vancouver, BC, is a study trying to observe people's perception of back alleys in the City of Vancouver, especially those located within a neighbourhood. Another focal point in the study is identifying residents' or potential residents' opinions on back-alley renovation projects. The researcher anticipates the findings from the survey can provide some info for future research or project (i.e., back-alley renovation project). Knowing such patterns allows the urban planner to discover these alleys' weaknesses and find potential solutions. Some precedents show the importance of back-alley projects and how good or bad alley management can influence local areas' social, economic, and ecological factors.

The presentation will demonstrate the study's results and some analysis by the researcher. The presentation will also address future research opportunities and the next phase of this study.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Characterization of lower urinary tract function in the context of ambulatory urodynamic monitoring in a porcine model of spinal cord injury

Presenter(s): *Ashnoor Arora*

Abstract:

The vast majority of people living with spinal cord injury (SCI) experience neurogenic lower urinary tract (LUT) dysfunction which poses a heightened health risk. Presently, the gold standard for the assessment of LUT function after SCI is urodynamics. This technique involves the insertion of a catheter into the bladder lumen for retrograde filling which only provides a 'snapshot' assessment with one or two fill-empty cycles; however, this method has many recognized limitations. Alternatively, ambulatory urodynamic monitoring (AUM) is an emerging assessment technique that involves catheter-free unrestricted monitoring using natural bladder filling and may improve the evaluation of LUT function. Overall, the goal of this study was to characterize LUT function in the context of AUM in a porcine model of SCI.

In this investigation, a radio-telemetric device was surgically implanted into the bladder dome for continuous bladder pressure monitoring. Pigs were then subjected to a T10 contusion/compression SCI and the bladder pressure, frequency of bladder contractions, and presence of urinary tract infection (UTI) were monitored over a 12-week period after injury.

Bladder contraction pressure was approximately the same during the 12-week recovery period in all animals; however, considerable inter-animal variability was observed in the bladder pressure and voiding frequency. A gradual decrease in contraction frequency was observed over time in all the animals. Our findings indicate that the presence of UTI had little to no influence on the frequency or amplitude of bladder contractions. Further investigation into AUM after SCI may aid in assessing treatment efficacy and improving bladder management.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Does Dog Impulsivity Assessment Scale (DIAS) predict behavioural persistence in an extinction learning task?

Presenter(s): *Steve Shan*

Abstract:

Previous research described impulsivity as a behavioural trait characterized by the presence of persistence, impaired motor inhibitory control, and the inability to inhibit behaviour when being exposed to a discriminative stimulus (Sd). Impulsivity can affect many aspects of the dog's relationship with humans, especially the dog-owner bond. The Dog Impulsivity Assessment Scale (DIAS) is an assessment of dog impulsivity based on the owner's report. Previous studies found inconsistent results regarding the generalizability of the owners' reports regarding impulsivity in dogs. The aim of the current study is to replicate these studies and determine whether DIAS can be predictive to the level of persistence and resistance to extinction in dogs using an extinction learning task. A total of 30 dogs consisting of four major breed categories: herding, retriever, spitz, and mastiff-like breeds were tested. Dogs were first reinforced to perform a nose-touch behaviour on the owner's hand. Having four consecutive responses, each less than three seconds after the hand presentation, was considered as the behavioural acquisition criteria. Once the dogs met the acquisition criteria, the owner were asked to present both hands at the same time and the dogs were only reinforced for choosing and touching a pre-determined hand (the target hand or Sd) over the other. Each dog could have a maximum of 6 sessions to meet the criteria, which was having 8 touches on the target hand out of 10 trials per session. The test was then finished with an extinction phase, where no reinforcement was provided upon responses on either of the owner's hand. While the effect was not statistically significant, results showed a medium positive correlation between DIAS score and total number of responses during extinction ($r = 0.361$, $F(1, 28) = 4.194$, $p = 0.0501$). Moreover, herding dogs and retrievers were found to be the most (18.56 ± 14.54) and the least persistent breed (7.33 ± 8.75) respectively based on the mean number of responses during extinction phase, although the difference between breed groups were not statistically significant ($p = 0.1790$). Given the small sample size in this study, resistance to extinction could be predicted by DIAS score if the sample size increases, which shows that owners' assessment of their dogs' impulsivity level through a validated questionnaire could be generalizable to their dogs' level of behavioural persistence.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: The Gut-Brain Axis: Characterising the Effect of Inflammatory Bowel Disorder (IBD) on Sexual Behaviour

Presenter(s): *Cal Rosete*

Abstract:

Inflammatory bowel disease (IBD) causes many disturbances in overall health, wellness, and lifestyle. Common forms of IBD, such as Crohn's Disease, are characterised by chronic inflammation of the gastrointestinal tract; however, growing evidence suggests their symptoms are seldom confined to the gut. Current literature demonstrates that gut health influences brain function and microglial physiology (neural immune cells), but fails to address the interaction of these factors on mental health and behaviour. Its influence is further complicated through gonadal and endocrine disruptions brought with IBD, such as delayed puberty and atypical gonad mass. Given the myriad of factors at play in the IBD gut-brain axis, the current study aims to characterise mechanisms by which gut health influences sexual behaviour. Using a dextran sulfate sodium (DSS) mouse model of IBD, sexual behaviours were quantified through mate preference, mating vocalisations, and copulatory behaviours. Behavioural analysis demonstrated that males with simulated IBD lacked a preference for female stimuli, unlike their healthy counterparts. Potential physiological mechanisms were investigated through microglial morphology and hormonal analysis. Based on prior research, we expect sexual deficiencies to be coupled with diminished microglial branching, atypically increased testosterone concentration in males, and atypically decreased estradiol concentration in females. Such results further characterise the influence of the gut on brain health and behaviour. Given that Canada has one of the highest prevalence rates of IBD worldwide, identifying relevant psychological and sexual disruptions has meaningful implications for well-rounded treatment and care for IBD patients.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: The effect of the dispersion on the autofluorescence of cellulose nanocrystals

Presenter(s): *Cindy Lam*

Abstract:

Cellulose nanocrystals (CNCs) are rod-like nanoparticles garnering significant industrial interest. Their mechanical properties, high aspect ratio, and non-toxicity enable their use in many applications including wastewater treatment, food/cosmetic additives, and composite materials. The renewability of CNC feedstock, wood and plants, is advantageous in comparison to conventional petroleum-based materials, especially in a transition toward a more sustainable circular economy. CNCs demonstrate inherent cluster-triggered emission fluorescence (autofluorescence), which enables the use of fluorescence microscopy for their characterization, without the need for adding stains or labels. Fluorescence microscopy has the potential to be a rapid and efficient tool for assessing product quality during CNC manufacturing. The ratio of band intensities from the fluorescent emission spectra can provide CNC concentration, predict liquid crystalline phase occurrence, and determine surface charge content.

This study investigates whether changes in the physiochemical environment affect the autofluorescence of CNCs. CNCs were dispersed in water with different amounts of sonication energy to produce samples ranging from aggregated to well-dispersed. Atomic force microscopy (AFM), dynamic light scattering (DLS), rheology, and fluorescence microscopy were used to characterize the samples. Whilst the impact of CNC dispersion does not impact the fluorescence intensity as significantly as CNC concentration, the intensity was observed to decrease as CNC dispersion increased. The observed response correlated well to DLS and AFM data, confirming the role of particle-particle interaction in the autofluorescence mechanism. This thorough investigation enables us to better understand the autofluorescence mechanism of CNCs and will help provide a rapid, quantitative characterization of CNCs.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Measuring the activity of a steroid-synthesizing enzyme in the avian brain

Presenter(s): *Emma Lam*

Abstract:

Steroids act on the brain and modulate social behaviours, such as aggression. Steroids synthesized locally within the brain (termed "neurosteroids") can modulate behaviour without increasing steroid levels in the blood. Neurosteroids can be synthesized de novo from cholesterol or from circulating precursor steroids. 3β-hydroxysteroid dehydrogenase/Δ5-4 isomerase (3β-HSD) is an enzyme that catalyzes the conversion of dehydroepiandrosterone (DHEA), an inactive sex steroid precursor, to androstenedione (AE). AE is further converted into other active sex steroids, such as testosterone and estradiol, by different enzymes. 3β-HSD is present in the brain of many vertebrate species in a region-specific manner. The activity of 3β-HSD can alter the availability of active steroids within the brain, which can modulate behaviour. This study aims to develop and validate an accurate and specific enzyme activity assay to examine the activity of 3β-HSD within different regions of the song sparrow brain. The activity of 3β-HSD is quantified by measuring the amount of AE produced after brain samples are incubated with a known amount of DHEA. I will quantify AE and DHEA using liquid chromatography-tandem mass spectrometry (LC-MS/MS), an accurate and specific method for steroid quantification. I will use this method to measure the differences in 3β-HSD activity between areas of the social decision-making network in the adult male song sparrow brain. Preliminary results show that 3β-HSD activity can be measured in brain tissue using LC-MS/MS. Developing a more sensitive and specific method to measure 3β-HSD activity will help us understand the region-specific activity of 3β-HSD within the brain.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Clinical interpretation of rare human gene variants in Drosophila. Autism and beyond.

Presenter(s): *Bea Liston, Graeme McIntosh, Saharah Bains, Bill Wang*

Abstract:

Gene variant discovery is becoming routine, but it remains frustratingly difficult to interpret the functional consequence or disease relevance of most identified rare variants. Experimental assays are helping to fill this interpretation gap, but there remain many roadblocks in creating assays that can accurately interpret variant functions with clinical predictive value. These include issues with assay reproducibility, scalability to hundreds of variants, and relevance to the pertinent disease mechanism. We have been using Drosophila melanogaster as a versatile assay platform to minimize these roadblocks and enable large-scale clinical interpretation of rare variants in many human genes. We take advantage of Drosophila's molecular genetic tractability to perform inexpensive, reproducible, in vivo functional testing of hundreds of variants. These tests are calibrated for clinical interpretation in accordance with the quality requirement proposed by the ClinGen Sequence Variant Interpretation (SVI) Working Group guidelines for clinical interpretation of variant function. We exploit genetic interaction analysis to confirm disease-relevant functions of variants. Our project's contribution includes the development of: (i) An informatics pipeline for prioritizing genes amenable to Drosophila testing and identifying reference variants for calibrating assays. (ii) Generating the molecular genetic reagents for testing variants. (iii) Developing assays for Autism variants in the Raf, CTNNB1, and MECP2 genes for clinical interpretation in alignment with SVI guidelines.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Towards developing kinematic cervical spine motion corridors for direct frontal head impacts

Presenter(s): *Sabiha Sultana*

Abstract:

Anthropometric test devices (ATDs) including crash test dummies are used to evaluate automotive and sport safety technologies. However, the surrogate necks used in ATDs have certain limitations as they are not biofidelic in multi-plane loading. Assessing the biofidelity of ATD is challenging due to the limited availability of in vivo human dynamic tests. In this work, data was gathered from previous experiments where researchers recorded human head and cervical spine kinematics during low-severity direct frontal head impacts using a soccer ball at 25 mph. All subjects were instrumented with bite blocks with accelerometers mounted on them. Initial data analysis involved time-shifting and digital filtering according to SAEJ211 specifications. The mean acceleration signal and standard deviation are calculated at each point in time. The acceleration corridor is represented using the mean with ± 1 standard deviation in the temporal domain. Next, the acceleration signals are integrated using Simpson's numerical method twice to derive the displacement. The displacement corridor is represented using the mean with ± 1 standard deviation in the temporal domain. The kinematic corridors show the mean mouth bite-block acceleration and displacement in the temporal domain with ± 1 standard deviation. These kinematic corridors, designed using human subject tests, will help the validation of next-generation surrogate necks in direct frontal head impacts.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: How Canada government's policies affected the change in NEET (not in employment, education or training) rate of Canadian post-secondary students of different genders during the covid-19 pandemic.

Presenter(s): *Crystal Pan*

Abstract:

Bălan et al.'s (2022) research on the NEET (not in employment, education or training) rate of youth in Europe during the period 2008 to 2021, a variable rate of NEET can be observed due to the "Big Events" of the world as well as government interventions. The Covid- 19 pandemic, one of the "Big Events" had caused a huge increase in the number of NEET teenagers in OECD countries, and thus there was a strong need to find practical policies that could go into effect quickly.

Living in Canada, I am thus interested in the change in NEET rate of post-secondary students during the Covid-19 pandemic as well as government reactions to it. Katherine Wall (2021) said in her research that "The divergent gendered patterns may have long-term implications on patterns for future economic wellbeing." which aroused my interest and thus led me into my research thesis about the effect that Canada government's policies had on Canadian post-secondary students of different genders during the covid-19 pandemic. I'll value the effects of the policy by first predicting the possible NEET rate of post-secondary students from Dec. 2019 to Jan. 2021 (the worst outbreak of the Covid-19 period) if there was no covid-19 pandemic. Then, I'll compare the real NEET rate during the Covid-19 period to the data predicted, and analyze the two to see the negative impact of the pandemic. Concluding with comparison of the NEET rate after policy was announced with the predicted data if there is no Covid pandemic.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Social Media for Dementia Risk Reduction: Identifying Ethical Concerns Among Research Professionals and Community Members

Presenter(s): *Grayden Zaleski*

Abstract:

Introduction

Social media can be an asset to engage participants in dementia prevention research. However, current social media guidelines are broad and inconsistent across research institutions. By engaging with professional and community experts, we seek to identify the ethical parameters for the use of social media in dementia prevention research.

Methods

We conducted semi-structured, qualitative interviews with professional experts working in dementia research (n=15) and experts by experience (n=14; e.g., persons with lived experience of dementia). We used thematic qualitative analysis to extract key themes from interview transcripts.

Results

Professional experts reported a lack of ethical guidelines for engagement through social media, relying instead on informal sources of guidance. Areas identified as needing more attention included privacy concerns and handling instances of misinformation.

Experts by experience valued the ability to learn about healthy aging via social media, but expressed uncertainty on distinguishing between facts and misinformation. The negative consequences of diminished online privacy, such as being targeted for scams, were a major ethical concern. Both groups discussed factors that dampen social media's theoretical reach to diverse publics, such as existing inequalities in digital access and literacy (i.e., age, internet infrastructure). Nevertheless, they noted that awareness of dementia risk reduction can be improved with social media's wide reach.

Conclusion

Research professionals and community experts identified ethical factors surrounding the use of social media for dementia risk reduction. The next project phase will use these data to inform the creation of consensus-based guidelines for brain health research.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Understanding the Complex Dynamic encompassing the Northern Pacific Marine Food Web, including the vitality of its Apex Predators

Presenter(s): *Antonio Dias*

Abstract:

This research project examines the competitive and predator-prey relationships between large marine organisms within the Eastern North Pacific Ocean, specifically between the Northern California and Alaskan borders. Through literature review, critical study species were identified, including Orcas, Sperm Whales, Stellar Sea Lions, White Sharks, Mako Sharks, Thresher Sharks, Six- and Sevengill Sharks – each of these consumers encompass a high trophic level (Secondary or Tertiary), with diverse diets and hunting strategies depending on migratory patterns, proximity to shore and seasonal weather fluctuations. This research project seeks to understand the paramount role which these organisms have in maintaining trophic balance, as apex predators are often considered 'keystone' species, which disproportionately – yet positively – affect their ecosystem. Secondary consumers – Threshers, Sea Lions, etc. – are also integral when attempting to examine the ecosystem dynamic, as they serve as the primary junction for both primary consumers – through their feeding – and tertiary consumers – through them being hunted – hence, recognizing their migratory patterns, feeding systems, and defensive mechanisms, coupled with the aforementioned knowledge of Apex Predators, better elucidates the dynamics of the Northeastern Pacific Marine Ecosystem.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Characterization of skeletal muscle type-2 innate lymphoid cell infiltrates in a mouse model of Duchenne muscular dystrophy

Presenter(s): *James Wu, Omar Husain, Pamela Peng, Clayton Lee*

Abstract:

Duchenne muscular dystrophy (DMD) is a disease that causes rapid deterioration of muscle function resulting in skeletal muscle inflammation and fibrosis. Type-2 innate lymphoid cells (ILC2s) are a recently discovered type of immune cell that has been shown to be a key mediator of fibrosis in various conditions. This study aims to investigate the role of ILC2s in skeletal muscle fibrosis development using mdx mice, a mouse model of DMD. Previously, it has been shown that 4-week-old mdx skeletal muscle is enriched in ILC2s but these cells have never been characterized in the skeletal muscle of adult (12+ week-old) mice when fibrosis due to the disease is the most severe.

To characterize ILC2s at this age, we use flow cytometry, a method based on hydrodynamic focusing to streamline the flow of cells that carry antibodies conjugated to fluorophores. These fluorophores are excited by a laser and the light scattering patterns enable the characterization of cells based on fluorescence intensity and various physical characteristics.

Through these analyses and comparison with previous literature, we anticipate to reveal the quantity and inflammatory phenotype of ILC2s present in the skeletal muscle of adult mdx mice. This will provide the foundation to further interrogate the specific role of ILC2s in skeletal muscle fibrosis development, contribute to our knowledge of immunological mechanisms, and reveal therapeutic targets to develop new treatment strategies.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Unraveling the genetic mechanism of asexual seed production in Crepis

Presenter(s): *Max Gray*

Abstract:

Apomixis is the asexual formation of a seed, occurring in less than 1% of flowering plants, which typically require pollen to produce viable seeds. In 2022, a gene for parthenogenesis (PAR), the formation of an embryo without fertilization, was identified in Taraxacum and Hieracium, both members of the sunflower family. Surprisingly, the PAR alleles in apomicts of both species contained a miniature inverted-repeat transposable element (MITE) in the promoter, which wasn't present in the sexual alleles. The evidence for this case of parallel evolution is currently limited to these two separate origins of apomixis. Crepis is another genus with apomictic populations in the same subtribe as Taraxacum. We hypothesize that, in Crepis, apomicts will also have a MITE in the promoter of their PAR gene. We are attempting to amplify the PAR gene from sexual and apomictic Crepis individuals using the polymerase chain reaction (PCR) and primers designed for Taraxacum. We will then sequence the alleles and search for a MITE insertion. We expect that the apomictic allele in Crepis will contain a MITE in its promoter, as in Taraxacum and Hieracium. These results would add a third case of parallel evolution of apomixis involving this genetic feature, allowing a glimpse into the origin of apomixis. Understanding the genetic mechanism behind apomixis also has the potential to revolutionize agriculture; if engineered into productive hybrid crop lines, these crop lines could produce genetically identical seeds and maintain themselves, rather than needing to be produced and purchased each year at great expense.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Access to Pediatric Urology Care: A Pilot Study in British Columbia

Presenter(s): *Aygun Ibrahimova*

Abstract:

Canada's vast geography poses barriers for patients requiring access to specialized care. Currently, approximately one million children in British Columbia and Yukon depend on BC Children's Hospital (BCCH) to receive pediatric urology care. Two change ideas have been implemented to improve patients' access to care: an outreach program and virtual delivery of care. The outreach program consisted of pediatric urologists from BCCH traveling periodically to University Hospital of Northern BC in Prince George. Where suitable, patients also have the option for virtual provision of care.

This retrospective study included new consultations for hydronephrosis or non-urgent testicular pathologies in 2018 and 2021, which were before and after the implementation of the outreach program and virtual healthcare. Information on residences and appointments was extracted from their electronic medical records. The distances travelled by these patients to reach the urology clinic at BCCH were calculated on Google Maps using shortest driving distances possible. The wait times were calculated by subtracting referral dates from consultation dates.

Virtual provision of care did not affect the wait times but significantly reduced the average traveling distance by 40.6%, from 239.76km to 142.43km ($p < 0.001$) and saved patients 73,698km. The outreach program saved patients 15,899km.

Given this study's findings, the outreach program and virtual provision of care can potentially reduce barriers for patients to access pediatric urology care at BCCH. The findings from this study will help to inform health care delivery models, with the ultimate goal to improve access to necessary surgical care for pediatric patients.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: The Association Between Hormonal Contraceptive Use and Symptoms of Psychopathology

Presenter(s): *Nicholas Latimer*

Abstract:

Previous research suggests that hormonal contraceptive (HC) use, particularly during adolescence, can increase risk of depression. Furthermore, recent findings suggest that there might be a link between HC use and increased risk of other mental health disorders such as anxiety. However, the link between HC use and mental health disorders other than depression is not fully understood. Therefore, in this study, we aim to explore the relationship between HC use and symptoms associated with various mental health disorders including depression, anxiety, and mania. I hypothesize that HC use, particularly during adolescence, is associated with higher levels of psychopathology. To this end, we will analyze data from 716 participants with different histories of HC use (e.g., current HC users, past HC users, and never users). Participants were asked to complete a survey that collected information about the frequency by which they experienced symptoms of various mental health disorders in the past two weeks and their history of HC use. This study expands on previous literature on the effect of HC use on mental health by clarifying the relationship between HC use and symptoms associated with various mental health disorders. We hope that this line of research will improve our understanding of the adverse psychological effects of HCs and allow women to make informed decisions for their reproductive health.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Polygenic risk score associates with rate of cognitive decline in Alzheimer's disease

Presenter(s): *Darren Christy*

Abstract:

Alzheimer's disease (AD) is a complex and heterogeneous neurodegenerative condition for which genetic susceptibility is a primary risk factor. Genome-wide association studies (GWAS) have identified 29 disease associated genomic loci, each with limited clinical applicability due to small effect size. Polygenic risk scores (PRS) provide an opportunity to assess the cumulative association by combining the effect of each susceptibility loci into a single value. Forty-nine disease associated single nucleotide polymorphisms (SNPs) were genotyped in 124 patients clinically diagnosed with AD for which longitudinal clinical information was available. Single variant and polygenic risk score association to rate of cognitive decline, as defined by the annual change in Mini-Mental State Examination (MMSE) score, was assessed. The polygenic risk score composed of 20 disease linked SNPs forms an association with annual MMSE score rate of decline. The association is lost upon APOE variant removal, suggesting APOE variants constitute the bulk of the observed association strength. A significant negative association is additionally established between age at onset and annual MMSE score rate of decline. These results further support the link between genetic risk of AD and rate of cognitive decline.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Mapping Forest Succession in Pacific Spirit Park

Presenter(s): *Eric Lee, Tatum Narode*

Abstract:

Pacific Spirit Park, known as ʔəlqsən by the original xʷməθkʷəyʼəm stewards of the land, has been clear-cut on multiple occasions to financially support the establishment of West Point Grey. Following such a disturbance, tree species repopulate the ecosystem in repeatable stages known as succession. In this context, species are often referred to as r-selected or K-selected. R-strategists commonly produce many seeds and grow quickly, and K-strategists commonly put more energy into growth and survival and thus dominate within more complex community structures. Here we observed and mapped tree species, sizes, and successional stages in two different regions of Pacific Spirit Park to determine if the logging history of each area was reflected in tree species composition and distribution. We recorded GPS coordinates for all native canopy species along pre-established transects. We then ran Fisher's Exact tests to determine whether the measured qualities of the observed tree species were independent of their region. We found that an abundance of K-selected trees corresponded with older growth areas. Additionally, the areas of older growth had more trees overall, and larger trees than the areas with recent clear-cutting activity. The temperate coastal rainforest ecosystem in southern British Columbia is extremely valuable, not only because of its diversity and productivity - hosting specialist species and sequestering carbon dioxide every year - but the cultural and spiritual significance it holds. Clearly, the logging history of the rainforest can help guide inferences about species composition as well as show how human actions can far exceed human timescales.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Thermally Activated Delayed Fluorescence and Mechanochromism from Naphthalimide-Azatriangulene Derivatives

Presenter(s): *Ying Cai*

Abstract:

Organic light emitting diodes (OLEDs) are thinner, brighter, and cheaper to produce than other common lighting materials and have exciting applications in wearable technologies. Emissive molecules displaying thermally activated delayed fluorescence (TADF) are being investigated for use in third-generation OLEDs as the light producing component. TADF emitters can convert non-emissive excited states into emissive excited states using ambient heat, making sure energy used to excite emitter molecules results in light production.

A common design strategy for TADF emitters is to couple electron-rich donor groups and electron-deficient acceptor groups with a large twist between them. The colour of emission may be changed by tuning the strength of the donor and acceptor groups, with stronger donors and acceptors leading to emitters that are more red in colour.

In this work, we investigated the relative strengths of three azatriangulene donors by examining their absorption and emission properties when coupled with a strong naphthalimide acceptor. Varying the bridging heteroatom in these donors is shown to result in different electron donating properties, with the compounds displaying green to orange emission. The investigated compounds are all TADF active and displayed unexpected mechanochromism. This work marks the first use of oxotetrametnylazatriangulene (OMAT) as a donor in a TADF emitter.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Opinion Formation in a Twitter Network Model

Presenter(s): *Nate Holers*

Abstract:

With political polarization reaching historic highs, and overwhelming evidence that attitudinal social media consumption exacerbates the issue, understanding the underlying mechanisms of opinion-related influence on platforms like Twitter is urgently important. Previous explorations into opinion dynamics have relied on simple computational models with an idealized community-network structure, which are unlikely to be useful for real interventions into Twitter's functioning. This presentation outlines a method for constructing a small-scale model of the Twitter follower network, using network graph theory to capture its key topological features. The model is then used as the connective structure of an agent-based population with abstract opinion values, which are simulated to interact with each other––iteratively updating their opinions according to existing theories of social influence. During the simulations, the populations converge on certain opinion distributions, which are indicative of the level of polarization in the community. By comparing opinion dynamics on this model with a 'complete' network (in which everyone talks to everyone), we can better understand how the structure of Twitter predisposes a population towards certain behaviors. In simulations which assumed repulsive influence during agent-interactions (where agents with opposing beliefs polarize each other further), the Twitter model was more likely to produce a population with extreme opinions. This was due to structural features that make it more likely for extreme groups to form, and for celebrity users within such groups to influence the 'moderate majority'. These observations––combined with a dynamically-updating network with weighted connections––provide direction for making changes to the website's recommendation algorithms.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Effect of loss-of-function Plcb4 on skin pigmentation in mice

Presenter(s): *Amy Luty*

Abstract:

Melanocytes are pigmentation cells found in the skin, hair and eyes. The genes Gnaq and Gna11 affect the growth of melanocytes. Both gain-of-function mutations and loss-of-function mutations in these genes have been found to alter skin pigmentation. Loss-of-function mutations result in lighter pigmentation of the dermis. Phospholipase C beta 4 (Plcb4) is located downstream of Gnaq and Gna11 in the heterotrimeric G protein signalling pathway. Loss-of-function mutations in Plcb4 are common in cutaneous melanoma; however, significance of this is unknown. It is also unknown how loss-of-function Plcb4 affects skin pigmentation. We hypothesize that loss-of-function Plcb4 results in lighter pigmentation of the dermis, because Plcb4 is downstream in the same signalling pathway as Gnaq and Gna11. To test this, we will examine the pigmentation of the epidermis and dermis in heterozygous and homozygous knockout Plcb4 mouse tails. The skins will be isolated from the tailbone. To separate the epidermis and dermis, the skins will be incubated in sodium bromide. Then, they will be fixed with formalin and photographed. ImageJ software will be used to compare the pixel intensity between wildtype and mutant mice. We found both heterozygous and homozygous Plcb4 mice had no change in pigmentation of the epidermis or dermis. The control group for our homozygous experiment were heterozygous for the Baw mutation and had lighter dermis pigmentation than expected for wildtype mice. This indicates that the Baw gene may cause lighter pigmentation of the dermis. Further research is needed to understand the role of the Baw mutation on pigmentation.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Qualitative Research Methods Used to Explore Sexual and Reproductive Health in Adolescents: A Scoping Review

Presenter(s): *Shiva Esfandnia*

Abstract:

Studies report an increased incidence of medical issues such as cancer and endometriosis in adolescents between the ages of 10-17 years, with major impacts on sexual and reproductive health (SRH). While conversations regarding these topics are necessary to support lifelong treatment, evidence suggests that there are numerous barriers to discussing adolescent SRH. This scoping review aims to synthesize currently available qualitative research methods to facilitate these conversations, and to assess the shortcomings and benefits of identified methods. We searched EMBASE and MEDLINE from inception to May 24th, 2022, to identify studies that used qualitative research methods (e.g. interviews, focus groups) to discuss SRH with adolescents aged 10-17 years. Data extracted include number, age, and sex of participants, qualitative research method used, and reported strengths and weaknesses. Descriptive analysis of patient and study characteristics was completed. We captured 4554 records and excluded 3539 at the title-abstract screening stage due to wrong age group, not a qualitative method, or no full text access. Qualitative research methods used to collect data largely included interviews, focus groups, body-mapping, photo-voice, and dyads. Challenges reported include issues with generalizability, sample sizes, stigma, power dynamics between interviewers and interviewees, and cultural influences. Approaches that supported conversations included grouping by age or gender, snowball sampling, group discussions to promote open conversation, and anonymity. This scoping review of qualitative research methods used in SRH conversations with adolescent has implications for supporting safe conversations and informing future approaches.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: The effect of gut metabolites on cancer: Intermittent fasting-mediated changes in ursodeoxycholic acid, deoxycholic acid, and isovaleric acid

Presenter(s): *Rosey Qiu, Chenny Chen, Bernice Yue, Jessie Luo, Leili Hamidi*

Abstract:

Diet has been shown to shape gut microbes which hold implications for human health, including cancer prevention. Preliminary results from a feasibility trial found significant changes in the secondary bile acids, ursodeoxycholic acid (UDCA) and deoxycholic acid (DCA), and a branched-chain fatty acid, isovaleric acid (IVA), after intermittent fasting (IF) (limiting eating to an 8-hour window per day) for 3 months in a subset of patients with stage 0 chronic lymphocytic leukemia/ small lymphocytic lymphoma. It is unknown, however, what role these metabolites may play in the cancer process. The aim of this study was to conduct a preliminary literature review to support the trial's findings and answer, "What effect do IF-mediated changes in the gut microbiota associated with the production of metabolites UDCA, DCA, and IVA have on cancer?" MEDLINE and grey literature (ex. Google Scholar) were searched using a combination of subject headings and keywords such as, "UDCA", "DCA", "IVA", "bile acids" and "cancer." No literature was found directly answering the research question; however, 31 articles were identified as relevant. Pertinent information was extracted using a data extraction form describing the metabolites' origin, potential cancer crosstalk, and associations with IF. Understanding the impact of IF on the gut microbiome and the resulting metabolites may provide new insights into cancer treatment and/or prevention. To our knowledge, this is the first study to describe and investigate these metabolites together which, based on preliminary research findings, may be modified by IF and play a potential role in the cancer process.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: The Novel Application of Collagen Fingerprinting for the Identification of Archaeological Flatfish from the Northeast Pacific

Presenter(s): *Jay Hilsden*

Abstract:

Fish comprise key aspects of culture, diet, and spirituality for Indigenous peoples on the Pacific Northwest Coast, reflecting deep human and environmental histories. However, archaeological investigations have historically emphasized the significance of salmon and herring despite flatfish (including flounders, soles, and halibut) being among the most ubiquitous fish occurring in sites from Oregon to Alaska. Additionally, reliably documenting which flatfish species occur archaeologically is hindered by their fragmentation and the morphological similarities between each species' skeletal elements. To address these issues, we apply collagen peptide mass-fingerprinting (ZooMS), using MALDI-TOF-MS, to identify archaeologically recovered Northwest Coast flatfish to the species level. By using ZooMS to characterize the unique collagen peptide mass fingerprint of twenty-six modern North pacific flatfish species, we constructed a preliminary database of Northwest Coast flatfish collagen biomarkers. The database will subsequently be evaluated using a test sample of 17 archaeological specimens from Tseshaht First Nation territory in Barkley Sound, western Vancouver Island. Considering each species in the database has a distinct biomarker set, we expect the archaeological samples to be identifiable to the genus or species levels when compared against the biomarkers identified in the modern samples. If ZooMS successfully identifies these archaeological flatfish samples, additional flatfish assemblages could be investigated to supplement zooarchaeological analyses. By generating higher resolution data, interpretations of the importance of flatfish to the Northwest Coast Indigenous peoples' lifeways can be made, having relevance to modern contestations of land and title, while also supporting current efforts in marine conservation and fisheries management.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Effects of Wood Smoke on Human Airway Epithelial Cells

Presenter(s): *Nataly El-Bittar*

Abstract:

Exposure to wildfire smoke in western Canada has been an increasing problem over the last decade. From 2016 to 2018, the average annual ambient fine particulate matter ($PM_{2.5}$) levels were 8.2 μg/m3 in the lower mainland region; however, after forest fire activity daily averages have been observed well above 100μg/m3. Exposure to wood smoke (WS) is known to be harmful to health, with associated increases in heart attacks, asthma exacerbations and even death. However, the molecular effects of WS exposure on human lung cells is understudied. We hypothesize that exposure to high levels of WS will elevate oxidative stress levels and inflammation leading to increased airway epithelial cell death. Immortalized human lung epithelial cells (BEAS-2B) were exposed to fresh WS generated from untreated dried cedar that was combusted in a quartz fire tube. WS was delivered to cell cultures using a Cultex live aerosol delivery system. Particle counts and gases (NO, NO2, NOX, CO, CO2) were measured in real-time, with cells being exposed to ~1000 mg/mˆ3 for one hour. Oxidative stress and cytotoxicity were measured 24 hours post-exposure using fluorescent lipid peroxidation and Calcein AM assays. Significantly increased cytotoxicity and oxidative stress were observed in BEAS-2B cells 24 hours post-exposure compared to filtered air controls. These harmful effects on epithelial cells demonstrate how WS may be deleterious to human lung health. As global temperatures continue to rise, priming more fire seasons, it is important to understand the impact of these exposures on human respiratory health.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Immune Cell-Tumor Cell Neighbor Pair Analysis to Guide Individualized Lung Cancer Treatment in Canada

Presenter(s): *Puneet Arora, Ava Keshavarzsafiei*

Abstract:

In Canada, non-small cell lung cancer (NSCLC) is the most common cause of cancer-related mortality, killing more Canadians than colon, breast, and prostate cancers combined. Patients with early-stage NSCLC are amenable to surgery and have a better prognosis compared to patients with later stages of the tumor. However, many patients experience recurrence without long-term survival often caused by mutations in the tumor genes and in the patient's immune cells. Therefore, there is an unmet need to decrease tumor recurrence and increase survival outcomes for Canadians with early-stage NSCLC. We hypothesize that immune cell-tumor cell interaction in lung cancer tissue can predict a) recurrence after surgery, b) response to immune therapy, and c) help guide patient treatment. We will perform immunohistochemistry (IHC) on primary tumors of 350 resected early-stage NSCLC (60 of which had recurrence), and 35 late-stage NSCLC treated with immune therapy to identify immune cell-tumor cell interactions. The cell-cell interactions will be analyzed via hyperspectral cell sociology (HCS) platform to quantify cell subsets and measure the spatial distance between cell types of interest. To investigate the diagnostic and prognostic value of cell-cell interactions, Voronoi diagrams (VD) will be constructed using HCS-scanned images. Multiple markers across multiple sections will be identified by IHC stain thresholding via the VisioPHARM software. We expect that this research will have high clinical implications for patients who will benefit from adjuvant targeted therapy and immune therapy. Patients with early-stage NSCLC may realize a higher survival benefit as a result of individualized immune therapy.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Identification of Chinese Bronze Age bone tools from Huanbei using peptide mass fingerprinting

Presenter(s): *Pengpeng Chen*

Abstract:

Huanbei was the capital of the middle Shang Dynasty (3200 BP) during Bronze Age, located in Anyang, China. The site features a bone tool workshop, reflecting the craft industry of the Shang dynasty and the large demand for animal bone products. Within the workshop, the excavation of tomb M5 revealed layers of fill containing a large number of fragmented animal bones (n=764) and bone tools (n=19). Although morphological analysis confirms the dominance of cattle bones, as well as sheep, dogs, pigs, and deer antlers, the majority of the fragmented bones cannot be identified, hindering the study of the raw material selection in tool production. Thus, this study aims to investigate whether a consistent pattern exists in each stage of bone tool production, and to explore the animal husbandry and hunting culture that took place at the site. Collagen peptide mass fingerprinting (ZooMS) was applied to the 79 samples of raw material, semi-finished, and finished products to identify their species based on differences in collagen amino acid sequences. Results show the majority of semi- and finished products were cattle, with a few deer bones and antlers, and exotic materials such as tortoise shells. Raw materials have a more diverse range of domestic and wild animals, such as sheep, pigs, deer, and dog. Overall, this research will be the first study to apply the ZooMS method to Middle Shang samples, which will expand the method's feasibility on Chinese samples and provide new insight into craft production in Shang Dynasty China.

Wave 2 | Poster Presentation

PONDEROSA BALLROOM **|** 11:00 AM – 12:15 PM

Title: Why do Corporations Transition to Net Zero? A Case Study of Maple Leaf Foods

Presenter(s): *Clarrie Dee*

Abstract:

Also called carbon neutrality, "net-zero" in climate change parlance refers to a state of balance between greenhouse gas emissions released into and absorbed from the environment. Scientists recommend how much emissions to release and absorb, governments make policies to implement those recommendations in society, and corporations are key targets of such policies, expected to align their processes. Therefore, to achieve net-zero emissions, science and policies require businesses to reduce their carbon emissions and offset the remainder. Previous research has shown why and how businesses analyze the costs and benefits of transitioning to net-zero (Simon and Simon 2022) and the challenges they may face (Millot and Maizi 2021), but we know very little about why they ultimately transition. This paper contributes to filling this knowledge gap based on a case study of Maple Leaf Foods. A Canadian company in the business of packaged meats, Maple Leaf Foods successfully achieved carbon neutrality in 2019. By reviewing investor and profit reports, backed by scholarly literature, this paper analyzes the reasoning of Maple Leaf Foods before and after its carbon neutrality transition to answer the question: What motivates a company to transition to carbon neutrality? Findings are that the motivation is partly due to the values of the board members and shareholders and the market benefits that would come with the estimated demand for sustainable products in the net-zero transition. These results indicate factors to consider in incentivizing corporations to embrace net-zero emissions agenda.

WAVE 3
ORAL & POSTER PRESENTATIONS

WAVE 3 ORAL PRESENTATIONS

PONDEROSA COMMONS NORTH AND SWING SPACE

SWNG 105

Associations between floral diversity and syrphid assemblages in urban gardens	Savi Raghuraman
Identifying the stigmas faced by people who use drugs when seeking veterinary care in accidental pet drug poisonings	Chloe Chambers
A guide for the development/ modification of alternative habitats for migratory shorebirds at the Yellow Sea region	Ryan Ng
Investigation of Sex Differences in the Rate of Cell Proliferation in Active Oncogenes and Loss of Function Tumor Suppressors in Drosophila Melanogaster	Ghoncheh Eijadi
Impact of diet density on Drosophila suzukii and its parasitoid, Leptopilina japonica	Grace Wang

SWNG 107

Helping Hands & Helping Hearts: Understanding the emotional experiences of workers at food security initiatives	Samantha Smith
The Effect of the Menstrual Cycle on the Way we Breathe During Exercise	Sierra Arn
Perceived Coping Efficacy and Cortisol Dynamic Range: Associations Between Coping and Physiological Stress	Cecilia Liu
Targeting Peroxisome-Mediated Lipid Metabolism in Melanoma	Kshemaka Gunawardena
Ow! What bit me? Determining mosquito distribution ranges in British Columbia.	Danica Shannon

SWNG 109

Developing and Piloting the Work Integrated Learning Co-Development Framework	Kawami Cao
Determining the effectiveness of the IBI302 protein in reducing abnormal blood vessel growth in wet AMD.	Sid Das, Helena Ghorbani, Michelle Wang
11Beta-HSD1 enzyme activity in the maternal and fetal placental regions contributes to corticosterone production in rat	Anna Mazurenko

Predicting Recurrence of Cervical Cancer: Large Scale Nuclear Biomarker Based Models	Ava Keshavarzsafiei, Puneet Arora

PCN 1002

An Assessment of Zooplankton in Four Salmon-Bearing Esuaries Across Clayoquot Sound	Colton Van Der Minne
Characterizing C. elegans orthologs of Parkinson's Disease-associated genes across a broad array of phenotypes	Kristen Tsoi
Energetic consequences of freezing in the intertidal mussel, Mytilus trossulus	Josh Yang
Russia's Justification for Invasion: Role of a Compatriot Defender	Chantal Lee
What happens in our brain when we imagine emotional scenes?	Isabel Wilson
Comparing Decision Regret in OPSCC Patients treated with Trans-oral Robotic Surgery or Radiotherapy	Harkaran Dial

SWNG 208

Investigating the association between Gliotactin and Axotactin in the tricellular junctions of Drosophila melanogaster	Eva Bhathena
The relationship between Cognitive Function and Brain Structure in patients with Long-COVID and Normal Recovery	Alysha Alimohamed
Body image self-consciousness and sexual well-being during the transition to parenthood	Maya Thulin
The impact of various factors on development of LARS following oncologic rectal surgery	Elliott Gee

SWNG 210

Methane Reduction in Canada: Regulatory Capture and Solutions	Manon Melkonyan
Steps toward a novel bioinsecticide: Expression, purification and functional characterization of recombinant chitinase	Soroush Mohebat, Pooya Namavari, Zee Muradi, Negarin Shahtalebi
Associating Predicted 3D Structure and Bioactivity of Antimicrobial Peptides	Lia Richter

Impact of acute psychological stress on experimental pain: A systematic review	Atrina Shadgan, Nazanin Sadoughian, Alyssa Chen
Measuring and Treating Cognitive Deficits in Depression	Nicola Wray

WAVE 3 POSTER PRESENTATIONS

PONDEROSA BALLROOM

How does the infant brain process speech? An fNIRS meta-analysis	Jaimie Muller
Towards the Total Synthesis of the Highly Potent Insecticide Rotundial	Reegan Forsyth
Does the type of training shape the dog's level of impulsivity, sensitivity to reinforcements, and emotionality later in life?	Sanjana Ashok
Novel Predictive Biomarkers for Metastatic Triple-Negative Breast Cancer: IL-2 and CD16 Possibly Associated with High Survival Rates in Patients	Florence Sanjaya, Joshanne Palces, Aryana Hossein Khani
Towards the Optimization of a NLRP3 Inflammasome Model System in J774A.1 Murine Macrophages and THP-1 Human Monocytes	Ali Reza Nasseri Dehkharghani, Darius Parmar, Mehdi Tabesh, Mark Wang
Ultrasound evaluation of infralesional muscle integrity following cervical spinal cord injury	Hannah Ro
Synthesis and In-Vivo Characterization of a new Pain-Relieving Enkephalin-like Peptide	Shawna Lu
Development of an ultra-rapid magnetic CRISPR screening method for genetic analysis of cellular glycosylation pathways	Jimmy Kim
Rewilding Urban Cemeteries in Metro Vancouver	Hooria Bilal, Ernest Gao, Ruoxuan Ma
Lighter on the land: Effect of regenerative agricultural practices on post-harvest soil	Asha Wareham
Reflections and Recommendations from International Youth Advisors on the Need for Standardized Training	Georgia Simkin, Sofia Serrano
Examining Fitness Variation in Annual plant Plectritis Congesta	Ria Raut
Gender and Sexual Orientation Differences in Suicide-Related Coping	Ria Wong
The Effect of Aerobic Exercise on Syntactic Development for Infants	Clara Saad
Novel Cell-Penetrating Platform for Gene Delivery	Natalie Jones, Angeline Wu
Expression and Function of TLR7 and TLR9 in Diffuse Large B Cell Lymphoma	Cecilia Lee

Directive and Non-Directive Behaviours in Caregivers During Infant Play	Carmynn Skalnik
Does Gliotactin Bind Extracellular LamG Domain Proteins to Associate to Cellular Junctions?	Maxim Ufimtsev
Inflammatory responses in the lung: Does age matter?	Alex Stolz, Mido Luo
Investigating the Impact of COVID-19 Vaccine Status on the Evolution of SARS-CoV-2 Variants through Long-Read Sequencing.	Karina Budhwani, Megan Ong, Arshi Malhotra, Nathan Millward
When a coin-tossing game becomes rock, paper, scissors	Peter Peng, April Ju, Mathew Drexel
Effects of viral geometry and receptor distribution on influenza motility	Shona Sinclair, Justin Huang, Owen Kwong
Feasability of ADC in 129-Xe MRI for Monitoring CF in Pediatric Patients	Hana Salehi, Namya Sharma, Shreya Arora
Development of a Peer Feedback Activity to Improve Pharmacy Students' Clinical Documentation Skills	Sarah Burke
The Impacts of Breed and Individual Personality on Learning and Persistence in Pure Dog Breeds	Lucy Macdonell
Studying the impact of mood on domestic dog's learning and resilience to the environmental distractions	Hao I Yuen
The Main Cause of Neuron Loss in Alzheimer's Disease is Associated with the Build up of Two Proteins: Abnormal Tau and Beta-Amyloid (ABeta) become Toxic to the Brain	Dilnoor Gadh
Healthcare provider attitudes towards the use of social robots in pediatric healthcare	Katelyn Teng
Investigating the role of Tom5 on the assembly of mitochondrial protein import channel subunit, Tom22	Yuhang Wu
Calcium-dependent inactivation of voltage-gated calcium channels	Katherine Feng
MEK inhibitor resistance in lung adenocarcinoma is associated with addiction to sustained ERK suppression, representing a novel, potentially therapeutically relevant vulnerability	Josephine Ma, Rhea Arora, Angelina Stevenson
Promoting Positive Multiracial Identity Offline and Online: A Literature Review	Gale Chong
A novel DNA-siRNA hybrid lipid nanoparticle	Melody Cheng

A longitudinal study exploring temporal changes in amyloid beta and phosphorylated tau post traumatic brain injury in high-contact athletes: a research protocol	Samadhee Kaluarachchi, Jaysheen Badohal, Jasper Delichte, Sanjana Subramania, Michelle Midlyne
Natural- and Vaccine-Induced Immunity against Future COVID-19 Infection	Kayla Audreyartha, Sahar Elhag
Engineering K. rhaeticus to shine in the dark and Explore its Downstream Utilization as a Smart Food Packaging	Alice Martins, Patsa Nawaphongrat, Theo Nguyen, Michelle Peng
Identifying Neocortex L6b Neuronal Subpopulations in the Mouse Brain	Margarita Kapustina
The Effect of Neuroinflammatory Suppression on SSRI Efficacy in Post-Partum Depression	Tej Atwal
Comparative Analysis of Microneedle Electrode Designs for Electroencephalography: A Comprehensive Review	Tiffany Huang, Sze Lok Ng, Jack Plant, Kriti Verma
Selling the Rainbow: Queer Identity Formation and the Reclamation of Rainbow Capitalism	Hal Kowalewski
Ex Vivo Programming of Murine Type 1 Regulatory T Cells	Sarah Lim, Andrew Sze
Integration of a Markerless Motion Capture on Post-stroke Participants in 2D and 3D	Kaylee McGeough, Anna Zhu
A Behavioral Analysis of Salt Modulation in Genetically Manipulated Fruit Flies	Sanam Farman-Farmian
Effect of blood flow restriction on maximum repetitions completed in a barbell curl exercise across a range of relative loads	Katrin Denson
Safety Implications of Automated Vehicle Technologies on Older Drivers in British Columbia: A Scoping Review	Roxanna Akhtary, Anahita Seraji
The Effect of Neuroinflammatory Suppression on SSRI Efficacy in Post-Partum Depression	Niki Shahraki
Investigating the Impacts of Whaling on the Abundance of Large Baleen and Toothed Whales in the World's Oceans	Melanie Jackson-Rinjtema
Participatory Sense-making in Dance Improvisation	Paige Whitehead

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Associations between floral diversity and syrphid assemblages in urban gardens

Presenter(s): *Savi Raghuraman*

Abstract:

