FEBRUARY 24 TO 26, 2021

CALGARY, ALBERTA
HOSTED LIVE ON HOPIN
gsa.ucalgary.ca/peerbeyond

Hosted by

GRADUATE STUDENTS' ASSOCIATION
UNIVERSITY OF CALGARY
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LAND ACKNOWLEDGEMENT

In the spirit of respect, reciprocity and truth, we honour and acknowledge Moh’kinsstis, and the traditional Treaty 7 territory and oral practices of the Blackfoot confederacy: Siksika, Kainai, Piikani, as well as the Îyâxe Nakoda and Tsuu’tina nations. We acknowledge that this territory is home to the Métis Nation of Alberta, Region 3 within the historical Northwest Métis homeland. Finally, we acknowledge all Nations – Indigenous and non – who live, work and play on this land, and who honour and celebrate this territory.
ABOUT PEER BEYOND GRADUATE RESEARCH CONFERENCE

Welcome to the 2021 Peer Beyond Graduate Research Conference. Peer Beyond is a multi-disciplinary graduate research conference where graduate students have a unique opportunity to present their research and to cultivate interdisciplinary collaborations within the graduate community. For the first time ever the conference this year will be run virtually over Hopin and have graduate students participating from 10 different faculties and there will be over 30 awards for presenters to win. Thank you to all presenters. We are excited to learn about your amazing research.

PRESENTATION AWARDS

TALK AWARDS:
First Place ($500)
Second Place ($300)
Third Place ($100)

POSTER AWARDS:
First Place ($500)
Second Place ($300)
Third Place ($100)

FACULTY AWARDS:
Best Presentation talk or poster ($250)

YEAR OF STUDY AWARDS:
(MSc and PhD)
Best Presentation talk or poster ($250)
ACKNOWLEDGEMENTS

PANEL OF JUDGES

Jean-Christopher Boucher
Mary O’Brien
Peter Dunfield
Jesus Enrique Hernandez
Zavaleta
Yeonjung Lee
Tara Beattie
Sarah Eaton
Jenny Godley
Tanya Beran
Guosong Wu
Haris Ansari
Suriakarthiga Ganesan
Srijak Bhatnagar
Faezeh Kimiaee Asadi
John Scott
Anna MacKinnon
Matt Patterson
Shirin Moossavi
Karen Lithgow
Shaminder Singh
Selim Khan
Joshua Goldstein
Kyle Plotsky
Sourab Kumar
Oyeniyi Oyewunmi

VOLUNTEERS AND STAFF

The GSA would like to thank all of those who have helped make this conference possible. Without our volunteers, GSA staff and GSA executives this event would not be possible.

<table>
<thead>
<tr>
<th>GSA Academic Support Committee</th>
<th>GSA Executives</th>
<th>GSA Staff</th>
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<tr>
<td>Martine Dennie</td>
<td>Tanille Shandro</td>
<td>Megan Sawchuk</td>
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<td>Suzie Lee</td>
<td>Christine Cao</td>
<td>Thao Nguyen</td>
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<tr>
<td>Dusan Nikolic</td>
<td>Mary Zhang</td>
<td>Danielle Abbott</td>
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<tr>
<td>Harrison Campbell</td>
<td>Kabita Baral</td>
<td>Rachel Duchesne</td>
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<td>Kelsey Pennanen</td>
<td>Alex Paquette</td>
<td>Daniella Ikurusi</td>
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<td>Courtney Miller</td>
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<td>Lina Girgis</td>
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<td>Amir Varamesh</td>
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<td>Miha Alam</td>
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<td>Mahyar Nakhaei</td>
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<td>Crystal Ellis</td>
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<td>Filip Rakic</td>
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<td>Tina Sarkar</td>
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<td>Sabrina Buharideen</td>
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AGENDA FOR WEDNESDAY
FEBRUARY 24

START TIME:

11:00 am    Welcome
11:05 am    Land Acknowledgement
11:15 am    Keynote Speaker with Janis Irwin
12:00 pm    Talk 1: Claire McGuiness (Education)
12:13 pm    Talk 2: Anamika Choudhary (Medicine)
12:26 pm    Talk 3: Katelyn O’Keefe (Arts)
12:39 pm    Talk 4: Moji Hasemi (Engineering)
12:53 pm    Talk 5: Kayla Dias (Science)
1:10 pm     Poster session
2:00 pm     Networking

Each talk is a 10-minute presentation followed by 2 minutes for Q&A.

ABOUT JANIS IRWIN
Janis Irwin was elected to the Legislative Assembly of Alberta as the representative for Edmonton-Highlands-Norwood on April 16, 2019. Janis serves as the Official Opposition Deputy Whip and the Critic for Status of Women and LGBTQ2S+ Issues.

POSTER PRESENTERS

Agnei Marcano Pina
Ali Mohammadi
Alican Basdemir
Amberlee Boulton
Brittany DeMone
Chelsea Klinke
Darrah Kennedy
Dusan Nikolic
Elnaz Erfanian
Halley Silversides
Heather Cant
Hector Bonilla
Hesamaddin Rezaei
Jessica Mulli
Kaitlyn Diallabough
Kate Bourne
Kateryna Soldatenkova
Keelin McKiernan
Kelsey Pennanen
Lucia Otero Varela
Madelyn Knaub
Maimuna Khan
Marianne Grenier
Marianne Haines
Maryam Taherinezhad
Mohammadali Ahmadi
Nerea Jimenez-Tellez
Pooja Woosaree
Reza Jafari