Concern about insect biodiversity loss worldwide in combination with increasing urbanization makes it important to find opportunities for conservation in cities. Gardens, which tend to have high flowering plant diversity, have emerged as a key habitat resource for urban pollinators, but more research is needed to determine the optimal garden characteristics for maximizing native pollinator diversity. Syrphid flies (Diptera: Syrphidae) are abundant generalist fly pollinators that have received less study than their bee counterparts in the context of urban gardens, despite their distinct foraging strategies and life histories. In this study, we investigated whether garden-scale flowering plant diversity was related to syrphid abundance and diversity. Based on the existence of floral preferences and the variation in their specificity between syrphid groups, we predicted that gardens with more flowering plant taxa would attract more abundant and diverse syrphid visitors. Over a two-month period, we sampled 12 small public gardens with varying levels of floral richness in a single residential urban area in order to explore correlations between plant and syrphid assemblages across time. Contrary to our predictions, there was no significant relationship between floral diversity and syrphid abundance or diversity. Furthermore, there was high variation in levels of plant diversity and syrphid diversity over time. These findings suggest that factors other than flowering plant diversity may be more important to syrphids in this system. Better understanding the role of garden characteristics among the complex factors shaping urban syrphid assemblages will offer valuable insights for improvement of conservation strategies.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Identifying the stigmas faced by people who use drugs when seeking veterinary care in accidental pet drug poisonings

Presenter(s): *Chloe Chambers*

Abstract:

People who use drugs are a medically vulnerable population who face stigmas and shaming when accessing healthcare services that engender mistrust and hinder future access. Companion animals have been found to play a role in reducing substance use, protecting against suicide, and increasing positive public interactions for people in precarious financial or housing situations, populations that frequently include people who use drugs. However, there is no current research on whether these barriers to personal healthcare also prevent owners from seeking veterinary care for fear of judgment, or even the seizure of their pet. This study aims to identify the stigmas faced by pet owners accessing care in a drug-related pet poisoning emergency by surveying owners about the factors in their decision to access care and the judgment they may have felt in a veterinary setting using Likert scale questions. We predict to find that stigmas, or a fear of stigmatization, complicate the decision-making process in this type of emergency. We will also be collecting demographic information, as we expect that socioeconomic and geographic factors become more deciding in drug poisoning cases. This research will be able to guide veterinary professional development to promote stigma-free environments that encourage pet owners to access suitable care. As we develop new strategies to lessen the harms of toxic drug use in BC, it is important to explore barriers to accessing healthcare. Protecting the valuable relationship between people and their companion animals represents a positive health outcome for people who use drugs.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: A guide for the development/ modification of alternative habitats for migratory shorebirds at the Yellow Sea region

Presenter(s): *Ryan Ng*

Abstract:

As millions of shorebirds migrate annually along the East Asian-Australasian Flyway, they congregate and refuel along mudflats in the Yellow Sea region of East Asia. Unfortunately, anthropogenic activities have driven the unprecedented loss of mudflats at the Yellow Sea, magnifying population declines for many shorebird species, including the endangered Far eastern curlew and Great knot. While recent studies indicate that alternative habitats (i.e., habitats created or modified from their natural state) are used by shorebirds, little is known about how different alternative habitat types contribute to shorebird populations, or how these habitats complement natural wetlands. As such, my research aims to construct a holistic framework for managing alternative habitat development at the Yellow Sea region to better support migratory shorebirds. Data on shorebird abundance and richness, alongside physical characteristics unique to the landscape will be recorded for the three most pervasive alternative habitat types: rice paddies, semi-intensive shrimp farms and salt production sites. Statistical models will be employed to identify features within each habitat that impact shorebird populations, and guidelines will be developed for each habitat type. Alternative habitats in closer proximity to natural wetlands, and those that experience limited temporal disturbances, such as salt production sites, are expected to better support shorebird populations. While alternative habitats are certainly not analogous to natural wetlands, the results can help to integrate the two habitat types during conservation planning, and encourage a more holistic approach towards the conservation of migratory shorebirds at the Yellow Sea.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Investigation of Sex Differences in the Rate of Cell Proliferation in Active Oncogenes and Loss of Function Tumor Suppressors in Drosophila Melanogaster

Presenter(s): *Ghoncheh Eijadi*

Abstract:

An overwhelming amount of supporting evidence suggests that the activation of certain signalling pathways give rise to cell and tissue overgrowth in all animals. However, most studies have examined these pathways using cell cultures in which cell sex is abnormal, or in mixed-sex animal groups. Addressing the gap in knowledge with respect to sex-differences, our study used Drosophila melanogaster as a model organism and examined whether a sex difference exists in the magnitude of overgrowth caused by genetically induced overexpression of oncogenes and loss-of-function mutation in tumour suppressors. We hypothesized that a sex difference exists in the magnitude of tissue overgrowth in response to these activated signalling pathways. To stimulate organ overgrowth, the expression of activated Ras, Notch and Hipk were induced within the wing imaginal disc. To examine the effects of the overgrowth seen in the transgenes between sexes, the ratio of the area of the dpp line to the area of the disc was calculated and compared between the control and treatment group and categorized separately between the two sexes. The ratio of the dpp line was used for analysis to avoid the biological variable for sex differences in the size of the organ. The experiment results did not support our previously stated hypothesis of seeing a sex difference in the amount of tissue overgrowth as a result of the genetically induced oncogene and/or loss of function tumor suppressors. These findings are important as they provide us with data and can help steer and inform our future experiments.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Impact of diet density on Drosophila suzukii and its parasitoid, Leptopilina japonica

Presenter(s): *Grace Wang*

Abstract:

Drosophila suzukii is a pest that feeds on numerous cultivated and wild fruits in British Columbia. Current management strategies for D. suzukii rely heavily on regular application of broad-spectrum insecticides, necessitating additional control methods for sustainable management. Candidate biological control agents include Leptopilina japonica and Ganaspis brasiliensis, both introduced within BC and specialised on D. suzukii. To use parasitoid wasps as a potential management strategy, it's crucial to have a simple and efficient rearing process that allows for the release of a substantial quantity of these wasps. While instant formula diets have been successful for certain parasitoids, they may not work for all. As such, developing a diet that closely mimics the host-fruit may be a more effective method for rearing. Previous studies have shown that penetration force determines some D. suzukii host fruit selection, with preferences across different host plants dependent on fruit ripeness and fruit tissue density. Fruit tissue density can also influence parasitoids' fitness as oviposition success depends on their ability to probe with their ovipositor through fruit to locate for larvae. We explored the fitness effects on both D. suzukii and L. japonica using a novel plant-based diet at different agar concentrations. We have found that there are variable fitness effects due to agar concentrations. These findings may benefit future research for laboratory or mass rearing of D. suzukii and its associated larval parasitoids for augmentative release, as well as increase our understanding of the natural history of this pest and its associated parasitoids.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Helping Hands & Helping Hearts: Understanding the emotional experiences of workers at food security initiatives

Presenter(s): *Sam Smith*

Abstract:

The COVID-19 pandemic has highlighted the demand for food security initiatives such as community pantries, community kitchens, and food banks. Understanding how staff and volunteers of such initiatives navigate the emotional landscapes of their work is imperative in providing them with sufficient support, thus ensuring operations run as effectively as possible. To achieve this, researchers must answer questions such as: what does the performance of emotional labour look like for workers of food security initiatives? Does this performance vary between paid and volunteer positions? Finally, what is needed by staff and volunteers for such initiatives to achieve their goals? My research provides a multi-methodological analysis of a food security initiative called City Pantry to explore these questions. Participant observation of City Pantry's operations was conducted over the course of four months, utilizing lived experience in motion as the primary source of evidence. Additionally, three semi-structured interviews with paid staff and volunteers present a deeper understanding of how these roles are understood individually. Despite hypothesizing that the majority of emotional labour would play out in staff-patron interactions, specifically the task faced by staff of having to deny patrons more food in the interest of resource management, workers have indicated that the majority of their emotional labour is carried out towards economic structures which prioritize profit over human need, and are the primary catalysts of food insecurity. This finding suggests that tackling food insecurity requires the restructuring of current food distribution systems and policies in their entirety.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: The Effect of the Menstrual Cycle on the Way we Breathe During Exercise

Presenter(s): *Sierra Arn*

Abstract:

The sex hormones estrogen and progesterone fluctuate during the menstrual cycle (MC) creating the early follicular (EF) and midluteal (ML) phases. Females are often excluded from exercise research on the basis of these undulating hormones, despite increased female sport participation. The goal of this study was to provide insight into the interaction between progesterone, hypoxia (low oxygen), exercise intensity, and ventilation (breathing), in athletic females. BACKGROUND: Sex hormones affect the control of ventilation. Hypoxia stimulates ventilation, as does whole-body dynamic exercise (e.g. cycling). There is evidence to suggest that, in males, the ventilatory response to hypoxia is potentiated with high- relative to low-intensity exercise. Progesterone is linked to increased resting ventilation at sea-level (normoxia) during the ML compared to the EF phase, but not during submaximal exercise in normoxia and hypoxia. The combined effect of hypoxia and progesterone on ventilation during severe-intensity exercise is not clear. PURPOSE: To test whether ventilation is higher in the ML compared to the EF phase of the MC during severe-intensity exercise in hypoxia. HYPOTHESIS: We hypothesized that peak progesterone levels (ML phase) are associated with a higher exercise ventilation in hypoxia compared to the EF phase. METHODS: Eumenorrheic aerobically-trained females aged 18-35 completed a maximal exercise test to exhaustion. On the two subsequent days (one day in ML and EF) blood tests measuring estrogen and progesterone preceded severe-intensity exercise in hypoxia and normoxia. RESULTS: Ventilation was higher in the ML compared to the EF phase of the MC during severe-intensity exercise in hypoxia.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Perceived Coping Efficacy and Cortisol Dynamic Range: Associations Between Coping and Physiological Stress

Presenter(s): *Cecilia Liu*

Abstract:

Being able to cope with stress is an important aspect of navigating all of the challenging situations that individuals may experience in their daily lives. Previous studies show that high confidence in one's ability to deal with difficult situations is linked to decreased subjective ratings stress. However, there has been less research on the association between perceived coping efficacy--defined as an individual's evaluation of how well they responded to a specific stressor--and biomarkers of chronic stress, such as cortisol dynamic range (CDR). Given the negative effects of prolonged stress on health, exploring these relationships may provide insight into how successful coping may be able to offset symptoms of stress. The goal of the current study was to examine the relationship between perceived coping efficacy and CDR. Data were collected from 250 community-dwelling adults in British Columbia between March 2021 and October 2022. Participants filled out short surveys five times per day for fourteen days about their daily experiences including stressful events and perceived coping efficacy. To collect salivary cortisol data, participants provided saliva samples three times per day for four consecutive days. We predicted that higher perceived coping efficacy and lower variability in perceived coping efficacy would be associated with higher CDR, but both of these relationships were not statistically significant. These findings revealed that successful coping may not be related to chronic stress burden. Future investigations should clarify this relationship by examining other measures of stress to gain insight into the physiological effects of coping.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Targeting Peroxisome-Mediated Lipid Metabolism in Melanoma

Presenter(s): *Kshemaka Gunawardena*

Abstract:

Melanoma is a type of skin cancer that often develops resistance to treatment with MAP kinase pathway inhibitors (MAPKi). The MAP kinase signaling pathway, which regulates processes including cell growth, division, and survival, is a key therapeutic target as it is hyperactivated in most melanomas, leading to tumor proliferation. In melanoma cells, MAPKi resistance can occur through metabolic reprogramming, which involves changes in lipid metabolism. Our research shows that peroxisomes, organelles involved in lipid synthesis, cooperate with an enzyme known as UDP-glucose ceramide glycosyltransferase (UGCG) to mediate MAPKi resistance. Repressing peroxisome biogenesis by targeting a peroxisome biogenesis factor, PEX3, promoted cell death (apoptosis) when combined with MAPKi by inducing the production of pro-apoptotic ceramide. However, UGCG limited the effects of ceramide by catalyzing its clearance from cells. Thus, by co-targeting PEX3 and UGCG, we were able to restore MAPKi sensitivity in drug-resistant melanoma cells. We also identified a novel peroxisome inhibitor that blocks the interaction between PEX3 and another protein called PEX19, which is crucial for peroxisome biogenesis. This inhibitor led to PEX3 degradation and sensitized melanoma cells to MAPKi upon co-treatment with a UGCG inhibitor. In summary, our findings shed light on how melanoma cells can develop resistance to MAPKi and identified potential new approaches for treating this deadly disease. By inhibiting the PEX3-PEX19 interaction, we can disrupt peroxisome biogenesis and induce ceramide production, which can promote cell death and sensitize melanoma cells to MAPKi when combined with a UGCG inhibitor.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Ow! What bit me? Determining mosquito distribution ranges in British Columbia.

Presenter(s): *Danica Shannon*

Abstract:

There are over 3500 species of mosquito known worldwide, with many of these posing a major threat to public health as vectors of pathogens including malaria, Zika virus, dengue, and West Nile virus. The threat of mosquito-borne disease is compounded by changes in climate and anthropogenic factors, as species may experience a shift in their geographic distributions when environmental conditions are altered. In British Columbia, mosquito species records have not been thoroughly documented in recent years, meaning many ranges, and range shifts, are not precisely known. To address this, mosquito samples from around British Columbia were mailed in by citizen scientists contributing to the 'Ow! What Bit Me? Project', aimed at filling some of these distribution knowledge gaps. These samples will be molecularly analyzed to determine their identity to the species level. This will be done using DNA barcoding and metabarcoding methods, which make use of gene regions such as the cytochrome c oxidase subunit I gene (COI) that have high interspecific variation to identify specimens to the species level. To visualize results, an interactive map containing collection points and species records will be created. This data will help elucidate where mosquitoes are currently found across BC, allowing for a more thorough comparison between past and future data and helping to inform targeted efforts to understand the potential for emerging threats from mosquito vectors. In addition, it will provide a clearer image of how climate and anthropogenic factors are affecting mosquito species in BC.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Developing and Piloting the Work Integrated Learning Co-Development Framework

Presenter(s): *Kawami Cao*

Abstract:

Work Integrated Learning (WIL) allows students to develop employment-related competencies by integrating lecture-based learning with practicums. Despite the importance of multi-directional collaboration between industry partners, faculty, and students, there are no known approaches to ensure co-development of WIL courses that integrate needs of all stakeholders. This study aims to 1) describe development of the WIL Co-Development framework and 2) pilot-test its effectiveness using a case example.

Methods

The WIL framework was piloted with the Physical Activity Research Centre (PARC), an adaptive exercise facility for individuals with spinal cord dysfunction (SCD).

Objective 1: The Knowledge-to-Action framework informed broad phases of the WIL framework; the Quality Implementation Framework provided actionable steps. Semi-structured interviews to iteratively refine the framework were conducted in terms 1 and 2 with PARC staff and in term 2 with PARC members.

Objective 2: The WIL course's ability to develop students' skills in promoting physical activity with individuals with SCD was assessed through student surveys at three timepoints.

Results

Term 1 interviews identified opportunities to involve PARC supervisors earlier during planning and clarify role expectations of students and PARC supervisors. Survey results demonstrated a significant increase ($p<0.001$; 95% CI: 0.78, 1.87) in students' perceived skills from pre-course ($M=4.26$, $SD=0.96$) to end of term one ($M=5.58$, $SD=0.95$), with analyses suggesting a medium-large effect size ($d=0.70$).

Conclusion

The WIL Co-Development framework has supported the design and delivery of a WIL course which increased students' perceived ability to deliver PA prescription and counselling for people with SCD.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Determining the effectiveness of the IBI302 protein in reducing abnormal blood vessel growth in wet AMD.

Presenter(s): *Sid Das, Helena Ghorbani, Michelle Wang*

Abstract:

A leading cause of blindness in older generations is age-related macular degeneration (AMD). Notably, the subtype wet AMD causes abnormal blood vessel growth, leading to leakage of blood and fluid in the macula, which processes central vision. Vascular endothelial growth factor (VEGF) is a protein that stimulates the growth of new blood vessels, and its overabundance contributes to the progression of wet AMD. Current wet AMD treatment consists of monthly intraocular injections of VEGF inhibitors, such as bevacizumab (Avastin). The protein IBI302 is a promising wet AMD treatment due to its capability of inhibiting VEGF and other molecules associated with inflammation; However, IBI302's effectiveness is yet to be studied in humans. We hypothesize that IBI302 is more effective in slowing wet AMD progression than current anti-VEGF drugs, such as Avastin. Roughly 100 participants diagnosed with wet AMD will be divided into four experimental groups. Group 1 will receive monthly IBI302 injections, group 2 will receive monthly Avastin injections, group 3 will receive IBI302 injections as needed, and group 4 will receive Avastin injections as needed. For one year, changes in visual acuity and retinal thickness will be measured and compared between all four groups, and the frequency of injections will be compared between groups 3 and 4. Our hypothesis predicts group 1 having greater improvement in visual acuity and retinal thickness than group 2, and group 3 requiring less frequent injections than group 4. These results may determine if IBI302 is a good candidate for wet AMD treatment in humans.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: 11β-HSD1 enzyme activity in the maternal and fetal placental regions contributes to corticosterone production in rat

Presenter(s): *Anna Mazurenko*

Abstract:

Glucocorticoids are stress hormones that regulate many physiological processes and are vital in fetal neurodevelopment. However, high glucocorticoid levels during gestation can have detrimental effects on the developing brain. In adult rats, corticosterone (main active glucocorticoid in rats) is primarily produced in the adrenal glands. However, fetal rats have immature adrenal glands. Instead, a corticosterone precursor from maternal blood can be enzymatically converted to corticosterone in two regions of the placenta (fetal labyrinth zone and maternal decidua) and then reach the fetus. The placenta contains the enzyme 11β -hydroxysteroid dehydrogenase type 1 (11β -HSD1), which regenerates corticosterone from its inactive metabolite, 11-dehydrocorticosterone (DHC). However, little is known about 11β -HSD1 activity in different regions of the placenta. Thus, we developed a method to measure 11β-HSD1 activity in Long-Evans rat labyrinth zone and decidua near birth (embryonic day 19). We incubated the tissues with either DHC substrate or no added substrate (control), for three hours (n=3/treatment). After incubation, we measured corticosterone in each sample using liquid chromatography-tandem mass spectrometry, the gold standard for glucocorticoid quantification. We then compared corticosterone levels in samples incubated with DHC to controls to determine 11β-HSD1 activity. The data suggest that 11β-HSD1 activity is present in both regions. Currently, we are working to elucidate which region contributes more to corticosterone production in the placenta. Future research can use our results to further explore placental glucocorticoid contribution to fetal neurodevelopment.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Predicting Recurrence of Cervical Cancer: Large Scale Nuclear Biomarker Based Models

Presenter(s): *Ava Keshavarzsafiei, Puneet Arora*

Abstract:

It is estimated that 1 in 168 women will develop cervical cancer (CC) during their lifetime and 1 in 478 will die from it. Even though extensive screening procedures are in place to diagnose and treat CC early, it can reoccur in approximately a third of the patients. A method was proposed to predict the recurrence of CC, by comparing nuclear features of cervical cells collected using Loop Electrosurgical Excision Procedure (LEEP), with deep learning algorithms and random forest models (RFs). Feulgen-stained LEEP cervix slides from 18 patients (9 with recurrence and 9 without recurrence) with varying severity of dysplasia (using the CIN classification) were scanned. The regions of interest (ROI) on cervical tissue slides were selected and categorized by pathologists (57 ROIs with CIN1; 55 ROIs with CIN2). The nuclei of cells within these ROIs were segmented using an in-house deep learning algorithm and 144 nuclei features like area, radius, and staining intensity were extracted. An RF was trained with a set of 18000 nuclei and validated to classify the well-segmented nuclei from artifacts. It is expected that some features of these well-segmented nuclei, like staining intensity, variance of staining intensity, and nuclei border shape can predict the recurrence of CC. To do this, another RF will be trained and validated using 82000 nuclei. Through these results, the risk of future recurrence of CC can be assessed using the initial cervical LEEP biopsy, and recurrent and nonrecurrent cancers can be distinguished from one another.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: An Assessment of Zooplankton in Four Salmon-Bearing Esuaries Across Clayoquot Sound

Presenter(s): *Colton Van Der Minne*

Abstract:

Salmon are of great importance to Nuu-chah-nulth First Nations as a source of food, ceremony, health, and livelihood. Alarmingly, many salmon populations are in decline due to a variety of anthropogenic factors yet managing these populations and associated fishing activities is made difficult by a lack of information. Juvenile salmon are particularly vulnerable and understudied, with one knowledge gap in the Nuu-chah-nulth context being a lack of information on food availability. To that end, this project aims to assess the availability of a key food source for juvenile salmon, zooplankton, in estuaries of Clayoquot Sound on the West Coast of Vancouver Island, Canada. These estuaries are in the territories of two Nuu-chah-nulth Nations: Ahousaht and Tla-o-qui-aht. Plankton samples were taken in four estuaries from June through August 2022, along with environmental measurements including water temperature, salinity, and turbidity. Samples were then analyzed to assess plankton diversity and abundance. We will be conducting statistical analyses to investigate the relationships between our recorded plankton and environmental factors. We predict that plankton diversity will be greatest in low salinity and high temperature and turbidity, while abundance of prey species will be greatest in low turbidity and high temperature and salinity. This research will provide clarity on the state of juvenile salmon in Clayoquot Sound, providing valuable information for fishing and restoration decisions. The broad aim of this work is to contribute to upholding the traditional Nuu-chah-nulth relationship to salmon, a relationship that has long been compromised by salmon decline.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Characterizing C. elegans orthologs of Parkinson's Disease-associated genes across a broad array of phenotypes

Presenter(s): *Kristen Tsoi*

Abstract:

Parkinson's disease (PD) is a common progressive neurodegenerative disorder that affects more than 10 million people worldwide. Although a large number of PD risk genes has been discovered due to advancements in genomic sequencing, our understanding on the impact of these genes have been bottlenecked by methods to validate the functional significance of these genes in vivo. We will study these genes with C. elegans because the organism features three key advantages: 1. It is relatively cheap to maintain and has a short life cycle. 2. C. elegans has many orthologs to humans' PD genes. 3. Our lab's Multi Worm Tracker (MWT) facilitates the high-throughput phenotypic characterization of populations of freely living animals. Using the MWT, we will phenotype C. elegans strains with mutations in genes orthologous to PD-linked genes and generate a phenomic profile for each gene spanning up to 30+ phenotypes. Therefore, we will use C. elegans to highlight key risk genes that impair morphology and behavior metrics. We expect to see that mutations in orthologs of PD risk genes will influence morphological and behavioural metrics in strains of C. elegans. Through this work, we will gain more insights on how genes associated with PD contribute to disease pathogenesis, and potentially identify new pathways and genetic interactions. Follow-up research based on this work will contribute to advancing the understanding of the genetic architecture of PD for therapeutic development.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Energetic consequences of freezing in the intertidal mussel, Mytilus trossulus

Presenter(s): *Josh Yang*

Abstract:

Background: Animals which live in the intertidal of temperate regions risk freezing in the winter when temperatures drop subzero. While many animals can relocate to warmer areas, sessile animals such as the bay mussel, Mytilus trossulus, have instead evolved the ability to tolerate freezing. They may even freeze multiple times depending on the length of a cold spell. However, freezing inevitably causes some cellular damage which needs to be repaired after thawing. However, the costs associated with the repair processes are unknown, and also whether this cost differs between single and repeated freezing events.

Methods: I sampled mussels from Tower Beach and then exposed them to -6.2^{0}C once for 6h or three times for 2h. Then with closed respirometry, I measured oxygen consumption before and immediately after freezing to determine the effects of freezing on oxygen consumption as a proxy for metabolic rate.

Results & Conclusion: While a single prolonged freeze caused oxygen consumption to increase but multiple shorter freezes caused oxygen consumption to decrease. This may indicate that when frozen once, mussels are able to upregulate metabolism to repair damages, but when repeatedly frozen, mussels are no longer able to support post-freeze repair.

Study Significance: Mussels are ecosystem engineers who increase biodiversity by providing shelter and food for other animals. With the projected increase of cold spells, mussels are increasingly likely to freeze in the winter of temperate regions. Understanding how mussels survive freezing will allow us to better understand the future of our mussel populations and ultimately coastline ecosystems.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Russia's Justification for Invasion: Role of a Compatriot Defender

Presenter(s): *Chantal Lee*

Abstract:

On 24 February 2022, Russian troops invaded Ukraine in what Russia termed "a special military operation." However, this invasion is not a standalone event in the former Soviet region. In 2008, Russia invaded the South Ossetian and Abkhazia regions of Georgia; in 2014, Ukraine's Crimean, Donetsk and Luhansk regions. These two significant events beg the question: "How did Russia justify its military actions? And how does Ukraine 2022 make a difference?"

This presentation will seek to illuminate how Russia uses the label of a "[co]compatriot defender" to justify its former invasions, then how this failed to justify the 2022 Ukrainian invasion. To understand Russia's justification, the term "compatriot" used will follow the definition set by Russian Federal Law: "...peoples historically residing in the territory of the Russian Federation, as well as those who have freely chosen to be spiritually, culturally and legally linked to the Russian Federation, [and] those whose direct ancestors resided in the territory of the Russian Federation."

Russia's aggression in 2008 and 2014 followed a similar pattern. The Kremlin begins by identifying a Russian compatriot population in said region, then pinpoints an existential threat. This "forces" Russia to defend its compatriots, framing invasion as humanitarian intervention. However, in 2022, Russia's attempt to adopt the same pattern for its invasion of Ukraine was unsuccessful. No identifiable compatriot population was present, and the Kremlin's identified threat was non-existent. Thus, the "special military operation" had no humanitarian justification, leaving Russia unable to get away with another "humanitarian intervention."

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: What happens in our brain when we imagine emotional scenes?

Presenter(s): *Isabel Wilson*

Abstract:

In our daily lives, we experience the objects we encounter as having a positive or negative emotionality, or valence. Through a process called transfer of valence, objects can acquire the valence of neighbouring items. That is, the emotionality of an item can rub off on a neutral item that appears alongside it, resulting in a shift in preference for the latter. Many simple psychological processes are associated with characteristic patterns of brain activation, and this activation can be estimated using functional magnetic resonance imaging (fMRI). This project aims to use fMRI to understand which regions of the brain are active during transfer of valence. While in an fMRI scanner, participants first completed an encoding phase where they viewed a series of image pairs, each of which included a neutral object (e.g., a mailbox) alongside a neutral scene (e.g., a car) or a negative scene (e.g., a burning car), followed by a transfer-of-valence phase where they rated the pleasantness of the previously viewed neutral objects. Afterwards, we measured their ability to explicitly recall the pairing. Imaging analyses are ongoing; however, here we present preliminary data on the regions of the brain which are active when a participant is encoding negative vs. neutral pairs. Future work aims to describe activation patterns for trials where transfer of valence and episodic memory does and does not occur.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE | 12:30 PM – 1:45 PM

Title: Comparing Decision Regret in OPSCC Patients treated with Trans-oral Robotic Surgery or Radiotherapy

Presenter(s): *Harkaran Dial*

Abstract:

Background:

Transoral robotic surgery (TORS) or radiation therapy (RT) are well-established treatment options of early-stage oropharyngeal squamous cell carcinoma (OPSCC). While oncological outcomes are similar, there remains clinical equipoise as to the modality offering less side effects.

Objective:

Assess decision regret as a function of treatment received, primary TORS vs. RT, in patients considered candidates for both interventions. Secondary objectives included identifying variables associated with patient-reported decisional regret, dysphagia, and quality of life.

Methods:

A cross-sectional survey was administered to patients who received or declined TORS for early-stage OPSCC from February 2016 to August 2021 and were at least 6 months post primary treatment. Patients completed the Decision Regret Scale (DRS), the MD Anderson Dysphagia Inventory (MDADI), and the University of Washington Quality of Life (UW-QoL) questionnaires. Univariate and multivariate analyses were conducted with patient-reported outcomes and clinical data.

Results:

Eighty-seven patients participated; 65 had received primary TORS and 22 had declined TORS and received primary RT. DRS scores were found to be significantly higher for primary RT patients compared to TORS patients (22.5±23.5 vs. 10.6±15.5, $p<0.05$); 13.8% of TORS patients expressed moderate to high regret, while this was 45.5% for the primary RT group. No significant difference was found between MDADI (78.8±18.7, 81.2±14.3, $p=0.16$) or UW-QoL (84.6±12.4 vs. 81.1±8.7, $p=0.22$) scores between the primary treatment groups.

Conclusions:

There was significantly less regret in patients choosing TORS over RT, and no changes in dysphagia or quality of life scores. Both treatment modalities found decisional regret correlated with postoperative dysphagia.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Investigating the association between Gliotactin and Axotactin in the tricellular junctions of Drosophila melanogaster

Presenter(s): *Eva Bhathena*

Abstract:

In animals, the formation of permeability barriers in epithelial cells is essential to prevent unwanted solutes and pathogens from passing from one cell region to another. Permeability barriers are found within septate junctions (SJ), where two epithelial cells meet and in tricellular junctions (TCJ), the point where three epithelial cells meet. In Drosophila melanogaster, Gliotactin is an essential TCJ protein barrier that is necessary for the formation of SJs and TCJs. Gliotactin is part of the Neuroligin family proteins (Gilbert et al., 2001) and contains a highly conserved extracellular domain. In vertebrates, Neuroligins bind the laminin globular (LamG) domains of Neurexin proteins (Suckow et al., 2008), however, the binding partner of Gliotactin in TCJs is unknown. I hypothesize that Gliotactin localizes to the TCJs by binding to the LamG domain protein Axotactin. To test this hypothesis, I used the GAL/UAS system to drive the expression of endogenously tagged epithelial barrier proteins and RNAi-mediated knockdown of Axotactin in the wing discs of Drosophila larvae. Currently, I am collecting data using confocal microscopy and analyzing the distribution of Gliotactin tagged with antibodies. If Gliotactin binds to the LamG domains of Axotactin, I expect that Gliotactin will not be localized to the TCJs when Axotactin is knocked down. This project can provide fundamental information required to fully understand the development of organ systems derived from epithelia. If more barrier proteins in TCJs become known, then we may also know more about potential treatments for epithelial barrier dysfunctions.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: The relationship between Cognitive Function and Brain Structure in patients with Long-COVID and Normal Recovery

Presenter(s): *Alysha Alimohamed*

Abstract:

COVID-19 illness may result in lingering neurological symptoms such as fatigue, mood disturbances, and cognitive impairment. Such symptoms may correlate with changes to brain morphology. Previous research has largely focused on structural brain differences and cognitive function between infected and non-infected individuals, without consideration towards symptom duration. This study examines the relationship between cognitive function and brain structure in individuals who suffered COVID-19 symptoms for longer than two months (long-COVID) to individuals who recovered within two months (normal recovery). We aim to see how this relationship differs as a function of symptom duration. We hypothesized that individuals with long-COVID would have worse white matter integrity and lower cognitive scores than patients who recovered normally. Cognitive function was assessed using the National Institutes of Health's (NIH) Toolbox Cognition battery. Participants underwent Magnetic Resonance Imaging (MRI) with Diffusion Tensor Imaging (DTI) to assess brain structure. White matter diffusivity was examined using tract-based spatial statistics on key DTI metrics (FA and MD), and volumetric comparisons were conducted on brain regions of interest (ROIs). We found correlations between brain structure and cognition in the normal recovery group only, but a lack of group differences on these measures alone meant we could not conclude there were any structural brain differences between groups. No relationship was observed between brain volume and cognitive scores between groups. Our findings suggest that long-COVID may be associated with relational differences in cognition and brain structure between groups, yet further research is required to understand the reasons for these differences.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Body image self-consciousness and sexual well-being during the transition to parenthood

Presenter(s): *Maya Thulin*

Abstract:

Couples often experience challenges to their sexual relationship during the transition to parenthood, including engaging in partnered sexual activity less frequently, sexual dissatisfaction, and sexual distress (i.e., feelings of anxiety, worry, and frustration about one's sexual activity). One potential contributor to sexual problems may be how self-conscious an individual feels about their body during sexual activity (body image self-consciousness; BISC), especially given the bodily changes that occur for both members of the couple throughout the transition to parenthood. Our dyadic study of over 200 first-time parent couples examined associations between an individual's own BISC and the couple's sexual frequency as well as their own and their partner's sexual satisfaction, and sexual distress at 20-weeks gestation, 32-weeks gestation, and 3-months postpartum. Using the Actor-Partner Interdependence Model to inform our analyses, we found that when birthing parents reported higher levels of BISC at all timepoints, this was linked with the couples' lower sexual frequency, and their own lower sexual satisfaction and greater sexual distress at that same timepoint. In addition, when non-birthing parents reported higher levels of BISC at all timepoints, this was associated with their own greater sexual distress. Partners' higher BISC at 32-weeks gestation was also linked with the birthing parents' lower sexual satisfaction. Our results suggest that there are changes in body image for both members of a couple, and feelings of self-consciousness about these changes during sexual activity may be more strongly linked to the birthing parents' sexual well-being than to their partners'.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: The impact of various factors on development of LARS following oncologic rectal surgery

Presenter(s): *Elliott Gee*

Abstract:

Introduction:

Low anterior resection syndrome (LARS) is a debilitating syndrome characterized by fecal incontinence, frequent bowel movements, and clustered bowel movements, which some rectal cancer (RC) patients develop after surgery. Currently, some risk factors for developing LARS are known but the underlying mechanisms are not well understood. Our objective is to determine which factors increase the likelihood of developing LARS, to inform our ongoing study examining relationships between gut microbiome alterations and LARS development.

Methods:

A retrospective review was conducted on RC patients who received a low anterior resection (RC surgery) between September 1, 2017 and June 31, 2021 at St. Paul's Hospital. Patients with at least one LARS score (used to determine presence of LARS) within 15 months of RC surgery were included (n = 154), and scores were separated into groups: <6 months, 6-12 months, and >12 months since bowel continuity. LARS development was compared between patients with/without a temporary ileostomy, radiotherapy, and chemotherapy (either pre-/post-surgery) using Fisher's exact test.

Results:

There was no difference in LARS development at < 6 months (n = 31) between all groups. Patients at 6-12 months (n = 96) and >12 months (n = 122) had a significant ($p < 0.05$) increase in LARS development when receiving pre-surgery radiotherapy and an ileostomy.

Conclusion:

Development of LARS is increased in patients receiving radiotherapy and an ileostomy, aligned with previous studies. The underlying reasons are unknown, and we are currently investigating whether the gut microbiome is the link, to better target treatments for LARS.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Methane Reduction in Canada: Regulatory Capture and Solutions

Presenter(s): *Manon Melkonyan*

Abstract:

Since their founding in 2013, the Alberta Energy Regulator has been entirely funded by the oil, natural gas, and coal industry, while simultaneously being responsible for monitoring Albertan energy development. While the Canadian government has attempted to mitigate regulatory capture in its methane reduction program, the question remains whether its effort of involving the private sector has hindered this goal. Dominant research shows that there is a discrepancy between the AER's approach to methane reduction and that of the federal government and that the AER's record of financial mismanagement further disproves their legitimacy as a regulatory agency. This paper, focused on environmental regulatory capture, relies on the AER as a case study for the incompatibility of the public and private sector in climate change policy-making. Contrary to theories supporting collaborative governance, findings from this research dictate that the federal government should more actively interfere when provinces like Alberta demonstrate a lack of accountability for their regulatory bodies. Whether this interference comes in the form of federal laws such as the GHG Emissions Pricing Act, equalization payment mechanisms, or more aggressive approaches such as litigation, it is imperative for Canada to address how its history of federalism has hindered climate reform.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Steps toward a novel bioinsecticide: Expression, purification and functional characterization of recombinant chitinase

Presenter(s): *Soroush Mohebat, Pooya Namavari, Zee Muradi, Negarin Shahtalebi*

Abstract:

The Chitinase C (ChiC) enzyme from the bacterium Pseudomonas aeruginosa has potential as a natural insecticide (bioinsecticide), but the bacteria can cause disease, making its development and use in agriculture undesirable. This enzyme can break down chitin, a crucial component of most insect exoskeletons. Previous studies attempted to genetically engineer a non-disease causing E. coli to safely produce ChiC; however, they did not go further to isolate the protein. This study aimed to obtain purified and functional ChiC by measuring ChiC expression in E. coli under various conditions. We found that incubating the E. coli cells with 0.1 mM IPTG, an expression inducer, at 37°C for 2 hours produced the highest amount of expressed ChiC under the conditions tested. However, most of the obtained ChiC proteins were non-functional, as they were not in their correct three-dimensional structure. We also observed that isolating functional ChiC directly from E. coli comes at the cost of lower yield making it inefficient for industrial use. Thus, we focused on obtaining a high yield of initially non-functional ChiC, purifying, and manipulating it to achieve a functional form. After the manipulation, we observed promising functional activity in ChiC. The findings of this study pave the way for a novel bioinsecticide with potential applications in agriculture and industry.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Associating Predicted 3D Structure and Bioactivity of Antimicrobial Peptides

Presenter(s): *Lia Richter*

Abstract:

Antimicrobial resistance is an escalating global health concern, with multiple infectious diseases becoming increasingly difficult and expensive to treat. Antimicrobial peptides (AMPs) are a functionally and structurally diverse class of biological molecules produced by all living organisms that present a promising opportunity to develop new therapeutics to target bacterial infections. Bioinformatic methods offer the ability to discover numerous AMPs with a variety of physiochemical properties. The structure of AMPs can influence their activity, however determining AMP structure in the lab can be costly and time consuming. Prediction of 3D structures of AMPs using the neural network-based structure prediction tool ColabFold indicated an association between peptides predicted to adopt an alpha - helical structure and broad-spectrum antibacterial activity. These findings demonstrate the potential of ColabFold to categorize AMPs discovered and predict antimicrobial activity.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Impact of acute psychological stress on experimental pain: A systematic review

Presenter(s): *Atrina Shadgan, Nazanin Sadoughian, Alyssa Chen*

Abstract:

Chronic pain is a devastating condition impacting approximately 1 of 5 Canadians and yet often remains mismanaged and untreated. It is a complex condition influenced by multiple factors, among which stress has been reliably shown to increase chronic pain.

To better understand this relationship between stress and pain, we conducted a systematic review assessing the experimental impact of different acute stressors on pain in healthy populations.

Five databases were searched: MEDLINE, EMBASE; CINAHL; PsycInfo; Cochrane Database of Systematic Reviews, yielding 18,168 studies. After abstract and full-text screening, 51 studies were included in the review. Data was then assessed for relationships between various factors including pain types, stressor types, and stress responses.

Preliminary results indicate a heterogeneous effect, with studies showing acute psychological stress (1) increasing, (2) decreasing, or (3) having no effect on pain. Of these results, pain reduction was the most common. Each type of psychological stressor also influenced pain diversely, with pain increased, decreased or not changed in several studies. While many experimental studies have sought to understand the relationship between psychological stress and pain, the methodologies used varied greatly. These findings suggest the importance of different stress and pain induction procedures in pain modulation.

Results from this study can further our understanding of the mechanism behind pain by exploring the relationship between different facets of stress and pain in pain perception. Synthesis and analysis of current literature will guide future research aiming to mitigate the impact stress has on exacerbating chronic pain.

Wave 3 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 12:30 PM – 1:45 PM

Title: Measuring and Treating Cognitive Deficits in Depression

Presenter(s): *Nicola Wray*

Abstract:

Major depressive disorder (MDD) is a common mood disorder and the leading cause of disability worldwide. While various treatments reduce depressive symptoms, many patients never fully recover their previous functional abilities prior to the onset of MDD. This inability to functionally recover is attributed to the chronic and recurrent nature of residual symptoms, which impair daily functioning after recovery from severe depressive episodes. Cognitive dysfunction, or residual symptoms associated with deficits in attention, memory, response time, and planning, significantly mediates functional impairments among patients with MDD. However, evidence-based guidelines addressing how to measure and treat cognitive deficits in depression remain unestablished. To assess the risk factors, diagnostic tools, and treatment options addressing cognitive deficits in depression, this review examines data from clinical interviews, computerized cognitive tests, self-report questionnaires, multimodal brain imaging, and medication trials conducted by the Canadian Biomarker Integration Network in Depression (CANBIND) on patients with MDD. The results indicate an association among patients with MDD who experienced childhood maltreatment and present cognitive deficits. These findings also support the use of self-report measures to assess cognitive dysfunction associated with MDD. Lastly, evidence suggests multimodal antidepressants minimize cognitive deficits in MDD. Together, these studies inspire the new recommendations documented in the Canadian Network for Mood and Anxiety Treatments (CANMAT) guidelines, which now advise screening for patient history of childhood maltreatment and directly monitoring cognitive symptoms among patients with MDD. This comprehensive review on CANBIND studies provides opportunities to improve clinician care, optimize functional outcomes, and reduce healthcare burden from MDD.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: How does the infant brain process speech? An fNIRS meta-analysis

Presenter(s): *Jaimie Muller*

Abstract:

The scientific community has been fascinated with understanding the neural mechanisms involved in infant speech perception. In adult research, the frontal and temporal lobes of the brain's left hemisphere activate when one is exposed to speech. However, infant findings are inconsistent; some show the above regions of both hemispheres activating, while others demonstrate only the left hemisphere, creating controversy regarding the early language system's spatial organization. Part of this confusion stems from the initial lack of infant-friendly technology. This meta-analysis - for the first time in the field - examines studies employing functional near-infrared spectroscopy (fNIRS) to determine whether the frontal and temporal lobes of both hemispheres activate when infants are exposed to speech. fNIRS will allow researchers to measure the brain with high spatial resolution in awake infants with its quiet, non-invasive, increasingly-used technology. It measures neural blood oxygenation when participants are exposed to stimuli. Thus, researchers can clearly see which brain regions are activated when babies process speech. Our ongoing meta-analysis has collected studies by searching the UBC Library and PubMed, with inclusion criteria involving healthy babies (3-12 months) presented with speech. We have screened abstracts and are currently reviewing the findings of 30 selected papers. Upon completion, our results will clarify the spatial brain organization for early network speech processing, and inform the ongoing debate regarding language lateralization development (ie., primarily one hemisphere activation). This meta-analysis will further theories of infants' speech perception and provide a foundation for future research including naturalistic studies of neural responses.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Towards the Total Synthesis of the Highly Potent Insecticide Rotundial

Presenter(s): *Reegan Forsyth*

Abstract:

Insect-borne diseases continue to be a worldwide cause of illnesses and deaths, with protection using insecticides remaining the cheapest and most feasible option for preventative treatment. The current most widely used insecticide, DEET (N,N-diethyl-meta-toluamide), despite its high efficacy and simple two-step preparation, has several undesirable side-effects that includes short-term irritation and long-term neurotoxic and carcinogenic effects. Rotundial is a monoterpene dialdehyde molecule isolated from the traditional Asian medicinal plant Vitex Rotundifolia that possesses greater mosquito repellency and higher effect longevity than DEET. While naturally occurring (R)-rotundial is promising as a highly potent insecticide, it rapidly degrades via oxidation from the atmosphere to a non-bioactive carboxylic acid form. Consequently, research into the molecule as an insecticide target has been limited. A new 4-step total synthesis of rotundial is reported that allows for rapid derivatization to explore alterations in structure to increase its stability and bioactivity. This synthesis utilizes a metal-catalyzed carbene intermediate, defined as a highly reactive neutral carbon with only 6 valence electrons, which can act as an electrophile and nucleophile simultaneously. The selective cyclopropane ring-expansion sequence generates a cyclopentene ring with the functional groups in the desired orientation. This synthetic method can be adapted by modifying the starting material for simple regioselective syntheses of cyclopentene rings. The proposed synthetic route can be further applied to the synthesis and derivatization of other naturally occurring monoterpene dialdehydes to find the most bioactive, long-lasting, and safe insecticides for the prevention of insect-borne diseases.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Does the type of training shape the dog's level of impulsivity, sensitivity to reinforcements, and emotionality later in life?

Presenter(s): *Sanjana Ashok*

Abstract:

Aversive training is believed to cause general negative mood states and more pessimistic behavioural patterns; however, recent studies found inconclusive results. The current study aims to evaluate the correlation between the type of training and dogs' behaviour during a learning task. A total of 30 pet dogs were recruited for the study. Dog owners first filled out a validated impulsivity questionnaire. Three different dog-related scenarios were then provided to them, and they were asked to select the responses that apply to their reaction toward that scenario. Responses were scored based on the severity of aversiveness, and dogs were divided into two groups based on their cumulative training scores. For the learning test, dogs were first reinforced to touch one of the owner's hands. Once the learning criteria (80% correct touches per session) was met, the dogs underwent extinction, where no reinforcement was provided. The total number of responses (as a measure of optimism showing the dog's reward expectation), and percentage of trials with emotional responses (barking, jumping, etc.) were recorded for each dog. No significant differences were found between the two training groups in any measured variables. However, dogs in the positive training groups had more touches (18.8Â±15.73) and trials with emotion during extinction (22.49Â±30.64) compared to the negative group (10.56Â±8.53 and 9.54Â±12.56). Given the non-significant results, it can be concluded that pessimism, impulsivity, and emotionality are not necessarily associated with the type of training in dogs, however, a larger sample size may help to further clarify this hypothesis.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Novel Predictive Biomarkers for Metastatic Triple-Negative Breast Cancer: IL-2 and CD16 Possibly Associated with High Survival Rates in Patients

Presenter(s): *Florence Sanjaya, Joshanne Palces, Aryana Hossein Khani*

Abstract:

Triple-negative breast cancer (TNBC) is the most aggressive type of breast cancer due to its unique biology. Unlike other subtypes, TNBC lacks targetable hormone receptors or HER-2 (human epidermal growth factor receptor 2), rendering targeted therapy useless; therefore, chemotherapy is currently the sole mode of treatment.

TNBC is also considered the most immunogenic subtype of breast cancer, making it a suitable target for immunotherapy. However, there is a clinical need to utilize predictive biomarkers to find the treatment-sensitive cohort to avoid unwanted side effects. Interleukin-2 (IL-2), which contributes to T cell and natural killer cell development and activation, alongside CD16, a surface receptor expressed by the two cells to facilitate antibody dependent cell-mediated cytotoxicity, are a pair of potentially effective biomarkers to stratify TNBC patients who would benefit from immunotherapy. This pair was chosen because their functions are related and bridges the innate and adaptive immune response. Unstained slides will be obtained from a previous interventional phase 3 clinical trial, which included 902 participants randomly assigned to the experimental or placebo arm. Multiplex immunohistochemistry, anti-IL-2 and anti-CD16 antibodies will be used to measure biomarker levels and investigate their correlation with patients' survival. We hypothesise that patients with high levels of IL-2 and CD16 will respond better to immunotherapy than patients with lower levels. Results of this study would help TNBC patients receive the type of treatment they benefit most from.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Towards the Optimization of a NLRP3 Inflammasome Model System in J774A.1 Murine Macrophages and THP-1 Human Monocytes

Presenter(s): *Ali Reza Nasseri Dehkharghani, Darius Parmar, Mehdi Tabesh, Mark Wang*

Abstract:

The NLRP3 inflammasome is a cytosolic, multimeric protein complex, which detects and responds to tissue homeostasis disruptions such as pathogen detection, tissue damage, and environmental stressors. Dysregulated NLRP3 inflammasome activity has been linked to various autoinflammatory and autoimmune diseases including diabetes and Alzheimer's disease, rendering the inflammasome an attractive potential therapeutic target. However, NLRP3 activation mechanisms are complex and can be induced by a multitude of stimulation conditions, leading to challenges with developing a reliable model system. In this study, we aimed to optimize appropriate conditions to detect NLRP3 inflammasome activation in both J774A.1 murine macrophages and THP-1 human monocytes. In J774A.1 cells, we detected upregulated expression of pro-IL-1B following LPS-treatment, indicative of NLRP3 inflammasome priming. Following nigericin stimulation, we observed diminished pro-IL-1β levels and no mature IL-1β. We were able to differentiate THP-1 monocytic cells into macrophage-like phenotypes using 500nM PMA treatment for 24 hours. Following nigericin treatment, ASC levels decreased in LPS-undifferentiated, and increased in PMA-differentiated THP-1 cells relative to the respective untreated conditions. We observed nigericin-induced, duration-dependent increases in cell death for both THP-1 phenotypes using a cell viability assay. In conclusion, we confirmed prior findings regarding J774A.1 NLRP3 inflammasome signaling and initiated the optimization of NLRP3 inflammasome activation in THP-1 cells. Further enhancements are required to conclusively identify NLRP3 activation and optimize a reliable cell line model system.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Ultrasound evaluation of infralesional muscle integrity following cervical spinal cord injury

Presenter(s): *Hannah Ro*

Abstract:

Objective: Cervical spinal cord injury (SCI) results in devastating impairments of volitional motor control. Muscle denervation from SCI causes irreversible atrophy and fibrosis. Ultrasound (US) is a non-invasive imaging modality that can be used more regularly for SCI muscle assessment. We hypothesized that in the sub-acute period after injury, cervical SCI patients would exhibit reduced markers of muscle size and greater echogenicity values compared to able-bodied controls in functionally relevant upper limb muscles.

Design/methods: Five individuals (36.8 ± 8.4 years; 1F, 4M) with motor complete (AIS A or B) and neurological levels of injury C4-C6 were recruited for US assessment a mean of 3.9 ± 2.1 months post- injury. Cross-sectional B-mode images were captured bilaterally for extensor carpi ulnaris (ECU), extensor indicis (EI), flexor pollicis longus (FPL), and first dorsal interossei (FDI). Muscle cross-sectional area (CSA) and thickness (MT) were normalized to forearm circumference (n = 10 limbs). Able-bodied controls were scanned for comparison (36.4 ± 7.1 years; 1F, 4M).

Results: SCI individuals demonstrated reduced CSA for all muscles: ECU ($p = .03$), EI ($p = .002$), FPL ($p = .01$), and FDI ($p = .006$). Differences in MT were observed for ECU ($p = .04$), EI ($p = .04$), and FPL ($p = .01$). Echogenicity values were higher in FPL ($p = .03$).

Conclusion: SCI participants demonstrated atrophy of critical upper limb muscles. Evidence of fibrosis was observed in FPL. These results underscore the importance of incorporating muscle evaluation in cervical SCI assessment to optimize rehabilitation outcomes.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Synthesis and In-Vivo Characterization of a new Pain-Relieving Enkephalin-like Peptide

Presenter(s): *Shawna Lu*

Abstract:

Opioids are strong painkillers commonly used for pain management. Unfortunately, they are addictive and induce severe side effects that are often fatal, causing ~17,000 overdose deaths per year worldwide. Thus, a safer alternative is needed. Our brains produce Leucine-enkephalin (Leu-ENK), a peptide with opioid-like painkilling effects. Clinical use of Leu-ENK, however, has been unsuccessful due to its metabolic instability and low cell membrane permeability. Aiming to improve stability and membrane permeation, pivalic acid was attached to Tyr1 of Leu-ENK to produce KK-103. We determined blood-plasma concentrations of Leu-ENK or KK-103 in mice after subcutaneous injection and blood collection. KK-103 rapidly entered circulation with a 3-fold higher maximum plasma concentration compared to Leu-ENK. Additionally, KK-103 displayed a significantly longer half-life (~9min) compared to Leu-ENK, which was immediately eliminated. We tested the painkilling effect of KK-103 on a hotplate, demonstrating a 10-fold improved painkilling effect compared to Leu-ENK and a longer effect than morphine. To understand how KK-103 produces its painkilling effects, mice were injected with KK-103 and different opioid receptor blockers before exposure to the hotplate. We showed that KK-103 activated delta opioid receptors (DOR) and to a lesser extent mu opioid receptors (MOR). We finally tested the effect of KK-103 on constipation, a major opioid side effect. KK-103 only mildly reduced gastric motility (20%) compared to morphine (70%). In conclusion, KK-103 is quickly absorbed to obtain higher plasma concentrations compared to Leu-ENK. It produces a long-lasting analgesic effect mainly mediated by the DOR and does not induce constipation.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Development of an ultra-rapid magnetic CRISPR screening method for genetic analysis of cellular glycosylation pathways

Presenter(s): *Jimmy Kim*

Abstract:

Over the past 10 years, cancer research has undergone a major transformation. In 2018, the Nobel Prize in Medicine recognized the groundbreaking potential of cancer immunotherapies, drugs that allow the immune system to target and eliminate cancer cells. The human immune system functions by utilizing signalling receptors expressed on the surface of immune cells. Upon binding to specific targets (ligands), these receptors result in a decrease in the observed immune response. In diseases like cancer, the cell surface may be changed to allow cancerous cells to suppress immune cell activity and avoid detection by overexpressing certain ligands. The signalling pathways and genetic changes that lead to the alteration of the cell surface in cancer cells, however, are not well defined. Here, we propose a screening approach to identify genes and specific signalling pathways that can be targeted to reverse alterations of the cell surface in cancer cells, thus eliminating their ability to evade the immune response. We then optimized the approach using a co-culture assay to determine efficient conditions. With this approach in place, we conducted a genome-wide screen with MDA-MB-231 (breast cancer) cells, which revealed promising genes of interest that could be targeted. Our future steps aim to broaden the scope of the project to encompass multiple cancer cell lines to potentially identify new cancer targets, thereby generating novel therapeutic strategies for cancer treatment.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Rewilding Urban Cemeteries in Metro Vancouver

Presenter(s): *Hooria Bilal, Ernest Gao, Sunny Ma*

Abstract:

The increasing density of urban areas has resulted in a lack of greenspaces, which has led to reduced ecological resilience. Urban cemeteries and cities are interconnected and constitute some of the oldest and largest green and open spaces in the urban landscape. Introducing rewilding into urban cemeteries is a potential solution that can reduce intensive management practices and improve provision of ecosystem services without changing the cemetery's original function. Limited research has been conducted on the effect of rewilding on cultural ecosystem services and net biodiversity on North American urban cemeteries. Also the practicality of rewilding urban cemeteries has been unexplored in existing research or literature. We hypothesize that rewilding urban cemeteries will restore natural habitats and biodiversity, and also create open spaces for people's recreational needs in a way that's not reliant on intensive management practices. Using a spatially-explicit ecosystem service model, we will simulate the possible biophysical changes after rewilding urban cemeteries. We will survey people's perceptions of rewilding cemeteries based on the results of this model. Additionally, we will conduct expert interviews with managers of cemeteries to learn about the feasibility of implementing recommendations based on the results. We expect that locals will be in support of rewilding cemeteries once they are shown the improvements based on the spatially-explicit ecosystem service model simulating the biophysical changes. The results of our study will provide insight in the improvement of urban infrastructure, and influence future planning of other urban areas to be more ecologically resilient.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Lighter on the land: Effect of regenerative agricultural practices on post-harvest soil N

Presenter(s): *Asha Wareham*

Abstract:

Conventional agriculture is challenged by the effects of climate change (CC) yet also contributes to its escalation. Adaptation and mitigation to CC are projected for 'soil-centric' methodologies like regenerative agriculture (RA), which can reduce ecological impacts and maintain productivity by supporting soil health indicators for nutrient cycling and water dynamics. While extensively discussed for crop growth, a suite of indicators that captures soil's mitigative capacity and resilience to CC remains undeveloped. Further, responses of CC soil indicators to RA practices have not been evaluated in coastal agricultural regions. Of particular interest is soil nitrogen status because excess nitrogen (from fertilizer) is at risk of leaching into and polluting surrounding water resources or volatilizing into greenhouse gas that contributes to climate change. In cropped Alaksen National Wildlife Refuge fields (Delta, BC), this study investigates potential short-term benefits of RA practices (organic amendments and reduced tillage) compared to conventional practices on selected CC soil indicators, including nitrogen status. RA treatments were applied pre-planting, and soil samples were taken post-harvest at three depths in 2021 and 2022. Concentrations of the nitrogen species nitrate and ammonium were determined in the laboratory colormetrically using a spectrophotometer. Across tillage intensities and compared to conventional practices, organic amendments are expected to provide sufficient nitrogen to crops at levels that concurrently reduce environmental risk. The findings of this study could inform implementation of RA practices that meet ecological and productivity goals for coastal BC as it experiences CC.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Reflections and Recommendations from International Youth Advisors on the Need for Standardized Training

Presenter(s): *Georgia Simkin, Sofia Serrano*

Abstract:

Research has shown that youth advisory (YA) boards can promote meaningful engagement in various aspects of pediatric research. However, around the world there are large inconsistencies in the training of YAs. Proper training will allow youth the tools to ensure their voice is heard and incorporated to protect their perspective. Previous research into YA groups has encouraged and recommended that youth training materials are standardized and unique for youth.

This paper investigates the current training protocols used by various global YA groups to highlight unmet needs that youth face when seeking to provide credible youth perspectives in the creation and implementation of international research.

Methods:

Interviews of YAs from fifteen global advisory groups were conducted at the 2022 International Children's Advisory Network Summit in Lyon, France. All advisors were asked whether they received standardized training, the length and depth of their training, and if they could provide recommendations to improve future training.

Results:

Standardized training was non-existent in a national and global context, and the number of reported training hours in advisory groups ranged from zero to sixteen hours. Three members had formal training and eleven advisors underwent continuous training. The topics covered varied greatly; most desired more training on the research process and medical terminology.

Conclusions:

There remains a need for standardized training despite the existence of training platforms and YA groups. A standardized online resource where youth receive age-appropriate research training with buy-in from the network of global YA groups is critical for successful implementation.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Examining Fitness Variation in Annual plant Plectritis Congesta

Presenter(s): *Ria Raut*

Abstract:

The endangered Garry Oak ecosystem has numerous threats, including invasive plant species and excessive deer grazing (herbivory). To understand how the ecosystem will respond to threats, we must first understand the responses of key native species. One such species is Plectritis congesta, an annual plant that experiences high rates of herbivory. Since plants respond to herbivory of flowering stalks by making secondary flowers, individuals that can produce more or higher quality seeds on secondary compensatory flowers would have higher fitness. Previous research has found seed phenotype is related to deer abundance, such that areas experiencing higher herbivory tend to have more unwinged seeds than expected, though the cause is unknown. This project aimed to understand if unwinged phenotypes, which produce smaller seeds requiring less investment, compensated for herbivory differently compared to their winged counterparts. We grew winged and unwinged plants and simulated grazing (by clipping) for half the plants of each phenotype. We compared the relative fitness between the compensatory (i.e., those produced after the primary inflorescence had been clipped) and primary seeds within and across phenotypes. Our results indicate that first, both phenotypes were equally able to make compensatory seeds, and second, unwinged phenotypes produced a higher average number of compensatory seeds per plant compared to their winged counterparts; this could explain the higher-than-expected frequency of unwinged plants. Future research could evaluate how unwinged seeds influence dispersal and fitness, which could ultimately influence the ecosystem's biodiversity and resilience.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Gender and Sexual Orientation Differences in Suicide-Related Coping

Presenter(s): *Ria Wong*

Abstract:

Coping strategies when experiencing suicidal thoughts have been identified as a protective factor for suicide outcomes. Despite research suggesting group differences in seeking mental health services, it remains unclear whether this exists for suicide-related coping. Thus, the present study aimed to examine differences in suicide-related coping across gender and sexual orientation.

Method:

Participants were undergraduate students with a history of suicide ideation (n=69 Heterosexual orientation, n=32 Sexual minority; n=80 Women; n=18 Men; Mage=22). Knowledge and perceived ability in suicide-related coping were measured using the Suicide-Related Coping Scale (SRCS; Stanley et al., 2017). A semi-structured clinical interview assessing 36 coping strategies was used to examine coping strategies used when feeling suicidal.

Results:

Independent-samples t-tests revealed no statistical difference between genders on the SRCS or sexual orientation. Women reported being more likely to engage in nonsuicidal self-harm, making meaning out of the situation, while men were more likely to engage in mindfulness. For sexual orientation, participants reporting a heterosexual orientation suggest that they were more likely to think about the pain involved in attempting suicide and turning to religion. Participants belonging to a sexual minority were more likely to remove means that could be used.

Conclusion:

Across gender and sexual orientation participants reported similar knowledge and self-efficacy in suicide-related coping. However, there were differences when examining specific coping strategies. Findings help advance suicide research and prevention by adding to the literature regarding gender and sexual orientation differences in suicide-related coping.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: The Effect of Aerobic Exercise on Syntactic Development for Infants

Presenter(s): *Clara Saad*

Abstract:

Many children experience delays in syntactic development leading to subsequent issues in communication skills and early language education. It is crucial that children master the syntax of a language during the critical window of language development to prevent recurring errors in speech. Recent studies have shown that repeated aerobic exercise increases adults' ability to recall words, suggesting that aerobic exercise enhances the function of brain regions associated with language. Replication studies using school-aged children support the benefits of aerobic exercise for word learning; however, it is unclear whether these findings reflect improvements in memory or language development. In this study, I aim to use Mean Length of Utterance, a standardized measure of language proficiency, to ensure the results solely reflect improvements in syntactic development. Participants will be between 2-3 years old as children typically experience drastic increases in their vocabulary and understanding of grammar rules during this time. I hypothesize that aerobic exercise will lead to increased rates of syntactic development. This study will use a pretest-posttest between subjects' design. The two conditions will meet in separate classrooms for sixty-minute sessions three times a week for eight weeks. Participants in the aerobic exercise condition will play dance games while participants in the control condition work on arts and crafts. I expect that participants in the exercise condition will have higher MLU scores than those in the control condition. These results suggest that aerobic exercise is effective in improving syntactic development and can be applied to help children experiencing developmental delays.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Novel Cell-Penetrating Platform for Gene Delivery

Presenter(s): *Natalie Jones, Angeline Wu*

Abstract:

Protein and nucleic acid-based drugs are notorious for their low absorption and high instability in the gastrointestinal tract. For these treatments, injections are currently the only feasible route of administration, leading to significant discomfort for patients. As an alternative, we are developing a cell-penetrating platform (CPP) to facilitate the absorption of large molecules. This delivery system would allow these drugs to penetrate into the blood through mucosal tissues in the patient's eyes, nose, or mouth without needing to be injected. Our CPP has displayed efficacy in delivering treatments in multiple disease models, such as insulin for diabetes or monoclonal antibodies for chronic rhinosinusitis. Furthermore, engineering the CPP into a nanoparticle form (Nano-CPP) has been shown to significantly increase the delivery of therapeutic proteins. Given its exciting progress in protein delivery, we hypothesize that our platform could eventually be used for delivering CRISPR-Cas9, which would open opportunities for local treatment of genetic diseases. Since this would require the delivery of a protein-RNA complex, we first explored the capacity of our platform to deliver nucleic acids alone, using plasmid DNA transfection as a model. After our treatments were administered to cells, flow cytometry was used to quantify the expression of a fluorescent protein encoded by the plasmid. A two- to five-fold increase was found after treatment with our CPP and Nano-CPP respectively, indicating that our platform can successfully deliver nucleic acids. Ultimately, these results will contribute to the promising future of needle-free delivery of large therapeutics in numerous disease applications.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Expression and Function of TLR7 and TLR9 in Diffuse Large B Cell Lymphoma

Presenter(s): *Cecilia Lee*

Abstract:

Diffuse large B cell lymphoma (DLBCL), the most common lymphoid malignancy in adults, can be stratified into molecular subtypes, defined by recurring mutations. One particular subtype, "MCD" DLBCL, has a 5-year survival rate of just ~25%, as compared to ~65% for all DLBCL cases. Currently, all DLBCL patients receive the same chemoimmunotherapy regime, independent of subtype. The disparity in outcomes highlights a critical need for studying subtype-specific mechanisms of DLBCL pathogenesis to inform rational therapeutics. MCDs are characterised by a gain-of function mutation in the Toll-like receptor (TLR) signalling adaptor MYD88, which activates NF-kB signalling. Hyperactivation of NF-kB is critical for the survival of MCDs. TLRs are a family of innate immune receptors that recognize conserved pathogenic antigens. A genome-wide CRISPR-Cas9 knockout screen previously revealed that TLR9 was essential to the survival of fully transformed MCD cell lines. Still, little is known about the expression levels and functional roles of TLRs in MCDs. Intriguingly, in murine precursor models of MCDs, we identified an upregulation of TLR7, suggesting that it may also play a role in pathogenesis. Here, we assess the expression of TLR7 and TLR9 in human DLBCL cell lines using qPCR, flow cytometry, and western blotting, and in primary patient samples using RNA-seq data. Furthermore, we activate TLR7 and TLR9 with their respective ligands in DLBCL cell lines, and measure NF-kB signalling using western blotting. These findings may provide insight into the potential of clinically targeting TLRs in MCDs, and further our biological understanding of this aggressive tumour subtype.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Directive and Non-Directive Behaviours in Caregivers During Infant Play

Presenter(s): *Carmynn Skalnik*

Abstract:

It is well-recognized that there are many different ways through which infants engage in play, but how about the different ways that caregivers' behaviours influence this play? Prior research reveals that in childhood, caregivers impact children's play in two distinct ways: in whether they are leading the play, or being led by the child – known as directive and non-directive guidance respectively. However, there is scarce literature investigating directive and non-directive guidance in infancy. In this project, we seek to discern the effect of caregivers' directiveness on infant engagement during play. We recorded eight mother-infant dyads (infant M age = 5.9 months) while they engaged in face-to-face free-play sessions. We manually coded the video recordings of play sessions according to a developed coding scheme: We classified the mothers' play style as directive, non-directive, or a combination of both (directive-leaning, or non-directive-leaning) and identified four key infant object exploration behaviours (reaching, touching, mouthing, and looking at objects). We found that within a single play session, infants displayed all four exploratory behaviours while mothers alternated their level of directiveness. We will analyse if the prevalence and duration of infant object engagement differ depending on the level of directiveness. Our findings will inform the practice of mindful child-rearing by enriching one's understanding of the effects of different types of play demonstrated by caregivers.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Does Gliotactin Bind Extracellular LamG Domain Proteins to Associate to Cellular Junctions?

Presenter(s): *Max Ufimtsev*

Abstract:

How cells establish permeability barriers to block the flow of solutes and pathogens across the epithelia is a fundamental biological question. Barriers are created by septate or tight junctions between adjacent cells and at tricellular junctions at the kissing point of three neighboring epithelial cells. Gliotactin is a critical component of the tricellular junction and is required for tricellular and septate junction development, along with blood-nerve and transepithelial barrier formation. Gliotactin is a transmembrane protein with a highly conserved extracellular domain, and is a member of the Neuroligin family. The Neuroligins bind another family of transmembrane proteins called Neurexins through a protein domain called a LamG domain that is conserved in all Neurexins. However, the binding partner for Gliotactin is not known. The hypothesis to be tested in this thesis is that Gliotactin localization and function at the tricellular junction is mediated via binding to a LamG domain containing protein.

To investigate this, a screen using RNAi-mediated knockdown of a selection of Drosophila LamG domain containing protein crosses will be performed. A subset of the LamG proteins will be tested, specifically Kugeli and EyesShut. Each RNAi line will be expressed within the epithelial of the wing imaginal disc utilizing the GAL/UAS system and the effects on Gliotactin localization will be assessed. Genetic cross of fly strains will be paired with immunofluorescence labeling protocols, tissue dissection and analysis using high resolution microscopy. In parallel the presence of LamG protein in the wing disc epithelia will be assessed using antibody tagging.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Inflammatory responses in the lung: Does age matter?

Presenter(s): *Alex Stolz, Mido Luo*

Abstract:

Ageing involves an accumulation of cellular damage which results in a gradual decline of overall function, increasing risk of disease and death. This can involve dysregulation of the lung extracellular matrix (ECM) and immune response. This is a well-documented risk factor for chronic obstructive pulmonary disease (COPD), characterized by chronic bronchitis, airway remodeling and emphysema, typically ending with high mortality. Fibroblasts are the major structural cell within the lung that maintains the ECM. However, there is a knowledge gap regarding the changes in inflammatory mediators' release by these fibroblasts as chronological age increases. This study aimed to investigate the differences in lung fibroblast inflammatory cytokine production, specifically interleukin 6 (IL-6) and interleukin 8 (IL-8), in relation to chronological age. Primary human lung fibroblasts (PHLFBs) were obtained from 8 younger (20-50 years) and 8 older (70-83) subjects with no respiratory disease. Cells were seeded 100k cells/well in 6 wells plates and cultured until 90% confluent, then serum-deprived overnight and cultured for another 72 hrs. Cell-free supernatant was collected for inflammatory signal molecule IL-6 and IL-8 enzyme-linked immunosorbent assays (ELISA). Differences between groups were tested using the Mann-Whitney U test. We found fibroblasts from older donors had elevated IL-6 and IL-8 levels ($p < 0.05$) compared to fibroblasts from younger donors. These results suggest that lung fibroblasts in older individuals may have an exaggerated inflammatory response, which may contribute to â€˜inflammagingâ€™ observed in older individuals. These findings may be important to understanding the pathophysiology of chronic lung diseases like COPD.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Investigating the Impact of COVID-19 Vaccine Status on the Evolution of SARS-CoV-2 Variants through Long-Read Sequencing.

Presenter(s): *Karina Budhwani, Megan Ong, Arshi Malhotra, Nathan Millward*

Abstract:

The RNA virus SARS-CoV-2 has been observed to evolve rapidly, producing numerous new variants of clinical significance throughout the course of the covid-19 pandemic. This evolution is thought to result in increased transmissibility and resistance to existing antibodies, among other effects, highlighting the importance of viral detection and characterization strategies. Previous research has been largely focused on the spike protein, due to its direct involvement in host receptor-virus interaction. Moreover, such research has been primarily conducted using short-read sequencing. Here, we propose to consider regions outside of the spike protein and demonstrate the utility of long-read sequencing and hybrid analysis to better understand the evolution of SARS-CoV-2. Short-read sequencing allows 75-400 base pairs to be read at a time, whereas long-read sequencing allows 10,000-100,000 base pairs. Thus, long-read sequencing produces fewer fragments of larger size making it more suitable for analyzing the evolution of SARS-Cov-2 variants. Longer reads would allow for the identification of more complex sequence variants including repeats, duplications, or large deletions and insertions. We expect to see conservation in regions other than the spike protein, and may identify additional potential vaccine targets. These results will provide more insight into the evolution and understanding of SARS-CoV-2 variants. This can lead to improved treatment options such as vaccines and therapeutics to reduce harmful pathogenesis such as long covid, as well as better preparation for future pandemics.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: When a coin-tossing game becomes "rock, paper, scissors"

Presenter(s): *Peter Peng, April Ju, Mathew Drexel*

Abstract:

The statistics of a sequence of coin flips has been studied in mathematical literature since Bernoulli in the 18th century. Feller (1950) used this to formalize the concept of random walks and to develop tests for pseudo-randomness within a sequence of observations. To this day, coin flips are still used as the simplest model for random processes, including stock prices, randomized algorithms, and telecommunications noise. The study of "pattern matching", a classical problem in computer science, relies on this probabilistic model and led Knuth (1977) to investigate toy versions of the pattern matching problem. We investigate a related probabilistic game known as "Penney's game", introduced by Walter Penney (1969), in which a sequence of coin flips — either Heads (H) or Tails (T) — is generated, and two fixed sequences of coin flips, are "raced" against each other to see which sequence appears first. The first sequence to appear in the generated sequence is considered the winner. For a fair coin, one may guess that shorter sequences are more likely to win against longer sequences, but surprisingly, this is not always the case. Relying on a formula originally discovered by Conway and generalized by Li (1980), we characterize properties that would make a longer sequence win over a shorter sequence. Additionally, if the coin is biased with a different probability of Heads, we conjecture and verify computationally that as the probability of Heads becomes very small, the probability that any sequence beats another converges to either 1, 0, or 1/2.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Effects of viral geometry and receptor distribution on influenza motility

Presenter(s): *Shona Sinclair, Justin Huang, Owen Kwong*

Abstract:

Two surface receptor proteins, hemagglutinin (HA) and neuraminidase (NA), are located on an influenza A virion's surface. HA binds to sialic acid (SA) receptors on the cell surface, while NA cleaves the bonds and destroys the ligand. Through cycles of the formation and cleavage of HA-SA connections, the influenza virion is able to move across the surface of the cell. Distribution of NA on the viral surface, shape, and mode and directionality of motion vary between viruses, though the connections between these factors are not well-understood. This project will investigate how the geometry and NA distribution of a virion affect its motility. Stochastic simulation will be used to model the movement of an influenza virion. The receptors, viral surface, and cell surface will be modelled as simplified shapes, and the forces acting on them will be described in terms of their potential energies. Based on these forces, a set of stochastic differential equations simulating the virus's movement can be designed. It is expected that spherical virions will move more randomly compared to filamentous virions, whereas those with polar distributions of NA are expected to move more unidirectionally than virions with an equal distribution. The results of this study will clarify the relationship between viral geometry, receptor distribution, and virus motility and help better inform research into influenza. New information about how influenza moves and enters the cell can be applied in future studies to reducing infectivity and transmissibility.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Feasability of ADC in 129-Xe MRI for Monitoring CF in Pediatric Patients

Presenter(s): *Hana Salehi, Namya Sharma, Shreya Arora*

Abstract:

There is a current lack of sensitive lung function assessments in pediatric medicine. Hyperpolarized 129-Xenon magnetic resonance imaging of the lungs (XeMRI) is a new imaging technique that has promise to fill this gap. This non-invasive, radiation-free technique is currently being explored as a tool to monitor lung disease. Apparent Diffusion Coefficient (ADC), is an outcome measure from XeMRI that quantifies how well 129-Xenon gas diffuses through the airways. This study aims to evaluate the feasibility of ADC as a measure to quantify and monitor lung disease progression in pediatric patients with cystic fibrosis (CF). In this study, XeMRI imaging is performed with 10 healthy children and 15 children with CF, aged 6 to 18 years. ADC will be quantified from the images using a published ADC algorithm. Imaging sessions will occur every 6 months for a total of 5 years, to observe disease progression over time. We expect to see ADC values increase with worsening disease, due to a decrease in the available surface area for gas exchange, and to remain consistent in healthy individuals. By assessing if XeMRI can detect changes in disease over time, we can determine if this tool is suitable for clinical use to monitor disease. Research in this field is crucial as CF is one of the most common fatal genetic diseases in children, and it will contribute to filling the lack of functional lung assessments for pediatrics.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Development of a Peer Feedback Activity to Improve Pharmacy Students' Clinical Documentation Skills

Presenter(s): *Sarah Burke*

Abstract:

Background: The UBC Faculty of Pharmaceutical Sciences uses the SOAP (Subjective, Objective, Assessment, Plan) format tool to teach clinical documentation to students in the Entry-to-Practice PharmD program. A key competency to be met by pharmacy students is the ability to effectively document care provided.

Objective: A literature review was completed to address the question, "How does peer feedback correlate with academic performance and student confidence in pharmacy students writing SOAP notes?" to inform the development of a clinical writing activity for third year pharmacy students involving the provision of peer feedback.

Methods: The search engine Ovid was used to search Medline and Embase databases with search terms including pharmacy students, peer feedback, clinical documentation, and specifically "SOAP note" as a keyword. The study outcomes were left open-ended in order to keep the search as broad as possible.

Results: Of the 64 records screened, six relevant results were found. Five of the studies reported positive student attitudes towards peer feedback on a SOAP note activity. One study included academic performance as the primary outcome and concluded no statistically significant improvement in faculty-assigned grades following peer review of a SOAP note. The small size and heterogeneity of this study coupled with the absence of additional literature, provides an opportunity for further research into this outcome.

Implications: Creating a clinical writing activity which takes these results into account will increase student confidence in clinical documentation and contribute to the literature on the impact of peer review on academic performance.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: The Impacts of Breed and Individual Personality on Learning and Persistence in Pure Dog Breeds

Presenter(s): *Lucy Macdonell*

Abstract:

Over hundreds of years, as humans we have selectively bred dogs to cooperate with us for a variety of functions. The pure breeds resulting from this process have even developed enough genetic distance that it is translatable into measurable behavioral differences between them. However, there is no current research that has compared how these tendencies differ between dogs within a breed, and whether dogs' individual personality overrides these genetic predispositions in breeds. This study focuses on this overlap and how it applies to the dog's performance in learning aptitude tests specifically. The tests analyze their a) acquisition of skill, b) discrimination between skills, c) reversal learning, and d) extinction learning. This combined with the results of the preliminary owner questionnaire focusing on each individual dog will allow us to establish a correlation between their personality and learning ability. We hypothesize that differences will be consistent between the dog breed groups, and more variable between individuals. Furthermore, we expect to see higher aptitude for discrimination and acquisition learning in retriever and herding dogs compared to the ancient breeds due to that these dogs are bred for their high ability to understand and execute owner commands. The conclusions drawn from this research will help inform early detection of behavioral disorders in dogs, for example OCD, anxiety etc., and adapt behavioral standards for different dog breeds entering the workforce in high stress positions as service dogs.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Studying the impact of mood on domestic dog's learning and resilience to the environmental distractions

Presenter(s): *Nicola Yuen*

Abstract:

Mood is an affective state that might last hours to days. Previous research found mood as a significant contributor to the cognitive performance; however, the empirical findings are controversial. The purpose of this research is to examine whether the short-term mood of pet dogs can influence their speed of learning and focus on the task. Dogs (n=20) were divided into the experimental group, having 15 minutes of positive experiences (walking, playing with toys, and nose-work with treats) and the control group, experiencing a relatively boring situation in a room. Both groups then performed a hand-touch learning task. Once the learning criteria (six consecutive touches, each within three seconds) was met, a remote-control car (stressor) moved in a transparent box for two minutes. Number of responses until the learning criteria, latency to return to the task, time spent interacting with the car, frequency of gazing at the owner and the car, and the incidence of emotional responses (e.g., barking) were recorded for each dog. A normality test was conducted and based on the data distribution, either a Mann-Whitney or an unpaired T-test was conducted to compare the two groups. Results showed the control dogs (mean = 10.10±4.748 trials) had a higher learning speed ($p = 0.002$) compared to the experimental dogs (mean = 19.70±7.987 trials). However, the two groups did not differ in the other measured variables. It can be concluded that a short-term positive mood might either decrease the information processing o

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: The Main Cause of Neuron Loss in Alzheimer's Disease is Associated with the Build up of Two Proteins: Abnormal Tau and Beta-Amyloid (Aβ) become Toxic to the Brain

Presenter(s): *Dilnoor Gadh*

Abstract:

Alzheimer's disease (AD) is a common cause of dementia. AD disrupts the communication between neurons, which results in loss of function and cell death. It causes cognitive decline which results in disruptions in memory, inability to function independently and even death. This neurodegenerative disease is characterized by the buildup of Beta-Amyloid (Aβ) that accumulates in the brain and downstream phosphorylation of Tau that creates tangles inside the neurons. There are two hypotheses that are described for neuronal loss in AD. One being that increase in Aβ alone can lead to neuron death, and the other implies that Aβ triggers Tau's phosphorylation and then leads to neuron loss. The mechanisms that contribute to this neurotoxicity remain elusive. We utilise a 3D human cell culture system, called neurospheres, to investigate the underlying neuronal death pathways. We will use In vitro experiments using neurospheres treated with Aβ leading to the formation of aggregates inside the tissue. We will quantify the number of cells inside neurospheres following Aβ treatment and perform immunostainings for phosphorylated Tau. Finally, we can use pharmacological inhibitors to explore downstream signaling pathways in neuronal death. Additionally, we can use transgenic mouse models to examine the role of Aβ and Tau in neuronal death in vivo. These results will contribute to a better understanding of the underlying mechanisms of Aβ-mediated neuronal death in AD.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Healthcare provider attitudes towards the use of social robots in pediatric healthcare

Presenter(s): *Katelyn Teng*

Abstract:

Socially assistive robots use social interaction to support individuals in building emotional communicative capabilities. These devices have potential to be particularly helpful in stressful or anxiety-provoking environments for patients, such as hospitals. However, robot interventions are an emerging modality of treatment and therapy and are not yet widely accessible. While there is growing evidence that social robots can be helpful for children, several barriers still prevent the realization of their benefits. One such barrier to using social robot intervention in pediatric healthcare is the acceptability of this technology by healthcare providers, and whether social robots can enhance their practice. This study aims to use focus groups to explore attitudes of healthcare providers towards social robots used in pediatrics. Using guided topics, focus groups with health care providers will facilitate the discussion of their different perspectives on social robot use in hospitals. These topics include ethics, possible tasks of the robots, motivators for implementation, barriers, and practicality of implementation. The goal of the project is to better understand how social robots could support health care providers in improving patient experience, what barriers exist that make it difficult to integrate robots into health care facilities, and what solutions could address these barriers. The results will create a roadmap for the ethical and practical introduction of social robot interventions in pediatric healthcare.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Investigating the role of Tom5 on the assembly of mitochondrial protein import channel subunit, Tom22

Presenter(s): *Yuhang Wu*

Abstract:

Mitochondria is the powerhouse of the cell which produces essential metabolites including ATP. Healthy mitochondrial functions are essential for normal cellular activities, which largely depend on mitochondrial proteins. Most mitochondrial proteins are synthesized in the cytosol and require import into mitochondria. Translocase of outer membrane (TOM) complex is the common import gate for most mitochondrial proteins. A subunit of TOM called Tom5 has been shown to play an important part in maintaining the structural integrity of the complex and is critical for the assembly of Tom40, a main subunit that is responsible for the recognition and translocation of the preproteins that need to be imported. However, many functions and mechanisms related to Tom5 still remain unclear. Previous studies have shown a number of similarities in the role of Tom40 and another subunit Tom22. As a result, Tom5 possibly contributes to the assembly of Tom22 into the TOM complex as well. This study will focus on whether Tom5 is responsible for this process. We will use Tom5-deficient yeast cells to check for its effect on the assembly of Tom22 through blue native gel electrophoresis. Based on this, we may also use co-IP to test if Tom5 is directly interacting with Tom22 to regulate its assembly. The results of this study will provide a better understanding of the biogenesis of mitochondria import machineries and suggest new roles for the small import channel subunit.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Calcium-dependent inactivation of voltage-gated calcium channels

Presenter(s): *Katherine Feng*

Abstract:

Voltage-gated calcium channels are proteins embedded in the membranes of cells throughout the body, including in the heart, brain, and nerves. Voltage-gated calcium channels allow for influx of calcium into cells in response to changes in electrical activity. The flow of calcium into cells is a signal that can activate many cellular processes but can be harmful if excessive, so controlling the amount of calcium in cells is important. Mutations in the voltage-gated calcium channel can cause conditions including arrhythmias, seizures, and developmental abnormalities. Another protein, calmodulin, is found inside cells. Calmodulin senses calcium to help regulate how much calcium is allowed through voltage-gated calcium channels. When more calcium is sensed, calmodulin interacts with the voltage-gated calcium channel, somehow causing a change in the channel's structure to inactivate it and prevent further entry of calcium. This phenomenon is known as calcium-dependent inactivation. While a partial structure of the voltage-gated calcium channel has been discovered using cryo-electron microscopy, the resolution is not high enough to see the part of the channel that binds calmodulin. This project aims to better understand structural changes during calcium-dependent inactivation using x-ray crystallography to see with more detail. To do x-ray crystallography, a crystal of the protein must grow, which can only happen under the right conditions. We found strategies to promote crystallization, including ways to minimize protein flexibility. When hit with x-rays, the right crystal should scatter light to generate a pattern that can be used to solve the structure.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: MEK inhibitor resistance in lung adenocarcinoma is associated with addiction to sustained ERK suppression, representing a novel, potentially therapeutically relevant vulnerability

Presenter(s): *Josephine Ma*

Abstract:

The MAPK/ERK pathway regulates important cellular processes and includes signaling molecules Ras, Raf, MEK, and ERK; its hyperactivation plays a critical role in cancer biology. MEK inhibitors (MEKi) have yielded limited efficacy in KRAS-mutant lung adenocarcinoma patients, and this is attributed to intrinsic and adaptive mechanisms of drug resistance. While many studies focused on the former, there remains a dearth of data regarding acquired MEKi resistance. We established KRAS-mutant lung adenocarcinoma cells resistant to trametinib, an MEKi through dose-escalation studies and performed targeted sequencing to identify drivers of the resistance. Comparing the resistant cells to their sensitive counterparts revealed gene alterations associated with the trametinib-resistant response. We describe a state of "drug addiction" in resistant cases where cells are dependent on continuous culture in trametinib for survival. We show that dependence on trametinib for ERK2 suppression underlies this phenomenon and that trametinib removal hyperactivates ERK, resulting in ER stress and apoptosis. Amplification of the mutant, KRAS p.G12C occurs in drug-addicted cells and blocking mutant-specific activity with AMG 510 (a KRAS p.G12C inhibitor) rescues the lethality associated with trametinib withdrawal. Our study represents the first instance of this phenotype associated with KRAS amplification, and it demonstrates that toxic-acquired genetic changes can develop de novo with MEKi use. We suggest that probing for mutant KRAS amplification in patients may identify those that may benefit from a "drug holiday" to circumvent drug resistance. These findings demonstrate the toxic potential of hyperactive ERK signaling and highlight potential therapeutic opportunities in patients bearing KRAS mutations.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: The Impact of Different Exercise Modalities on Hepcidin Production Between Male and Female Athletes

Presenter(s): *Rhea Arora, Angelina Stevenson*

Abstract:

Iron is an essential element for active individuals; it is a major component of red blood cells and plays a key role in oxygen delivery from the lungs to the tissues. Without adequate iron levels during exercise, athletes cannot replenish their cells with oxygen, ultimately impairing physical performance. During high-intensity physical activity, exercise-induced increases in the inflammatory cytokine interleukin-6 (IL-6) triggers the production of hepcidin, a peptide hormone that blocks iron absorption from the diet and inhibits iron efflux from the duodenum. Previous findings illustrate that exercise increases hepcidin release, however research has yet to elucidate the impact of different exercise modalities on hepcidin production between male and female athletes. This research study hypothesizes that premenopausal female athletes will require greater iron supplementation for both endurance-based and resistance-based training as the female sex hormone, progesterone, triggers hepcidin production and blocks iron absorption. Female athletes in the mid-follicular phase of their menstrual cycle and male athletes will randomly be placed into the endurance or resistance group and undergo 30 minutes of training for 3 consecutive days. Venous blood samples will be obtained before every exercise session, immediately after exercise, and 24 hours post-exercise to compare hepcidin and iron levels as time progresses. This study expects women in the mid-follicular phase of their menstrual cycle to have low iron stores as progesterone levels are highest, thus triggering IL-6 production and increasing hepcidin levels in the blood. This highlights that female athletes may need to increase their iron uptake to maintain active lifestyles.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Promoting Positive Multiracial Identity Offline and Online: A Literature Review

Presenter(s): *Gale Chong*

Abstract:

Globally, multiracial populations are growing more rapidly than monoracial populations. Nevertheless, attitudes toward mixed-race individuals can often be negative, with identity-targeted discrimination being particularly common. Such discrimination adversely affects well-being, thus making it critical to study factors that can support positive racial-ethnic identity among multiracial people. With the rise of social networking sites, this literature review examined how online spaces may benefit multiracial identity development, using research on other marginalized communities and offline peer influences to inform conclusions. Offline, peers and friends promote positive multiracial identity via validation, sense of belongingness, and conversations that facilitate meaning-making. In addition to extending these offline benefits beyond physical limitations, online spaces hold great potential for promoting positive identity through their unique affordances, such as global connection; freedom of identity construction; and engagement in digital activism, which can strengthen multiracial pride. Furthermore, this review explored how third space theory might inform the construction of positive online spaces for multiracial people. Third space theory defines spaces that challenge categorical understandings of identity, thus enabling individuals to create new cultural hybrid identities. Online spaces may be uniquely suited to function as third spaces for multiracial people, as they offer creativity, autonomy, and anonymity in contesting monoracism and negotiating identity. Overall, this review foregrounds online spaces as a rich and exciting area for future research. Specifically, focus on how mixed-race individuals currently use online spaces and the construction of online third spaces would advance the important goal of supporting mixed-race individuals in developing a positive racial-ethnic identity.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: A novel DNA-siRNA hybrid lipid nanoparticle

Presenter(s): *Melody Cheng*

Abstract:

Small interfering RNA (siRNA)-based therapeutics holds great promise for treating cancer, hereditary genetic disorders, and neurological and infectious diseases. Lipid nanoparticles (LNPs) have been successfully used in Patisiran (ONPATTRO™), the first clinically approved siRNA drug, for the treatment of transthyretin-mediated amyloidosis. LNP-based siRNA delivery is currently of great interest for the development of the next siRNA formulation. However, the mechanism whereby LNPs deliver siRNA to the cell cytoplasm is not well studied. DNA nanostructures are emerging as powerful tools for biomedical and biological applications, which may contribute to a better understanding of the LNP-based siRNA delivery mechanism. We aim to exploit a novel hybrid LNPs system by integrating fluorescent DNA nanostructure into a siRNA-LNP system. The DNA-siRNA hybrid LNP system formed from lipid mixtures dissolved in ethanol is rapidly mixed with siRNA and fluorescent DNA duplex probes in aqueous buffer at pH 4. The resulting LNP dispersions are then dialyzed against saline buffers at variable pHs to remove residual ethanol and adjust the pH to desired value. Hybrid LNPs containing siRNA and DNA probes are characterized by dynamic light scattering, cholesterol assay and cryo-electro microscopy for particle size, lipid content and morphological analysis. The integration of fluorescent DNA probes into LNPs is confirmed by Triton X-100 treatment and fluorescent measurements. This work will pave the way for integrating functional nucleic acids and complex DNA nanostructures into LNPs for sensing, imaging and biomedicine.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Glacial Retreat and Changes in Streamflow at the Temperate Lake-Terminating Bridge Glacier

Presenter(s): *Samadhee Kaluarachchi*

Abstract:

Glaciers supply water to downstream ecosystems and helps meet human water demands, especially during dry summer months. Mountain regions are sensitive to climate change which accelerates glacial retreat and impacts flows to glacier-fed rivers. This study examines glacial and climatic influences on the streamflow of Bridge Glacier in British Columbia's Coast Mountains. This glacier terminates at Bridge Lake and calves icebergs into the lake. Statistical Mann-Kendall tests were used to identify temporal trends in temperature, precipitation, and streamflow of Bridge River between 2010 to 2021. Linear regressions account for climatic variability on streamflow, then residuals were analyzed to identify glacial influences on streamflow. Statistically significant trends ($p < 0.05$) show increasing December precipitation, decreasing February temperatures, and increasing winter streamflow. Over the melt season temperature and precipitation were significant predictors of streamflow, as seen during the June 2021 heatwave where temperatures reached 33^{0}C, an increase of 19^{0}C from the average daily high, and streamflow reached 80 m3/s, exceeding June and July averages of 24 m3/s and 39 m3/s, respectively. This suggests increased meltwater production with extreme temperatures. However, lack of clear trends in glacial influences on streamflow suggest that streamflow may currently be at a highest point, and future reductions of glacial area may produce lower flows. Overall, the glacier retreated 2.7 km2 between 2010-2021, presumably retreating beyond the lake, and we expect increases in water temperatures. Ecological impacts of flow reductions and increased temperatures should be investigated due to the cascading influences of deglaciating processes in high mountain regions.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: A longitudinal study exploring temporal changes in amyloid beta and phosphorylated tau post traumatic brain injury in high-contact athletes

Presenter(s): *Sanjana Subramaniam, Jaysheen Badohal, Jasper Delichte, Michelle Widlyne*

Abstract:

Every year, millions of athletes suffer from sports-related traumatic brain injuries (TBI), which increase their risk of developing Alzheimer's disease (AD) due to the accumulation of abnormal proteins in the brain. However, there is limited research combining positron emission tomography (PET) scans with blood biomarkers and cognitive testing to track changes in these proteins longitudinally after TBI. This study aims to investigate the temporal changes in Aβ and p-tau after TBI and their correlation with cognitive performance. High-contact athletes will be recruited at the beginning of the season, and baseline levels of Aβ and p-tau will be assessed with PET scans and blood sampling. Memory performance will also be assessed using the Montreal Cognitive Assessment (MoCA). Participants who report TBI(s) will undergo further assessments at 24 hours, 2 weeks, 6 weeks, and 6 months post-injury, and mixed-effects models will be used to analyze longitudinal changes in Aβ, p-tau, and memory performance.

It is anticipated that the TBI group will exhibit higher levels of Aβ and p-tau in PET scans and blood samples during the acute phase of injury, followed by a subsequent decline over the following month. These changes are expected to correlate with memory testing performance positively. As TBI is considered a risk factor for AD, investigating the temporal patterns in neurodegenerative biomarkers is essential to better understand the factors driving progression and recovery and the potential role of anti-amyloid therapies in TBI patients. This study aims to contribute to this critical area of research.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Natural and Vaccine-Induced Immunity against Future COVID-19 Infection

Presenter(s): *Kayla Audreyartha, Sahar Elhag*

Abstract:

Since the implementation of vaccinations, mortality rates of Coronavirus Disease 2019 (COVID-19) have decreased. However, new cases of COVID-19 among previously infected and vaccinated individuals continue to be reported. Although vaccination is shown to induce higher antibody levels, it remains unclear whether vaccination offers better protection against future COVID-19 infection than natural-induced immunity from a previous infection. We hypothesize that vaccination yields better immunity than natural infection and thus provides better protection against future infection. To evaluate the current evidence, we will carry out a systematic review by conducting literature searches for human observational studies on PubMed and MEDLINE databases using relevant Medical Subject Headings (MeSH) terms, including keywords relevant to COVID-19, vaccination, reinfection, protective effectiveness, antibodies, immune responses, social determinants of health, and public health measures. We will then screen through the abstract and exclude literature based on the inclusion/exclusion criteria that we constructed beforehand. Our main outcome of interest is infection within 90 days of vaccine administration or complete recovery from COVID-19. We expect to see that COVID-19 vaccination provides better protection against COVID-19 infection compared to prior natural infection. Better protection will be evaluated based on the ability to decrease the probability of developing COVID-19-related outcomes, such as severe diseases, hospitalization, and death. This work can inform future research on COVID-19 vaccination and booster regimens, and provide insight regarding the protection provided by vaccines against COVID-19 reinfection.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Engineering K. rhaeticus to shine in the dark and Explore its Downstream Utilization as a Smart Food Packaging

Presenter(s): *Alice Martins, Michelle Peng, Theo Nguyen, Patsa Naowaphongrat*

Abstract:

Kombucha has played an outsized role in the health craze of recent years, largely due to its palatability and ease of access. SCOBY, the Symbiotic Culture Of Bacteria and Yeast responsible for the fermentation of sweetened tea into the final kombucha product, is often underutilized, especially in homebrewed variations.

This project seeks to engineer Komagataeibacter rhaeticus, an acetobacter integral to SCOBY formation, to luminesce using a lux system optimized for bacterial usage. This will allow a "quick and dirty" visualization system for the principle bacterial component in kombucha culture that is accessible to homebrewers without access to microscopes and more sophisticated imaging equipment. High level, stable bioluminescence will be achieved through the transformation of K. rhaeticus with a plasmid containing the genes encoding the proteins required for bioluminescence (iluxCDABE and iluxfrp) under the control of a strong promoter (pBAD).

This project also explores downstream uses of SCOBY, post fermentation, that take advantage of the unique structural properties of bacterial cellulose. One of the most promising applications is as a rough indicator of environmental pH, useful for everything from detecting food spoilage to monitoring the growth of subsequent kombucha cultures.

By engineering an intuitive and eye-catching expression system, we aim to facilitate home brewing and encourage the development of sustainable homebrewing practices, including the reuse of SCOBY and other by-products.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Identifying Neocortex L6b Neuronal Subpopulations in the Mouse Brain

Presenter(s): *Margarita Kapustina*

Abstract:

The brain's deepest neocortical layer, Layer 6b (L6b), is an often-overlooked brain region recently implicated in neuropathologies of schizophrenia and autism (Eastwood & Harrison, 2005; Hoerder-Suabedissen & MolnÃir, 2013; Nagode et al., 2017). It is also the sole neocortical layer responsive to wake-promoting hypocretin/orexin neuropeptides (Bayer et al., 2004) Pathologically, the absence of these hypocretin/orexin neuropeptides, or mutations in hypocretin/orexin receptors found in L6b, leads to narcolepsy (Peyron et al., 2000; Lin et al., 1999). Remarkably, the potential existence of L6b neuronal subpopulations remains previously unstudied. To investigate the existence of unique neuronal subpopulations within L6b of mouse neocortex primary motor area, I analyzed single-cell RNA sequencing data employing machine learning techniques. I identified four distinct L6b neuronal subpopulations and their marker genes based on unique gene expression signatures. These marker genes include neuromedin B receptor (Nmbr), Solute Carrier Family 17 Member 8 (Slc17a8), hypocretin/orexin receptor 2 (Hcrtr2) and serotonin receptor 1D (Htr1d). I also validated L6b-specific expression in mouse neocortex of L6b marker genes, Ly6g6e, Nxph4, Cplx3, and Ctgf using multiplexed fluorescent in situ hybridization. Together, these findings help elucidate the transcriptomic diversity of L6b neurons in the mouse brain and provide insight into higher-order differences such as function and morphology for future studies.

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PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Elucidating the role of integrin-linked kinase in epithelial-to-mesenchymal transition and osimertinib resistance in EGFR-mutant lung adenocarcinoma

Presenter(s): *Tej Atwal*

Abstract:

Lung cancer is the leading cause of cancer-related deaths in Canada, with lung adenocarcinoma (LUAD) making up a major portion of the histological subtypes. A significant portion of LUAD is driven by mutations in epidermal growth factor receptor (EGFR), which has led to the development of LUAD therapeutics including osimertinib, a third-generation EGFR tyrosine kinase inhibitor. Despite improved patient outcomes, many patients ultimately become resistant to the therapy. Among the mechanisms of acquired osimertinib resistance, epithelial-to-mesenchymal transition (EMT) makes up a small, but significant portion of cases. Integrin-linked kinase (ILK) has been shown to be involved with promoting epithelial-to-mesenchymal transition in other types of cancers and provides a promising role in mediating EMT in EGFR-mutant LUAD. The focus of this project is to investigate the role of ILK in EMT in EGFR-driven LUAD. Through Gene Set Enrichment Analysis, conducted on the GSE31210 and TCGA PanCan Atlas databases, we found that genes associated with EMT were correlated with high ILK expression in patients with EGFR-mutant LUAD. Through experimental work, the findings demonstrate that the HCC4006 cell line, which are EGFR-mutant cells with high ILK expression, showed decreased expression of EMT protein markers and increased osimertinib sensitivity in response to ILK knockdown and treatment with osimertinib. When these cells were made resistant to osimertinib, they displayed increased expression of EMT protein markers. These results suggest that ILK plays a crucial role in mediating EMT and further understanding of the mechanisms behind this phenomenon can lead to potential therapies to combat osimertinib resistance.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Comparative Analysis of Microneedle Electrode Designs for Electroencephalography: A Comprehensive Review

Presenter(s): *Sze Lok Ng, Jack Plant, Tiffany Huang, Kriti Verma*

Abstract:

Electroencephalography (EEG) is a non-invasive technique that is used to measure electrical activity in the brain. EEG can be used to diagnose and monitor a variety of brain disorders, including epilepsy, narcolepsy, and traumatic brain injuries. Currently, Ag/AgCl gel electrodes are the gold standard for EEG. However, to obtain high-quality signals for clinical diagnostics and research applications, hair must be removed, and skin must be properly prepared to reduce noise. Nevertheless, these processes can be arduous and uncomfortable, leading to low client compliance. To address these shortcomings, our team has explored using Microneedle Electrodes (MNAEs) for EEG. MNAEs are an alternative to gel electrodes which do not require extensive skin preparation and can provide higher accuracy in signal acquisition. Many studies have been conducted on the use and production of microneedle electrodes; however, little research has been done to standardize microneedle design parameters (such as needle size and material) for optimal EEG efficiency. Thus, in this study, several MNAEs with varying dimensions and materials will be investigated. The effect of modifying these parameters on the signal acquisition and patient comfort will be analyzed. Ultimately, the aim is to compare and contrast various parameters and find an optimal MNAE design to maximize signal acquisition efficiency while minimizing patient discomfort. Such a design could increase patient compliance and ease of data acquisition, increasing the quality of clinical diagnostics and neuroscience research.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Selling the Rainbow: Queer Identity Formation and the Reclamation of Rainbow Capitalism

Presenter(s): *Hal Kowalewski*

Abstract:

Rainbow capitalism--a marketing technique in which corporations co-opt the language and imagery of queerness--is increasingly pervasive in modern North American markets. Existing studies attempt to identify this phenomenon and trace its growth alongside growing social acceptance of queerness. However, the voices of queer people themselves have been notably absent from this research. This study attempts to re-center queer voices in the study of rainbow capitalism in order to determine the relationship between queer identity formation and rainbow capitalism. Data was collected through a combination of autoethnographic accounts and semi-structured interviews with four members of the Vancouver community, focused on topics of consumer sovereignty, identity formation, and reclamation. Preliminary findings indicate that some queer people approach rainbow capitalism as an opportunity to assert queer identity in subversive ways rather than as a source of marginalization. Further, queer people view themselves as active participants in the construction of a queer counterculture rather than passive recipients of rainbow marketing. This research shifts the agency in the advertiser-consumer relationship away from the advertiser and toward the consumer. Further, it examines the way in which everyday expressions of queer identity demonstrate anti-capitalist and anti-cis-heteronormative attitudes.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Ex Vivo Programming of Murine Type 1 Regulatory T Cells

Presenter(s): *Andrew Sze, Sarah Lim*

Abstract:

Regulatory T cells (Tregs) suppress immune responses to maintain self-tolerance and homeostasis. Type 1 regulatory T cells (Tr1) are a subset of Tregs that secrete high amounts of IL-10 – an anti-inflammatory cytokine. Tr1 cells show therapeutic potential in cancer, autoimmune diseases, and chronic inflammation. To generate enough cells for therapeutic purposes, we must be able to differentiate naive CD4+ T cells into Tr1 cells ex vivo. Literature has demonstrated the importance of IL-27 in inducing Tr1 cells, but the role of IL-7, a hematopoietic growth factor, is less understood. We hypothesized that stimulation of murine CD4+ cells in the presence of IL-7 & IL-27 would induce a subset of Tr1 cells. To optimize Tr1 expansion, we isolated CD4+ T cells from FOXP3:GFP and IL-10:GPF reporter mice via immunomagnetic cell separation, stimulated them with anti-CD3/CD28 for 2 days, and sorted for cells that are CD44high FOXP3:GFP(neg) or CD25(neg) IL-10high. We continued to culture these under different cytokine conditions and analyzed supernatants for anti & pro-inflammatory cytokines using ELISAs and cytometric bead arrays after 1, 2, or 8 days. Following stimulation, CD44high FOXP3-GFP(neg) and CD25(neg) IL-10high sorted cells produced significantly increased levels of IL-10 in the presence of IL-7. However, IL-7 also appeared to increase levels of pro-inflammatory Th2 cytokine IL-4 in the CD44high FOXP3-GFP(neg) population. Taken together, these results suggest IL-7 can be used in expanding CD25(neg) IL-10high, but not CD44high FOXP3-GFP(neg) cells. We recommend using CD25(neg) IL-10high sorted cells in downstream experiments evaluating Tr1 therapy.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Integration of a Markerless Motion Capture on Post-stroke Participants in 2D and 3D

Presenter(s): *Anna Zhu, Kaylee McGeough*

Abstract:

Stroke is the 10th largest contributor to disability-adjusted life in Canada [1]. Post-stroke patients undergoing rehabilitation of the affected limb(s) often experience weakness and fatigue during rehabilitation exercises, such as arm reaching and leg kicking, which can lead to improper technique and slower rehabilitation progress. However, understanding and motivating the patient's rehabilitation exercises using conventional marker-based motion capture systems can be difficult and cumbersome for post-stroke patients due to the physical markers restricting their movement. DeepLabCut is a markerless motion capture system that uses pose estimation algorithms to track and quantify movements across mammalian species. Using DeepLabCut, we hypothesize obtaining 2D position data with an error rate of 5 pixels or less [2], as well as creating 2D kinematic plots and 3D positioning graphs. This is accomplished by recording a video of common rehabilitation exercises and extracting a certain number of desired frames to manually label joints/body parts of interest. These frames are used to train the pre-set Resnet machine learning model for hundreds of thousands of iterations and tested to evaluate accuracy. We can create fully marked videos and corresponding 2D position data using the trained model. From this data, we can extract joint angles and point velocities and a fully calibrated 2-camera setup would allow us to acquire 3D position data and model these as graphs. With the results of this project, visualizing and quantifying post-stroke patients' movements in rehabilitation exercises at specified points of interest is achieved with a markerless motion capture system.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: A Behavioral Analysis of Salt Modulation in Genetically Manipulated Fruit Flies

Presenter(s): *Sanam Farman-Farmaian*

Abstract:

Salt detection is strictly monitored within the animal kingdom. Salt is vital for ensuring bodily functions are carried out properly, and thus behavioral responses to salt are modified based on salt need. Salt activates multiple taste pathways, including those that lead to attraction and others leading to aversion. Low salt concentrations are known to amplify salt attraction, while high salt concentrations are linked with aversive behavior. In the common fruit fly (Drosophila melanogaster), salt attraction is mediated by the activation of sweet neurons via the receptor IR56b. Conversely, salt avoidance is mediated by a member of the same receptor family, IR7c. Activation of the attractive or aversive salt pathways can be blocked by mutations in IR56b and IR7c, respectively. The mechanisms underlying modulation of these two pathways in response to salt need are unknown. It is hypothesized that salt deprivation leads to the enhancement of the attractive pathway and suppression of the aversive pathway. Drosophila are genetically manipulated to yield an IR56b mutant, an IR7c mutant, and an IR56b and IR7c double mutant and are tested alongside a wildtype control group. Flies of each genotype are presented with a salt fed or a salt deprived pre-condition. Flies are then presented with two substances, one with NaCl and another without. We expect to see increased attraction for flies previously salt deprived, except for those with the double mutant genotype. We hope to provide a foundational study that can be later adapted for future experimentation in more complex organisms, such as mammals.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Effect of blood flow restriction on maximum repetitions completed in a barbell curl exercise across a range of relative loads

Presenter(s): *Katrin Denson*

Abstract:

Intramuscular pressure within working muscle during resistance exercise can increase to the extent that it occludes vasculature thereby reducing blood flow during each contraction. There appears to be a load threshold at which this occlusion occurs. Above this threshold, vasculature within the muscle is occluded limiting oxygen delivery and metabolic byproduct removal. Thus, resistance exercise bouts at higher relative loads result in less maximum repetitions performed than at lower relative loads where muscle vasculature is not occluded. This occlusion can be simulated using an exercise-specific blood flow restriction (BFR) cuff. However, no study has yet examined the effect of BFR on maximum repetitions performed at a range of relative loads. This study will examine maximum repetitions performed in a barbell curl exercise at several different relative loads with and without a BFR cuff. At low loads, BFR is expected to greatly reduce maximum repetitions due to the oxygen delivery and metabolic byproduct removal limitation. However, it is expected there will be a threshold above which BFR has a minimal effect on maximum repetitions performed as muscle vasculature is already occluded without BFR. Overall, this exploratory study aims to examine the load threshold at which muscle appears to be occluded through its own contractile force. These findings could add insight to understanding the different energy systems utilized at various relative loads during resistance exercise. Future research could examine how training at these different relative loads may elicit different energy system-specific training adaptations which could be used to guide exercise prescription.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Safety Implications of Automated Vehicle Technologies on Older Drivers in British Columbia: A Scoping Review

Presenter(s): *Roxanna Akhtary, Anahita Seraji*

Abstract:

Automated vehicle technologies (AVTs) such as lane-centring, traffic jam chauffeurs, and automatic emergency braking systems increase the mobility of older drivers that may otherwise refrain from driving due to age-related declines. Although the benefits of AVTs for older drivers have been investigated, the extent to which current AVT features have considered older drivers' safety needs regarding age-related declines (i.e., declined visual scanning, cognitive, sensory and physical factors) is unknown. This study aims to assess whether current AVT features can counteract the limitations faced by older drivers and recommend the level of automation required to accommodate their needs in accordance with current Canadian Council of Motor Transport Administrator (CCMTA) standards for fitness to drive in British Columbia. After characterizing the limitations faced by drivers aged 65 and older, we will extract, then pool data from studies about AVT safety with a focus on older drivers, published from 1997-2022 via databases such as MEDLINE, EMBASE, and CINAHL and by searching Google Scholar. By synthesizing this information, we expect to identify AVTs that can counteract the limitations faced by older drivers and the limitations that still need to be addressed to make driving safe and accessible to all. Lastly, AVT's ability to restore driving capacity will be compared to CCMTA driving fitness requirements to evaluate AVT implementations. The results of this study can restore older drivers' autonomy by empowering them to adopt AVTs and facilitate adoption by recommending automation levels that would best fulfill their needs.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: The Effect of Neuroinflammatory Suppression on SSRI Efficacy in Post-Partum Depression

Presenter(s): *Niki Shahraki*

Abstract:

Post-partum depression (PPD) is a psychiatric condition affecting approximately 15% of individuals after childbirth. Although antidepressants such as selective serotonin reuptake inhibitors (SSRIs) are often beneficial in treating general depression, there is limited evidence supporting their efficacy in PPD. Current research suggests that PPD may be associated with neuroinflammation marked by the pro-inflammatory cytokine IL-1ß, which can influence antidepressant efficacy. Here we examined the effects of an IL-1ß antagonist drug and SSRI treatment on depressive-like behaviours and brain plasticity in a rodent model of post-partum depression. Female rat dams received daily injections of either vehicle or corticosterone (CORT) from post-natal day (PND) 2-23 to induce depressive-like behaviours. A subgroup of dams was concurrently treated with the SSRI fluoxetine (FLX) or vehicle. We further administered IL-1ß antagonist drug Anakinra or vehicle to a subset of dams from PND 9-23. We measured off-nest and nursing behaviours through maternal care observations during PND 2-8. To measure depressive-like behaviours at the end of treatment, we conducted the forced swim test (FST) and measured the percentage of time spent immobile in water. Brain slices were stained for perineuronal nets (PNNs), a marker of brain plasticity in the ventral and dorsal hippocampus using immunohistochemistry. We hypothesize that CORT treatment will induce depressive-like markers including changes in immobility percent time during FST, maternal-care off-nest behaviours, and the density of PNNs in the hippocampus. We predict that concurrent FLX treatment will demonstrate a limited decrease in depressive-like markers induced by CORT, and that further treatment with Anakinra will mediate an augmented decrease. Understanding the effect of neuroinflammation on SSRI efficacy in PPD may propose novel approaches for the development of more effective treatments.

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

Title: Investigating the Impacts of Whaling on the Abundance of Large Baleen and Toothed Whales in the World's Oceans

Presenter(s): *Melanie Jackson-Rintjema*

Abstract:

This research project examines the recorded catch numbers of large baleen (Mysticeti) and toothed (Odontoceti) whales over the course of recorded human history. Our main objective is to assess the effects whaling has had on the populations of different species of large whales (blue Balaenoptera musculus, fin B. physalus, sei B. borealis, right Eubalaena australis E, japonica and E. glacialis, humpback Megaptera novaeangliae, and sperm whales Physeter macrocephalus) in the world's oceans. We analyzed the recorded numbers of whale catches for all species from all oceanic regions (North Pacific, North Atlantic, and the Southern Ocean) and recorded those numbers. We also did an analysis of literature estimating the abundance numbers of these whale species before these catches occurred and compared those findings to the International Whaling Commission's most current abundance estimates to analyse temporal changes in these populations. By comparing abundance estimates in the periods pre- and post-whaling, between species/within ocean basins and within species between oceans, we hope to provide new information on the factors that might be affecting species recovery. This research is important for understanding how human interactions both direct (e.g., hunting, overfishing preferred prey, ship strikes) and indirect (e.g., climate changes) have affected the populations of these large marine mammals. This information will help us to investigate how human interactions can affect marine ecosystems and give us an idea of how we can help improve the populations of large whales in all oceanic regions.

Literature Review Question:

How has the human history of whaling affected the abundance of large whales in the world's oceans?

Wave 3 | Poster Presentation

PONDEROSA BALLROOM **|** 12:30 PM – 1:45 PM

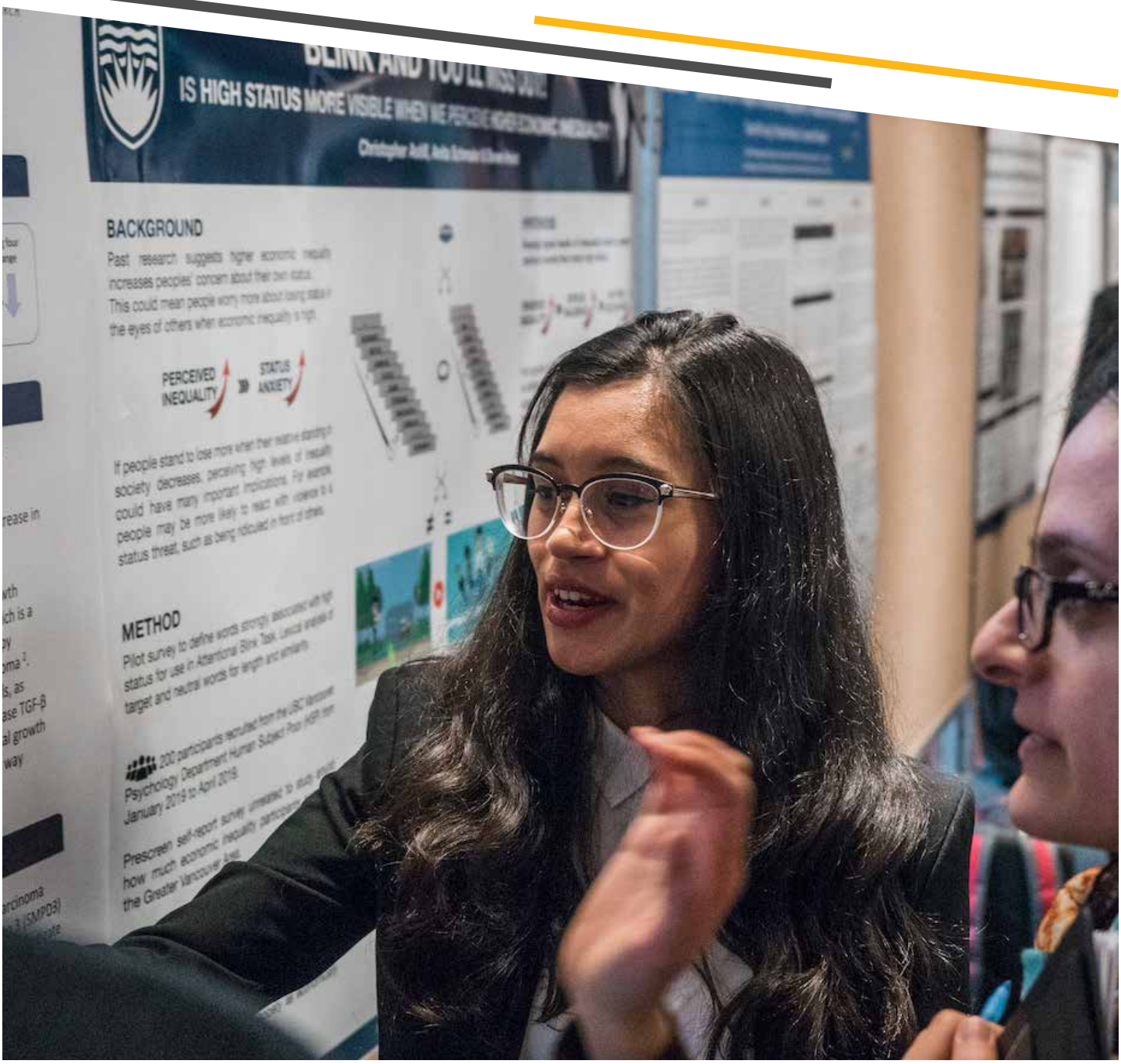
Title: Participatory Sense-making in Dance Improvisation

Presenter(s): *Paige Whitehead*

Abstract:

Participatory sense-making (PSM) provides a rich theoretical framework for empirical investigations of social interactions. According to PSM, the rise and fall of synchrony between individual actors provides useful information about the organization of social interactions. By extension, it's hypothesized that synchrony may be a suitable index of social understanding. Representing interpersonal synchrony, however, remains a challenge, and existing research is limited to quantitative, nondirectional accounts of synchrony. Using a dance-improvisation-based task, the goals of the present study are threefold: (1) to evaluate the suitability of different measures of behavioural synchrony, (2) to investigate the dynamics of interpersonal synchrony and information transfer between two dancers during improvisation, and (3) to observe how subjective experiences of synchrony reflect objective measures of synchrony. To do this, measurements of participants' hand trajectories are used to calculate speed time series (i.e., sequences of data representing the speed of movement at each point in time), which provide the basis for all further computations, including three different approaches to measuring synchrony and a measure of information transfer between individuals. Using these measures, we look at moments of observed high and low synchrony and evaluate how individuals' subjective experiences of emotion, intention, and action reflect quantitative measures of synchrony and information transfer. We expect to find strong accordance between measures of synchrony and subjective experience and argue these results would not only corroborate hypotheses derived from PSM but support an emerging shift in the study of social cognition away from individuals' mental processes and toward interactional processes.

WAVE 4
ORAL & POSTER PRESENTATIONS



WAVE 4 ORAL PRESENTATIONS

PONDEROSA COMMONS NORTH AND SWING SPACE

PCN 1009

The Stability of Stress During a Cognitive Task	Michelle Gitaari
The Scent of the City: Investigating Odorous Pollutants in Metro Vancouver's Air	Kana Kawanishi
"One flesh, one end": Examining the Mutation of Christian Theology into Horror Through Imaginative Apologetics in Tamsyn Muir's Gideon the Ninth	Madison Fernway
Loss-of-function mutations in orthologs of Parkinson's disease-associated genes affect a dopamine-dependent behaviour in C. elegans	Ben Westmore
Towards the Total Synthesis of a Chemical Probe to Study LTCCs in Living Cells	Megan Schroeder

PCN 1011

EMPHASize - EModule on Professional Health Awareness on Size	Mona Huang, Lakoda Thomas, Danae Snell, Hannah Dunsmore
Mapping Opportunities for Human Papillomavirus (HPV) Vaccination and Screening Engagement and Uptake in Trans and Gender Non-Binary (GNB) individuals: MOVE UP	Brody Lyons
The Significance of Text-To-Speech Systems in Ojibwe Language Education and Revitilization	Disha Pandurangi, Inyoung Kim, Laura O'Sullivan, Logan Keener
A quantitative analysis of the potential of assisted gene flow to combat the effects of climate change on Engelmann Spruce	Grace Fields, Sophie Hu

SWNG 105

Nucleolar prominence in prostate cancer: Studies on the biophysical properties and functions of RNA Binding Motif Protein X-Linked 2	Margaret Javier
Coefficients of Functions in Complex Mathematical Spaces	Rahim Hossain

Using Atmospheric Carbon Dioxide and Renewable Energy to Target Carbon-Carbon Bond Formation	Jared Litman
Cryptic corallines? Distinguishing eastern Pacific Corallina species with morphology	Risa Ogushi
Investigating Solvent Effects on Electrocatalytic CO2 Reduction	Ujas Acharya

SWNG 107

The influence of coralline species and morphology as substrate for Alaria marginata and Hedophyllum sessile settlement	Ruby Burns
Understanding Dietary and Physical Activity Traits in Breast Cancer Survivors	Andy Huang
Midngiht Sun, Polar Night: Competing Histories of Greenland	Nick Toney
The Impact Fantasy Football Has on NFL Live Game Viewership	Bryan Ly
Investigating the Distribution of Curve Coefficients Using Matrices	Mila Micovic

SWNG 109

Field study of a Personal Belongings Carrier (PBC) as a mobile cart to assist homeless community in Kelowna	Shiva Natarajan, Alison Siddon
Vegetable Motor Project- a low impact alternative to 'green' electric vehicles	AJ Jennison
Food Worry and Parental Mental Health during COVID-19	Yenah Byun

PCN 1002

Infants' neural processing of helping and hindering scenarios	Sarah Wissmann
The Sleep and Dreams of Asian Slow Cinema	Jasmine Sanau
Can we determine using classification algorithms whether a person's drawing of an Archimedean spiral, collected online, was made using their dominant hand or non-dominant hand?	Akira Kudo, Hoai Huong Nguyen, Roman Sinkus
When Cultures Clash: Validation of the Translated Negative Physical Self Scale in a Female Asian North American Sample	Shahrazad Amin
New methodologies for Construction of Supported Excavations	Wise Chen

WAVE 4 POSTER PRESENTATIONS

PONDEROSA BALLROOM

A Review of Privacy Within TransLink's Compass Card System	Evan Powers
Assessing the prevalence of iron deficiency among young children in British Columbia	Oliver Kodet
The Role of Pregnancy in Breast Cancer Tumour Metastasis	Ever Roberts, Parveen Gill, Siddhi Singh, Simran Behniwal
Determinants of Depression Among Individuals with Inflammatory Arthritis	Emilie McGuire
The female endurance advantage and the role of blood flow restriction	Max Abercrombie
Odd-One-Out: How infants and toddlers learn to associate word meanings	Zahra Fallah, Ria Nair
Effects of IL-13 on Cathepsin-S in the Lung Extracellular Matrix During SARS-CoV-2 Infection	Annie Li, Leo Tang, Leiana Hoshyari, Anthony Wong
Exploring the relationships between greenspace and urban heat exposure	Rachel Dong, Neha Menon, Naomi Madokoro
B.I.G. Whales: Archaeological Record of whaling in the Broken Group Islands, British Columbia, Canada using Collagen Peptide Mass fingerprinting	Kara Ren
Electroreception Sensory Systems in Acipenser transmontanus	Toktam Movassagh
Recycled Composite Paddle Board	Lillian McCallum, Auguste Bruno, Dana Mavrow, Ishaani Joshi
Relationship between M1 and M2 Macrophages in Uveal Melanoma	Chloe Hess, Christina Zhang
Radiopharmaceuticals: New Cancer treatments	Tino Masvikeni
What are the changes in common genetic markers due to differential EC treatment from racial disparity	Ria Bhatt, Ran Feng, Anisha Biswas, Aarya Gokhale
British Columbia's Freezing Forests: Yellow-Cedar Frost Damage and the Impact of Climate Change in Owikeno Conservancy, BC.	Nolan Meier

Are stressed-out calves predictable? Assessing the consistency of coping ability over time in dairy calves	Alex Aparicio
Applying the incessant ovulation theory to non-hormonal methods of ovarian cancer prevention	Gabrielle Chiu
Ovarian cancer risk with long-term use of gonadotropins fertility medication	Jolie Wu
Neuroinflammatory Response in Alzheimer Disease	Michelle Huang, Matilda San
mRNA-LNP Enabled CAR Therapy for Distinct Immune Cell Populations	Ria Perencsik, Jeongan Kim, Nari Kim, Raquel Harte
Changes in Blood Brain Barrier Associated Proteins in Ischemic Stroke	Abdulaziz Tawfik
Project Treehole Public Communication	Eman Dhanoya
Salmon at Large: Peptide Mass Fingerprinting of Archaeological Fauna at Prince Rupert Harbour	Pengpeng Chen, Jay Hilsden, Jennifer Zhu, Jenna Loupret
Correlation Between Interleukin-17 and Gut Microbiome Dysbiosis in Severe and Moderate RSV Infection	Nima Shokoohmand, Tianne Kussat
Post harvest analysis of three raspberry species to compare differentially expressed genes involved in freshness	Emily Frketich
Is there an association between neighbourhood playability and early child development?	Abbi Yuniarto, Ravleen Gill, Sara Ndlovu-Fraser, Anushka Bellani, Flora Su
Substitution of Tailings in the Composite Matrix of Concrete to Improve its Material Properties	Ezekiel Camacho, Taimur Masood, Li Yen Cheng, Ava Wang, Geoffrey Zhou
Vitamin B-12 status of vegetarian or vegan pregnant women in Metro Vancouver compared to pregnant women on an omnivorous diet.	Jennifer Daniera, Leah Qiyue, Patrick MacNeill, Wing Cheong
Exotic Electronic Transport in Ultrapure Metal Oxides	Nathan Durand-Brousseau, Andrew Du
Can inhibiting EMT genes attenuate metastasis in uveal melanoma?	Michael Mok
Providing a picture of perception: How ethical consideration changes across digital and physical pictures of people	Salina Edwards

Social Media "Friends" or Foes: How Gender, Website of Choice, and Time Spent Online Can Impact Cyberbullying Perpetration	Carling Bauer
Understanding the implications of redlining housing policies and their lasting impacts on college graduation rates	Luigi Vicencio, Jesse DeCoste, Sriya Regulapati, Juhi Grover
Optimizing a Mechanical Arterial Niche to Examine Blood Cell Emergence	Taia Yuen-Joaquin
What's so special about the first time? Comparing the phenomenology of memories for first versus most recent sexual experiences and associations with current sexual well-being	Stephanie Chen
Detection of early facial motor symptoms of neuropsychiatric disorders using Deepface technology	Chun Pang Wong, Chris Ren, Astrid Tam, Anna Malikovskaia
Investigating whether H3.3-induced metastasis is specific to breast cancer	Wendy Feng, Michael Geletu
A Step Forward in Understanding Skin Cancer: Modelling Keratinocyte Stem Cell Proliferation Regulated by p63 and c-Myc Proteins	Kyle Palacios, Janet He, Hanson Sun, Qais Alsharif
From Expertise to Uncertainty: Young Women's Responses to Therapeutic Content on Social Media	Emilia Heilakka
Three Doses of Psilocybin vs Thirty doses of SSRIs	Osheen Dayal
The effects of various gene mutations in colorectal cancer on the prognosis of affected patients	Sania Solouki, Lucas Cannon, Bhupesh Jassal, Jesse Luyan
(Not) meeting expectations? Comparing perceived responsibility for and frequency of White/European-Americans' Allyship	Andrea Camacho Garron
Wastewater-Based Surveillance of Infectious Diseases	Paniz Ataei, Finn McCord
Does Consciousness Matter?: A Novel Paradigm to Study Inattentional Blindness	Isha Verma
Current treatments of osteoblastic suppression in multiple myeloma and their mechanism of action	Sophie Nguyen, Dennis Tanujaya, Nathan Lam
What Bugs Bunnies: Investigating Rabbit Behaviour in an Animal Cafe Environment	Mabel Guo
Deep learning for optical character and handwriting recognition	Gagan Bhatia

The Effects of Cocaine as a Dopamine Booster on Depressed Animal Models	Chelsea Seaby Bruno, Srishti Rao, Olivia Shao, Jaiden Casapao
Application of embryonic stem cells in the recellularization of brain scaffolds	Alayne Mariano
A proposed study investigating the effects of psilocybin on the 5HT2A receptor and Streptozotocin-induced cell death in the hippocampus.	Sabrina Wei
Localizing LAC11-mCherry in the Stems of lac11 Arabidopsis thaliana Mutant Plants	Fabrizio Chow
The role of gay-straight alliances in mitigating harassment for Canadian and United States queer youth: a comparative analysis	Ariyana Dina, Ruier Yang
Barriers to Accessing Food Support at UBC	Nicole Shew, Mahin Khan

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: The Stability of Stress During a Cognitive Task

Presenter(s): *Michelle Gitaari*

Abstract:

Functional cognitive disorder (FCD) is a psychological condition characterized by cognitive difficulties such as excessive memory lapses or problems concentrating despite no medical reasons for such symptoms. It is expected that patients with FCD will have an increased error reactivity (i.e., fight or flight response) while having their cognitive abilities tested. Error reactivity may be a useful biological marker for diagnosing FCD and measuring response to treatment. However, a physiological response must be demonstrated reliable in a healthy population to determine if it is an appropriate candidate to measure treatment outcome. We will investigate whether electrodermal activity (EDA, i.e., the measure of sweat and the fight or flight response) will be stable over time during a cognitive task in a healthy population. Forty-five neurologically healthy undergraduate students will participate in our study consisting of two identical sessions set four to sixteen weeks apart. We will measure their EDA in each session while taking a recognition memory task. Using the interclass correlation coefficient, a measure of test-retest reliability, we expect to observe that EDA will be stable between their initial and follow-up sessions. These results would indicate that error reactivity could be studied as an indicator of treatment outcome over varying treatment lengths in FCD, providing clinicians with a secondary way to confirm successful intervention in addition to patient reports.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: The Scent of the City: Investigating Odorous Pollutants in Metro Vancouver's Air

Presenter(s): *Kana Kawanishi*

Abstract:

While odour is often seen as only an annoyance, odour exposures can adversely impact human health, well-being, and quality of life. Odorous contaminants include mixtures of volatile organic compounds (VOCs) that can affect cognition and mood, irritate upper airways, contain toxic constituents, and produce secondary pollutants that are associated with premature mortality. Despite this, the current understanding of the sources and source-resolved health impacts is quite limited. As a part of the Smell Vancouver project, a community science app SmellVan was launched in 2020 to collect odour complaints from crowd scientists of the Metro Vancouver region. In this work, we used these complaints to examine the spatial relationships of sources of odorous air pollutants and their impacts using an open-source geospatial analysis tool QGIS. First, we developed a VOC emissions inventory for Metro Vancouver with time-resolved emission patterns of chemical signatures of VOCs across 12 different types of anthropogenic emission sources for the year 2021. Next, we spatially allocated that emission inventory to facilities across Metro Vancouver. Finally, we quantified the proximity of odour sources from our inventory to community odour reports in SmellVan using different approaches. We also estimated intra-industry and inter-industry variability of odour impact, and estimated policy-relevant metrics such as the separation distance that are relevant for urban planning of residential centres and industrial facilities. Findings from this research can inform the development of environmental regulations and policies around zoning and limit the odour and air pollutant exposures of community members living or working near odour sources.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: "One flesh, one end": Examining the Mutation of Christian Theology into Horror Through Imaginative Apologetics in Tamsyn Muir's Gideon the Ninth

Presenter(s): *Madison Fernway*

Abstract:

Tamsyn Muir's Gideon the Ninth is a genre-defying science fantasy set in the far-future Empire of the Nine Houses, a galaxy-spanning empire of necromancy, the occult practice of communing with the dead. The Nine Houses revolve around their Emperor and God, who brought his Houses back from death in the Resurrection 10,000 years earlier. Each Nine Houses has a varied and rich history, filled with necromancy, powerful lineages, and battles for political influence. Unquestionably, Muir's works exist at a subversive axis of genres, a liminal space combining elements of gothic horror, science fiction, and Christian theology. My research explores how Muir's narrative takes advantage of the liminal fulcrum point at which belief systems, the conscious and the unconscious, dominant and resistant modes of religious discourse begin to break down. Gothic literature has historically explored Christianity and the notion of religion through its presence and absence in texts; traditionally, Gothic texts have evaluated religion according to its deviation from rationality, often placing Christianity in a dubious light. With the aid of imaginative apologetics (Greenaway 2020), this paper examines the novel through a theological lens, enabling a deeper understanding of how Muir uses religious motifs to mutate the orthodox revelation of God into the darkest narratives and cultures. This distortion opens tremendous possibilities enabling the text to rewrite Christian assumptions of immortality through a transgressive and horrifying exploration of necromancy.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Loss-of-function mutations in orthologs of Parkinson's disease-associated genes affect a dopamine-dependent behaviour in C. elegans

Presenter(s): *Ben Westmore*

Abstract:

Parkinson's disease (PD) is a human neurodegenerative disease associated with both motor and non-motor deficiencies, and its symptoms are hypothesized to be due in part to depletion of dopamine neurotransmission. However, the disorder's genetic underpinnings are yet to be completely understood. In recent years, genome-wide association studies (GWAS) and meta-analyses of GWASs have rapidly uncovered genes potentially associated with a risk of PD. In an effort to functionally characterize these genes to determine pathological relevance, the nematode Caenorhabditis elegans can be studied due to its expression of genetic orthologs (functional equivalents) of many PD-associated genes. C. elegans is an exceptional model organism for this work for a multitude of reasons, including its genome having been completely sequenced. High-throughput phenotyping of the behaviours and morphology of C. elegans can be achieved using the Rankin Lab's Multi-Worm Tracker, making it possible for orthologs of PD-associated genes to be functionally characterized in a rapid manner. This project primarily investigates the effect of loss-of-function mutations in orthologs of PD-associated genes on the basal slowing response (BSR). BSR is a dopamine-dependent slowing behaviour exhibited by C. elegans when in the presence of food, and a lack of slowing in these conditions is indicative of insufficient dopamine neurotransmission. By comparing the behavioural and morphological profiles of C. elegans strains carrying loss-of-function mutations in orthologs of PD-associated genes, it is possible to help characterize the roles their human equivalents may play in PD and how they might interact with one another.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Towards the Total Synthesis of a Chemical Probe to Study LTCCs in Living Cells

Presenter(s): *Megan Schroeder*

Abstract:

Calcium is a fundamental signalling ion that is involved in cellular processes, that range from cellular adhesion to signal transduction in electrically active cells, such as cardiac tissue and neurons. In post-synaptic neurons, L-type voltage-gated calcium channels (LTCCs), regulate the intracellular concentration of calcium based on membrane potential and stimulation from other neurons. This regulation is essential for neuronal communication and synaptic plasticity and is an underlying factor in learning and memory. In contrast, dysregulated neuronal calcium levels can lead to neurodegeneration, which is linked to diseases such as Alzheimer's, Parkinson's and Huntington's. Therefore, it is imperative to study LTCCs to gain information about how these proteins behave in healthy and diseased tissue, and the effects of different modulators or pharmaceuticals on their function. The major LTCCs in neurons are the Cav1.2 and Cav1.3 isoforms. Confocal microscopy is a common technique to visualize proteins in living cells, however this requires the use of a selective fluorescent probe to distinguish these proteins from others. In this study, a new fluorescent probe to study Cav1.2 and Cav1.3 proteins is designed and synthesized. It has three components: a barbiturate inhibitor that has been shown to selectively bind Cav1.2 and Cav1.3 proteins, a fluorescent moiety, and a molecular tether holding the two together. This probe will allow the Cav1.2 and Cav1.3 channels to be visualized in their native environment, increasing the number of diverse experiments that can be performed to study these channels that have such a pivotal role in brain health.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: EMPHASize - EModule on Professional Health Awareness on Size

Presenter(s): *Mona Huang, Lakoda Thomas*

Abstract:

Eating disorders (ED) can compromise many aspects of a person's quality of life. However, many barriers prevent accurate and timely diagnosis, leading to additional distress due to delays in diagnosis and treatment. As ED remains a persistent issue in society, EMPHASize, a set of educational modules encompassing both clinical and psychosocial aspects of ED, is developed to address the knowledge gaps in current education and practice. The aim of the pilot study is to develop a module specific to ED that can be used in healthcare education, and assess the practicability of its implementation.

The two self-paced online modules will be implemented in health science and nursing classrooms, as well as training for professional coaches. Participants will complete an anonymous online survey to provide feedback on several metrics, including satisfaction with content, self-perceived increase in knowledge, and overall suitability of the modules in post-secondary classrooms. The results collected from the survey will provide insight on the feasibility of module implementation to students and practicing professionals. This pilot will provide a foundation for future evaluation of EMPHASize as an effective tool in healthcare education, with the aim of implementing it as a part of standard curriculum in health science disciplines and continuing education for practicing health professionals. With increased education surrounding ED, it is anticipated that underdiagnosis of ED will reduce as healthcare providers gain a more comprehensive understanding of ED.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Mapping Opportunities for Human Papillomavirus (HPV) Vaccination and Screening Engagement and Uptake in Trans and Gender Non-Binary (GNB) individuals: MOVE UP

Presenter(s): *Brody Lyons*

Abstract:

BACKGROUND: HPV-associated cancers and pre-cancers (e.g., cervical, anal) disproportionately burden sex and gender minorities (SGM). Though cisgender individuals have benefitted from research on HPV screening, a paucity of data exists on these issues for SGM – particularly, transgender and GNB individuals. This study aims to identify facilitators and barriers to the uptake of HPV-associated cancer prevention and screening interventions for transgender and GNB individuals.

METHODS: We conducted an evidence review for publications specifically focused on management of HPV in transgender and GNB individuals. Additionally, we conducted an environmental scan for existing provincial, national, and international guidelines on these issues, as well as for transgender and GNB-specific HPV resources/programs. We will now conduct qualitative interviews with 40 transgender/GNB study participants, and 12 healthcare providers working in primary care and sexual health settings.

ANTICIPATED RESULTS: We identified a number of knowledge and evidence gaps in the literature that indicate fundamental deficiencies in HPV vaccination and screening for transgender and GNB individuals. The qualitative interviews will explore the knowledge, attitudes, and beliefs of both transgender and GNB patients, as well as providers, around their experiences with HPV management.

DISCUSSION: This study will help inform the development of HPV prevention, vaccination, and screening resources and programs geared explicitly toward transgender and GNB individuals. To our knowledge, this is the first study on HPV-associated disease devoted to the unique needs and strengths of transgender and GNB individuals and communities in Canada, and as such represents a crucial first step in addressing this research disparity.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: The Significance of Text-To-Speech Systems in Ojibwe Language Education and Revitilization

Presenter(s): *Disha Pandurangi, Inyoung Kim, Laura O'Sullivan, Logan Keener*

Abstract:

Text-to-speech (TTS) systems can be powerful educational tools to aid the revitalization of indigenous languages such as Ojibwe. To use TTS systems in teaching Ojibwe, we must first determine whether learning from a TTS system is equivalent to a human teacher. This study aims to determine whether the cognitive load of listening to text-to-speech synthesised Ojibwe is the same as spoken Ojibwe. We will have two groups of participants: one listening to synthesised speech through headphones while the latter will be exposed to human speech. They will be instructed to stare at a computer screen throughout the experiment to measure pupil size using an eye-tracker called the SR Research Eyelink Portable Duo. This data will be utilised for analysis of the cognitive load. We chose this eye-tracker while devising the methodology since it can be used easily in fieldwork. This study focuses on the utilisation of text-to-speech systems specifically for educational purposes. Since its creation, there have been requests from within the Ojibwe community to evaluate its prospective effectiveness. By conducting this evaluation, we can enhance the educational impact of our work and use this to create more ease in teaching indigenous languages, to support the preservation and continuation of the Ojibwe language. We expect that the results will show that listening to synthesised Ojibwe speech has a higher cognitive load than human speech. However, we hope the difference will be minimal, to demonstrate that TTS synthesised speech can be a good substitute for human speech in Ojibwe language education.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: A quantitative analysis of the potential of assisted gene flow to combat the effects of climate change on Engelmann Spruce

Presenter(s): *Grace Fields, Sophie Hu*

Abstract:

The impacts of climate change are affecting our ecosystems at increasing rates. Many plant species will struggle to adapt in time to these changes, particularly those with longer life spans and reproductive cycles. Picea engelmannii, or Engelmann Spruce, is one tree species that faces threats from climate change. Previous research has shown that Engelmann spruce seed yield may fail to be consistent as temperatures become more extreme. The species is somewhat drought-resistant, but changes in mean temperatures leaves specimens vulnerable. One possible method of reducing maladaptation of tree species to climate change is through assisted gene flow. Assisted gene flow involves planting specimens adapted to specific climates in new places within the species' natural range. In this study, we will conduct a quantitative analysis of hypothetical data from provenance trials around the province of British Columbia, modified from a lodgepole pine project. We will compare several recorded climatic and location-based variables and their influences on tree characteristics through statistical modeling and analysis, evaluating how assisted gene flow could support the future of the species as a management tool. Based on the available literature, we believe that assisted gene flow has the potential to be a valuable tool for aiding the resiliency of Engelmann Spruce. Using specimens that are adapted to predicted future climatic extremes will help combat the higher mortality rates and low reproductive rates that are anticipated as a result of climate change.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Nucleolar prominence in prostate cancer: Studies on the biophysical properties and functions of RNA Binding Motif Protein X-Linked 2

Presenter(s): *Margaret Javier*

Abstract:

Biophysical studies of the nucleolus have revolutionized our understanding of its assembly and organization – notably, the discovery of soluble macromolecules condensing to form nucleoli through a process called liquid-liquid phase separation. Apart from ribosome biogenesis, the nucleolus regulates many aspects of cell physiology, including genome organization, stress responses, and cell cycle. Therefore, maintaining normal nucleolar functions is essential to homeostasis and preventing the development of pathologies like cancer, ageing, and neurodegeneration. We recently discovered a connection between the enhanced translation of nucleolar proteins and prostate cancer tumour resistance. Polysome RNA sequencing showed that prostate cancers unresponsive to treatment, castration-resistant, had enhanced mRNA translation of nucleolar proteins compared to treatment-naÃ¯ve prostate cancer – the candidate nucleolar protein investigated in our studies is RNA Binding Motif Protein X-Linked 2, RBMX2.

Immunofluorescence staining revealed RBMX2 located in small nuclear condensates partially distributed in the nucleolus. Using a prokaryotic expression system, we purified recombinant RBMX2 and found it undergoes liquid-liquid phase separation, forming liquid condensates; this process was enhanced under heat stress. Further studies revealed that the C-terminus intrinsically-disordered region of RBMX2 is responsible for its phase separation properties. Through siRNA experiments, we also found that the knockdown of RBMX2 significantly altered nucleoli morphology and reduced the proliferation of castration-resistant prostate cancer cells, with little to no effect in normal cells, indicating that RBMX2 supports a treatment-resistant phenotype. Together, our study shows a vital role for RBMX2 in regulating nucleolar functions and proposes this mechanism's significance in cell survival in treatment-resistant prostate cancer.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Coefficients of Functions in Complex Mathematical Spaces

Presenter(s): *Rahim Hossain*

Abstract:

Our research studies the properties of functions in hyperbolic space. This is a space that bends and warps our notion of distance in ways such that the shortest path between two points is a curve rather than a line and the closer you get to a boundary, the farther everything stretches away from you. Our focus has been on Maass forms which are a type of function in this space that have an extraordinary number of symmetries. Special analysis can then be used to decompose these functions into their discrete components called Maass form coefficients. Our work groups these coefficients into smaller sets based on certain conditions and derives a bound for the measure of their size. The question of the size of sets of Maass form coefficients holds a large significance in number theory and the ultimate goal is to prove the Sato-Tate conjecture. It says that the sizes of these coefficients collected from any suitable Maass form will create a semi-circle distribution. Our aim was to find partial results towards this conjecture and obtain bounds consistent with this distribution. The result we achieved shows that given any suitable Maass form, the proportion of its coefficients satisfying a_(p)â‰¤ c is greater than or equal to (cˆ2+1)ˆ2/(cˆ4+6cˆ2+2)(|S|). Here a_p is the pˆth coefficient, c is a fixed constant, and |S| is the proportional size of a subset of the primes p determined by a coprime congruence condition.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Using Atmospheric Carbon Dioxide and Renewable Energy to Target Carbon-Carbon Bond Formation

Presenter(s): *Jared Litman*

Abstract:

The rise in human activities over the past century has significantly increased atmospheric CO2 concentrations and is a major cause of climate change. Catalysts can speed up the transformation of "waste" CO2 into useful industrial precursors for renewable chemical resources. Electrocatalysts are a sub-class of catalysts that are activated using electricity, and when they are molecular-based, they tend to produce single-carbon products from CO2. Literature precedent from the Tanaka research group deviates from this norm and establishes a ruthenium polypyridyl electrocatalyst, "Ru-CO", as being the first molecular electrocatalyst to produce multi-carbon products at low temperature (-20°C). Despite being reported over 30 years ago, this claim remains unverified and multi-carbon products from any molecular electrocatalyst is still an extremely rare feat. Our project seeks to synthesize Tanaka's catalyst ("Ru-CO") and verify their claim of carbon-carbon bond formation during the electrochemical reduction of CO2. We expand on Tanaka's work by investigating catalytic performance as a function of temperature, electrolyte choice, and electronic modification of the catalyst. Our research uses variable-temperature cyclic voltammetry (CV) and controlled potential electrolysis (CPE) to measure the activity and stability of Ru-CO during electrolysis. Preliminary CVs replicate literature results and show a clear difference in catalytic current at room temperature versus -20°C. Product analysis of post-electrolysis solutions contain Tanaka's previously reported single-carbon products, and efforts are underway to identify multi-carbon products via Gas Chromatography-Mass Spectrometry (GC-MS). These findings will provide a modern update to Tanaka's research and will establish the viability of molecular electrocatalysts in multi-carbon product formation.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Cryptic corallines? Distinguishing eastern Pacific Corallina species with morphology

Presenter(s): *Risa Ogushi*

Abstract:

Coralline algae (Corallinales, Rhodophyta) play significant roles in coastal ecosystems, such as providing habitat for animals and recruiting invertebrates and kelps. They are also predicted to be sensitive to ocean acidification, and therefore the effects of climate change, due to their calcified nature. Studying the current and future ecology of coralline algae, especially species-dependent processes, requires confident and accurate species identifications. However, corallines are notoriously difficult to identify in the field and there are species that have not been properly described. Here, I investigated the morphology of four eastern Pacific coralline species in the genus Corallina (C. bathybentha and the three undescribed species "C. sp. 4 frondescens", "C. sp. 1 California", and "C. sp. 5 frondescens"). My objectives were: 1) to determine if Corallina species can be reliably identified by morphology, 2) to identify characteristics that allow for accurate identification in the field, and 3) examine if geographically isolated populations of the same species exhibit similar morphology. Using specimens whose identifications were confirmed using molecular barcoding, I measured and compared physical traits including the size of calcified segments (intergenicula) and reproductive structures (conceptacles). C. bathybentha had large intergenicula and conceptacles compared to the other three species. The three remaining species have largely convergent morphological characteristics and cannot be distinguished without genetic data. South American individuals of C. sp. 4. frondescens had slightly larger intergenicula than North American specimens. These findings contribute to our understanding of coralline diversity in the East Pacific and will better inform future coastal studies involving Corallina

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Investigating Solvent Effects on Electrocatalytic CO2 Reduction

Presenter(s): *Ujas Acharya*

Abstract:

A major contributor to climate change today, is the accumulation of atmospheric carbon dioxide (CO2) stemming from human activities. Carbon recycling based on electrochemical CO2 reduction (eCO2R) is a strategy to reduce net CO2 levels, by recycling this abundant carbon resource into other useful products like fuels or industrial chemicals, using catalysts working in tandem with electricity to achieve this transformation. Achieving this effectively requires detailed understanding of catalytic systems. To better design eCO2R catalytic systems with high efficiency, the effect of local reaction environments such as solvents must be elucidated, as solvents can have a marked impact on efficiency and selectivity. Previous solvent dependence investigations on eCO2R are scarce, but several reports have observed high catalytic activity in acetonitrile. However, it is not currently understood which parameters of this solvent are the reason for its excellent performance. This study aims to investigate a variety of solvents for eCO2R using iron tetraphenylporphorins, a class of robust catalysts known for their efficiency and selectivity, and to correlate their catalytic activity to known solvent parameters. Catalytic activity was studied using a technique known as cyclic voltammetry. We hypothesized that solvents with properties similar to acetonitrile would likewise exhibit good catalytic activity. Low viscosity and polarizability solvents appear to perform better than others. However, solvents with similar properties showed remarkably different activity. Despite inconclusive results, this study provides a foundation for further computational studies to correlate the experimental catalytic activity in these solvents to several parameters, leading to more efficient carbon recycling

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: The influence of coralline species and morphology as substrate for Alaria marginata and Hedophyllum sessile settlement

Presenter(s): *Ruby Burns*

Abstract:

Kelps and coralline algae are important producers and habitat-builders in the intertidal ecosystem, yet we know little about their interactions. The intertidal kelps Alaria marginata and Hedophyllum sessile grow more often on articulated corallines than other available substrates. There are multiple plausible mechanisms driving this pattern; one possibility is that kelp spores settle and germinate better on articulated corallines than other substrates. My study tested this hypothesis by releasing A. marginata and H. sessile spores on articulated corallines, coralline crusts, bare rock, and glass, then calculating the sporophyte density on each. For both kelps, the highest mean sporophyte density was observed on glass, followed by the articulated coralline Calliarthron tuberculosum. Alaria marginata settled at similar densities on bare rock, the articulated Corallina sp. and the crust Chamberlainium tumidum. Hedophyllum sessile settled better on bare rock than on Corallina chilensis, and better on C. chilensis than Corallina vancouveriensis or Chamberlainium tumidum. Mean sporophyte density was consistently the lowest on the crusts Lithophyllum sp. and Crusticorallina sp. These results show that settlement is dependent on both kelp and coralline species, with little consistent benefit of settling on articulated corallines versus crusts. As settlement was generally higher on inert substrates like glass or rock, it is likely that corallines actively discourage spore settlement through methods like cell shedding and allelopathy. This research contributes to understanding how the fate of kelps is linked to that of corallines, which is important for the effective conservation of intertidal kelp beds at risk due to climate change.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Understanding Dietary and Physical Activity Traits in Breast Cancer Survivors

Presenter(s): *Andy Huang*

Abstract:

Worldwide, breast cancer is the most common form of cancer in women, but advances in diagnostics and treatments have resulted in favourable overall survival rates. However, breast cancer survivors are at an increased risk of developing obesity, which may raise the risk of cancer recurrence and development of comorbidities. Accordingly, eating behaviour traits can predict weight gain and may differ in people with higher body weights. Whether this occurs in breast cancer survivors is unknown. As such, sixteen pre-menopausal women (age: 47 ± 6.6, BMI: 26.0 ± 4.96) who had completed active treatment for hormone receptor positive breast cancer in the previous five years were enrolled. Eating behaviour traits were assessed using the Power Food Scale (PFS), Three-Factor Eating Questionnaire (TFEQ), Compensatory Health Beliefs (CHBs), and Weight-Efficacy Lifestyle Questionnaire (WELQ). Scores from these questionnaires were compared between women with lower or higher body mass index (BMI; split by median). Compared to women with lower BMI, those with higher BMI report increased measures of cognitive restraint in the physical presence of food within the environment and greater food restraint when faced with negative emotions. No differences in compensatory health behaviours were observed. Understanding what behavioural and physiological factors contribute to weight gain after active treatment for breast cancer may help personalize future health interventions. Analysis of body composition, energy metabolism, and physical activity are underway and may help further characterize energy balance in this population.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Midngiht Sun, Polar Night: Competing Histories of Greenland

Presenter(s): *Nick Toney*

Abstract:

In 2014, at the press conference announcing the newly-minted Greenland Reconciliation Commission, Helle Thorning-Schmidt, the Danish Prime Minister at the time, publicly and officially withdrew her government's support from the process, stating "we [the Danish] have no need for reconciliation." The Prime Minister's remark speaks to the paradoxical lenses through which Denmark has and continues to see Greenland. Greenland has been brightly pictured under the perpetual light of a midnight sun as an example of a people subject to a benign colonisation followed by a peaceful decolonisation by some, while others lock it in a perpetual polar night as a colony subjected to the full-blown policies of economic exploitation and civilising quests. Essentially, there is a general understanding that Danish colonialism operated along similar lines as the colonial powers of Western Europe, but manifested to a smaller, and less visible, scale. But little work has been done to specify why and how and why the Danish escape colonial scrutiny. This research articulates three sites of the Danish historiographic tradition that diminishes Danish colonial culpability: in narrativizing the colonial history, in policing Greenlandic identity, and colonial visibility in public-facing historical monuments.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: The Impact Fantasy Football Has on NFL Live Game Viewership

Presenter(s): *Bryan Ly*

Abstract:

Fantasy football is a multi-billion dollar industry that millions around the world take part in. This well-established game calls upon its participants to assemble imaginary National Football League (NFL) teams by drafting and trading real-life players. Existing research indicates that the rising popularity of fantasy football has had real-world implications for the league from a business and profitability standpoint, demonstrated by the increase in both stadium attendance of NFL games and global NFL fans. However, there remains uncertainty on how this domain can affect the largely profitable factor of live game viewership. I postulate that, given fantasy football's positive impact on the league, this domain should have a similar impact on NFL game viewership as well. This study explores this claim by investigating whether the ownership of certain players in fantasy football leagues influences the decision of participants to watch the NFL games their players are playing in. By collecting and combining NFL viewership, fantasy football, and team performance data, and conducting a multiple linear regression, I find that fantasy football and the ownership of certain NFL players on fantasy teams impacts live game viewership. In particular, the number of fantasy-drafted players for a team playing in their home stadium is statistically significant in increasing viewership while the number of fantasy-drafted players for an away team and the fantasy-value of players is insignificant. This research can be used by professional sports leagues and their business partners in framing decisions surrounding viewership such as advertisement pricing or ownership of broadcasting rights.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Investigating the Distribution of Curve Coefficients Using Matrices

Presenter(s): *Mila Micovic*

Abstract:

Elliptic curves are specific types of algebraic curves which are not only important in the field of pure mathematics, but also in our everyday lives. Elliptic curve cryptography (ECC) uses elliptic curves to encrypt highly sensitive information in emails, cryptocurrency, and even everyday Google searches! Pure mathematicians have attempted to uncover better ways of generalizing, simplifying, and grouping these elliptic curves, which are so important, yet quite complicated. This ever-growing area of study has several open-ended hypotheses and ideas which have not yet been fully proven. Our goal was to try to fill in some of these gaps, and to further research, and ultimately prove some of these ideas. More specifically, we looked into certain mathematical structures, known as matrices, which reflect an important aspect of elliptic curves, and sought to find patterns in the distribution of these matrices. Our process incorporated a variety of methods involving long and complicated systems of creating these matrices, and deducing obscure patterns, involving computers, algorithms and formulas. Over time we managed to find a general pattern and system of simplifying their distribution – we found that the matrices were showing up in three distinct amounts, solely dependent on a few key characteristics of each elliptic curve. These results allowed us to come up with a succinct formula and way of grouping the curves.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Field study of a Personal Belongings Carrier (PBC) as a mobile cart to assist homeless community in Kelowna

Presenter(s): *Shiva Natarajan, Alison Siddon*

Abstract:

Personal belongings are crucial part of people's identity, and their daily lives. For the homeless population the importance of belongings is heightened, yet they still lack secure methods of storage for their possessions. The homeless community could benefit from a secured "moving" belongings storage unit, as it would further enable them to tend to personal matters (e.g. medical appointments) with the ease of mind that their belongings are protected. In the present case study, a Personal Belongings Carrier (PBC) as a mobile cart was built at the School of Engineering at UBC to create a safe and robust mobile storage for homeless individuals to use. The collaborative study with the School of Social Work then assessed the usability of the PBC for people with lived experience of homelessness in Kelowna. For the field study, 14 participants with lived experience of homelessness were recruited to use the PBC and completed a designed questionnaire. Participants reported that majority of the features like the solar USB and safe locker would be advantageous in their daily lives. While they recommended noise reduction, the PBC overall was reported to be a beneficial product. The PBC was overall found to be a potentially valuable design for storage with respect to homelessness. To our knowledge, this is the first research to directly address the storage issues associated with homelessness in Canada. Distribution of the PBC and its further research may be beneficial for similar homeless populations in other regions.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Vegetable Motor Project- a low impact alternative to 'green' electric vehicles

Presenter(s): *AJ Jennison*

Abstract:

Ecosystems are collapsing while society considers 'green' technology as the solution. Material extraction and technological redundancy are vital issues; how do we solve them? Producing a technology, or indeed anything new, has mass ecological implications due to mining, refining, manufacturing, and shipping. They create toxic ponds and cause deforestation, undermining food security. We need to transition away from fossil fuels, and we can do so in a way that does not shift urban air pollution in the global north to groundwater pollution in the south. If the cobalt required for EVs causes humanitarian atrocities in the Democratic Republic of the Congo, a region disproportionately impacted by imperial histories, is it a solution?

In this talk, I will describe how my team and I have improved upon a system that allowed enthusiasts to run their old diesel vehicles on vegetable oil- without the diesel startup and turn-off dependence. I will describe how it has a significantly lower environmental impact, both in terms of GHGs and ecologically, and how a simple paradigm shift has profound implications on global innovation practices.

Our prototype utilises an old, already-manufactured diesel engine, and we will run it exclusively on used vegetable oil. By designing a heated fuel tank that reaches 60°C and comparing viscosity values to diesel, we expect to transport a human in a small vehicle reliably. The implications of this research will extend the working, low-impact life of millions of vehicles on the road today.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Food Worry and Parental Mental Health during COVID-19

Presenter(s): *Yenah Byun*

Abstract:

Food insecurity can be described as inadequate or insecure access to food due to financial constraints. For some Canadians, the onset of COVID-19 intensified financial stress and food-related worries which have previously been found to be positively associated with poor mental health symptoms. As primary caregivers, parents are responsible for buffering the effects of such stressors on children. In the Canadian literature, few studies have examined the association between concerns related to food insecurity and mental health outcomes during COVID-19 among parents. We hypothesize that parents who experienced food-related worry during COVID-19 will be more likely to report poorer mental health. We will use a nation-wide survey, encompassing questions about household demographics, food-related worry, and mental health outcomes. We will perform logistic regression analyses on survey data from parents (n=585) to examine the associations between food worry and mental health outcomes. After examining univariate models, we will control for household characteristics and pre-existing mental health conditions to explore the potentially confounding effects of these variables. We expect to find statistically significant associations between food-related worry and poor mental health among parents. These results will provide a better understanding of mental health implications related to food stressors for Canadian parents. With growing concerns surrounding the affordability of food for Canadian families, having robust and timely evidence related to the associations between food insecurity and adverse mental health outcomes is valuable for informing interventions and policies to better support caregivers.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Infants' neural processing of helping and hindering scenarios

Presenter(s): *Sarah Wissmann*

Abstract:

Morality relies on a foundation of social understanding. Preverbal infants prefer prosocial characters over antisocial ones, suggesting that they are capable of making sociomoral evaluations. To explore the mechanisms underlying this preference, infants were shown a helping-hindering scenario where a protagonist is helped by a prosocial character or hindered by an antisocial one while measuring their neural responses using electroencephalography (EEG). We predicted that motivational and social processing are involved in infants' sociomoral responses.

To date, the hill paradigm is the only helping-hindering scenario that has been used to investigate infants' social processing using EEG. The present study familiarized 6- and 12-month-old infants with the box show, a distinct helping and hindering scenario, to assess right and left frontal alpha power (indexing approach and withdrawal motivation, respectively) using EEG. Previous studies found inconsistent results between age groups. Further, infants viewed images of the prosocial and antisocial characters to detect neural signatures called event-related potentials (ERPs) that are associated with specific events, such as social or general attentional processing. Previous studies have found differential effects in ERP components P400 and N290 (indexing social processing) between the helping and hindering characters but not in the Nc component (indexing general attention), suggesting that infants are engaging in social evaluation. However, one study observed higher P400 for the hinderer compared to the helper while another found the opposite. The present study sought to clarify differences in age-related findings in frontal alpha power and P400 components between studies. Data analysis is ongoing.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: The Sleep and Dreams of Asian Slow Cinema

Presenter(s): *Jasmine Sanau*

Abstract:

In a world of rapid acceleration and constant movement, little have thought to stop and contemplate our state of perpetual fatigue and weariness. Here, slow cinema is needed more than ever as its minimal aesthetics and slow temporality treasure the tired and dreamy cinematic body as induced by the dullness of capitalism. Of particular interest is the slow cinema of Asia through directors Hong-Sang Soo, Apichatpong Weerasethakul, and Tsai Ming-Liang. I analyzed three films from each director to conduct how each of these cinemas are approached and conducted in the national contexts of South Korea, Thailand, and Taiwan. I find that my results demonstrate that each of these cinemas manifest sleeping and dreaming in cinema to critique the hastiness and overstimulation of global capitalism; Hong-Sang Soo's cinema of dreamy unconscious desires, Apichatpong Weerasethakul's cinema of dream-like animism, and Tsai Ming-Liang's cinema of drifting and fatigued figures. This suggests the power of passive resistance and the still image in producing a corporeal capacity separate from rigorous work life and consumerism, and instead, a body able to rest, sleep, and dream.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: Parkison's disease (PD) patients' drawings are data that effectively capture lower hand dexterity, a notable symptom of PD.

Presenter(s): *Akira Kudo, Hoai Huong Nguyen, Roman Sinkus*

Abstract:

Neuroprior.com is a website in development aiming to diagnose if a user has PD, by analyzing their trace of an Archimedean spiral using classification algorithms. Drawings are made with a computer mouse, and stored as timestamped X / Y coordinates of the cursor. Although Machine Learning (ML) classifiers in previous papers accurately differentiate drawings by PD patients from controls, our data collection and format significantly differs from precedents. Therefore, this study: 1) posits the usefulness of data collected in our method, and 2) identifies effective classification algorithms for the task.

Unable to collect PD patient's drawing data directly, alternative drawings made by healthy people using their dominant and non-dominant hands were collected. Because a person's non-dominant hand has lower dexterity than their dominant hand, drawings made by these hands should exhibit differences in dexterities similar in nature to that between healthy / PD patients' drawings. Thus, our method's successfulness on the alternative data should reflect its applicability for data on drawings by PD patients and controls.

An Approximate Entropy method, statistical inference, and a fine-tuned MobileNetV3-Large model were employed, pre-trained on a dataset of hand-drawings obtained from UBC students.

The MobileNetV3-Large model reached the highest prediction accuracy at 87%, proving potential for data collected in our new method.

This study lays the groundwork for the deployment of Neuroprior.com once drawing data is collected from PD patients and used to retrain the classifiers.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: When Cultures Clash: Validation of the Translated Negative Physical Self Scale in a Female Asian North American Sample

Presenter(s): *Shahrazad Amin*

Abstract:

Body image ideals vary across cultures. Many existing measures of body dissatisfaction (BD) were developed in Western societies with Caucasian participants and fail to capture complex variation across cultures. The Negative Physical Self Scale (NPSS) is a measure of BD that is unique in its consideration for Chinese ideals of body image and has been translated for use in a North American sample by a research group at UBCO. The current study explored the use of the NPSS in a sample of women who self-identify as Asian and live in North America.

A sample of 908 Asian North American undergraduate women, ages 18-25, completed an online survey comprising the NPSS and other common measures of BD.

Confirmatory factor analysis revealed that the four-factor NPSS structure suggested by the research group at UBCO was a poor fit to the data. The NPSS demonstrated excellent internal consistency, where Cronbach's alpha values were 0.90, 0.92, 0.93, and 0.90 for the Body Concern, Thinness, Shortness, and Facial Appearance subscales respectively. The NPSS Body Concern subscale showed high convergence with other measures of BD and is a candidate measure of BD in Asian women in clinical and research settings.

The NPSS provides a valid assessment of BD among the North American Asian female population. It is important to develop and validate cross-cultural measures of body image dissatisfaction to better inform the clinical assessment of eating disorders among a culturally diverse population.

Wave 4 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 3:45 PM – 5:00 PM

Title: New methodologies for Construction of Supported Excavations

Presenter(s): *Wise Chen*

Abstract:

Urban areas are becoming increasingly congested with the development of future cities and population growth in metropolitan areas. Reliable underground construction is essential for addressing environmental pollution, ensuring resilient infrastructure, and managing project costs. Sustainable and efficient underground construction methodologies are needed to replace many of the current practices. Boston's eight-lane underground tunnel and Toronto's Path are excellent examples of highly acceptable performance in underground construction. Our aim is to raise the idea of using cost-efficient and sustainable underground construction methodologies to save urban construction land while also expediting the process and diminishing the costs. Our effort is to respond to the queries "What are the current methodologies for the underground stories of mid-rise structures construction," and "How can this practice be possibly improved?" Our hypothesis is that in the early stages of a construction project, the foundation systems in the construction area may not be stable, leading to settlement issues. To address this problem, we explore novel methods of design and preparation of supported excavations to create a reliable work area for the underground construction phase of multi-storey buildings, such as pile walls, diaphragm walls, caisson walls, etc. It may be determined that there is a positive correlation between the use of certain excavation systems, increased speed and decreased costs of construction. The possibility of using such materials as soil-rubber mixtures, which have high damping ratios and may greatly dissipate the dynamic loads, on the soil-foundation interface will also be briefly discussed, followed by further suggestions for future research.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: A Review of Privacy Within TransLink's Compass Card System

Presenter(s): *Evan Powers*

Abstract:

The concepts of the smart city and the green city are related city planning models that can both embrace big data; namely personal, spatio-temporally marked, traceable user data. As green cities and smart cities have become increasingly big data focused, the advent of unobtrusive, real-time collection of information from users raises questions of user privacy. Vancouver is a city that embraces both concepts and can be used to analyze the aspect of user privacy at the intersection of the two concepts. Specifically, the integration of personal and traceable data could pose severe privacy risks. For instance, concerns about surveillance in a city that collects data on its users arise (Bakker & Ritts, 2018). Additionally, vulnerabilities also lie in the potential disclosure of personal data if improperly collected and stored (Kitchin, 2013). Conducting an in-depth review of TransLink's Compass cards, which embrace big data collection, through the use of stakeholder interviews will provide insight into how privacy is maintained for Metro Vancouver transit users and how user information is handled within the project. Findings from this review will show how Vancouver specifically handles privacy issues in regards to big data, as well as highlight the drivers behind and barriers to privacy within a city that embraces both a smart and green city approach. This review would highlight privacy concerns within the Compass card initiative, and therefore could be used to inform future projects or reexamine similar projects in regards to their privacy policies.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Assessing the prevalence of iron deficiency among young children in British Columbia

Presenter(s): *Oliver Kodet*

Abstract:

Iron deficiency is a common condition that affects infants in Canada. Iron deficiency can lead to anemia, a condition in which the blood is unable to carry enough oxygen to the body's tissues. In severe cases, iron deficiency in young children can lead to growth delays, developmental delays, and behavioural problems. A recent UBC study showed alarmingly high rates of iron deficiency among pregnant women in Vancouver. This is important because infants born to mothers with an iron deficiency are at risk of being iron deficient. Hence, the goal of this research is to assess the prevalence of iron deficiency in young children (< 1 year of age) in blood specimens of healthy infants that are currently available in the BC Children's Hospital Biobank. We will measure ferritin concentrations (a biomarker of iron stores), as well as two acute phase proteins which are known to influence ferritin concentrations (biomarkers of inflammation, C-reactive protein, CRP, and alpha-1-acid glycoprotein, AGP). CRP and AGP increase in the bloodstream in response to inflammation and tissue damage. We are currently in the process of obtaining ethical approval and the next step will be to assess biospecimens for ferritin, AGP and CRP concentrations. This research will help to guide appropriate iron interventions for both pregnant women and young children in British Columbia.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: The Role of Pregnancy in Breast Cancer Tumour Metastasis

Presenter(s): *Ever Roberts, Parveen Gill, Siddhi Singh, Simran Behniwal*

Abstract:

Breast cancer is a heterogeneous disease resulting from the uncontrolled growth of cells in the mammary gland and is the leading cause of death for women between the ages of 20 and 49. During pregnancy, the hormones estrogen, prolactin, progesterone, and human chorionic gonadotropin (HCG) are released at elevated levels and act on the mammary gland to prepare for lactation. Whether or not these hormones encourage the proliferation and metastasis of cancer cells in the mammary gland remains unclear. We hypothesize that the increased secretion and subsequent activity of these hormones in the mammary gland during pregnancy increases the proliferation and invasion of mammary tumours. To determine if pregnancy will induce faster tumour growth and higher rates of metastasis, we will utilize mouse models engrafted with luciferase and GFP-tagged human breast cancer cells before pregnancy. To investigate how pregnancy hormones alter tumour growth kinetics in vitro we will perform flow cytometry experiments to quantify proliferation numbers of cancer cell lines grown in the presence of pregnancy-associated hormones. Additionally, we will conduct 3D invasion assays with tumour spheroids grown with pregnancy hormones or mock-treated to determine how hormones may alter tumour invasion. We expect to observe increased tumour cell proliferation, and for invading cells to travel faster and further when cultured in the presence of pregnancy-associated hormones and in mice that become pregnant. These results could support the development of treatments for females who are at high risk of developing or are diagnosed with breast cancer during pregnancy.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Determinants of Depression Among Individuals with Inflammatory Arthritis

Presenter(s): *Emilie McGuire*

Abstract:

The risk of depression is higher among Canadian adults with arthritis. We identified determinants of depression among individuals with inflammatory arthritis (IA), which is important to identify persons at risk and address risk factors. Our cross-sectional study used baseline questionnaire data from a randomized controlled trial of an employment intervention in IA,'Making It Work' . Participants were recruited in British Columbia, Alberta and Ontario through rheumatologist practices, consumer organizations, arthritis programs, and a health benefit plan, between 07/2013 and 04/2017. The Patient Health Questionnaire (PHQ-9, range: 0-27) assessed depression. Potential determinants included sociodemographic, health and work-related variables (Table 1). Multivariable-linear regression analyses were performed with forward variable selection based on adjusted R-squared. The sample included 564 adults (mean(SD) age: 45.7(9.9) years, 77.8% female, 81.5% Caucasian). Mean(SD) depression score was 7.20(5.08), indicating mild depression. Factors associated with depression in the final multivariable model included: insomnia, job strain, number of limiting comorbidities, fatigue, low job satisfaction. They explained 55.50% of the variance in depression. Insomnia contributed most (partial adjusted R-squared), explaining 17.66% of the variance after controlling for other variables. Limitations include cross-sectional design, inability to assess causation. Insomnia (a symptom of depression), fatigue, job strain and low job satisfaction could be consequences of depression. Sample was workers predominantly Caucasian, highly educated, with longstanding disease. Results may not generalize to individuals with differing characteristics.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: The female endurance advantage and the role of blood flow restriction

Presenter(s): *Max J. Abercrombie, Katrin G. Denson, Matthew D. Fliss, Cameron J. Mitchell*

Abstract:

For resistance exercise at lower relative loads, sex differences in muscular endurance exist with females performing more maximal repetitions than males. One proposed mechanism for this effect surrounds blood flow restriction (BFR). Due to males producing greater absolute forces than females for the same relative load, higher levels of intramuscular pressure generated occludes blood flow to and from active muscles. This reduction of muscular blood flow directly results in a decrease of oxygen delivery and metabolic by-product removal, increasing the onset of muscular fatigue and decreasing maximal repetitions performed. When working at higher relative loads, the female endurance advantage is eliminated due to high levels of intramuscular pressure and BFR present for both sexes. However, studies examining sex differences in resistance exercise endurance under manually induced BFR are inconclusive due to contradicting results. This study will examine maximal elbow flexion repetitions under twelve conditions at varying percentages of one repetition maximum with each load being performed in a free flow and BFR state. We expect to observe a relative load threshold below which females perform a greater number of elbow flexor repetitions than males and that there will be no difference in maximal repetitions performed between males and females when under BFR. The results of this research will offer additional evidence towards the role of BFR as an underlying mechanism for the female endurance advantage and contribute to the field as a novel testing protocol of maximal repetitions performed using BFR through a range of relative loads will be utilized.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Odd-One-Out: How infants and toddlers learn to associate word meanings

Presenter(s): *Zahra Fallah, Ria Nair*

Abstract:

Words are characterized by various semantic features, which encompass different dimensions of meaning. These can be functional (relating to use), perceptual (sensory information, such as color), taxonomic (relating to category), or encyclopedic (all other information). While adults flexibly encode different semantic features when learning new words, research suggests that early word learning is highly dependent on perceptual features. Such research often uses the "odd-one-out" paradigm, where participants are presented with three words (e.g. apple, orange, bottle) and asked to pick the one which does not belong to the group via pointing, speaking, or key pressing. However, these measures are not accurate when used with preverbal children. The current study adapts the odd-one-out paradigm to infant- and toddler-age children by characterizing their choices based on looking time. Study 1 pilots different image alignments to determine the optimal screen layout for eye tracking. We expect looking patterns to be best distinguishable when objects are placed in a triangular shape on the screen. In Study 2, we will present children between 6 months and 4 years of age with sets of object images with different semantic features. We hypothesize that children categorize objects by attending to more complex and specific features as they grow older, and patterns of object categorization differ in bilingual and monolingual children. Through these studies, we hope to develop a new odd-one-out paradigm that can be reliably used with preverbal infants, and further our understanding of how humans begin to make sense of world through language.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Effects of IL-13 on Cathepsin-S in the Lung Extracellular Matrix During SARS-CoV-2 Infection

Presenter(s): *Annie Li, Leo Tang, Leiana Hoshyari, Anthony Wong*

Abstract:

Extracellular matrix (ECM) remodeling is one of the pathologies observed following respiratory infection by SARS-CoV-2, the virus causing COVID-19. Fibrous proteins, such as elastin, in the ECM contribute to the structure of the lungs; degradation of these fibers by Cathepsin S (CTSS) may remodel the ECM and induce pulmonary function impairment. Pro-inflammatory cytokine IL-13 is released during SAR-CoV-2 infection and plays a vital role in regulating elastin levels. Currently, it is unknown if COVID-19 induced IL-13 increase impacts CTSS levels. We investigated how SARS-CoV-2 infection affects IL-13 expression and levels of cathepsin-S in the ECM. We hypothesized that CTSS expression will be upregulated due to the increase in IL-13. SARS-CoV-2 spike protein gene was successfully cloned into the pCMV14 3x-FLAG expression vector, which was confirmed with DNA electrophoresis. Transfecting this plasmid into 16HBE bronchial epithelial cells, which was verified through western blotting, would model SARS-CoV-2 infection. Further experimentation was not conducted due to time constraint, however, western blotting can be used to compare levels of IL-13 and CTSS in transfected 16HBE and healthy cells. To assess the relationship between CTSS and IL-13 expression, western blotting would be used to measure CTSS levels in 16HBE cells containing anti-IL13 receptor neutralizing antibodies. The expected results would demonstrate an increased level of CTSS due to an increase of IL-13 in spike transfected bronchial epithelial cells. Understanding the role of IL-13 signaling and its impacts on CTSS expression is important in improving evidence-based practices for COVID-19 induced pulmonary fibrosis and discovering new therapeutic targets.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Exploring the relationships between greenspace and urban heat exposure

Presenter(s): *Rachel Dong, Neha Menon, Naomi Madokoro*

Abstract:

Extreme heat events are predicted to continue to increase in frequency, duration, and intensity, as one of the most well documented outcomes of ongoing climate change. The impact of these heat events can be fatal; for example, the 2021 heat dome in British Columbia caused 619 excess deaths. Green space interventions have been shown to successfully mitigate urban heat exposure. It has been shown that individuals living in less green neighborhoods are at a greater risk of mortality during heat events. However, less work has looked specifically at which types of greenspace are most predictive of local land surface temperature. To address this knowledge gap, this study looks at the relationship between these green space measures and surface temperatures. The study utilizes spatial analysis tools to explore the relationship between surface temperature data, and greenspace metric data calculated from the average buffer normalized differences vegetation index (NDVI), green land cover, tree canopy cover, and park count. We expect to see an inverse relationship between amount of greenspace and temperature with the strength of relationship differing based on the type of green space. These results will provide insight into modifiable environmental factors that may reduce the risks of heat-related health outcomes.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: B.I.G. Whales: Archaeological Record of whaling in the Broken Group Islands, British Columbia, Canada using Collagen Peptide Mass fingerprinting

Presenter(s): *Kara Ren*

Abstract:

Indigenous Nuu-chah-nulth communities on western Vancouver Island have significant relationships with toothed and baleen whales spanning millennia. While considerable archaeological and ethnographic evidence of these relationships exists, most archaeologically recovered whale remains are highly fragmentary, making it difficult to determine skeletal elements let alone species level identifications. Here, we describe a rapid and cost-effective biomolecular method of collagen peptide mass-fingerprinting (ZooMS) for identifying whale species from samples that are otherwise too fragmentary for morphological identification. By expanding the existing ZooMS reference database with 10 modern reference beaked whale samples, we processed 47 archaeological Cetacea samples collected from eight Tseshaht First Nation village sites as part of an ongoing collaborative project between Tseshaht First Nation, University of Victoria, and Pacific Rim National Park Reserve. The modern reference samples expanded the number of collagen fingerprints and provide further differentiation from other toothed and baleen whales, thereby improving the range of species possible for identification using ZooMS. For the archaeological samples, we expect the composition of whale species to largely parallel those seen in previous studies within Barkley Sound. Furthermore, these results will strengthen current understandings of whale species composition on the Pacific Coast of North America in ancient times.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Electroreception Sensory Systems in Acipenser transmontanus

Presenter(s): *Toktam Movassagh*

Abstract:

Organisms detect important sensory cues from their environment to guide behavior. One important signal arises from the faint electrical signature of potential predators or prey, and the detection of these voltages arises through the electrosensory system (a branch of the lateral line system). Despite the unusual nature of this sensory modality, it has independently evolved or re-evolved in at least 6 vertebrate lineages. Previous research has been done on the mechanosensory lateral line and electrosensory systems of elasmobranch and bony fishes; however, little is known about these systems in the sturgeon, an extant representative of the ancient chondrostean fishes.

This project investigates peripheral nervous system adaptations related to the electrosensory and lateral line systems in juvenile White sturgeon (Acipenser transmontanus), the largest freshwater fish in Canada and a keystone species in the Fraser River system. Adopting a comparative neuroanatomical approach, we analyze the distribution of peripheral electroreceptors and mechanosensory neuromasts across the body surface of multiple individual sturgeon with an eye towards the natural behaviors of sturgeons. These investigations explore the hypothesis that sturgeons have neural adaptations related to enhancement of their aquatic sensory systems (electroreception and lateral line) as they navigate through deep and murky water systems, as compared to other fishes.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Recycled Composite Paddle Board

Presenter(s): *Lillian McCallum, Auguste Bruno, Dana Mavrow, Ishaani Joshi*

Abstract:

Paddleboarding is currently one of the fastest-growing sports in the world. Over the past few years, paddleboarding has experienced a surge in popularity and the global standup paddle board market is expected to increase from 364.96 million USD in 2022 to 551.47 million USD by 2027 [1]. However, current paddle boards contain expanded polystyrene (EPS), commonly known as styrofoam, inside the board which have negative environmental impacts. The EPS used in these boards can take up to 500 years to decompose and is estimated to take up 30% of all landfills [2]. To address this issue, our research aims to identify biodegradable materials that can serve as sustainable alternatives for those currently used in paddle boards. Additionally, we will be integrating recycled polypropylene and cork to build a prototype of an environmentally friendly composite paddle board with use of injection molding. Our study will compare the lifespan and environmental impacts of current paddle board materials versus their sustainable alternatives. Specifically by performing life cycle analysis on traditional paddle board materials including EPS and Fiberglass, and promising alternatives including cork and beeswax. Furthermore, our research aims to raise environmental implications associated with the production and disposal of paddle boards and promote a more sustainable future for blue spaces.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Relationship between M1 and M2 Macrophages in Uveal Melanoma

Presenter(s): *Chloe Hess, Christina Zhang*

Abstract:

Uveal melanoma (UM) is the most common type of eye cancer with increased mortality after metastasis. Metastasis of UM to the lungs and liver (most common) is largely impacted by M1 and M2 tumor-associated macrophages (TAMs), which inhibit cell proliferation and promote cell reproduction respectively. Various studies have been conducted to look at TAMs function in different diseases. Jager et al. (2010) have studied the immunosuppressive features of M2 macrophages in mice with ocular tumors, finding that M2 tumor-associated macrophages are directly involved in the growth of ocular melanoma tumors. However, the relationship between M1 and M2 macrophages and their role in UM metastasis is yet to be concluded. Using the Mitf-cre; GNAQ Q209L; Bap1 (fl/+) mouse model generated by the Van Raamsdonk lab, we will use CRIPS-Cas9 to generate the following mice: M1/M2 double knockout, M1 KO, M2 KO, and M2 WT by orthotopically injecting sgRNAs at 2 weeks of age. After aging the mice to 20 weeks, we will compare the size and number of tumors in the eyes, liver, and lungs through dissection, to determine the role of M1 and M2 macrophages in UM metastasis. Since M1 inhibits cell proliferation and M2 promotes cell proliferation, it is expected to see the most tumors in mice with solely M2 macrophages, and the least in mice with solely M1 macrophages. A better understanding of the relationship between M1 and M2 tumor-associated macrophages (TAMs) will help in developing new treatments to lower the rate of UM metastasis.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Radiopharmaceuticals: New Cancer treatments

Presenter(s): *Tino Masvikeni*

Abstract:

Radiopharmaceuticals make use of various radiometals with specific decay characteristics used for cancer diagnosis and treatments based on specific tumor margins. For example, tumour size, density or whether the cancer has metastasized or not. Radiopharmaceuticals have a four-component approach: i) the radiometal with the specific decay characteristics ii) the bifunctional chelator which attaches to the radiometal for safe biological transport iii) the linker which connects the radioactive and targeting components and iv) the bioconjugate which makes sure the drug gets to and accumulates at the desired target.

Radiopharmaceuticals is a fairly new field of research in need of chelators well matched to radiometals. This research focuses on the development of the chelator, an organic molecule with specific characteristics matched to the radiometal. Additionally, the chelators must form chemically stable (do not react) and kinetically inert (are not easily substituted by other biological chelators) complexes with the radiometals. The potency of the chelators is measured by the ability of the chelator to attach to the desired metal at room temperature and the length of stability of the metal-chelator pair in human serum. Reported are four novel triaza-18-crown-6 chelators: TRIPA, TRIHOPO, TRIAMIDE and TRICA. The results of this research offer new and potentially more potent chelators for various radiometals including 225Ac, 227Th, 213Bi, 111In, 89Zr, 177Lu, 44Sc and 203/213Pb.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: What are the changes in common genetic markers due to differential EC treatment from racial disparity

Presenter(s): *Ria Bhatt, Ran Feng, Anisha Biswas, Aarya Gokhale*

Abstract:

In recent years more women are seeking treatment for endometrial cancer (EC) (Lee, 2021). Whetstone et al. (2022) reported that healthcare professionals have observed significant differential EC treatment as a result of racial disparities. There are known specific EC markers such as HER2 that are associated with high-risk cancer progression (Javadian et al., 2021). Treatment differences such as stress in surgical environments can alter the genetic markers expressed in EC tumors (Pedersen et al., 2018). We hypothesize significant alterations in genetic marker expression between racial groups are due to racial disparities experienced in the healthcare system and have cascading effects on other cancer progression markers (Urick & Bell, 2019). We will conduct a retrospective clinical chart review to assess ethnic differences in disease outcomes for women diagnosed with EC in British Columbia. We will conduct patient interviews to assess medical histories and demographics, in addition to sample collection for examining how medical treatments may alter the expression of EC genetic markers. We expect that there will be a change in genetic markers of marginalized groups due to environmental stressors caused by mistreatment in the healthcare environment.. These results will elucidate the implications of racial disparity on genetic markers to better understand how differential treatment can impact EC severity. Future research can target equal treatment for women throughout their treatment and beyond.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: British Columbia's Freezing Forests: Yellow-Cedar Frost Damage and the Impact of Climate Change in Owikeno Conservancy, BC.

Presenter(s): *Nolan Meier*

Abstract:

Since the little ice age ended around 1850, incremental health decline has been observed in stands of yellow-cedar (Callitropsis nootkatensis) at low elevations across much of its native range. As global temperatures rise, the threshold where winter precipitation turns from snow to rain has been gradually shifting to higher latitudes, and to higher elevations in mountainous regions. As this threshold moves, the resulting decrease in snowpack has left yellow-cedar unprotected from thaw-freeze cycles and the root-damage they induce. Snowpack-driven yellow-cedar decline has been observed at lower elevations, but due to the mechanism behind decline and the progression of climate change, it may advance into higher elevations that were previously unaffected. Our research question is: has yellow-cedar decline progressed into higher elevations along with the advance of warmer winter temperatures into higher elevations? We will test for relationships between yellow-cedar annual ring-widths and climate variables previously associated with decline. We will collect ring-width samples from 30 trees at 12 research plots placed along an elevation gradient between 200 and 800m in the Owikeno Conservancy near Rivers Inlet, BC (n = 12 sites x 30 trees = 360). We will compare mean winter temperature, number of thaw-freeze days, and total snowfall to the ring-width chronologies using Pearson's correlation coefficients and linear regression. We predict that there is a negative correlation between ring-widths and these variables, which are factors related to decline. Yellow-cedar decline, if indeed progressing into higher elevations, could put previously healthy stands of trees at risk of decline.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Are stressed-out calves predictable? Assessing the consistency of coping ability over time in dairy calves

Presenter(s): *Alex Aparicio*

Abstract:

Every year, approximately one million Canadian dairy cows give birth to a calf. The calves are separated immediately and reared by the farmer. Many standard calf management practices are stressful, potentially compromising calf health and welfare. While current research has primarily focused on the ability of calves to cope with a specific stressful event, little attention has focused on whether they are able to consistently cope when subjected to multiple stressors over time. This aim of this study was to determine whether the coping strategies of calves are consistent across time and context when subjected to three different stressors reflecting routine management practices during the pre-weaning, weaning and post-weaning periods. We looked at three common stressors: 1) disbudding that often occurs pre-weaning, 2) weaning off of milk, and 3) regrouping with unfamiliar individuals post-weaning. Measures were specific to each stressor: in the days following disbudding we measured changes in reward intake; during weaning we monitored changes in play behaviours; and finally, we monitored changes in time spent feeding during their first regrouping. We expected that calves showing a large decrease in reward intake after disbudding, would exhibit greater decreases in play behaviour during weaning and time spent feeding when regrouped. Calves that are able to adequately cope when subjected to multiple stressors, maybe more resilient and thus able to show improved coping skills when subjected to subsequent stressors later in life. This consistency overtime may allow farmers to identify early on which individuals will be most successful in their herd.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Applying the incessant ovulation theory to non-hormonal methods of ovarian cancer prevention

Presenter(s): *Gabrielle Chiu*

Abstract:

Background:

Ovarian cancer affects approximately 3100 Canadian individuals each year. With less than 50% expected to live five years past their diagnosis. The incessant ovulation theory hypothesizes that repeated minor trauma inflicted on the ovaries' surface epithelium during ovulation can potentially increase the risk of ovarian cancer. Research has shown that oral contraceptives can minimize this risk by up to 50%. However, oral contraceptives can have potential side effects, such as weight gain, acne, and mood changes.

Objective :

This study aims to investigate whether non-hormonal drugs that minimize or inhibit ovulation can reduce the risk of ovarian cancer, such as cyclooxygenase-2 (COX2) inhibitors. These inhibitors decrease follicular prostaglandin production, which is crucial in ovulation. Results of studies show that using COX2 inhibitors decreased ovulation rates while removing the side effects of oral contraceptives.

Study Design/Methodology:

We will conduct a prospective, longitudinal study to assess differences in potential ovarian cancer outcomes of people aged 18-50 years in BC with or without a genetic predisposition. The study will compare oral contraceptive users and daily COX2 inhibitor users. We will collect variables such as duration of use and outcomes like cancer diagnoses, pain, and bleeding. We will then run statistical tests on the various factors.

Anticipated Results:

Based on the incessant ovulation theory, we expect oral contraceptives and COX2 inhibitors to reduce ovarian cancer risk.

Implications:

This study aims to add to the body of literature centred on ovarian cancer prevention, proposing a strategy that does not have hormonal side effects.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Ovarian cancer risk with long-term use of gonadotropins fertility medication

Presenter(s): *Jolie Wu*

Abstract:

Background

1 in 78 women risk getting ovarian cancer during their lifetime. Long-term effects of fertility drugs remain poorly understood. Theories suggest uninterrupted ovulation and exposure to high gonadotropin levels induced by fertility medications could lead to increased ovarian cancer risk. Recent studies found no such relationship, except in long-term users who remained unpregnant after treatments. Emerging evidence suggests the prescription of human chorionic gonadotropin (hCG) increases ovarian cancer risk.

Objective

We aim to determine whether increased hCG levels after using fertility drugs increase ovarian cancer risk.

Methodology

This is a survey-based longitudinal study. Our cohort includes pre-menopausal adult women undergoing fertility treatments in Vancouver fertilization centers. Participants are given a validated survey once a year until they reach menopause that inquires about medication use, contraception use, any pregnancies, pain severity and bleeding. We will test hCG levels in participants' urine samples every two months, at 2 weeks after ovulation. Those who become pregnant are excluded from the treatment group and kept as a comparison group. We will control for confounding variables including contraception use, pregnancies, and breastfeeding duration.

Anticipated Results

We hypothesize that a higher percentage of participants who took more than 12 cycles of hCG treatments without getting pregnant develop ovarian cancer in their later life than those who do not undergo long-term treatment.

Conclusion

There are no long-term studies on the effect of hCG as fertility medications. It is important to understand the long-term effects of fertility treatments as they are commonly used by the general population.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Neuroinflammatory Response in Alzheimer Disease

Presenter(s): *Michelle Huang, Matilda San*

Abstract:

Alzheimer's disease (AD) is a progressive neurodegenerative disease characterized by the formation of plaques. Plaques are formed from the amyloid beta (Aβ) peptide accumulating in the extracellular space, which is one of the key hallmarks of AD. Here we focus on two immune cell types which were reported to respond to Aβ plaques: MHC class II expressing microglia and CD4+ T cells. Although previous studies have shown CD4+ T cells are positively stimulated by MHC class II microglia to create a stronger immune response, the mechanism of this interaction remains elusive. We generate iPSC-derived human 3D neurospheroids forming a multiple cell type culture system including microglia. Stimulation with Aβ leads to the formation of plaques and in preliminary experiments we found microglia to interact with Aβ. To model this process, CD4+ T-cells will be developed from iPSCs and introduced to the neurospheroids using two different pathways. We propose to use immunofluorescence staining and confocal microscopy to analyze microglia, T-cell and Aβ interaction using 3D reconstructions. Additionally, phagocytosis assays using flow cytometry will be used to investigate Aβ phagocytosis. We hypothesize the upregulation of MHC class II microglia which stimulate CD4+ T cells reducing the number of Aβ plaques. The expected results of this study will allow us to gain a better perspective on the intricate relationship between MHC class II microglia and CD4+ T cells in regard to the immune response against the accumulation of Aβ in a novel 3D human cell culture model.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: mRNA-LNP Enabled CAR Therapy for Distinct Immune Cell Populations

Presenter(s): *Ria Perencsik, Jeongan Kim, Nari Kim, Raquel Harte*

Abstract:

The most common cancer treatments used today are accompanied with many side effects and are less effective for treating cancers with high recurrence rates. Immuno-engineering with CAR (Chimeric Antigen Receptor) is a promising alternative to current/conventional cancer treatments. Genetic engineering of immune cells improves the ability to target desired cancer antigens by increasing immune cell engagement with cancer cells. The cost and rigor associated with manufacturing engineered cells ex vivo, however, can be discouraging. Programming cells in vivo using mRNA-lipid nanoparticles (mRNA-LNPs) thus offers a viable alternative. However, mRNA-LNP assisted CAR-immune cell therapies present several limitations such as endosomal escape, off-target effects, and costs that pose hurdles to increasing clinical efficacy and reducing patient side effects. Therefore, in this study, we describe practical considerations in optimization of mRNA-lipid nanoparticle components, and immune cell targeting, in order to increase clinical efficacy and safety of the emerging CAR-immune cell therapies.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Changes in Blood Brain Barrier Associated Proteins in Ischemic Stroke

Presenter(s): *Abdulaziz Tawfik*

Abstract:

Cerebral edema is a strong predictor of death and disability after an ischemic stroke. In the later stages of stroke, blood-brain barrier integrity is compromised, leading to vasogenic edema, which can cause an increase in intracranial pressure and brain herniation. Matrix metalloproteinase-9 has been implicated in the disruption of the blood-brain barrier via protein degradation. However, the specific effects of ischemic stroke on endothelial tight and adherens junctions, astrocytic endfeet, and the perivascular extracellular matrix have yet to be confirmed. Here, we use quantitative confocal imaging to show that matrix metalloproteinase-9 and zonula occludens-1 are significantly upregulated in the infarcted cortices of rats subjected to a 1-hour transient middle cerebral artery occlusion, a model for ischemic stroke. We also found that blood vessel morphology was disrupted in the infarcted sections, such that they were fragmented. In addition, there were no significant differences in the fluorescence intensities of claudin-5, agrin, alpha-dystroglycan and laminin in ischemic regions of the brain. Our results suggest that matrix metalloproteinase-9 and possibly zonula occludens-1 are key players in the events that occur after ischemic stroke. This study identifies these proteins as markers of the BBB breakdown in our ischemic stroke model and potentially as targets to prevent or reduce cerebral edema. Furthermore, matrix metalloproteinase-9 inhibition is a promising avenue of drug development in the improvement of patient outcome in clinical settings, and our study further justifies the need for increased research in this area.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Project Treehole Public Communication

Presenter(s): *Eman Dhanoya*

Abstract:

Overview: Project Treehole is a community science project being run in the Lower Mainland (ran Summer 2022) and several European cities, which recruits volunteers to install water-filled containers on their property to be collected in the summer. The goal is to understand how urbanization affects the biodiversity of insects that colonize these containers. We surveyed the urban environment, collected and identified the insects in the containers, and communicated with our volunteers - I lead my own analysis of the community science aspect of this project. Specifically, I interviewed volunteer participants to understand their motivation in becoming involved with the project, as well as to determine whether their expectations were met. This will allow me to propose improvements in the public communication of the project for future years.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Salmon at Large: Peptide Mass Fingerprinting of Archaeological Fauna at Prince Rupert Harbour

Presenter(s): *Pengpeng Chen, Jay Hilsden, Jennifer Zhu, Jenna Loupret*

Abstract:

Pacific Salmon are central to the cultures of North America's Northwest Coast. Salmon represent an important cultural, dietary, spiritual and financial resource, making them a cultural and ecological keystone species. At Prince Rupert Harbour (PRH), on the traditional and unceded territory of the Tsimshian people, salmon comprise the majority of faunal elements from archaeological sites, but the significance of salmon and the history of Tsimshian resource management is limited by the challenges of osteologically identifying salmon species. This project seeks to differentiate salmon species from PRH using Zooarchaeology by Mass Spectrometry (ZooMS), a fast and inexpensive method that does not rely on bone morphometrics. ZooMS is a minimally-invasive biomolecular method that determines the sample taxon based on differences in COL1 (collagen) amino acid sequences. A total of 94 samples were judgmentally selected from five historically significant village sites to test this technique, seeking an understanding of spatiotemporal variation. Our results were promising (of the samples tested, pink (n=62), chum (n=20), coho (n=5), and sockeye (n=4) salmon were identified), showing that ZooMS can be a revolutionary method for understanding Indigenous history from archaeology. Our results demonstrate the potential to utilize ZooMS to further cultural and ecological understandings of this region through a greater resolution of the salmon species in archaeological contexts. In combination with other methodologies, the robust data produced by ZooMS could enable interpretations of the salmon fishing practices, historical land and resource use, land tenure and stewardship, and ultimately contemporary cases of Tsimshianic legal rights.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Correlation Between Interleukin-17 and Gut Microbiome Dysbiosis in Severe and Moderate RSV Infection

Presenter(s): *Nima Shokoohmand, Tianne Kussat*

Abstract:

Respiratory syncytial virus (RSV) is a respiratory infection of the upper respiratory tract. It may lead to bronchiolitis and potential death in infants and immunocompromised adults. Respiratory infections have been linked to changes (dysbiosis) in gut microbial composition, yet how this occurs during RSV is poorly understood. In RSV, dysbiosis is correlated to cytokines produced by CD8 T+ cells. These microbiome changes accumulate as the infection progresses (thus, we expect severe and moderate infection microbiome compositions to differ). While the specific cytokines involved are unclear, research has shown a negative correlation between RSV severity and concentration of cytokine Interleukin-17 (IL-17). Therefore, we hypothesize that IL-17 is associated with gut microbiome changes (relative to healthy microbiome controls). We first inject 2 groups of mice with differing doses of A2-RSV strain to induce severe and moderate infection, and a third control group with saline. Fecal samples taken every 2 days post-infection will be used to compare the microbiomes of the 3 groups. We then inject half the mice from both infected groups with anti-IL-17 antibodies to neutralize any effect IL-17 may have on the microbiome. IL-17 activity in the other halves will remain unchanged. We expect to observe dysbiosis in infected mice relative to controls, along with microbiota differences in severe versus moderate infection — with partial reversal of dysbiosis in mice given aIL-17. This could expand the current understanding of the role IL-17 plays in the immune pathway against RSV, giving researchers insight into the infection, possibly aiding in vaccine development.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Post harvest analysis of three raspberry species to compare differentially expressed genes involved in freshness

Presenter(s): *Emily Frketich*

Abstract:

Raspberries are a widely consumed fruit that provide numerous health benefits such as high vitamin C content, antioxidants, and fiber. There are three common commercial raspberry species: Rubus idaeus L. (red raspberry), Rubus occidentalis L. (black raspberry), and Rubus ellipticus Sm. (golden Himalayan raspberry). These species retain their freshness differently during storage — some perform better and last longer on commercial shelves, but why this happens is unknown. We hypothesize that differences at the gene transcription level impact the ability of raspberry species to stay fresh after harvest. The proposed study examines the expression of genes of red, black, and golden Himalayan raspberries controlling for colour, sugar content, and acidity at time points during storage. RNA will be extracted from the fruit at the time of harvest, 4 days postharvest, 8 days postharvest, and 12 days postharvest. RNA sequencing and qRT-PCR will be performed to study differentially expressed genes across the three species at these time points. We expect to understand the expression pattern of our chosen genes and to identify the transcriptomic changes in raspberry fruit occurring postharvest. Outlining these changes for the three raspberry species will allow for comparison between them and provide insights as to why the different species retain their freshness for different time periods on shelves. Ultimately, results from this study will offer helpful information toward modification of genes to maintain freshness.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Is there an association between neighbourhood playability and early child development?

Presenter(s): *Abbi Yuniarto, Ravleen Gill, Sara Ndlovu-Fraser, Anushka Bellani, Flora Su*

Abstract:

Background

Past research has linked outdoor play with positive outcomes in childrens' well-being and physical, social, emotional, and behaviour development. However, the quality and availability of environments for outdoor play varies across urban neighbourhoods. Currently, there is little research directly linking neighbourhood playability and early childhood developmental outcomes. Our study will aim to address this research gap.

Methods

We will examine the association between neighbourhood playability using a previously developed metric for urban playability and child development outcome scores measured using the Early Years Development Instrument (EDI) survey. The playability metric assesses social and environmental factors. The EDI is a validated survey that assesses communication, physical, emotional, social, and cognitive development in young children. This investigation will be done on a population of kindergarten-aged children living in the Vancouver census metropolitan area.

Results

We find that in unadjusted models, there is no association between mean composite playscore and overall child developmental vulnerability. However, breaking down the results, we find that higher scores (indicating better quality) for natural environment, traffic environment, and spaces for play were associated with lower percentages of EDI vulnerability.

Conclusion

The relationship between the built environment and child development may be partly mediated by a child's engagement in play behaviour. The findings of this study can inform policy on urban neighbourhood design that supports healthy child development. As a result, clearer incentives can be provided for cost-effective investment of funds to enhance urban neighbourhood design.

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PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Substitution of Tailings in the Composite Matrix of Concrete to Improve its Material Properties

Presenter(s): *Ezekiel Camacho, Taimur Masood, Li Yen Cheng, Ava Wang, Geoffrey Zhou*

Abstract:

The mining and concrete industries face great challenges in the status quo. Waste materials generated from mining processes are stored in tailings pond facilities which pose health and environmental risks in the event of failure. The depletion of fine aggregates—a key component of concrete—raises long-term concerns, but its replacement with dry mine tailings can achieve a mutually beneficial solution. In this study, we test the effects of copper mine tailings on the mechanical properties of concrete. Fine aggregate in the conventional concrete mixture was partially substituted with 10%, 20%, 30%, and 40% tailings and samples were tested for compressive strength according to ASTM C39 specifications. Results from the initial tests showed that compressive strengths fell within the accepted range of standard strength concrete of 25-45 MPa with the maximum compressive strength being 43.3 MPa at 30% tailings and the minimum is 36.9 MPa at 40% tailings. While additional compressive strength tests are required to improve its accuracy, preliminary results reveal that tailings-based concrete can offer a sustainable alternative to conventional concrete by establishing a circular economy in the mining and concrete industries. Since mine tailings embedded in the concrete matrix were prevented from reacting spontaneously with natural elements, the risk of acid mine drainage and exposure of surrounding ecosystems are also mitigated.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Vitamin B-12 status of vegetarian or vegan pregnant women in Metro Vancouver compared to pregnant women on an omnivorous diet.

Presenter(s): *Jennifer Daniera, Leah Qiyue, Patrick MacNeill, Wing Cheong*

Abstract:

Vitamin B12 is an important nutrient found only in animal-source foods, because of this people on a plant-based diet are more likely to experience vitamin B12 deficiency. Vitamin B12 plays a role in preventing neural tube defects from occurring during the early stages of pregnancy. Thus, adequate intake of vitamin B12 during pregnancy is essential for preventing adverse neurological outcomes in the fetus. There is limited research on the vitamin B12 status of pregnant vegetarian or vegan women in Canada. According to our hypothesis, pregnant vegetarian or vegan women are more likely to be vitamin B12 deficient. We will conduct a longitudinal cohort study measuring vitamin B12 status of vegan, vegetarian and omnivorous pregnant women in Metro Vancouver. To assess vitamin B12 status, we will measure serum total vitamin B12, holotranscobalamin and methylmalonic acid, as well as plasma total homocysteine. The data will be collected at the start of each trimester and at the last week of pregnancy. We expect the omnivorous pregnant women group to have the highest vitamin B12 status indicated by higher serum total vitamin B12 and holotranscobalamin and lower methylmalonic acid and total homocysteine concentrations, while the vegan pregnant women group expected to have the lowest vitamin B12 status. Implications of this study include use for educational purposes to ensure women are aware if they are consuming adequate vitamin B12 in their diet, as well as providing clinicians with further knowledge, helping them decide when to recommend vitamin B12 supplements to pregnant patients.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Exotic Electronic Transport in Ultrapure Metal Oxides

Presenter(s): *Nathan Durand-Brousseau, Andrew Du*

Abstract:

The development of better conductors is one of the most significant research goals of current material and solid state physics. These could open the door to vastly more efficient energy transport systems, and applications in for example electronics and catalysis. It has recently been shown that ultrapure palladium cobaltate (PdCoO2) exhibits a new regime of electron transport in cryogenic conditions. Furthermore, this regime's presence and properties seem to be dictated by the orientation of the material's nearly hexagonal Fermi surface relative to the current flow.

This transport regime shows similarities to those found in known high-purity conductors, indicating the potential for the development of a better understanding of electron transport in general. However, a better model of this new directional ballistic transport regime is necessary for this. Further development of these new models will require more studies on different systems. Specifically, it is necessary to find materials that can be grown into very pure crystals of sufficient size, and whose Fermi surfaces are very nearly polyhedral. A literature review was conducted in order to identify materials that exhibit these properties. It was found that oxides of noble metals, especially the platinoids like platinium and rhenium, and p-group metal salts of f-block metals like EuGa4 are the most appropriate for such studies. These can be grown into very pure crystals, and often exhibit faceted Fermi surfaces. Cataloguing these materials will provide a reference for future researchers hoping to investigate exotic regimes of electron transport, including the directional ballistic and hydrodynamic regimes.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Can inhibiting EMT genes attenuate metastasis in uveal melanoma?

Presenter(s): *Michael Mok*

Abstract:

Metastasis is a process that rapidly spread primary tumor cells from an organ to another while EMT genes is a kind of genes that help with the transport process. With the absence of EMT genes, the speed of making cancer tumors lethal remains unknown. We hypothesize that inhibiting EMT genes can effectively help reduce the speed of growing a tumor cell. Cell line of a mouse with GNAQ and BAP1 will be used to first test the efficiency of inhibiting several specific types of EMT genes. Invasive assay is a technique that will be used to inhibit the specific kinds of EMT genes. Numbers of invasive cells will be counted before and after the experiment to determine efficiency of inhabitation process. Living mouse with metastasis will be then used to carry out the same experiment again. We expect to observe a significant decrease of invasive cells remain inside the mouse. This result may provide insights how metastasis can be affected with the absence of EMT genes. Future research may lead to pharmaceutical strategies decelerating metastasis in order to lower the lethalness of cancer.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Providing a picture of perception: How ethical consideration changes across digital and physical pictures of people

Presenter(s): *Salina Edwards*

Abstract:

Pictures of people contain diminished features from their depicted reality, representing abstractions of their real selves. Some pictures contain pictures within themselves, furthering this abstraction. We distinguish these abstractions with the assignment of levels: Level 1 abstractions (L1) refer to pictures of people within the environment, and pictures within pictures as Level 2 (L2). As the abstraction of a person increases (L1 to L2), mind perception decreases. This is known as the "Medusa Effect", referring to the mythical Gorgon whose image lacked the petrifying power of her gaze. Given that mind perception underpins ethical consideration, as the former decreases, so does the latter. While the Medusa Effect has been established using pictures in the digital medium, it has yet to be examined across physical pictures: a gap this experiment seeks to close. We hypothesize that digital pictures of people will be given higher ethical consideration than physical pictures. To compare these two mediums, we will measure mind perception of people in digital and physical pictures by asking participants to assign measures of agency, experience, and realness across L1 and L2 abstractions using two-alternative forced choice methodology (2AFC). We expect to find higher assignments of ethical consideration given to digital pictures compared to physical pictures. As access to online services continues to increase, especially following the COVID-19 pandemic, understanding the cognitive biases in ethical consideration across levels of abstraction is vital in domains such as administration of health services, photographic evidence in court trials, and academic presentations of pictures representing people.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Social Media "Friends" or Foes: How Gender, Website of Choice, and Time Spent Online Can Impact Cyberbullying Perpetration

Presenter(s): *Carling Bauer*

Abstract:

As we spend more time online, the incidence of negative digital interactions and cyberbullying may increase in tandem. Cyberbullying is unique because of the wider audience, its pervasive nature, anonymity, and lack of feedback from the victim. Despite growing concern over the rates and severe implications of cyberbullying, the potential factors that predict instances of cyberbullying remain unclear. Our research investigates how gender, website of choice, and time spent online can impact cyberbullying perpetration. We hypothesized that men, those who spend more time online, and websites that promote anonymity, would be linked with a higher incidence of cyberbullying perpetration. Data was collected online where participants (N = 1118; 73.8% women) responded to surveys regarding their social media usage and experiences with cyberbullying. A binary logistic regression supported our hypotheses and showed that being a man and spending more time online were associated with a higher likelihood of having engaged in cyberbullying perpetration. Contrary to our hypothesis, website of choice was not a significant predictor of cyberbullying perpetration. This research provides greater insight into the variables that influence cyberbullying to understand the conditions that could facilitate this online aggression. Therefore, this study can inform future cyberbullying interventions to ensure safer internet usage amongst vulnerable users.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Understanding the implications of redlining housing policies and their lasting impacts on college graduation rates

Presenter(s): *Luigi Vicencio, Jesse DeCoste, Sriya Regulapati, Juhi Grover*

Abstract:

In the 1930s, the U.S. Home Owners' Loan Corporation (HOLC) divided and classified neighbourhoods according to their inhabitants' perceived risk of mortgage default. These housing policies have now come to be known as "redlining" - the persistent racial and socioeconomic segregation they brought about has received much academic attention. This study will identify differences in local property values between cities with similar characteristics that were and were not redlined to determine if said differences had long-run effects on the college graduation rates of local residents. Previous work has tied home values to educational outcomes through local property tax revenue, a vital source of K-12 school funding in the U.S. Our empirical strategy builds on the regression discontinuity design implemented by Aaronson et al. (2020), comparing similar neighbourhoods in cities that were and were not affected by the HOLC's policies. The sample includes the 53 US cities that, in 1930, had a population close to the threshold defined by the HOLC as the minimum required population for redlining. We combine home price information with census data from the Opportunity Atlas to compare historical college graduation rates in cities within our sample. We expect to find lower college graduation rates in redlined neighbourhoods compared to similar areas in non-redlined cities. We hypothesize that these differences are attributable to reduced home prices, lower school funding, lower household wealth, and the overall segregation of redlined areas.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Optimizing a Mechanical Arterial Niche to Examine Blood Cell Emergence

Presenter(s): *Taia Yuen-Joaquin*

Abstract:

Blood cells originate from hematopoietic stem and progenitor cells (HSPCs). These HSPCs are therapeutically-valuable for pharmaceutical applications. To generate HSPCs in vitro, we must understand how they arise in vivo. HSPCs bud from hemogenic endothelial (HE) cells in the dorsal aorta during a process called the endothelial-to-hematopoietic transition (EHT). Current protocols for the EHT include culturing cells on flat plastic wells in EHT-inducing media conditions. This method does not consider the dynamic in vitro environment, so there is a need to explore the mechanical cues of the dorsal aorta. To investigate the impact of mechanical cues, I have developed a device that recreates the mechanical microenvironment during the EHT. Since the HE cells experience shear stress from blood flow, the device incorporates fluid flow with a pump to flow media over the cells. The cells are cultured on a thin polydimethylsiloxane (PDMS) membrane subject to a vacuum to create circumferential stretch to mimic the elasticity and curvature of the blood vessel . In fabrication of the device, PDMS was poured into 3D-printed molds created by stereolithography (SLA). All PDMS components of the device were then adhered together using plasma bonding. Once fabricated and connected to fluid flow and vacuum modulation, HE cells will be seeded on the membrane and exposed to shear stress and stretch. The output HPSCs will be evaluated for the type and yield of progeny cells produced. Better understanding of the EHT environment can aid in the creation of blood cells in vitro for pharmaceutical use.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: What's so special about the first time? Comparing the phenomenology of memories for first versus most recent sexual experiences and associations with current sexual well-being

Presenter(s): *Stephanie Chen*

Abstract:

Sexuality is integral to people's lives, with a person's first sexual experience—sexual debut—among the most salient. Indeed, sexual debut has been described as a pivotal event in individuals' lives, with significant implications for later sexual health and well-being. Despite the importance of sexual debut for people's lives, there has been no inquiry into how people remember this experience. Additionally, no work has examined how these memories shape later sexual outcomes. The proposed study aims to examine if first sexual experiences are indeed remembered differently than most recent sexual experiences. Specifically, three characteristics of phenomenology will be examined: emotional intensity, valence, and vividness. The secondary goal seeks to examine how these phenomenological dimensions relate to sexual well-being. We hypothesize that the memory of a first-time sexual experience will be associated with greater emotional intensity, valence, and vividness compared to the memory of a more recent sexual experience. Additionally, we predict that the phenomenological memory qualities of a person's first sexual experience will be associated with current sexual outcomes. More specifically, first sexual experiences that are remembered negatively will be associated with negative sexual well-being, and positively remembered sexual experiences will be associated with positive sexual well-being. The implications of such research may be useful in the development of interventions that target specific aspects of sexual debut memories in order to improve sexual well-being in adulthood.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Detection of early facial motor symptoms of neuropsychiatric disorders using Deepface technology

Presenter(s): *Chun Pang Wong, Chris Ren, Astrid Tam, Anna Malikovskaia*

Abstract:

Abnormal facial expressions can occur as early symptoms of neuropsychiatric diseases. Recognizing subtle changes in facial expressions solely by physicians can lead to biased and subjective results. Therefore, an objective, automatic face detection system is valuable for the early diagnosis of neuropsychiatric diseases. In this research, we aim to identify early symptoms of facial motor disorders through computer vision and machine learning (ML). Using images from open-source databases and Beijing Tiantan Hospital, 500 normal face images, and 60 abnormal images are randomly selected and labeled "normal" and "abnormal" accordingly. To analyze facial attribution and identify emotions, a face attribute detection model Deepface pre-trained with TensorFlow, a convolutional ML neural network-based framework is applied. The system identifies the emotion on the images and gives scores based on the degree of emotion expressions – emotion expression score (EES). The processed images and their EES are randomly assigned to the training group and the testing group with a ratio of 8:2. With the Python sklearn ML framework, the ML model is trained by a decision tree algorithm, using EES generated from training group images. With the trained ML model, any input facial image can be analyzed and predicted as "normal" or "abnormal", indicating the early onset of facial motor disorders. The validation of the ML model was conducted in the testing group with an accuracy rate of 95.5%. As a result, we show that our approach can be used to detect early neuropsychiatric disorders.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Investigating whether H3.3-induced metastasis is specific to breast cancer

Presenter(s): *Wendy Feng, Michael Geletu*

Abstract:

The repression of CAF-1 is caused by signalling from metastasis inducers and is one of many epigenetic mechanisms that could contribute to the spread of cancer. Epigenetic alterations impact gene expression through dynamic and reversible processes that do not change the DNA sequence of cells. They are associated with metastasis, the spread of cancer from the primary tumour, by enhancing cells' ability to adapt to new microenvironments in the body. Chromatin remodelling is a type of epigenetic regulation affecting the accessibility of genes for transcription through nucleosome activation and histone modification. When CAF-1, a protein responsible for starting nucleosome formation by depositing the histones H3 and H4 onto DNA, is repressed, the H3 histone variant H3.3 is incorporated into the nucleosome instead, which leads to breast cancer metastasis. Little is known as to whether H3.3-induced metastasis is specific to breast cancer or is a plausible pathway for metastasis in various cancers. To investigate this, data from the Cancer Dependency Map (DepMap) was used. DepMap consists of genomic, transcriptomic, and genetic dependency information for 500 pan-cancer cell lines. Analyzing these data is predicted to reveal that CAF-1 repression leads to H3.3-mediated metastasis across multiple cancer types. By revealing a possible connection between different metastatic cancers through regulatory components of epigenetics, more insight can be gained on treatments that could be effective against metastasis across multiple cancers.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: A Step Forward in Understanding Skin Cancer: Modelling Keratinocyte Stem Cell Proliferation Regulated by p63 and c-Myc Proteins

Presenter(s): *Kyle Palacios, Janet He, Hanson Sun, Qais Alsharif*

Abstract:

An exponential growth in stem cell research has occurred over previous years, but there is a need for understanding how stem cells function and communicate due to their versatility. In current literature, Cell-cell communication inference involves a deep understanding of cells and genes via single-cell RNA sequencing and the use of mathematical models to provide numbers that can potentially describe how cells communicate. By providing numbers to the concept of cell-cell communication, we can "infer" how a cell would communicate with other cells or with itself in a given biological system.

Within the world of gene-regulatory modeling, calculating the variance of input signals is a niche topic. Initially, it was decided that a collective effort would be made to model a gene regulatory network that would calculate the variance of noisy input signals. After further research, we discovered that this topic has already been explored but is open to contributions. While current models are an excellent representation of gene regulatory networks, they rely on theoretical interactions. This is due to the fact that there is not enough real-world data.

Since a rigorous model was made, it was decided that the pre-existing model would be used to explore the interactions between the p63 and c-Myc proteins in stem cell proliferation. Understanding the interactivity between these two is crucial in determining how stem cells proliferate. Furthermore, if the interactions are modeled, certain benchmarks can be made to control and influence stem cell differentiation.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: From Expertise to Uncertainty: Young Women's Responses to Therapeutic Content on Social Media

Presenter(s): *Emilia Heilakka*

Abstract:

Therapeutic culture has become pervasive on social media. Terms like "red flags," "trauma," or "narcissism" frequently surface on Instagram and TikTok, and in everyday conversations. Past research into therapeutic culture has focused on actors involved in therapeutic culture, either as active consumers or producers. However, therapeutic information is now widely available on social media in the form of short videos ("reels") and infographics that portray psychology in an easy-to-understand way. Thus, it reaches a wider audience that is not only limited to those who purchase self-help literature or other therapeutic services, and its implications are crucial for us to understand. This research investigates how young women who encounter therapeutic content on their social media pages respond to it. Drawing on eight semi-structured interviews with young women on a university campus, the article outlines three distinct and conflicting responses to therapeutic content: curiosity, resistance and overwhelm. These responses suggest that young women are not mere "dupes," as previous research into therapeutic culture has often implied, but instead they grapple with psychological information to a great extent. Despite being perceived as valuable, the negative views on therapeutic information suggest that therapeutic cultures' triumphant journey may have its limits.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Three Doses of Psilocybin vs Thirty doses of SSRIs

Presenter(s): *Osheen Dayal*

Abstract:

Depression is one of the most common and debilitating mental health disorders in the world. It can lead to self-harming behaviours, suicide ideation, suicide attempt, and death. Serotonin plays a pivotal role in maintaining good mental health, and serotonin deficit can lead to depression. In treatment of depression, SSRIs (Selective Serotonin Reuptake Inhibitors) may be prescribed to a patient along with therapy. Recent studies have also proven that Psilocybin, a 5-HT2A serotonin receptor agonist found in psychedelic mushrooms might be an alternative. There has been strong evidence of reduction in suicidal behaviour after just one dose of psilocybin. At the moment, there is a dire need for larger trials and longitudinal research in comparing the results of psilocybin and SSRIs. This study sheds light on the effects of psilocybin compared to SSRI-Prozac administered on depressed rats. It is expected to see that psilocybin will have better and long-lasting effects on treating depression than Prozac, along with synaptogenesis in the brain. One group of depressed rats will be given Prozac for 30 days and the second will receive three doses of psilocybin during the same 30 days, a third control group will get saline. Recovery from depression will be quantified by sucrose preference test in-vivo and coping in a forced swim test. Synaptogenesis in the prefrontal cortex and hippocampus in rats' brains will be investigated post-mortem via staining. These results will explicate that psilocybin may be a breakthrough treatment for depression and pave a strong argument for alternatives to SSRIs.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: The effects of various gene mutations in colorectal cancer on the prognosis of affected patients

Presenter(s): *Sania Solouki, Lucas Cannon, Bhupesh Jassal, Jesse Luyan*

Abstract:

Currently the 3rd most common cancer-related disease that accounts for almost a million deaths in 2020, colorectal cancer primarily affects the large intestine or also known as the colon. While general causes for cancers of this type are commonly known and listed as carcinogens, the exact changes to the genome which lead to the formation of a tumor have required extensive research. Through surveys conducted by multiple research groups, the possible genetic mutations leading to CRC formation were isolated into 3 major groups: chromosomal, microsatellite and epigenetic instability. Together these three types of mutations are the cause for 95% of CRC cases, with the remaining 5% stemming from heritable conditions such as Lynch syndrome. By gathering information regarding each of three main mutation types, we are able to compare and contrast their effects on colorectal cancer's prognosis. In addition to this, differentiating between CRC variations helps determine which gives the best or worst chances of recovery and what treatment would be most effective.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: (Not) meeting expectations? Comparing perceived responsibility for and frequency of White/European-Americans' Allyship

Presenter(s): *Andrea Camacho Garron*

Abstract:

Despite expectations for their allyship, White allies are perceived to be less willing to engage in racial issues (Brown & Ostrove, 2013). Our work directly compares perceptions of White/European-Americans' responsibility for versus frequency of allyship towards Black/African-Americans. In Study 1 (N = 237; CloudResearch), participants across identity groups perceived White agents as having a higher responsibility than Black agents for taking six forms of allyship (De Souza & Schmader, 2022). However, participants uniquely perceived White agents to take less action than they are responsible for. Recruiting (255) White/European Americans on CloudResearch, Study 2 investigates if specific barriers (above and beyond interest; i.e., self-efficacy, resources, social support, and backlash) explain lower perceptions of White/European-Americans' action frequency. We test several hypotheses regarding factors that could inhibit or motivate action, dependent on the form of action taken. This research seeks to elucidate why White/European Americans, even those interested in taking action, are not perceived to meet allyship expectations.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Wastewater-Based Surveillance of Infectious Diseases

Presenter(s): *Paniz Ataei, Finn McCord*

Abstract:

Due to the global reduction in clinical testing for SARS-CoV-2, wastewater-based epidemiology is an attractive alternative, providing crucial information for surveillance programs. Municipal wastewater samples provide a snapshot of the public's health at the community level, including the emergence and relative prevalence of COVID-19 variants of concern. Viruses are detectable, identifiable, and measurable by their genomic material found in wastewater, but the concentration and quality are often low. Therefore, the nucleic acids must be concentrated before effective genetic testing.

This study leveraged emerging nanoparticle technology (Nanotrap), offering the potential for easy handling, cost-effective and relatively equipment-free methods of viral concentration compared to current methods of polyethylene glycol (PEG) precipitation and Amicon Ultrafiltration. Raw samples were collected from Annacis Island Wastewater Treatment Plant, with genetic testing completed at BCCDC and UBC thereafter. After viral enrichment, downstream RT-qPCR testing and Oxford Nanopore long-read genome sequencing generated data to determine the concentration and quality of nucleic acids. It was found that PEG precipitation obtained the highest levels of concentration at 210 (±29) cp/mL, while Nanotrap 186 (±30) cp/mL and Amicon Ultrafiltration 179 (±29) cp/mL performed similarly. Furthermore, all methods obtained >99% SARS-CoV-2 genome coverage, indicating Nanotrap's ability to yield competitive RNA quality compared to current methods. Interestingly, Nanotrap did not increase mapping efficiencies and had greater variation between replicates contrary to expectations. Overall, Nanotrap concentrates viral genomes effectively for RT-qPCR detection and sequencing when compared with standard procedures, offering a potentially valuable alternative for testing in remote areas despite decreased mapping efficiencies.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Does Consciousness Matter?: A Novel Paradigm to Study Inattentional Blindness

Presenter(s): *Isha Verma*

Abstract:

While the Invisible Gorilla Experiment is established as it displayed the relationship between what is in one's visual field and perception and how it is based more on attention than was previously thought, little is known about its underlying concept, inattentional blindness (IB). Even then, most previous methods studying IB are not robust -- they can only be carried out once, and no within-subject data is possible. IB describes the effect of failing to perceive stimuli due to attention being directed elsewhere. This could result in altered perception when evaluated with conscious versus unconscious thought, namely, identifying explicit and implicit stimuli. This project will investigate whether certain cues can be consciously noted when presented simultaneously with an more "obvious" cue that could unconsciously prime responses. This study uses a novel within-subject paradigm that measures IB robustly. Participants are shown a series of trials consisting of a few components: a target symbol that stochastically appears in the middle of the screen with distractors flashing away from it. Participants then have to answer about whether or not they saw the target symbol and perform additional distracting tasks immediately after the trial, to further limit attention allocation. Through measuring response times, we want to identify the effects of cues directing our attention consciously versus unconsciously. Findings from this study will provide further insight into how unconscious perception can aid learning and suggest that consciousness is unnecessary for things that we have already learned, but is needed to learn and use new things.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Current treatments of osteoblastic suppression in multiple myeloma and their mechanism of action

Presenter(s): *Sophie Nguyen, Dennis Tanujaya, Nathan Lam*

Abstract:

Multiple Myeloma (MM) is a disease of monoclonal plasma cells accumulating in the bone marrow. MM is the most frequent cancer involving the skeletal system, and is currently incurable. Osteolytic bone lesions affect up to 80% of MM patients (Terpos et al., 2018). They occur as a result of an imbalance between osteoblasts (OB, bone formation) and osteoclasts (OC, bone resorption) activity. Multiple signaling pathways, cytokines and chemokines induce OC hyperactivity and suppress OB activity, creating an environment prone to bone demineralization that leads to bone lesions and fractures (Marino et. al., 2017). The molecular basis of OB suppression in MM patients is not fully understood and few treatments are available for MM bone disease, most of which target OCs. Through utilizing electronic databases such as PubMed and Google Scholar, we answer the question of whether there are current treatments targeting OB suppression in MM. This electronic research was conducted using keywords such as "MM osteoblast suppression", "bone marrow stromal cells", "bone repair in MM", and "MM bone marrow microenvironment". Multiple published articles were then specifically selected and analyzed. Bisphosphonates were repeatedly mentioned and thus identified to be the principal medical intervention targeting OB suppression. Their main mechanism of action works through down regulating RANKL, a transmembrane protein that can result in excessive bone resorption in MM bone disease. All interventions introduced, however are accompanied with severe side effects such as osteonecrosis of the jaw and renal impairment for bisphosphonates. Thus, further research should be done to establish additional treatments.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: What Bugs Bunnies: Investigating Rabbit Behaviour in an Animal Cafe Environment

Presenter(s): *Mabel Guo*

Abstract:

Despite being among the most popular companion animals, domesticated rabbits are commonly abandoned or relinquished to shelters and rescues in North America. To reduce rabbit welfare challenges and environmental degradation from overpopulation, rabbit rescue organizations trap, and sterilize feral rabbits. Rescues, shelters, and 'Rabbit Cafes,' also house rabbits to expose them to potential adopters while providing socialization opportunities. Understanding rabbit behaviour in these contexts is important given its significant role in assessing welfare and owner relinquishment.

This observational study investigates the daily behaviour (maintenance, social, and locomotive) of rabbits living in a cafe by creating and analyzing activity budgets. Group-housed rabbits (n = 41) were observed in a 3-month study conducted in a rabbit cafe setting. Behavioural observations were made tri-weekly from admittance until adoption or the end of data collection and involved two 4-minute samples per rabbit daily. Observations were recorded using a zero-one sampling method with 30-second intervals, and each rabbit's percentage of time dedicated to each behaviour was calculated. Environmental monitoring including ambient temperature and noise levels were recorded.

Pending results will include daily activity budgets of rabbits and the impact of rabbit cafÃ© variables (including sound levels and the number of people present) on rabbit behaviour. Activity budgets resembling those of wild rabbits could reflect positive welfare within cafe settings, while dissimilar budgets may identify aspects to ameliorate. Results will help inform understanding of normal rabbit activity and the variables impacting rabbit behaviour and welfare in cafÃ© settings.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Deep learning for optical character and handwriting recognition

Presenter(s): *Gagan Bhatia*

Abstract:

Handwriting recognition is one of the most active and challenging research areas in image processing and pattern recognition. Despite the advancements in OCR (Optical Character Recognition) systems for the Latin script, recognizing cursive writing in scripts defined by variations in writing styles, such as the Arabic script, has remained a challenge. This work presents a state-of-the-art solution for handwriting recognition using an encoder-decoder transformer-based model. The model is pre-trained on large datasets of text-based images and text and fine-tuned to improve recognition of handwritten text, especially scripts with variations in writing styles such as Arabic. Additionally, large language models with external n-gram statistical decoding are incorporated to improve accuracy by more than 10% on all datasets. Our approach is an efficient and accurate end-to-end solution that significantly contributes to handwriting recognition.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: The Effects of Cocaine as a Dopamine Booster on Depressed Animal Models

Presenter(s): *Chelsea Seaby Bruno, Srishti Rao, Olivia Shao, Jaiden Casapao*

Abstract:

Both depression and chronic cocaine use are widespread issues today that have significant impacts on behaviour and cognition. In terms of motivation, both seem to lead to a deficit in engaging in daily activities and social responsibility. Unlike depression, cocaine users maintain high motivation in cocaine-seeking behaviour. We are interested in the combined effects of chronic cocaine usage and depression, and our hypothesis is that cocaine exposure in depressed rodents will improve their dopamine deficit in cocaine-seeking behaviour. To test our hypothesis, rodents in this study are split into two groups, depressed/healthy. Within these two groups, they are randomly assigned to one of the three conditions, controlled (saline)/controlled reward(sugar water)/experimental(cocaine). For rodents in the depressed condition, we will adapt the Unpredictable Chronic Mild Stress Model (UCMS) to manipulate the dopamine deficit in rodents. After the exposure to UCMS, all rodents will be introduced to the motivational task, training, and test day. In training, rodents will get intravenous cocaine exposure for 14 days in an operant box (saline/sugar water for controlled) with 6hrs intermittent access. On test day, rodents are put back into the operant box, however, rodents are required to lever press in a progressive ratio with limited access to cocaine (0.1mg). Point of Maximum will be the indicator for motivation level. The proposed research is significant in order to further understand the interaction between cocaine addiction and major depressive disorder. The finding could influence future treatment methods, as understanding patients' motivation levels may affect future prescription and therapy decisions.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Application of embryonic stem cells in the recellularization of brain scaffolds

Presenter(s): *Alayne Mariano*

Abstract:

Background: Waitlists that extend for years, daily medication that suppresses the immune system, and an ever-expanding list of possible health risks; these are all desperate circumstances that those in line for an organ transplant must face. Enter organ generation, the possibility of engineering organs from a patient's stem cells resulting in organs that are biologically identical to their own. The method of recellularization specifically, holds promise as it involves donor organs being removed of their cells leaving behind a scaffold of the original organ. This method, therefore, eradicates the search for a match, aiding the organ shortage crisis and the need for post-transplant medication. The injected stem cells' ability to become any kind of cell within the scaffold results in a healthy organ identical to the patient's. The possible recellularization of the brain opens new avenues of effective treatment and diagnosis as well as further research on the impact of diseases like Alzheimer's, Parkinsons, and traumatic brain injury. The aim is to determine the possibility of producing a successfully recellularized brain to treat neurodegenerative disease.

Methodology: Donor brains are first decellularized by flushing a detergent through the main arteries, following a twenty-four-hour freezing and thawing process. The scaffold is then recellularized by directly injecting embryonic stem cells, which differentiate into functional neurons within the scaffold.

Impact: As a result, recellularization can therefore successfully generate functional patient-specific organs, leading toward the possibilities of appreciably effective treatment methods that are decreasingly abrasive on the patient.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: A proposed study investigating the effects of psilocybin on the 5HT2A receptor and Streptozotocin-induced cell death in the hippocampus.

Presenter(s): *Sabrina Wei*

Abstract:

Alzheimer's disease (AD) is a progressive neurological disorder caused by mass accumulation of proteins resulting in programmed cell death. The hippocampus is a key component of the memory system affected by AD, causing dementia. There is a surge of research around treating neurological disorders with psychedelics due to their strong affinity to hippocampal 5HT receptors as well as their neuroplasticity and neurogenesis abilities. Psilocybin, the main ingredient in "magic mushrooms", is an agonist that binds to the 5HT2A receptor. Prior studies have shown increased 5HT2A agonistic activity improving memory impairments and decreasing programmed cell death. Another study has shown psilocybin improving cognitive dysfunction in rat models of AD. There is a lack of research on the use of psilocybin as an agonist in these 5HT2A receptor activation studies. This study aims to determine the effect of psilocybin on the rate of programmed cell death in a rat model of AD induced by Streptozotocin. The rats are randomly divided into four groups of 12, with 6 of each sex. The groups are: control, placebo, AD model, and AD with a microdose of psilocybin (2 mg/kg). TUNEL staining is used to analyze the number of dead neuronal cells between groups. The results are expected to reflect a previous study using other 5HT hallucinogenic agonists, where decreased cell death was observed in AD rats. These results will demonstrate the ability of psilocybin to decrease hippocampal cell death, which provides insight into the future use of psychedelics for treatment of AD.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Localizing LAC11-mCherry in the Stems of lac11 Arabidopsis thaliana Mutant Plants

Presenter(s): *Fabrizio Chow*

Abstract:

Introduction

Lignin is an essential polymer of the secondary cell wall in vascular plants. However, lignin is not easily broken down posing a challenge to using plant biomass as a renewable energy source. Laccases (LAC) and peroxidases (PRX) are oxidative enzymes that play an essential role in lignin biosynthesis by radicalizing monolignols to polymerize into lignin. Previous studies have shown that both laccases and peroxidases have distinct distributions within the cell wall domain; however, previous attempts to localize LAC11 in the wildtype background have been unsuccessful. The inability to localize LAC11 is associated with high levels of LAC11 mRNA transcript leading to gene silencing.

Methods

To avoid the overexpression of LAC11 mRNA, this study used a lac11 mutant background. Lac11 mutant Arabidopsis thaliana plants were grown and genotyped with PCR to ensure they contained the T-DNA insertion. RT-qPCR was conducted to confirm the knockdown of LAC11. The ProLAC11::LAC11-mCherry construct was transformed into the lac11 mutants using a floral dipping method and plants were screened for transformants using a hygromycin resistance marker. The transformants were visualized using fluorescent microscopy to determine LAC11 localization.

Results

Early results demonstrate that LAC11 is localized to the secondary cell walls of both the xylem vessels elements and interfascicular fibers.

Conclusion

LAC11 is localized to the secondary cell walls of the xylem vessel elements and the interfascicular fibers. This work provides insight to help us better understand the mechanisms behind lignin formation and disposition based on the specificity and distribution of oxidative enzymes.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: The role of gay-straight alliances in mitigating harassment for Canadian and United States queer youth: a comparative analysis

Presenter(s): *Ariyana Dina, Ruier Yang*

Abstract:

Gay-straight alliances in subnational Canadian and United States regions have received mixed support from legislators, school authorities, and parents of Two Spirit, lesbian, gay, bisexual, transgender, and queer (2SLGBTQ+)youth. However, emerging research reveals that students in gay-straight alliances

experience more secure relationships, greater comfort with their gender or sexual orientation, higher self-worth, and less physical danger and social isolation.

As such, this research aims to understand how youth membership in Canadian and U.S. gay-straight alliances shapes 2SLGBTQ+ self-image and safety. Through semi-structured focus group interviews with 18-to-25-year-old participants from Canada and the U.S., we will gather information about the experiences of these participants, specifically concerning their exposure or lack thereof to high school gay-straight alliances. The narrative analysis will be used to interpret the participants' accounts of minoritization and the role of gay-straight alliances in their high school experiences. This enables us to understand how they make sense of their lived experiences and construct and communicate meaning through their narratives. By identifying patterns and themes in the participants' responses, we anticipate gaining valuable insights into the social context and outcomes of participation and exclusion from gay-straight alliances. The comparative nature of this study will allow for a cross-cultural examination of 2SLGBTQ+ youth experiences and uncover how cultural, political, and sociodemographic differences inform their perspectives. This research has the potential to direct policy and programming to foster safer environments for 2SLGBTQ+ youth, as well as support existing evidence concerning the value of gay-straight alliances in education settings.

Wave 4 | Poster Presentation

PONDEROSA BALLROOM **|** 3:45 PM – 5:00 PM

Title: Barriers to Accessing Food Support at UBC

Presenter(s): *Nicole Shew, Mahin Khan*

Abstract:

Food insecurity amongst post-secondary students is an ongoing issue that has serious implications on academic performance and well-being. Previous research has found that 42% of university students experience food insecurity. Although many universities offer support such as food pantries, the effectiveness of these initiatives to the larger student population is questionable, given that rates of food insecurity are still high. This may be, in part, due to barriers preventing students from accessing the support. However, limited research on this issue has been conducted. In particular, no study about this topic has been conducted at the University of British Columbia, where 40% of students face food insecurity. While food insecurity cannot be fully eliminated without addressing its root causes, such as socioeconomic status, it is possible to reduce the extent to which students face this issue with accessible and effective food assistance. This study will use a mixed-methods approach to survey UBC students on their experiences with food insecurity and accessing food support. Questions will focus on the degree of usage of campus resources, such as the food pantry or low-cost food cafes, and the barriers that prevent students from doing so. The results of this study are expected to be consistent with previous research, where stigma and shame are the largest factors preventing students from seeking assistance. Through discovering the barriers that prevent students from accessing available food support, we hope to contribute to the improvement of equitable food systems by easing access to food for all students.

WAVE 5
ORAL & POSTER PRESENTATIONS

WAVE 5 ORAL PRESENTATIONS

PONDEROSA COMMONS NORTH AND SWING SPACE

PCN 1009

Engineering and Directing Regulatory T cells to Treat Type 1 Diabetes	Evelyn Mitchell, Aaron Tieu, Sean Fox, Michael Collins, Yaseen Mandoub
Visualizing Conversations Between A Social Robot and A Child	Nathania Hendradjaja
Interleukin-1 Alpha and Transforming Growth Factor-Beta 1 Signal Interaction: Implication in Chronic Obstructive Pulmonary Disease	Sheena Jiang, Gargi Rao
Systematic Review For the Impacts of Marketing to Children Policy on Different Socio-Demographic Subgroups	Eunice Kong, Derek Tian, Marcella Li, Kseniia Voronkova

PCN 1011

An augmented reality (AR) application to solve difficult intravenous access.	Nicole Merritt, Kieble Sebnem Yildirim
Energy transition for space heating in Metro Vancouver buildings.	Saloha Aboud, Mankanwar Singh, Youssef Elhagrasy
Investigating the potential effects of cis-acting RNA-protecting elements on circular RNA stability and translation	Steve Wang
Bergmann's Rule: How to best measure body size in birds	Vera Parco, Son Rongbundit, Elena Yu, Abbas Blue
Was it a just punishment or were they just punishing? How children evaluate the morality of third-party authority figures who punish previous antisocial others	Hattie Zhang

SWING 105

Local to Global Principle for Higher Moments over Function Fields	Ying Qi Wen

SWNG 107

Ethical partnerships with transGender And Gender diverse communities for conducting pharmacoEpidemiologic research (EnGAGE)	Preet Kang
Sink or source? Tundra carbon fluxes in a high-Arctic polar oasis	Declan Taylor
Probing Broad Line Region Dynamics with Single-Epoch Line Profiles	Lucas Kuhn
Infrastructure Digitalization for a Decarbonized Built Environment	Wise Chen, Owen Hung, Ben Liu, Xudong Wang
The Role of Personality in COVID-19 Pandemic Health Behaviour	April Hwang

SWNG 109

Socioemotional Outcomes of One-Year Old Children Born During the Pandemic	Valerie Teng
The Age Filter: An Investigation into the Priorities for Personality Perception	Yukta Bhandari, Vaane Tewari
Pediatric Pain Prediction: A study to gather patient-reported outcome and experience measures to develop models for significant postoperative pain risk	Samantha Pang
The Regulation and Phenotypic Effects of miRNA-193a on Acute Myeloid Leukemia	Sharon Gao

PCN 1002

Ultrasound Screening for Infants at-risk of Developmental Hip Dysplasia in BC: Assessing Access-to-Care	Trevor Fowler
Implicit Cognition: Transliminality and Ideomotor Effects	Tiana Hoang
How Spiritual Experiences in Nature Affect Well-being and Environmental Behaviour	Anabelle McPherson
Structural and Diffusion Neuroimaging Findings after COVID-19 Infection: A Systematic Review	Lea Farah, Catie Song
RoundUp: Interactive Data Wrangling Across Multiple Tables	Sam Fraser

WAVE 5 POSTER PRESENTATIONS

PONDEROSA BALLROOM

Testing the effects of varying salinity levels on the growth rate of Tetraselmis suecica	Christopher Fischer-Labastida Beltrán
Individual variability in electric field distribution and the relation to clinical and demographic factors in patients with treatment-resistant depression treated with rTMS.	Sofia Cecic
Combat against Wilting Root Rot Complex; Possible New Weapon, Raspberry Bacterial Inoculation.	Natalie Westereng
Canadian dairy farmer perspectives on dairy cattle and calf welfare during the periparturient period	Amalia Urloiu
Diagnosis of Parkinson's disease through digitalized spiral drawing and machine learning	Alyssa Xiong, Sukhman Kang
Investigation of Purine Activation of CD8+ T Cell Triggering Ferroptosis in Cancerous Tumours	Madi Portas
Heterogeneity Analysis of The Effects of Inflation on Unemployment Rates in Different Industries	Simona Liu
Investigating the inhibition of PHD proteins as a potential therapeutic target for diabetic cardiomyopathy	Zach Ng, Max Lin, Nana Okraku-Yirenkyi
Developing a small molecule inhibitor targeting AR-V7 nuclear import to overcome theapeutic resistance in advanced prostate cancer	Aman Mohammed, Florin Lee, Miles Chapman, Indra Yavuukhulan
Classifying Phytoplankton by Size Classes and Pigment Groups using Extreme Gradient Boosting	Ahmed Rizk
How does Glutamate Receptor Agonist, LY35740, Affect Working Memory in a Rat Model with Schizophrenia?	Julia Wilson, Deeksha Yelamanchi
Investigating the link between language and perception: an examination into the effects of lexical term usage on color perception in Mandarin and English monolinguals	Jasmine Al-Shami, Munkhzaya Purevdorj, Suyuan Liu
Standardization of a Model to Investigate the Effects of Cuprizone and Immune Boost on Demyelination and T Cell Infiltration in Black 6 Mice	Audrey Golsteyn

Bubbleshooting: Troubleshooting and Enhancing the Microfluidics for Silicon Photonic Biosensors to Resolve Bubble Formation Issues	Elly Kim
Partial and Full N-terminus Truncation of Human P4-ATPase ATP8A2	Moloud Mazaheri Tehrani
Meadowing effects on bird community composition and diversity in urban spaces	Caroline Li, Alison Tucker
Quantifying the impacts of wildfire smoke on forest photosynthetic productivity in British Columbia	Pierre Rubia
Alternative Aridity Index for Dryland Expansion Prediction Model	Camilla Ren, Raunaq Nambiar
Optimizing and Monitoring the Growth and Extraction of Phaeodactylum Tricornutum for Biofuel Production	Devangana Mallik, Neha Bal, Keanna Yu, Bofan Chen
Associations between adverse childhood experiences, daily coping efficacy, and negative affect: A daily diary investigation	Olive Huang
CircPAN3 as a potential target for reversing drug resistance in AML	Ivan Zhang, Michelle Sutjitro, Lily Chen, Jolin Ren
Maternal Separation Exacerbates Stress Response to Social Isolation in Adulthood in rats	Vincy Huang, Megan Macfarlane, Asha Hui, Tessa McDermid
Urban Planning for Sustainability in Vancouver	Sania Julian
Exploring the role of histone SUMOylation in the DNA damage response Auditory Network Responses in Different Cognitive Tasks	Henry Li
Functional Assessment of the fMRI-derived Auditory Perception Network	Rita Jin
3D printer control system design	Jonathan Zhang, Lina Naleto, Rayyan Zaman
Openness buffers the impact of Belief in Conspiracy Theories on Covid-19 Vaccine Hesitancy: Evidence from a large, representative Italian sample	Tania Li
The Proteins that Fuel a Pandemic: How SARS-CoV-2â€™s Structure Sets It Apart from SARS-CoV and MERS-CoV	Asmita Jain
Enhancing Star Classification through Machine Learning Techniques and Recursive Feature Selection	Hanzhi Chen
Partnering with Patients with Living and Lived Experience of Eating Disorders to Improve Inpatient Care on an Acute Pediatric Medicine Unit	Rabiah Dhaliwal

Investigating the Influence of the Weekend Effect in Suspected Polytrauma Patients at a Level 1 Trauma Center	Waris Bhatia, Ali Zaidi
Splenic Ruptures: Imaging Features From a Level 1 Trauma Centre	Ali Zaidi, Waris Bhatia
Cold oxygen plasma treatment on blueberries: Effects on shelf-life extension and product quality	Caroline Mao, Erin Kim, Noel Wai
Age and sex difference in muscle fatiguability measuring exercise volume to failure of the isotonic contractions	Olivia Sun
How Do You Know Who's the Bad Guy? 4-Month-Olds' Neural Responses to Helping and Hindering Scenarios	Kaye Chan
Mental Health, Social Support and Resilience in Women Living With HIV (WLWH) During COVID-19	Sandy Hassoun
G20 Summits and Innovative Global Governance in a Changing World Order	Jessica Wang
The relationship between executive function and restricted/ repetitive behaviours & interests in children with Autism Spectrum Disorder	Laura Joyce
The spread of neurotoxic tau and its effect on hippocampal dendritic morphology and neurogenesis	Peyton Holder
Determining the impact of the polyphenol quercetin on primary human pancreatic islet cells insulin secretion and metabolic activity.	Katrina Jewell, Vivian Osiek, Yasmine Bellahcen, Brianna Tsuyuki
Investigating the effects of modulating the WNT signaling pathway in the production of T cell competent blood progenitor cells	Ellie Leung
How reliably can we predict phytoplankton population along the Northeast Pacific Ocean using genetic algorithm recurrent neural networks?	Wyatt Falcao
Do you know that I know what you know?	Shreya Kakachery
Small fruits aroma is strongly affected by agronomical, environmental, and postharvest practices	Denise Chew, Vania Kwan
Characterization of Daptomycin Use in the Leukemia Bone Marrow Transplantation, Intensive Care, and in Solid Organ Transplant Patients at Vancouver General Hospital (VGH)– A Quality Assurance Project	Alyssa Azote

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Engineering and Directing Regulatory T cells to Treat Type 1 Diabetes

Presenter(s): *Evelyn Mitchell, Aaron Tieu, Sean Fox, Michael Collins, Yaseen Mandoub*

Abstract:

Type 1 diabetes (T1D) is an autoimmune disorder in which your own immune cells attack pancreatic cells, preventing the secretion of insulin, causing hyperglycemia. Untreated, this disorder can prove fatal, and while daily insulin shots are functional treatments, they remain an enormous burden on the lives of patients. A possible cure involves using specialized immune cells, called regulatory T cells (Tregs), to protect insulin-producing pancreatic cells.

Tregs suppress immune responses that harm your own body. A method under investigation to treat T1D is to increase the suppressive capacity of Tregs so that they can prevent the autoimmune attack by T cells on pancreatic cells. T cell suppression by Tregs to protect against T1D is not well understood; this study will analyze where in the body Tregs suppress effectively and how we can engineer them to an optimal location.

We will monitor T1D in non-obese diabetic (NOD) mice which spontaneously develop the disease similarly to humans. We'll start with Treg suppression assays to determine which cells are targets of suppression. We will then traffic the Tregs to desired locations within the mice and assess the impact of engineered Tregs on T1D symptoms. Flow cytometric phenotyping and confocal microscopy will be used to confirm that Treg trafficking is working and that the autoreactive T Cells and the engineered Tregs are interacting.

With T1D becoming increasingly common and having significant negative impacts on patients' day-to-day life, our goal is to find potential cures to T1D by determining where Treg suppression should be targeted.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Visualizing Conversations Between A Social Robot and A Child

Presenter(s): *Nathania Hendradjaja*

Abstract:

Social robots are designed to emulate human-to-human interactions and can take on different forms, such as having a pair of eyes and/or a mouth to express simple and complex emotions. Research done in Human-Robot Interaction (HRI) focuses on how social robots can positively impact their users' lives. We are collaborating with the Honda Research Institute Japan to develop social robot applications for educational settings to help children learn independently. Since young children, a vulnerable population, are involved, it is important that we develop data transparency tools to carefully observe child-to-robot interaction. This project aims to automate the analyzing and visualizing of conversational data between child and robot as existing methods rely on manual work and can be laborious.Visualizing conversation patterns and characteristics, including sentiment, topics, and interaction frequency, between the child and robot, can offer insightful analytics and a heightened degree of data transparency, allowing the child's educators and parents to better support the child and inspect what conversations take place. We are exploring various data visualization techniques with a list of design requirements, such as identifying dialogue tags, showing positive or negative sentiment, representing the relationship between speakers, and providing context, to ensure that the visualization offers insightful information. We expect to observe that approaches including arc diagrams and flowcharts, complemented with additional interactive features, will offer improved data transparency. The resulting interactive visualization tool will then facilitate monitoring of child-to-robot interaction and allow its users to benefit from the information provided in the communication.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Interleukin-1 Alpha and Transforming Growth Factor-Beta 1 Signal Interaction: Implication in Chronic Obstructive Pulmonary Disease

Presenter(s): *Sheena Jiang, Gargi Rao*

Abstract:

Chronic Obstructive Pulmonary Disease (COPD) is an incurable lung disease, and the third-leading cause of death worldwide. COPD causes breathing obstruction resulting from chronic inflammation and airway thickening with scar tissue, through cells called fibroblasts. Two important cellular signalling (communication) molecules that regulate inflammation and scarring are Interleukin-1 Alpha (IL1A) and Transforming Growth Factor Beta-1 (TGFβ-1) respectively. These molecules control gene expression in fibroblasts, which determines cell behaviour, through small RNA molecules called miRNAs, such as miR-146a. Although the individual roles of IL-1A and TGFβ-1 in COPD are well-studied, their signal interaction is unknown. We hypothesize that imbalances in IL-1A and TGFβ-1 signal interactions disrupt the regulation of gene expression, thus causing airway inflammation and scarring in COPD. We mimicked COPD airway conditions by growing healthy human airway fibroblasts in-lab, then treating them with growth media (as control), 1 ng/ml IL-1A, 50 ng/ml TGFβ-1, and a combination of both. After 1 and 24 hours, miRNA produced by the fibroblasts was extracted for quantitative polymerase chain reaction, a technique which measures the relative amounts of DNA copies for miRNA, and therefore the miR-146a expression in the different treatments. miR-146a expression was significantly increased over time (1 and 24 hours) with IL-1A treatment compared to the control. IL-1A also inhibited TGFβ-1-induced miR-146a expression in human airway fibroblasts. This signal interaction may promote chronic inflammation and cause increased scarring, making miR-146a a possible therapeutic target in COPD.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Systematic Review For the Impacts of Marketing to Children Policy on Different Socio-Demographic Subgroups

Presenter(s): *Eunice Kong, Derek Tian, Marcella Li, Kseniia Voronkova*

Abstract:

Background: Evidence demonstrates that food marketing can impact children's choices, particularly affecting those of low socioeconomic positions (SEP) or racialized communities due to disproportional exposure to unhealthy advertising. Restrictions in food marketing contribute to reduced purchase of unhealthy goods by or on behalf of children, thus benefiting public health. However, little research has investigated the relationship between the difference in SEP and food marketing with a focus on the marketing to children policy (M2K).

Objective: The aim of this project is to examine probable impacts of the M2K implementation on low SEP subgroups compared to high SEP, and differentiate the features experienced by each group.

Methods: Five databases and grey literatures will be examined following the PRISMA guidelines. Using the terms "marketing to children policy", "food marketing", "price", "social-economic factors", the review observes independent studies and literature reviews published between 2015-2022. The inclusion criteria for the observed population are parents' education and family income. Based on the data, the work consequently gathers information about specific affected ethnic groups. The publications that satisfy the criteria will be chosen for further analysis. The degree of intervention, randomization, inclusion of reliable sources, and overall credibility of the studies will be evaluated.

Anticipated Results and Conclusion:

The findings from databases will be studied and linked to the development and utilization of M2K, further exploring the impacts of this food marketing strategy on children with high and low SEPs. This study can help policymakers and health professionals identify preferable components when implementing this policy.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: An augmented reality (AR) application to solve difficult intravenous access.

Presenter(s): *Nicole Merritt, Kieble Sebnem Yildirim,*

Abstract:

Difficult intravenous access (DIVA) is a prevalent healthcare issue that leads to repeated insertion attempts by healthcare staff and can 1) be uncomfortable and stressful for patients, 2) frustrating and time-consuming for healthcare professionals and 3) promote unnecessary wastage of single-use medical supplies. Access to a patient's veins is essential as it is necessary for maintaining fluid and electrolyte balance, administering critical medications, and preparing for medical imaging and surgeries. Unfortunately, existing vein-finding technologies face heavy user and technological limitations, and are extremely costly. The objectives of this research are a) to conduct a literature review on current vein-finding applications, evaluating the pros and cons of existing options, and b) to develop an innovative hands-free augmented reality (AR) system that allows healthcare professionals to better focus on the task at hand (IV starts). This proposed solution is backed by a machine learning (ML) system which improves vein detection efficiency through computer vision and infrared radiation (IR) depth detection technology to map the depth of the vein. The ML model will be informed by a wide collection of patient image data that will be collected in various Canadian Blood Services donation clinics. The completed ML algorithm will be integrated into smart glasses or a head-mounted display (ie. Microsoft Hololens) for a wearable design. Overall, through creating an innovative AR solution, this research work aims to assist the healthcare system in Canada reduce costs, unnecessary medical supply wastage, and negative patient experiences by providing a reliable solution for DIVA.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Energy transition for space heating in Metro Vancouver buildings.

Presenter(s): *Saloha Aboud, Mankanwar Singh, Youssef Elhagrasy*

Abstract:

To address the impact of climate change, Metro Vancouver aims to become carbon neutral by 2050 and reduce greenhouse gas emissions from buildings by 35% by 2030.. More than 90% of building emissions come from space and water heating. To address this, Metro Vancouver plans to transition buildings, particularly single-family houses, from natural gas furnaces to low-carbon energy systems such as electric heat pumps. This study aims to calculate the increased electricity demand due to this transition. In order to achieve this, historical ambient temperature data of Metro Vancouver will be used to calculate the coefficient of performance (COP) of the most effective heat pump for this climatic region. Open source building inventory data from Statistics Canada will be used to compute the building heating energy demand. Subsequently, the energy and power demand towards electric heat pumps will be computed and compared to the present scenario. The results of this study will help identify potential opportunities and challenges of transitioning natural gas furnaces to electric heat pumps, and inform policy decisions on achieving a low-carbon energy system. Furthermore, this study will provide insights on how Metro Vancouver can meet its goal of carbon neutrality by 2050 and reduce greenhouse gas emissions from buildings.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Investigating the potential effects of cis-acting RNA-protecting elements on circular RNA stability and translation

Presenter(s): *Steve Wang*

Abstract:

Recent advancements of RNA production, purification, and delivery have greatly broadened the application of RNA therapeutics, including several strategies for targeting endogenous protein synthesis and expressing recombinant proteins. Compared to conventional messenger RNA (mRNA), circular RNA (circRNA) are not subjected to standard mRNA degradation pathways due to lack of free ends. Thus, they are 2 - 5 times more stable, making them a promising class of novel RNA-based expression vectors for therapeutic applications, including vaccination. Despite these, circRNA remain susceptible to endonucleases, which cleave within circRNA and introduce free 5′ and 3′ ends. This subsequently leads to their degradation by mRNA-decay machinery and potentially limits their translation. Here, we aim to investigate whether incorporation of RNA-protecting elements, such as Zika virus (ZIKV) exonuclease-resistant RNA (xrRNA), could stabilize the nicked circRNA and increase their overall translation. To assess the translation of circRNA, we began by designing a Nano luciferase (NLuc) and enhanced green fluorescence protein (eGFP) dual reporter. RNA-protecting elements were then systematically incorporated into the upstream and downstream of the reporter. Finally, the entire construct was flanked by a split self-splicing intron that directs circularization of RNA. Our findings showed that circRNA was successfully enriched via selective degradation of uncircularized linear RNA. Furthermore, we observed strong translation of circRNA in mammalian cells. These findings established a platform for our ongoing high-throughput characterization of circRNA stability and translation. Our work provides a framework to identify the RNA-protecting elements that are critical to achieve prolonged protein expression for future RNA-based therapeutic applications.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Bergmann's Rule: How to best measure body size in birds

Presenter(s): *Vera Parco, Son Rongbundit, Elena Yu, Abbas Blue*

Abstract:

In 1847, Carl Bergmann postulated an ecogeographical rule describing how animals living at latitudes further from the equator tend to have larger body sizes due to thermoregulatory constraints. Bergmann's proposed rule has been observed in many species, however, few studies have been conducted about the application to migratory and nocturnal birds. Additionally, it is still unclear which morphological feature of birds is best predicted by latitude, hence, best represents Bergmann's rule. Apart from determining the best metric, this study also provides a framework for further research on how bird species respond to changes in environmental factors. In this study, we captured male Eastern whip-poor-wills, a species of migratory nocturnal birds, across their breeding grounds and measured for their body mass, wing chord (distance from the wrist joint to wing tip), and tail length. To understand if Eastern whip-poor-wills adhere to Bergmann's rule, we modeled the relationship between breeding latitude and three different metrics of body size, while controlling for age. The variation explained by each model was then compared to find the metric that tracks Bergmann's rule most closely. The results of the analysis show that in Eastern whip-poor-wills, all three variables follow Bergmanian patterns. However, mass proves to be the best metric for body size, showing the highest correlation with their breeding latitude.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Was it a just punishment or were they just punishing? How children evaluate the morality of third-party authority figures who punish previous antisocial others

Presenter(s): *Hattie Zhang*

Abstract:

Developmental psychologists have recently begun exploring children's reasoning in grey areas of morality. However, past research yielded mixed evidence regarding whether young children could make context-dependent sociomoral judgements. While some studies suggested that preschoolers would positively evaluate third-party punishers of previously antisocial individuals, others did not replicate this finding. Specifically, it has been shown that children dislike intentional harm, but will they condone intentional harm in the form of a deserved punishment, especially when done so by an authority? The current study explores whether preschoolers would justify the punishment of previously antisocial characters when done so by third-party authority figures. Three- and four-year-olds first watch a puppet show featuring a prosocial rabbit that helps a duck and an antisocial rabbit that hinders the same duck. Then, randomly choosing the prosocial or antisocial rabbit, the second puppet show entails the chosen rabbit asking for help. Next, an authority figure will refuse the request, hence punishing the rabbit. Another authority figure will agree to the request, helping the rabbit instead of enforcing punishment. The children then answer a series of questions about their sociomoral perceptions of the two authority figures. We hypothesize preschoolers to express that the third-party punishment was justified, given that it was done by an authority. The findings of our study would indicate whether children perceive the morality of punishment to be influenced by the social role/status of the punisher, ultimately informing parents and policymakers about the developmental process of context-specific moral reasoning.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Local to Global Principle for Higher Moments over Function Fields

Presenter(s): *Ying Qi Wen*

Abstract:

It is natural in mathematics to ask about the density of a subset of an underlying space. The notion of density can be formulated by the probability of picking an element in the space at random, and that element belongs to the subset. Local to global principle is a tool in mathematics that can be used to compute the density of select subsets. Local to global principle establishes that it is possible to take the subset and create counterparts in a series of spaces where the distance between elements are redefined, and in those spaces measuring density would be easier but equivalent to measuring density in the original space.

With some work, one can extend the notion of density to the notion of expectation and higher moments and extend the tool to compute them. Local to global principle higher moments has been established where the underlying space is the and number fields, which can be thought of rational numbers, but appended with limited number of irrational numbers. In our study, we extended the local to global principle for higher moments to function fields, which can be thought as a certain set of rational functions. We have done this by extracting and adapting the ideas from earlier works by Poonen, Micheli, Shraven, Tinani, and Weger. We then applied our theorem to compute the higher moments of subsets that are of interest in the mathematical world (coprime n-tuples, affine Eisenstein polynomials, and rectangular unimodular matrices).

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Ethical partnerships with transGender And Gender diverse communities for conducting pharmacoEpidemiologic research (EnGAGE)

Presenter(s): *Preet Kang*

Abstract:

The structural erasure of transgender and gender-diverse individuals from large Canadian datasets contributes to the considerable gap in transgender health knowledge, systematically failing to serve a population disproportionately affected by intersecting social marginalization and health inequities. There is inappropriate research data extraction from marginalized communities. Thus, it is important to engage in ethical and generative collaborative exchanges with the community. The current study's objective is to explore how to build a multi-disciplinary research capacity to engage with key stakeholder groups on pharmacoepidemiologic studies of medication adherence among transgender and gender-diverse populations. The two phases of this study involved qualitative interviews, with four groups of stakeholders including health researchers, healthcare providers, community organizations and individuals with lived experience. Our team seeks to gain insight from patients, clinicians, researchers, and community stakeholders on how to facilitate effective and ethical long-term participatory research collaborations in accordance with ethical guidelines and frameworks for conducting future transgender health research. After our ethics approval, we have scheduled 30+ interviews with our stakeholders in the month of March.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Sink or source? Tundra carbon fluxes in a high-Arctic polar oasis

Presenter(s): *Declan Taylor*

Abstract:

The Arctic is warming faster than predicted and faster than almost anywhere on the planet. Alexandra Fiord, NU is a high arctic coastal lowland and polar oasis warming by 1ºC per decade. Snowfall, snowmelt, and precipitation patterns are changing, and the summer active layer is deepening. Soil moisture regimes, and plant growing season length, greenness, composition, distribution, and phenology are all changing. These changes affect the flux of CO2 into/out of the tundra (net ecosystem exchange; NEE). Tundra regions may thus shift from a sink to a source of CO2 emissions with the changing climate.

To further understand this warming response, we are examining the effects of ambient and long-term experimental warming on tundra NEE. NEE is calculated by subtracting the rate of gross ecosystem photosynthesis (the "light" reaction) from ecosystem respiration (the "dark" reaction). NEE was measured in/out of passively warmed (1-3ºC) open-top warming chambers (N = 12) with an infrared gas analyzer. Plots were divided evenly across 3 sites representing different soil moisture regimes and plant community types and measured 3 times over the growing season. We are comparing 2022 data to 2008 and 2011 to look for long term trends.

Using linear mixed models, we will determine the effects of warming and interactions with factors such as soil moisture, plant community type, and greenness on NEE. Our initial hypothesis is that warming will promote increased uptake of CO2. We hope to comment on the effects of global warming on High Arctic tundra carbon sequestration.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Probing Broad Line Region Dynamics with Single-Epoch Line Profiles

Presenter(s): *Lucas Kuhn*

Abstract:

The broad-line region (BLR) of active galactic nuclei (AGN) can be used as an important probe of the mass of the central supermassive black hole (BH). Recent GRAVITY observations are able to spatially resolve the BLR and measure the BH mass by modeling the differential phase and the broad-line profile. Combining GRAVITY angular size measurements of the BLR with time lag observations from reverberation mapping (RM) studies, which can be used to determine the BLR physical size, one can constrain the geometric distance of the AGN, thus providing a promising cosmological probe of the universe from low to intermediate redshift's. However, these two techniques are often based on the measurements of different broad lines which creates complications as RM measurements show tentative evidence that the BLR sizes differ between different line profiles. In this work, we investigate the profiles of four broad emission lines of NGC 3783 concurrently measured by X-SHOOTER in ultra-violet, optical, and near-infrared. Once fixing the BH mass, we can constrain the BLR structure by fitting the line profiles simultaneously with the dynamical model. We find the different asymmetry of independent line profiles can be explained by the same BLR geometry with different radial distributions of line emission. In addition, we determine that several physical parameters such as the inclination angle, BLR radius, and virial factor can be well constrained. We find the BLR radii of H-alpha and H-gamma to be similar, measuring to be about 1.5 times larger than those of H-beta and Pa-beta.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Infrastructure Digitalization for a Decarbonized Built Environment

Presenter(s): *Wise Chen, Owen Hung, Ben Liu, Xudong Wang*

Abstract:

The world has seen a joint effort from different institutions and agencies to work to meet Candian 2050 sustainability goals. We have been developing new technologies, adopting new policies and improving systems. However, the scale of the climate emergency we are living through demands that we act with even greater urgency. Reliable construction and infrastructure lifecycle management method is an intrinsic part of future developments that may need to replace most current practices. London Forge project and the Maggie's Centre at York are quintessential examples reflecting Building Information Modelling (a process supported by various tools, technologies and contracts the generation) construction's necessity and importance. Our aim is to raise the idea of using cost-efficient and sustainable pre-construction methodologies to reduce construction risks while also expediting the process and diminishing the costs. Our research responds to the query "How can we improve current lifecycle management methods through digitalization technologies such as BIM?" We hypothesize that the construction teams are familiar with different BIM-related software during an early stage, and using them to build a strong collaboration for construction may be an option. The data are collected from present projects and combined with state-of-the-art of projects. It was found that there is a positive correlation between the use of BIM and increased construction speed and performance. The possibility of aspects such as time management, cost management, carbon reduction, etc. are briefly discussed, followed by further suggestions for future research.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Socioemotional Outcomes of One-Year Old Children Born During the Pandemic

Presenter(s): *Valerie Teng*

Abstract:

The COVID-19 pandemic led to restrictions and changes to everyday life. Few studies have explored how exposure to pandemic stressors influenced child socioemotional outcomes. Therefore, the present study examined if objective COVID-19 stressors experienced in pregnancy were related to later child socioemotional outcomes. During the pandemic, pregnant participants completed surveys assessing demographic information and stress linked to the pandemic using the Pandemic Objective Hardship Scale (POHI). At one year postpartum, participants (n=3,268) completed a measure of infant socioemotional outcomes (ASQ:SE-2), where higher scores indicate more socioemotional problems. Linear regression analysis showed that higher total scores on POHI in pregnancy were associated with higher ASQ:SE-2 scores on one-year-old infants ($F(1, 3266)=18.87$, $p<.001$, $R2=.01$, $B=.10$). The finding persisted after adjusting for covariates (parent age, household income, education, parental race/ethnicity, pre-pregnancy BMI, gestational age at recruitment, and gestational age at birth; $F(8, 3259)=9.624$, $p<.001$, $R2=.02$, $B=.05$). Higher objective pandemic stressors experienced in pregnancy were linked to infants having greater socioemotional problems at one-year. Implementation of timely interventions are necessary to assist children's socioemotional development during critical periods.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: The Age Filter: An Investigation into the Priorities for Personality Perception

Presenter(s): *Yukta Bhandari, Vaane Tewari*

Abstract:

Previous psychological research shows that when people seek information about another

person, they prioritize information about that person's honesty and interpersonal warmth. In those studies, the target persons were typically young adults. Do people prioritize obtaining the same—or different—information about elderly adults? No prior research has systematically addressed this question. We conducted an experiment in which participants (N = 205) imagined that they would soon encounter another person and then rated their interest in obtaining information about 16 different characteristics of that person (including personality traits, attitudes, and physical characteristics of various kinds). The age of the target persons was experimentally manipulated: They were either young adults (35 years old) or elderly adults (85 years old). Results showed substantial similarities across the two conditions (e.g., information about honesty and warmth was highly prioritized in both conditions; information was physical characteristics were generally rated to be a low priority), but there were some differences too. For example, information about honesty was especially highly prioritized when seeking information about young adults ($p = .002$); in contrast, information about health and physical strength was more highly prioritized when seeking information about elderly adults ($p's < .001$). These findings provide insights into the extent to which people's perception processes are influenced by the age of the person they are perceiving. They suggest that although there are some differences in the types of information people prioritize when seeking information, there are also similarities, adding to our understanding of what information they prioritize when seeking to understand them.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Pediatric Pain Prediction: A study to gather patient-reported outcome and experience measures to develop models for significant postoperative pain risk

Presenter(s): *Samantha Pang*

Abstract:

Approximately one in five children experience persistent postoperative pain for up to 12 months after surgery, which can be associated with undesired consequences, including poor quality of life, decreased trust in the healthcare system, increased opioid use, and additional use of healthcare resources such as emergency room visits. By identifying potential factors that may increase postoperative pain risk, preventative measures may be implemented to improve pain management. This study aims to develop a risk prediction tool to identify children at risk of significant postoperative pain. We will recruit 300 parents of children under 12 years and 100 adolescents undergoing anesthesia for surgery, as well as their parents, who will complete pre-and postoperative surveys augmented with data from the electronic medical record. Pre-operative surveys capture parents' and patients' demographics, mental health, and other risk factors. Postoperative surveys periodically assess the patients' recovery for up to 90 days, capturing pain levels and satisfaction with recovery. Of 145 initial participants, patients are median (interquartile range) 5 (2-10) years old, undergoing procedures lasting 50 (30-105) minutes; 120/145 (83%) were day-case procedures. 97 participants indicated that their child is fully recovered. The 97 patients fully recovered in 7 (3-15) days and 87 (90%) of those who recovered were day-case procedures. Data will be used in risk modelling to predict risk factors for significant postoperative pain, which will be integrated into a risk communication tool to create personalized interventions for preoperative use in a future study.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: The Regulation and Phenotypic Effects of miRNA-193a on Acute Myeloid Leukemia

Presenter(s): *Sharon Gao*

Abstract:

Acute myeloid leukemia (AML) is a blood cancer that begins in the bone marrow, where blood cells are produced. The disease interferes with the production of white blood cells, making them immature and malfunctional. With a 5-year survival rate of 21%, AML is a complex and deadly disease with no effective cure. However, recent research has shown that microRNAs (miRNA) may have therapeutic effects in treating AML. miRNAs are extremely small RNA molecules that regulate gene expression. They have been identified to play roles in normal and malignant processes, although the specific regulation mechanisms are unclear. One miRNA in particular, miRNA-193a (miR-193a), has been found to have anti-cancerous potentials and is found at low expression levels in AML patients with mutations in the Wilms Tumour 1 (WT1) gene. This study aims to understand the regulatory mechanisms and effects of miR-193a on AML in hopes of harnessing its therapeutic potential.

Analyses of DNA regions surrounding the miR-193a gene showed that WT1 is likely a transcription factor for miR-193a. To study this, we overexpressed WT1 wild-type and mutated genes in human AML cell lines using lentivirus, and results showed increased levels of miR-193a in the wild-type compared to controls. By overexpressing miR-193a in human AML cell lines using lentivirus, results also showed slower cell proliferation, decreased cell viability, and increased cell death compared to controls. This data suggests that miR-193a is regulated by WT1 and plays a tumour-suppressive role in AML, supporting its potential use in future miRNA-based therapies for AML.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Ultrasound Screening for Infants at-risk of Developmental Hip Dysplasia in BC: Assessing Access-to-Care

Presenter(s): *Trevor Fowler*

Abstract:

Developmental dysplasia of the hip (DDH) is a pediatric hip condition affecting 1 in 1000 newborns. Characterized by the presence of an abnormally developed hip socket(s), DDH progression can usually be reversed with minimal intervention if diagnosed early. Missed cases can lead to severe orthopaedic conditions requiring invasive procedures to address. Currently, infants province-wide are being referred to BC Children's hospital for an ultrasound scan (US) and further clinical care related to DDH. This Quality Assurance/Quality Improvement project aims to provide baseline data critical to understanding the landscape of DDH care in BC.

We will assess: 1) Average age of infant at first US; 2) Risk factors/physical findings among infants referred for an US; 3) Distance travelled by patient families for DDH care at BCCH. Included are all children less than a year old who received an US at BCCH in 2020 and 2021. Select preliminary summary statistics are presented.

To-date, a total of 1518 patient records have been abstracted across years 2020-2021. 32% of infants resides in a health authority other than Vancouver Coastal. Median age at first US was 7.3 weeks (Range: 0.5-33.4 weeks). Top indications for US referral were breech position (65.7%), a hip click (14.5%), and firstborn status (10.1%).

Preliminary results suggest some infants are receiving US screening for DDH beyond the recommended age range (4-8 weeks) and indications for US referrals match known DDH risk factors. Completion of data abstraction will allow for a thorough assessment of travel distances for DDH care in BC.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Implicit Cognition: Transliminality and Ideomotor Effects

Presenter(s): *Tiana Hoang*

Abstract:

The goal of this project is to test if a device like a Ouija board based on the use of the ideomotor effect could surpass explicit cognition and access / study implicit cognition. The Ouija board is a divination technique used to find answers to questions. Such movements can be explained by ideomotor effects, which is the focus of this study. Differences are compared between conscious (studied during the control) and unconscious knowledge (studied during the experimental) by comparing answers to questions by participants that are measured for accuracy. I specifically focus on the transliminality scale, referring to the sensitivity individuals have to subtle stimuli related to mystical ideation, magical experience, etc. I hypothesize that participants with a higher transliminality rating will demonstrate a higher accuracy rate during the Ouija phase (experimental) than the verbal phase (control).

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: How Spiritual Experiences in Nature Affect Well-being and Environmental Behaviour

Presenter(s): *Anabelle McPherson*

Abstract:

Spiritual connections to nature, or ecospiritual experiences, are ubiquitous and associated with a variety of positive outcomes. These experiences can benefit individuals by increasing their well-being and can benefit the environment by increasing people's level of environmental concern. Research aimed at improving mental and environmental health has grown in recent years, yet both are continuing to degrade around the world. Previous studies have found correlations between ecospirituality and both well-being and environmental behaviour, yet despite this promising evidence of a relationship, no experimental studies have looked at whether ecospirituality plays a causal role. To investigate this possibility, the present study will use a photo-taking task to induce a spiritual perspective of nature in participants in order to understand its causal effects on personal well-being and environmental concern. By comparing this spiritual view of nature to both a non-spiritual perspective of nature and a spiritual perspective of a human-built environment, we attempt to tease apart the independent effects of ecospirituality, general spirituality, and positive "non-spiritual" experiences in nature. We predict that a spiritual view of nature will lead to higher well-being and environmental behaviour scores compared to either general spirituality or exposure to nature alone, indicating an independent impact of ecospirituality on well-being and environmental behaviour. If true, this would highlight another reason to preserve the environment and could increase focus on spiritual experiences in nature as an avenue to personal well-being.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: Structural and Diffusion Neuroimaging Findings after COVID-19 Infection: A Systematic Review

Presenter(s): *Lea Farah, Catie Song*

Abstract:

Background: SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) has been primarily described as a respiratory illness. However recent research demonstrated neurological manifestation of the disease including olfactory disturbance, headaches, and cognitive difficulties. Emerging studies on recovered COVID-19 patients suggest structural alterations in the brain following SARS-CoV-2 infection.

Methods: We conducted a systematic review of studies published on PubMed before 27 September 2022 to examine structural and diffusion-weighted neuroimaging findings following COVID-19 diagnosis and COVID-19 associated olfactory dysfunction. Inclusion criteria were confirmation of COVID-19 infection; statistical comparison to non-COVID-19 control group; more than 5 COVID-19 participants in the sample; and quantitative Magnetic Resonance Imaging (MRI) or diffusion-weighted imaging obtained at least 6 weeks after infection. Case studies, post-mortem analyses, and qualitative MRI findings were excluded. In total 16 studies met the criteria and were included in the review.

Results: Result synthesis is underway and will be completed prior to the conference. Findings will be discussed with reference to the timing of the neuroimaging after COVID-19 infection and will be further subgrouped based on volumetric results, diffusion results, and studies examining olfactory dysfunction.

Significance: Examining the neurological sequelae of COVID-19 is crucial for understanding the pathology of the disease, studying the long-term effects of the illness, and evaluating treatment options for neurological symptoms.

Wave 5 | Oral Presentation

PONDEROSA COMMONS NORTH AND SWING SPACE **|** 5:15 PM – 6:30 PM

Title: RoundUp: Interactive Data Wrangling Across Multiple Tables

Presenter(s): *Sam Fraser*

Abstract:

Data wrangling is the iterative, human-in-the-loop process of making raw data usable for analysis. People who do not consider themselves programmers, such as data journalists, analysts, and data scientists, are able to discover insights from data with the assistance of interactive visual tools for data wrangling. Current open-source interactive applications for data wrangling lack support for multi-table transformations; that is, splitting and combining data from multiple sources. We present RoundUp, an interactive web application to support multi-table data wrangling. RoundUp aims to democratize data science across disciplines by enabling non-programmers to combine and analyze data from multiple sources with multi-table transformations. RoundUp is built on the open-source data wrangling platform OpenRefine (formerly known as Google Refine), and it will be made open source upon release.

By integrating research from the fields of data visualization and human-computer interaction, my directed studies project leverages algorithms and intuitive design principles to empower greater data analysis across disciplines. The project explores how to design signifiers for possible user interactions when subtle differences in actions can have dramatic impacts on the resulting data, and how our instantiated multi-table framework compares to existing transformation grammars in programming languages such as JavaScript and R. My work to date has focused on understanding the current capabilities of OpenRefine with respect to our design goals and making initial architectural choices for RoundUp's design. I work to develop the base operations that will set the foundation for RoundUp's core back-end functionality.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Testing the effects of varying salinity levels on the growth rate of Tetraselmis suecica

Presenter(s): *Christopher Fischer-Labastida Beltrán*

Abstract:

Salinity is the concentration of salts in water, and it is not homogenous throughout the oceans. For example, the Mediterranean Sea is more saline due to being closed off from the rest of the ocean and high rates of evaporation, whereas the North Pacific is less saline. As the ocean salinity is changing in response to climate change, more phytoplankton species will struggle to survive, thus impacting their growth rates. Phytoplankton survival is important for their ability to photosynthesize, ultimately providing every second breath of the oxygen we breath while only comprising 1% biomass. Not only do phytoplankton provide half of our oxygen, but they also help the oceans sequester carbon through the biological pump, and undergo primary production. Overall, I tested the effects of varying salinity levels on the growth rate of the prominent green algal species, Tetraselmis suecica.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Individual variability in electric field distribution and the relation to clinical and demographic factors in patients with treatment-resistant depression treated with rTMS.

Presenter(s): *Sofia Cecic*

Abstract:

Transcranial Magnetic Stimulation (TMS) is a non-invasive neurostimulation therapy indicated for numerous neuropsychiatric disorders, including treatment-resistant depression (TRD). Individual differences in anatomy result in variance in the induced electric field (EF) when applying a standard stimulation intensity to healthy subjects using a H-coil for deep-TMS (Tzirini et al.,2022). The relationship between induced EF and variables specific to patients with TRD treated with a figure-eight coil is unclear. This study aims to quantify the rTMS-induced EF in individuals treated with high-frequency rTMS and investigate the relationship between, EF and clinical/demographic factors. The sample consists of 60 subjects from the THREE-D clinical trial, randomized to daily high-frequency rTMS to the left-DLPFC for 4-6 weeks (Blumberger et al.,2018). SimNIBS4.0 was used to simulate the rTMS-induced EF in subject head models, created with T1 and T2-weighted anatomical scans collected at baseline. The simulation was targeted to [-38,44,26] in MNI space, and a constant stimulation intensity was used. The EF intensity and stimulated volume had a mean of 90.3±8.5 V/m and 5.4±1.0 cm3 respectively. Sex and age were both significantly correlated to stimulated volume ($p<0.04$). Change in depressive symptoms, ATHF score as well as AD and BZD dosage were not associated with any EF variables ($p>0.08$). Significant differences in rTMS-induced EF distribution exist due to inter-subject anatomical variances. The results further suggest that clinical factors specific to patients with TRD treated with rTMS might not impact EF distribution.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Combat against Wilting Root Rot Complex; Possible New Weapon, Raspberry Bacterial Inoculation.

Presenter(s): *Nat Westereng*

Abstract:

Red raspberry (Rubus idaeus L.) farms across the world experience complications and losses because of the root rot wilting complex (RRWC). The cause of the RRWC has been identified in the literature as multiple different species in the Phytophthoras genus. Bacterial inoculation has been proposed to help cope with RRWC and to aid the growth of raspberries. We hypothesize that the use of bacterial inoculation will aid the raspberry plants to be more resilient against Phytophthora spp. and produce higher yields than raspberry plants that don't receive the inoculation against Phytophthora spp. This is because the inoculated bacteria are beneficial to the raspberry and creates a hostile environment for Phytophthora spp. proliferation. To assess this hypothesis, there will be two scenarios. In the first scenario, bacterial inoculation will be applied to roots prior planting in Phytophthora spp. infected soil. In the second scenario, bacterial inoculation will first be applied to the roots and after 48 hours roots will be inoculated with Phytophthora spp. This will allow to determine if the timing of inoculation produces significant differences in the growth and yield of raspberry. If the bacterial inoculation proves effective against Phytophthora spp., this will help define more environmentally friendly approaches to manage Phytophthora spp. infections and RRWC.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Access to Mental Health Services

Presenter(s): *Lurit Lodo, Mahekaan Dost, Taya Lee, Ife Omelu*

Abstract:

Access to mental health services is a public health concern and the aim of this paper This evaluation study will evaluate the efficiency of the pilot e-mental health services in addressing barriers to access mental health services and patient experiences. The evaluation of the project implementation was administered in BC, Ontario and Alberta. We assessed the pilot projects through patient experience surveys, and interviewing stakeholders' project implementation experience. The quantitative results from our study showed that the percentage of patients using e-mental health (80%) were higher than in-person appointments (50%). We did a linear regression model to estimate the effect of e-mental health services ability to improve access adjusting for age, gender, socioeconomic status. We found that e-mental health services showed a statistically significant improvement in access to mental health services compared to in-person appointments. Through an analysis of mixed methods, the benefits of e-mental health services were evident. Using the findings from the patients survey and stakeholder interview, we have proposed a comprehensive province specific implementation strategy to scale up the e-mental health program. Patients' satisfaction with e-mental health was highlighted in their rebooking of follow-up appointments which was greater than in-person appointments. The advantages of e-mental health include 24/7 access to resources, affordability, and reduces barriers and stigma by granting patients the liberty to choose services catered to their needs. Areas of improvement discovered through patient surveys and stakeholder interviews highlighted gaps in usability of internet-based applications.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Canadian dairy farmer perspectives on dairy cattle and calf welfare during the periparturient period

Presenter(s): *Amalia Urloiu*

Abstract:

On dairy farms, the three weeks before and after a cow gives birth to a calf are known as the periparturient period. Throughout this period, dairy cows face many negative impacts to bodily wellbeing, including: lowered immunity and higher disease risk, potential uterus infection while the body adapts to lactation, and decreased time spent ruminating the days before and after calving, a process crucial for gut health. Certain management practices can aggravate the distress faced by periparturient cattle. Some examples include overstocking in group pens, reduced feed which heightens risk of early lactation, and premature assisted calving, which harms the cow and introduces greater morbidity risk for the calf. Dairy farmers have the most hands-on role in ensuring dairy cow and calf welfare, therefore, it is crucial to investigate their perspectives on periparturient cattle welfare concerns and management strategies. This study invited Canadian dairy farmers to partake in four recorded focus groups, where they were asked open-ended questions related to actions taken to promote periparturient cow and calf welfare, as well as obstacles they face in doing so. Recordings were transcribed using the Otter.ai and subsequent qualitative data analysis was performed through open coding, codebook development of relevant themes, and thematic coding in NVivo. Study findings can be applied to support dairy farmers in their role of caring for dairy cows and calves during the periparturient period by identifying where knowledge gaps should be filled or resources provided for a mutually beneficial outcome of farm efficiency and cattle welfare.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Diagnosis of Parkinson's disease through digitalized spiral drawing and machine learning

Presenter(s): *Alyssa Xiong, Sukhman Kang*

Abstract:

Parkinson's disease is a neurodegenerative disorder that affects movement and coordination. Limb tremors, bradykinesia, and rigidity occurring in the hands and fingers are early onset symptoms that are often overlooked. Early diagnosis can help patients seek medical treatment early on to slow down the progression of the disease, leading to an improvement in quality of life. Currently, there are no specific tests to diagnose Parkinson's, as most diagnoses are determined by neurologists that monitor a patient's symptoms overtime. A limitation is that the diagnosis is quite a lengthy process, leading to patients not receiving care early on. In this study, we use kinematic features extracted from digitally drawn spirals as a diagnostic model for Parkinson's disease, using an existing website in anticipation of creating an efficient and inexpensive means of diagnosis. We collected digitally drawn samples from two groups: those diagnosed with Parkinson's disease, and a group of healthy controls. Both groups traced a spiral template, in which 3 different models of CNN, K-nearest neighbors, and SVC C-support machine learning were used in this order to build an approach that could determine the presence of Parkinson's disease based on features including deviation of the drawn spiral from the template. We discovered that the drawings from patients with Parkinson's had many spikes not following the template, while the group of healthy controls traced the spirals accurately. Our approach could be valuable for early diagnosis of movement disorders, such as Parkinson's disease.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Investigation of Purine Activation of CD8+ T Cell Triggering Ferroptosis in Cancerous Tumours

Presenter(s): *Madi Portas*

Abstract:

Ferroptosis is a relatively newly discovered type of cell death resulting from iron-dependent lipid peroxide accumulation, and is characterised by cell volume shrinkage and increased density of mitochondrial membrane. The proliferation of cancerous tumour cells is regulated by ferroptosis, which can be induced through the disruption of various biological pathways, or chemically. Of particular interest is the means by which ferroptosis can be activated by CD8+ T cells through an endogenous pathway in the antitumor immune response. Inducing ferroptosis further heightens antitumor immunity through the release of tumour antigens, supporting the overall safety of attempting to modulate ferroptosis. This study aims to identify whether antitumour immunity can be enhanced through increased serum purine. Increased purine consumption has previously been established to endogenously increase IFN-gamma levels and therefore inflammation, which is essential to the CD8+ T cell triggering of ferroptosis. We hypothesise that through monitoring of lipid peroxidation, tumour ferroptosis will be heightened in Balb/c mice receiving T cells activated with purine. B16-OVA melanomas in mice will be used for the study, and IFN-gamma and lipid ROS levels determined through flow cytometry. Purine will be administered at a previously determined safe dose. The results will characterise a new potential route for cancer immunotherapies, that utilise the body's cells to fight cancerous tumours. Future studies may focus on other methods to endogenously increase IFN-gamma production without the potential risk of hyperuricemia.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Heterogeneity Analysis of The Effects of Inflation on Unemployment Rates in Different Industries

Presenter(s): *Simona Liu*

Abstract:

Governments globally always encounter the trade-off between inflation and unemployment suggested by the Phillips Curve. However, it is still debated over the negative relationship between inflation and unemployment. Canada is currently encountering the challenge of dealing with a high-level inflation after its employment has recently recovered. Therefore, understanding how different industries respond to changes in CPI growth is crucial for policymakers and businesses to make informed decisions about economic policies, investments, and pricing strategies and also knowing which groups within the labor force are likely to experience employment challenges during inflationary periods.. The present study empirically analyses the quarterly time series data of Canada over the period from 2003Q3 to 2022Q3 to examine the effects of inflation on the unemployment rates in six different industries. Based on Ordinary Least Square (OLS) regression and Vector Autoregression(VAR) analysis, it is concluded that Consumer Price Index (CPI) growth has negative effects on the unemployment rates in construction, manufacturing, and wholesale and retail trade industries, a positive effect on the unemployment rate in professional, scientific and technical services, and non-significant effects on the unemployment rates in transportation and warehousing as well as finance, insurance, real estate, rental and leasing. Therefore, the unemployment rates in different industries differently respond to CPI growth.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Investigating the inhibition of PHD proteins as a potential therapeutic target for diabetic cardiomyopathy

Presenter(s): *Zach Ng, Max Lin, Nana Kwadwo Okraku-Yirenkyi*

Abstract:

Introduction: Type 2 diabetes is a disease in which insulin dysregulation causes hyperglycemia and related complications such as obesity and diabetic cardiomyopathy (DCM). DCM has shown strong ties to pseudohypoxia, also caused by diabetes. Prolyl hydroxylase domain (PHD) proteins control hypoxia response factors in healthy people. Recent studies showed the aggravation of PHD proteins and its breakdown of hypoxia response factors within DCM; however, the effects of its inhibition and role as a therapeutic target remain unknown. This study aims to explore PHD manipulation for treating DCM in diabetic mice.

Methods: A colony of mice with knockout PHD genes will be produced. To induce type 2 diabetes in C57BL/6 mice, excessive feeding of a high-fat diet for a duration of eight weeks will be carried out. Glucose tolerance tests will be conducted to validate the induction of diabetes. 2D-Doppler-echocardiography and MRI will be used to compare the extent of DCM within the mouse heart.

Results: We anticipate from the graphs and images generated by 2D-Doppler-echocardiography and MRI to demonstrate lessened symptoms of DCM - higher ejection fraction and flow velocities - in DCM mouse models with inhibited PHD.

Conclusions: Our study will demonstrate whether PHD is able to lessen the effects of DCM within mice hearts. These findings will have a significant impact on the clinical treatment of DCM.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Developing a small molecule inhibitor targeting AR-V7 nuclear import to overcome theapeutic resistance in advanced prostate cancer

Presenter(s): *Aman Mohammed, Florin Lee, Miles Chapman, Indra Yavuukhulan*

Abstract:

Prostate cancer (PCa) is a leading cause of cancer-related deaths in men worldwide. Given that PCa is highly dependent on androgen receptor (AR) signalling, targeting the AR signalling axis is the standard of care for treating metastatic or recurrent PCa. Despite initial efficacy, the tumour almost always recurs as the more aggressive disease of castration resistant prostate cancer (CRPC). There are varied mechanisms by which CRPC can acquire castration resistance, one of the most prominent being the expression of constitutively active, alternatively spliced variants of AR, such as splice variant 7 (AR-V7). Lacking the ligand-binding domain of the full-length protein (flAR), AR-V7 is able to translocate to the nucleus and sustain AR signalling even in the absence of androgens. Recent work has demonstrated that flAR and AR-V7 utilize different nuclear import mechanisms, suggesting that targeting the cellular machinery critical for AR-V7 nuclear import could represent a novel therapeutic opportunity. In the present study, we propose to first identify proteins necessary for AR-V7 nuclear import, then based on pre-existing 3D structural data, design and test a library of small molecule inhibitors. These inhibitors will be screened for their effects on cell proliferation, transcription, and castration resistance and validated across numerous AR-V7-expressing cell line models. Currently, the five-year survival rate for CRPC remains less than 30%. As such, developing a novel compound for inhibiting AR-V7 nuclear import could overcome AR-V7-mediated castration resistance and substantially improve outcomes for patients afflicted with this disease.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Classifying Phytoplankton by Size Classes and Pigment Groups using Extreme Gradient Boosting

Presenter(s): *Ahmed Rizk*

Abstract:

It is estimated that more than 50% of photosynthesis in the earth is done by phytoplankton in the ocean. The diversity of phytoplankton both in terms of cellular size and pigment groups allow scientists to study their ecosystem. Phytoplankton may belong to several different size classes, and can be identified from the variation in pigment concentrations within each cell, most commonly from High-Performance Liquid Chromatography (HPLC) measurements.

Due to the limited nature and availability of HPLC sampling, along with the expenses required, absorption coefficients obtained from satellite measurements offer a more reliable source of data to train a classification model. Additionally, the relationship between the absorption coefficients, pigment concentrations and pigment groups cannot be captured by simple classification models (like those with linear decision boundaries), and so will require a complex multiclass model to capture the non-linear relationship.

Therefore, a neural network and an XGBoost model will be trained and validated on the data. Through the study, we can expect to find a model that can be operated with similar performances on much larger and more varied samples of ocean data. Additionally, the obtained weights will indicate the feature importance of the predictors towards classification models, which can be the focus of a future study.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: How does Glutamate Receptor Agonist, LY35740, Affect Working Memory in a Rat Model with Schizophrenia?

Presenter(s): *Julia Wilson, Deeksha Yelamanchi*

Abstract:

Schizophrenia is a complex mental health disorder often described as a form of psychosis, majorly characterized by symptoms that are complex in nature. These symptoms are both positive and negative in nature including hallucinations, delusions, disordered speech, and major withdrawal from daily life activities. Imminent literature is explicitly directing forthcoming research towards the fact that these symptoms have a major impact on several cognitive functions of the brain (Rahman et al., 2016). A major factor for cognitive impairment and positive symptoms in schizophrenic patients are being traced back to the hypofunction of NMDARs which trigger an excess efflux of glutamate into the prefrontal cortex, which ultimately plays a major role in the functioning of working memory (Mei et al., 2018). Thus, taking the aforementioned literature into account, this project aims to delve into the functions of working memory. Specifically, we aim to conduct a comparative research analysis between a Glutamate agonist drug, LY35740, which is a suppressant of stress induction and has previously demonstrated efficacy against stress-induced neuropsychiatric symptoms (Lee, 2006). We aim to conduct this through rodent testing, ultimately measuring the effectiveness of this drug in combating the excessive glutamate release by suppressing brain-derived neurotrophic factor mRNA expression in the neocortex and hippocampus. After close analysis, we predict that the drug use will be consistent in the efficacy of treatment of schizophrenic symptoms, through regulating the excess efflux of glutamate levels.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Investigating the link between language and perception: an examination into the effects of lexical term usage on color perception in Mandarin and English monolinguals

Presenter(s): *Jasmine Al-Shami, Munkhzaya Purevdorj, Suyuan Liu*

Abstract:

There is an ongoing debate on whether language has influence on our perceptions of the world (Regier & Kay 2009). This project examines whether the usage of specific color terms influences color categorization. When naming the colors in a rainbow, Mandarin has a term for the in-between of green and blue (qing se - "teal"), whereas English specifies the in-between of blue and purple (indigo). Does that imply that Mandarin speakers and English speakers categorize the green-blue-purple spectrum differently? To approach this question, native Mandarin speakers and native English speakers will be recruited to complete a color detection task and a rainbow survey.

In the color detection task, participants will be presented with two colors randomly drawn from a green-blue-purple spectrum. Each pair of colors will be extracted at equal intervals. Participants must decide whether the two colors are the same or different. This process will be repeated across the spectrum to evaluate participants' color categorization. The categorical tendency in human perception suggests when the comparison between two stimuli crosses a categorical boundary, participants are more likely to categorize them as different even when the interval stays constant (Goldston & Hendrickson 2010). If language affects perceptual categorization, we hypothesize that:(1) Mandarin speakers will have a three-way categorization for the green-blue spectrum (green-teal-blue), but not the blue-purple spectrum;(2) English speakers will have a two-way categorization for the green-blue spectrum, but a three-way categorization for the blue-purple spectrum (blue-indigo-purple). The rainbow survey is included to validate participants' use of rainbow color terms.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Standardization of a Model to Investigate the Effects of Cuprizone and Immune Boost on Demyelination and T Cell Infiltration in Black 6 Mice

Presenter(s): *Audrey Golsteyn*

Abstract:

Multiple Sclerosis (MS) is a chronic autoimmune disease that causes severe disability. Although this disease is globally distributed, Canada has the highest incidence worldwide, making it a disease of concern. Because the cause of MS is unknown, there are currently only therapeutics available but no curative treatments. Understanding the relationship between sexes, autoimmunity, and MS pathology is a major research focus in MS. There are currently no mouse models that reflect the progressive phenotype of MS. To establish a better model for this progressive disease, we propose to administer cuprizone, a copper chelating agent, to humanised mice. Our study aims to determine whether the cuprizone model can reflect the autoimmune demyelination observed in individuals with progressive MS. We predict that cuprizone treatment will result in demyelination and infiltration of human lymphocytes.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Bubbleshooting: Troubleshooting and Enhancing the Microfluidics for Silicon Photonic Biosensors to Resolve Bubble Formation Issues

Presenter(s): *Elly Kim*

Abstract:

Silicon photonic biosensing can detect the presence of a substrate in a sample by measuring the change in optical properties that occur as the substrate binds to a protein-functionalized detection zone. Our group aims to develop a silicon photonic biosensor capable of detecting multiple biomolecules in real-time, enabling on-site sample analysis. Microfluidic integration is an essential part of our biosensor for accurately quantifying substrates with minimal sample volume. The micro-scale channels facilitate the precise delivery of sample fluid to the detection zone. However, we found that sensor malfunctions can occur because of a small yet impactful phenomenon: bubbles. Bubbles are principally caused by the nucleation of supersaturated gas, which is dissolved in the moving fluid, onto the non-wetted crevices of microfluidic channels. The small bubble nuclei can enlarge into bubbles of various sizes, leading to flow rate fluctuations, channel obstructions, and abnormal sensor readings. We conducted "bubbleshooting" experiments with various Polydimethylsiloxane(PDMS)-based microfluidic chips to identify the source of bubbles, and determined that channels with 1) incomplete wetting, 2) high surface roughness, and 3) misaligned layers had significantly more bubble nucleation. To resolve these issues, we explored 1) pre-wetting the channels with a low surface tension fluid, 2) comparing molds with different resolution and surface roughness, and 3) testing different microfluidic materials and fabrication strategies. Our new microfluidic chip fabrication method involves laminating acrylic (PMMA) layers with pressure-sensitive adhesives (PSA). This lamination technique is expected to produce PMMA-based chips with channels of improved wettability and quality at a low-cost and high-throughput.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Partial and Full N-terminus Truncation of Human P4-ATPase ATP8A2

Presenter(s): *Moloud Mazaheri Tehrani*

Abstract:

The P-type ATPase family is one type of ATPase which hydrolyzes ATP to translocate specific substrates and contains 5 known subfamilies including P1-P5. Our study focuses on the P4-ATPases subfamily which translocates lipids from exoplasmic to the cytosolic leaflet of biological membranes to maintain lipid asymmetry that is crucial to cellular transport. Hence, mutations in human type 4 ATPases are associated with severe disorders. Consequently determining the mechanism of these enzymes is important for drug development. Unlike the well-studied P-ATPases (Na and K ATPases), the mechanism of the P4 subfamily is still not fully understood. Our study aimed to determine the mechanism of a specific P-4 ATPase known as hATP8A2 through a mutagenesis study. We hypothesized that the conserved region of hATP8A2's N-terminus has a specific function. So the full deletion of the N-terminus will have a higher effect on the hATP8A2 expression and activity level than its partial deletion. To test this hypothesis, three constructs were purified: wild-type, partially truncated (containing the N-terminus conserved region) and fully truncated. Then they underwent expression assay, ATPase activity assay, and Immunofluorescence microscopy. Both mutations had lower expression and activity levels than the WT hATP8A2. The significantly lower activity level of the partially truncated hATP8A2 suggests that extra amino acids in the N-terminus can be important for translocating phosphatidylserine at a higher rate. Additionally, like the WT hATP8A2, the mutant with conserved N-terminus was localized in both Golgi and plasma membrane, although its Golgi localization was not as significant as that of WT.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Meadowing effects on bird community composition and diversity in urban spaces

Presenter(s): *Caroline Li, Alison Tucker*

Abstract:

Urbanization is a key driver of biodiversity loss alongside agriculture and deforestation. At present, the majority of cities host abundant populations of generalist bird species (e.g., crows), but urban growth is associated with the decline of specialist species, leading to simpler, homogenous bird communities. With the loss of diverse, specialist birds, we also lose the benefits they provide, like improved mental well-being, pollination, and pest control. Though many of the direct causes of the loss of this urban bird diversity are clear, indirect effects, such as the presence of nest predators and an abundance of food waste, are still understudied in cities. We hypothesize that abundant turfgrass lawns may drive the homogenization of bird communities in cities through direct and indirect pathways.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Quantifying the impacts of wildfire smoke on forest photosynthetic productivity in British Columbia

Presenter(s): *Pierre Rubia*

Abstract:

One proposed solution to increasing bird diversity in cities is “meadowing”, or the diversification of plant species by converting frequently-mowed turfgrass monoculture lawns to diverse native plant and wildflower communities. We will use point-counts surveys to assess bird diversity on residential yards throughout Vancouver, BC within three yard types; low (3-4 species), medium (9-13 species), and high (16-21 species) plant diversity. Within each type, we will attempt to control for the higher-order effects of the surrounding environment by spreading observations across a variety of surrounding spaces. We expect to find greater bird species richness on more diverse plant community yards. In addition to its scientific contributions, the information generated by this study would be relevant to urban decision-makers who increasingly seek ways to support biodiversity in cities.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Alternative Aridity Index for Dryland Expansion Prediction Model

Presenter(s): *Camilla Ren, Raunaq Nambiar*

Abstract:

Drylands, defined by a scarcity of water, host a third of the global population and significantly contribute to ecosystem productivity, global agriculture, and global food supplies. The Aridity Index (AI) is a key empirical model classifying drylands but its accuracy in predicting dryland expansion has been questioned in the research community (Berg & McColl, 2021). We propose the alternative aridity metric, the New Aridity Index, instead (NAI). This is an aridity metric that uses the surface flux equilibrium theory (McColl, Salvucci & Gentine 2019) to physically classify drylands where the land surface is drier than atmospheric conditions (Kim et al., 2021). We compared the NAI with the AI by using 26 climate simulations collected from Coupled Model Intercomparison Project Phase 6 (CMIP6) (Eyring et al., 2016). Our methodology involves computing the AI and NAI to classify drylands for two distinct time frames: the past (1971-2000) and the future (2071-2100), with an emphasis on the high emission scenario for the future period (ssp585). We expect that in highly arid areas, the AI and NAI should not differ (highly arid areas will register as "arid" regardless of which metric is used). It's in the transitional area and habitat types (semi-arid drylands, savannah etc.) where we expect to see differences in the rate of expansion. Lack of knowledge about future dryland expansion can leave policymakers ill-prepared to make informed land-use decisions, significantly affecting all aspects of human and non-human life, from biodiversity conservation to agricultural output to economic growth (Wang et al, 2022).

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Optimizing and Monitoring the Growth and Extraction of Phaeodactylum Tricornutum for Biofuel Production

Presenter(s): *Devangana Mallik, Neha Bal, Keanna Yu, Bofan Chen*

Abstract:

With the increasing effects of climate change and the depletion of fossil fuels, sustainable sources of energy are required. Biofuels have long been considered and used, but not to their full capacity. A promising candidate is algae as it has a high lipid content and can be sourced sustainably. One of the main barriers to using algae is the expense associated with the extraction of the lipids and the conversion process to fuel. Our current research is focused on increasing the lipid yield of the marine algae species, Phaeodactylum tricornutum, through improvements to the growth conditions and increased efficiency of the extraction process. By decreasing the nitrogen concentration, we predict the lipid yield will increase. Our methods include gathering growth rate data at conditions with no added nitrogen first to gain a baseline growth curve in our bioreactor. The next growth cycle will contain three trials of differing nitrogen levels in the form of sodium nitrate, 0 mg/L, 15 mg/L, and 30 mg/L. For the extraction process, research was done on multiple methods to determine which would be viable and the most efficient, both in cost and yield. The primary extraction method analyzed is the Bligh & Dyer method. An impact analysis is done on the energy and resource usage, student enrichment, and cost. The measurements taken will include lipid yield per trial, as well as total impact. This research will help to gain more knowledge on P. tricornutum and improve the economic viability of algae-based biofuels.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Associations between adverse childhood experiences, daily coping efficacy, and negative affect: A daily diary investigation

Presenter(s): *Olive Huang*

Abstract:

Coping efficacy refers to an individual's perception of their ability to cope effectively with specific stressors, and has been increasingly emphasized in literature as a key factor of successful coping and health outcomes. While extant literature has focused on specific coping behaviour, such as approach and avoidance, preliminary findings have associated lower coping efficacy with more psychological symptoms, regardless of coping approach (Aldwin & Revenson, 1987). On the other hand, accumulating evidence demonstrates the negative impact of Adverse Childhood Events (ACEs) on later life health and wellbeing, including daily wellbeing and coping approaches. However, less is known about ACEs' potential impact on coping efficacy and negative affect in the daily context.

With data from a longitudinal study, we aim to examine the association between coping efficacy and daily negative affect, moderated by ACEs, among 246 community-based adults (aged 25-87). Participants reported ACEs in a baseline questionnaire and completed mobile surveys four times per day for 14 days. At each assessment, participants reported coping efficacy for their coping approaches with current stressors and negative affect. Multilevel analyses will be run predicting daily negative affect from daily coping efficacy, moderated by a history of ACEs.

By elucidating the impact of ACEs on later life coping efficacy and daily negative affect, we can better understand the potential mechanisms underlying the negative impacts of early adversity and provide appropriately targeted resources to mitigate its influence.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: CircPAN3 as a potential target for reversing drug resistance in AML

Presenter(s): *Ivan Zhang, Michelle Sutjitro, Lily Chen, Jolin Ren*

Abstract:

Acute myeloid leukemia (AML) is a rapidly progressive cancer of the blood and bone marrow in which an abnormally high amount of myeloblasts is produced. The standard treatment for AML is known as the "3 + 7 regimen", where an anthracycline is administered for 3 days, followed by cytarabine for 7 days. However, drug resistance is a major issue hindering the use of chemotherapy drugs for AML. One of the causes that contributes to drug resistance is the cellular process of autophagy, which is induced during chemotherapy treatment. Therefore, our research focuses on the ability of the circular RNA circPAN3 to regulate autophagy and drive drug resistance in AML.

The anthracycline doxorubicin (ADM) is one of the drugs that AML cells can develop resistance to. Studies looking at ADM-resistant AML cell lines have produced promising results that suggest the circular RNA circPAN3 may be a key mediator in the development of drug resistance in AML cells to chemotherapy drugs, specifically doxorubicin. We will obtain bone marrow (BM) samples from AML patients, including those who have undergone chemotherapy and relapsed. Then, we will examine the expression of circPAN3 in the BM samples we obtained. We expect to observe a higher expression level of circPAN3 in BM obtained from refractory/recurrent AML patients compared to chemosensitive AML patients. By investigating the role of circPAN3 in AML drug resistance, we can confirm whether circPAN3 is a potential target for reversing drug resistance in AML.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Maternal Separation Exacerbates Stress Response to Social Isolation in Adulthood in rats

Presenter(s): *Vincy Huang, Megan Macfarlane, Asha Hui, Tessa McDermid*

Abstract:

During the COVID-19 pandemic, social isolation spurred a surge in mental health concerns. While many COVID-related studies have focused on identifying common risk factors impacting well-being, risks such as chronic early life stress (ELS) are understudied. Using maternal separation (MS) to model early-life stress, this study examines whether ELS contributes to worse outcomes following social isolation (SI) in adulthood.

We employ a 2x2 design to investigate the effects of MS and SI on depression- and anxiety-like behaviours using the Open Field Test (OFT) and Sucrose Preference Test (SPT) using Long Evans rats. We also record plasma corticosterone levels and body weight. Rats are randomly assigned into four conditions: MS-alone, SI-alone, MS+SI, no-stressors-control. MS subjects are separated from dams 6 hours a day from postnatal day (PND)0-PND14. On PND60, adult animals either remained group-housed or underwent SI until PND74. Tests are performed on PND75.

In the OFT, SI alone leads to no differences in behaviour. Animals that underwent MS, however, spent significantly less time in the open space than controls; this difference in behaviour was more pronounced in animals that underwent both MS and SI. In SPT, MS animals showed a decrease in sucrose preference, regardless of SI. Similarly, MS conditions produced heightened plasma corticosterone levels, independent of SI. Body weight did not differ across conditions. Our analysis reflects that early-life stress increases psychological vulnerability following social isolation. This can inform health policymakers about additional social support for individuals with a history of early adversity following the social impacts of COVID-19.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Urban Planning for Sustainability in Vancouver

Presenter(s): *Sania Julian*

Abstract:

Vancouver, British Columbia, is a great example of a city where urban design has been utilized to shape more sustainable development, through the implementation of green spaces, community amenities, and transportation networks. However, challenges such as non-affordable housing, green gentrification, inequality amongst demographics, climate change, and the expenses associated with carrying out urban developments are current challenges that hinder the city's sustainability efforts. The aim of this project is to understand Vancouver's urban planning initiatives, and identify the benefits provided on the social, environmental and economic levels, as well as any shortcomings. A literature review was conducted to understand Vancouver's urban planning, highlighting that while Vancouver has made great advances for green space distribution and transportation networks, there appears to be a money-maximizing approach that prioritizes economic values over citizen welfare and liveability. Sources primarily included government documents and research publications. Through further analysis of the city's current action plans (e.g. Greenest City 2020 Action Plan, Transportation 2040, Metro Vancouver 2040), interviewing specialists in the field, and comparing Vancouver's situation with case studies from other cities, it is evident that a greater focus on socio-economic considerations must be made in order to interweave urban planning with sustainability. Future considerations such as decreasing the differences in accessibility between high-income and low-income households, bridging the gap between political decision makers and community individuals, and encouraging the voices of underrepresented groups would aid in maximizing human health, social capital, cultural heritage, environmental conservation, economic productivity, and overall community rapport.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Exploring the role of histone SUMOylation in the DNA damage response

Presenter(s): *Henry Li*

Abstract:

Many essential biological processes depend on chromatin remodeling for regulating DNA access, such as transcription, replication, and DNA repair. Chromatin is the basic packaging unit of DNA and consists as cores of ~146 base pairs wrapped around a protein made of the core histones: H2A, H2B, H3, and H4. Post-translational modifications are biochemical alterations to proteins after synthesis. Histone post-translational modifications regulate gene expression by remodeling chromatin structure. Small ubiquitin-like modifier (SUMO) protein is post-translational modification shown to be involved in the DNA damage response. SUMO can be reversibly linked to all histone proteins; however, it is unclear whether histone SUMOylation is correlated with DNA damage. Additionally, it is unknown the extent of which specific enzymes involved in the SUMOylation pathway are involved with modifying histones.

SUMOylation of histones were investigated using brewer's yeast as a model organism. Yeast strains were transformed with HISSUMO genes. Cells were grown in selective media and proteins were extracted. Immunoprecipitation was performed on extract to isolate for HISSUMO proteins. SUMOylation levels of H2A, H2B, H3, and H4 were then assessed through western blotting.

Preliminary results showed that SUMOylation occurs on H3 and H4 histones, with the involvement of E2 ligases in determining the amount of SUMOylation. H2A and H2B SUMOylation remains unclear. Additionally, current results showed a functional protocol in which SUMOylated histones can be isolated and DNA damage can be assessed.

By establishing the foundational knowledge on how cells recover from DNA damage, this opens more pathways for treatment of genetic diseases.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Functional Assessment of the fMRI-derived Auditory Perception Network

Presenter(s): *Rita Jin*

Abstract:

Functional magnetic resonance imaging (fMRI) is a method for tracking blood oxygen level-dependent (BOLD) signals as they move in different network configurations around the brain. The available network configurations are currently unknown. This oral presentation will display various analyses of fMRI signals during multiple cognitive tasks, curations of anatomical configurations that repeat over tasks, and interpretations of BOLD signal changes between task conditions. The project focuses on the discovery and study of the Auditory (AUD) network involved in linguistic processing. Through two key cognitive tasks, the Thought Generating Task and the Radio Speech Task, the activation of the novel AUD network is measured during times of auditory perception. Data from the functional brain network and its associated hemodynamic responses (HDRs) were analyzed through fMRI Constrained Principal Component Analysis (fMRI-CPCA), two-way repeated-measures ANOVA, and SPSS.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: 3D printer control system design

Presenter(s): *Jonathan Zhang, Lina Naleto, Rayyan Zaman*

Abstract:

Our presentation will be focusing on introducing basic working principles of the control system of a 3D printer. We will introduce the control system we build on Matlab and also introduce the difference between it and previous design.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Openness buffers the impact of Belief in Conspiracy Theories on Covid-19 Vaccine Hesitancy: Evidence from a large, representative Italian sample

Presenter(s): *Tania Li*

Abstract:

The world has seen a joint effort from different institutions and agencies to work to meet Candian 2050 sustainability goals. We have been developing new technologies, adopting new policies and improving systems. However, the scale of the climate emergency we are living through demands that we act with even greater urgency. Reliable construction and infrastructure lifecycle management method is an intrinsic part of future developments that may need to replace most current practices. London Forge project and the Maggie's Centre at York are quintessential examples reflecting Building Information Modelling(a process supported by various tools, technologies and contracts the generation) construction's necessity and importance. Our aim is to raise the idea of using cost-efficient and sustainable pre-construction methodologies to reduce construction risks while also expediting the process and diminishing the costs. Our research responds to the query "How can we improve current lifecycle management methods through digitalization technologies such as BIM?" We hypothesize that the construction teams are familiar with different BIM-related software during an early stage, and using them to build a strong collaboration for construction may be an option. The data are collected from present projects and combined with state-of-the-art of projects. It was found that there is a positive correlation between the use of BIM and increased construction speed and performance. The possibility of aspects such as time management, cost management, carbon reduction, etc. are briefly discussed, followed by further suggestions for future research.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: The Proteins that Fuel a Pandemic: How SARS-CoV-2's Structure Sets It Apart from SARS-CoV and MERS-CoV

Presenter(s): *Asmita Jain*

Abstract:

CoVID-19, also known as SARS-CoV-2, surged in the year 2019, took the world by storm, and has claimed millions of lives since. According to data, SARS-CoV-2 is more infectious compared to other coronaviruses encountered in the past, namely SARS-CoV and MERS-CoV. This higher infectivity is one of the significant factors that lead to the pandemic. In this study, we aim to identify the regions that contribute to the high infectivity of the novel coronavirus.

We will be using Multiple Sequence Alignment to compare the sequences of the coronaviruses and use this data to build a phylogenetic tree. We will then be checking for signs of positive selection in the spike protein sequences of SARS-CoV-2. Finally, we will inspect if the positively-selected mutations lead to structural changes in the mature proteins that could affect binding to the ACE2 receptor and increase viral infectivity.

We expect to find that the higher transmissibility of SARS-CoV-2 is due to differences in the spike proteins of the viruses. The higher S-S interaction in the spike protein of SARS-CoV-2 compared to the other viruses may make it more virulent. Additionally, it can recognize and bind to receptors more effectively, which might also contribute to higher infection rates.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Enhancing Star Classification through Machine Learning Techniques and Recursive Feature Selection

Presenter(s): *Hanzhi Chen*

Abstract:

We present a study using machine learning and feature engineering techniques, including column transformation and recursive feature elimination (RFE), for the multi-class classification of stars' spectral types using their photometry information. Our proposed supervised learning approach (Random Forest and Support Vector Machine) was trained on labeled stellar datasets. Two models were developed and compared to evaluate their performance. The experimental results demonstrated that the proposed method with feature engineering improved the classification accuracy and computational efficiency of the models. This research demonstrates the potential of using machine learning algorithms for improving the accuracy and efficiency of star classification tasks, which could be particularly beneficial for quicker classification of a large number of objects compared to traditional classification methods.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Partnering with Patients with Living and Lived Experience of Eating Disorders to Improve Inpatient Care on an Acute Pediatric Medicine Unit

Presenter(s): *Rabiah Dhaliwal*

Abstract:

Introduction: Patient partners are a pillar in healthcare quality improvement, but there is a paucity of literature on patient engagement in adolescent eating disorder treatment. Acute medical stabilization is both often a time of crisis and an opportunity to engage youth and families. We examined the experience of patients with eating disorders to improve the quality of care in an acute pediatric medicine unit.

Objective: To describe the experiences of patients with living and lived experience of eating disorder treatment at BC Children's Hospital.

Methods: For this stakeholder engagement phase of our quality improvement project, we used a mixed-methods design of semi-structured interviews and focus groups with adolescents with eating disorders and caregivers. We used thematic analysis to analyze the qualitative data and descriptive statistics to analyze the quantitative data, and created a driver diagram to identify drivers and change ideas.

Results: We completed 8 interviews with patients with living experience, 1 interview with a patient with lived experience, and 1 focus group with patients and caregivers. Primary themes include: uncertainty, stress from new expectations, relational care, inclusion, and acknowledgement. While 100% of participants understood the goals for admission, participants averaged 3.7 on a 1 to 5 Likert scale when asked to rate their satisfaction on information they received. The majority of patients felt there was consistency in team communication.

Conclusion/ Next Steps: Patients with eating disorders requiring acute medical stabilization have complex and unique needs. Change ideas include knowledge translation projects, such as admission-orientation documents and patient-centered rounds.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Investigating the Influence of the Weekend Effect in Suspected Polytrauma Patients at a Level 1 Trauma Center

Presenter(s): *Waris Bhatia, Ali Zaidi*

Abstract:

Objective

The weekend effect is an umbrella term for increase in adverse patient outcomes on weekends. The weekend effect, or any discrepancies influenced by the days of the week have not been thoroughly explored in radiology. Here, we investigate any association between the day and the number of scans conducted using the whole-body Rapid Imaging Protocol in Trauma (RIPIT).

Methods

Reports using RIPIT protocol from October 1st, 2021- October 31st, 2022, were retrospectively reviewed. The total number of scans were counted and categorized per day. A Poisson regression model was created using RStudio to evaluate the significance of association between the day of the week and the number of scans. Chi-square deviance test was used to assess the model relative to the intercept-only model containing no other parameters.

Results

365 observations were included. On average, 1.95 ± 1.54 scans were dictated per day. At α = 0.05, none of the p-values of the estimated coefficients were significant. This suggests there is not enough evidence to show any of the days were significantly different than 0 and hence, not significantly associated with the count of scans.

The full model was compared with the nested intercept-only model. The p-value (1.35β10-05 ; p = 0.05), indicates significant evidence to conclude the model containing all the days of the week did not fit the data better than the intercept-only model.

Conclusion

There is no significant association found between any of the days with the number of RIPIT scans dictated at VGH.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Splenic Ruptures: Imaging Features From a Level 1 Trauma Centre

Presenter(s): *Ali Zaidi, Waris Bhatia*

Abstract:

Objective

To evaluate patients found to have splenic ruptures using computed tomography (CT) at a Level 1 Trauma Centre and determine the frequency of commonly associated findings within radiology reports.

Methods

From our institution's database, patients who received a splenic rupture diagnosis over a period of 10 years were retrospectively identified and included through radiology reports. Only patients imaged using CT were included. Two keyword searches ("Splenic rupture" and "ruptured spleen") were used for searching the database from October 1st, 2012, to October 1st, 2022. Data was extracted from each report and categorized by age, sex, history, and presence of key findings including hematomas, splenomegaly, active extravasation, acute fractures and enlarged lymph nodes.

Results

A total of 24 patients were identified, with only 5 of the patients being imaged for ruling out splenic ruptures. The age of the patients ranged between 14-85 years old (mean = 54.9 years). 18 (75%) of the patients were male and 6 (25%) were female, respectively. Out of these, 6 (25%) were reported as trauma patients. 12 (50%) presented with hematomas, 6 patients (25%) presented with splenomegaly, 15 (62.5%) had active extravasation, 4 (16.7%) had acute fractures and 3 (12.5%) had enlarged lymph nodes. Additional abdominal findings were reported most in the colon and liver (both 25%).

Conclusion

Patients diagnosed with splenic ruptures presented with heterogenous findings. The majority of scans were not ordered to specifically rule out splenic trauma, and CT imaging served as an effective tool to detect solid organ injuries such as splenic ruptures.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Cold oxygen plasma treatment on blueberries: Effects on shelf-life extension and product quality

Presenter(s): *Caroline Mao, Erin Kim, Lok Noel Wai*

Abstract:

Cold plasma treatment is effective in extending the shelf-life of blueberries by inactivating microorganisms on the fruit surface. The process involves exposing the fruit to a gas, such as air or argon, that has been ionized by an electric discharge. The resulting plasma can inactivate microorganisms on the fruit surface by disrupting their cell membranes and denaturing their proteins. Cold plasma treatment is non-toxic, environmentally friendly, and does not affect the sensory quality of the fruit, which has been considered a promising alternative to traditional preservation methods.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Age and sex difference in muscle fatiguability measuring exercise volume to failure of the isotonic contractions

Presenter(s): *Olivia Sun*

Abstract:

As a practical approach to improving people's muscle and bone health, strength exercise has been subscribed to people of different ages and sex. To maximize the effectiveness of exercise prescription, this study aims to investigate whether there is a difference concerning muscle fatiguability, which is defined as the decreased capacity of muscle to generate maximum force, has been extensively explored by previous studies between younger (19-30 years old) and older (65-85 years old) adults, males, and females (Bigland-Ritchie et al., 1984). Ideally, the study recruits 6/6/6/6 young males/young females/old males/old females whose VO2 max falls in the range of 20%~80% of normative-referenced physical fitness to match up people's fitness levels. Participants will perform four sets (unlimited reps per set until failure) of unilateral isotonic strength exercise (leg press & knee extension) at their 70% one repetition maximum (1RM). The study calculates the total volume participants can lift during the maximal strength exercise to compare if any group of people has greater muscle fatigability. The rate of perceived exertion (RPE) will be recorded to be correlated with these findings.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: How Do You Know Who's the Bad Guy? 4-Month-Olds' Neural Responses to Helping and Hindering Scenarios

Presenter(s): *Kaye Chan*

Abstract:

The ability to access human interactions is crucial to have a successful social life. However, it remains unclear when and how sociomoral evaluations emerge and develop. Evidence from behavioural literature suggested an innate moral core in infants as they show sensitivity to sociomoral behaviours as early as 3 months of age by showing a preference towards a prosocial character relative to an antisocial character. However, some question the validity of results presented by behavioural studies due to their limitations, such as infants' low physical ability to reach out for their desired choice. One way to address behavioural studies' constraints is examining infants' neural processing underlying their sociomoral evaluations via EEG (electroencephalography). EEG has a high time resolution that allow us to investigate infants' brain responses while the prosocoial/antisocial events are unfolding. To date, only three studies have examined infants' neural responses to sociomoral stimuli. The studies only tested in age ranges of 6-, 12- and 24-months. One revealed higher P400 activity (associated with social perception) when viewing helpers while another recorded higher activity watching hinderers in 6-month-olds. Frontal alpha asymmetry (indexing approach motivation) was also found not to be significant in 12-month-olds in a more recent study conflicting with prior evidence. Thus, in this study, we aimed to further investigate neural processing underlying infants' sociomoral evaluations using the same helping/hindering paradigm but in younger ages. The investigation into a younger age range could solidify arguments for innate sociomoral evaluations and clarify neural mechanisms across development, supplementing behavioural studies.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Mental Health, Social Support and Resilience in Women Living With HIV (WLWH) During COVID-19

Presenter(s): *Sandy Hassoun*

Abstract:

Women Living with HIV (WLWH) face high rates of mental health disorders that may impact their HIV management and may have been exacerbated by the COVID-19 pandemic. We studied i) the effect of HIV status on mental health, social supports, and resilience, and investigated ii) relation of HIV status to health care needs and access during the pandemic (December 2020-May 2022). Mental health, social support and resilience were compared between 128 WLWH and 167 HIV-negative women >16y. Validated questionnaires assessed mental health (depression, anxiety, and post-traumatic stress disorders (PTSD)), social support and resilience. Demographic and clinical variables were compared between WLWH and controls using Student's t-test and Chi-square tests for continuous and categorical variables, respectively. WLWH were older than control women (median [IQR]; 50.1[42.3,58.2]y vs. 47.5[28.6,57,5]y; p=0.04), less often educated beyond high school (46.1% vs. 70.6%; p=0.0002), or employed (36.7% vs. 51.5%; p=0.04). There were no significant differences in depression, PTSD, psychological distress, anxiety, or social supports. WLWH had higher resilience scores versus controls (90[83.5,95.0] vs. 87[77.0,93.0]; p=0.02), but reported greater need of health services (100% vs. 82%; p=0.0001), and more difficulties in accessing them (p=0.0001). Moreover, WLWH felt less empowered in self-healthcare options compared to controls. Results highlight that throughout the COVID-19 pandemic, WLWH required access to health care resources (likely partly for their HIV care), but experienced greater barriers to accessing this care than women not living with HIV. These data highlight need for increased support/guidance in accessing healthcare services among women living with HIV during a pandemic.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: G20 Summits and Innovative Global Governance in a Changing World Order

Presenter(s): *Jessica Wang*

Abstract:

We live at a historical juncture with multiple global systemic disruptions, such as climate change, digital revolution, widening inequality, financial risks, weaponization of trade interdependence, and global pandemics. All of which are significant risks demanding urgent global cooperation. However, we are also experiencing one of the greatest power shifts in history with a rapidly transitioning international order, making cooperation more and more difficult. The institutions of global governance are far from ready, with a governance gap calling for policy innovation. Through systematically examining the cooperation of G20 summits from 2016 to the present, this research seeks to investigate: What makes global governance successful? And how do we innovate the future of global governance?

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: The relationship between executive function and restricted/repetitive behaviours & interests in children with Autism Spectrum Disorder

Presenter(s): *Laura Joyce*

Abstract:

Restricted and repetitive behaviours (RRBs) characteristic of Autism Spectrum Disorder (ASD) have been linked to anxiety. Determining the neurocognitive underpinnings of these behaviours could lead to intervention targets for children with ASD. Executive function (EF) domains of inhibition, cognitive flexibility and working memory may be involved, however, some research suggests associations between EF and RRBs while others do not. This study examined whether informant-reported and lab-based EF assessments independently predict variance in levels of RRBs, and which specific facets of EF relate to RRBs. Associations between informant-reported and lab-based measures of EF were also investigated. In a sample of 50 children with ASD (Mage = 11.78; MIQ = 93.28), EF was measured with the Behavioural Rating Inventory of Executive Functioning (BRIEF) and the Delis-Kaplan Executive Functioning System (D-KEFS), and RRBs were measured with the Social Responsiveness Scale (SRS). A series of linear regression models will examine associations between different facets of EF and RRBs. Moderate relationships are expected between both measures of EF and RRBs, but the BRIEF is expected to be more strongly related than the D-KEFS, as it captures everyday EF challenges. Secondly, correlations between corresponding subscales of the BRIEF and D-KEFS will be examined, with weak associations expected. Determining the facets of EF associated with RRBs will strengthen our understanding of the mechanisms underlying these behaviours and suggest possible therapeutic EF interventions for ASD. If different measures of EF independently predict levels of RRBs, this would support the argument for using multi-method assessment approaches when examining EF.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: The spread of neurotoxic tau and its effect on hippocampal dendritic morphology and neurogenesis

Presenter(s): *Peyton Holder*

Abstract:

The accumulation of tau protein in the brain is a characteristic trait of Alzheimer's disease, which is a progressive neurodegenerative dementia. In the initial stages of the disease, tau builds up in the lateral entorhinal cortex (LEC) and spreads downstream through axons to the dentate gyrus (DG) of the hippocampus, where adult neurogenesis occurs. We are interested in exploring how tau pathology impacts dendritic morphology and neurogenesis in the DG and whether there is increased neuronal vulnerability correlated with neuronal age or animal sex. Since tau is neurotoxic and correlated with synapse loss, we hypothesize that it will correlate with changes in dendritic morphology and neurogenesis. Using a transgenic mouse model, we injected a viral tau or control vector into the LEC of mice to imitate early Alzheimer's tau pathology and used confocal microscopy to examine the dendritic morphology of fluorescently labeled neurons in the DG and quantify new immature neurons labeled with doublecortin. Our results suggest that tau pathology changes dendritic morphology, and we expect that it will reduce neurogenesis. Examining how pathological tau conditions affect the LEC-DG pathway and neurogenesis will further our understanding of how these affected neurons play a role in memory loss, and thus direct research to a possible area for therapeutic treatment.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Determining the impact of the polyphenol quercetin on primary human pancreatic islet cells insulin secretion and metabolic activity.

Presenter(s): *Katrina Jewell, Vivian Osiek, Yasmine Bellahcen, Brianna Tsuyuki*

Abstract:

Insulin resistance contributes to the increase in pancreatic cell mass and beta cell apoptosis, resulting in hyperglycemia and type 2 diabetes. Excess pancreatic β-cell apoptosis is a component of type 2 diabetes pathophysiology and may lead to the oncogenesis of pancreatic endocrine tumors.

Researchers have identified polyphenols to be a novel agent in reducing pancreatic beta cell apoptosis and insulin resistance, both common complications of type 2 diabetes. One polyphenol, quercetin, usually studied for its anti-inflammatory effects, has recently been shown to reduce islet cell apoptosis. This highly accessible polyphenol, abundant in berries and leafy greens, could be a potential supplement in preserving pancreatic islet cells. However, the dose-dependent effects as well as the main mechanisms of action remain inconsistent between studies. Our project aims to determine the effects of quercetin-treated human pancreatic islet cells in-vitro and delineate the biological pathways of action via differential gene and protein expression.

Cultures of human pancreatic islet cells will be treated with serial dilutions of quercetin to study its effect. We will quantify the impact of quercetin on insulin production by using an insulin secretion assay. We will also use qPCR to identify differentially expressed genes as a result of exposure to this polyphenol. Through this work, we aim to elucidate the molecular signaling pathways associated with increased insulin secretion and decreased apoptosis levels as a result of polyphenols.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Investigating the effects of modulating the WNT signaling pathway in the production of T cell competent blood progenitor cells

Presenter(s): *Ellie Leung*

Abstract:

Pluripotent stem cells (PSCs) hold great promise in clinical applications because they can self-renew and differentiate into other cell types, such as hematopoietic stem/progenitor cells (HSPC) and T cells, that can be used in cell therapies to treat wide-range of diseases. Niche engineering can be used to recapitulate in vivo signals to direct differentiation of PSCs in vitro. The WNT signaling pathway involved in controlling biological processes, has been implicated as an important step during blood development. To understand the effects of the Wnt signaling pathway on the production of HSPCs and T cells, the timing and stimulation intensity of the pathway may become important. We hypothesize that with an increased activation of the Wnt-Î²-catenin pathway, the probability of generating HSPCs with T lymphoid potential will increase. The small molecule CHIR99021 (CHIR) is a Wnt agonist. We will modulate the Wnt pathway by manipulating CHIR concentration and time of addition in our in vitro cultures. To assess the cell phenotype, we will use flow cytometry at different time points. Specifically, we will characterize the effects of changing the initial concentration of CHIR between day 2-8 by measuring the counts and frequency of HSPCs and T cells in our in vitro differentiation system. This research reveals the possibility of controlling the stimulation of the Wnt-Î²-catenin signaling pathway in cell development to maximize the production of useful cell types for clinical applications.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: How reliably can we predict phytoplankton population along the Northeast Pacific Ocean using genetic algorithm recurrent neural networks?

Presenter(s): *Wyatt Falcao*

Abstract:

Phytoplankton are microscopic bacteria and protists responsible for over half of Earth's photosynthesis and oxygen production and are a large part of the foundation for the aquatic food chain. Phytoplankton populations can be calculated by their relation to chlorophyll levels in bodies of water, which can be obtained through various methods. Predicting future phytoplankton populations in the Northeast Pacific Ocean has not been done using a genetic algorithm recurrent neural network though. We hypothesize this network will show population estimations with greater accuracy than others when compared to standard mathematical models. Using the GA-RNN, we can operate on non-preprocessed and preprocessed moving average environmental data collected along the Northeast Pacific Ocean to predict long-term changes in chlorophyll levels, allowing for the prediction of phytoplankton populations. The results throughout testing can be compared to pigments collected locally with the HPLC method, and future predictions can be extrapolated from the most accurate network. A consistently accurate model that estimates previously calculated populations is our expected observation. These results can be related to the fishing industry to predict the impacts of both human and environmental factors on populations of interest.

Wave 5 | Poster Presentation

PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Do you know that I know what you know?

Presenter(s): *Shreya Kakachery*

Abstract:

Theory of Mind is the ability to ascribe mental states to others and understanding that it can differ from one's own beliefs. We lack a paradigm that can capture this ability in adults, so we are creating a novel online false-belief task for neurotypical adults. In the task the participant is facing an avatar who is collecting either ducks or rabbits. The toys are hidden from the avatar's view using occluders, but the participant can always see the toys. The occluders are lifted momentarily, allowing the avatar to view the toys, and then fall back down, hiding the toys from the avatar who then selects a toy. The participant responds with a keypress to indicate the chosen toy's colour. In some trials the location of the toys can switch places after they have been hidden from the avatar's view. When the switch happens, the participant is aware of the location change but the avatar is not. This causes the participant to hold two incongruent mental representations in the false-belief trials. We expect to see longer reaction times for false-belief trials since it conveys the hesitation that arises due to the mismatch between the agent's and the participant's beliefs about the true location of the chosen toy, thereby exhibiting Theory of Mind. Our next step in validating the task will be to minimize the influence of low-level processes. We hope this task will strengthen our understanding of the role of Theory of Mind in neurodevelopmental disorders such as autism spectrum disorder.

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Small fruits aroma is strongly affected by agronomical, environmental, and postharvest practices

Presenter(s): *Denise Chew, Vania Kwan*

Abstract:

Growing worldwide demand for berries has compelled the agriculture sector to adopt better agronomical practices and new postharvest technologies to improve berry plant and fruit quality. However, less attention has been paid to the effect of these factors on the berry flavor quality, which ultimately influences consumer perception. Instead, most of the studies related to berry aroma have been focused on the effect of the genotype or berry specie. The main objective of this project was to get a deeper understanding of the effect of agronomical and postharvest practices as well as environmental conditions and timing of harvest on small fruits' aroma. It was found that agronomical practices such as irrigation strategies (e.g., water deficit) resulted in increased plant stress that boosted monoterpene and sesquiterpene emissions. Regarding postharvest handling, storage at cold temperatures demonstrated to chemically increase the concentration of most of the volatiles in the first two weeks, which was explained as an effect of chilling injuries. Additionally, studies also indicated that volatile synthesis was correlated to changes in the pattern of temperature. Therefore, high temperatures were associated with high levels of benzene derivatives and terpenes. Finally, the timing of harvest and ripening degree were also known to influence the berry aroma; specifically, terpenes were highly synthesized between the pink and ripe stage, during sugar accumulation, while a large fraction of esters were exclusively synthesized in the last phase of ripening and magnified in overripe fruit. Thus, our work could provide a guideline for breeders, botanists, and plant and flavor scientists for the modulation of small fruits' flavor.

Keywords: volatile compounds; berries; gas chromatography; breeding; agronomical factors; post-harvest; processing; sensory

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PONDEROSA BALLROOM **|** 5:15 PM – 6:30 PM

Title: Characterization of Daptomycin Use in the Leukemia Bone Marrow Transplantation, Intensive Care, and in Solid Organ Transplant Patients at Vancouver General Hospital (VGH)– A Quality Assurance Project

Presenter(s): *Alyssa Azote*

Abstract:

The current BC Health Authority formulary restriction criteria at Vancouver General Hospital (VGH) restricts daptomycin use to Infectious Diseases and Intensive Care Services for the treatment of severe infections caused by resistant Gram-positive organisms, where other agents cannot be used. This includes resistant S. aureus or Enterococcus spp. Anecdotally, the Leukemia Bone Marrow Transplant (BMT) unit at VGH is seeing higher rates of VRE bacteremia. Additionally, daptomycin use at VGH has risen in recent years thus increasing the risk of developing resistance.

This quality assurance study examined the use of daptomycin in LBMT, ICU, and solid organ transplant inpatients at VGH between 2018 and 2021. The 248 courses of daptomycin administered in the study were used to treat a variety of gram-positive infections, with VRE being the most common. However, 57.3% of all courses did not meet the formulary restriction criteria with the top reasons being no positive culture, a gram-positive infection that was susceptible to alternatives such as vancomycin, or a VRE non-bacteremia infection susceptible to alternatives such as linezolid. The results of this study show that there is a need for increased education on the appropriate use of daptomycin to both prescribers and pharmacists to prevent overuse and risk for development of resistance. Other interventions include the establishment of protocols to provide audit and feedback of daptomycin orders to prescribers. A future study can aim to characterize the use of daptomycin in other areas of the hospital and track resistance patterns of daptomycin to better inform daptomycin prescribing.

THANK YOU

Thank you to everybody involved and for your participation and continued support in making MURC 2023 possible. If you are interested in getting involved with MURC 2024, please visit students.ubc.ca/murc.

We can't wait to see you next year at MURC 2024!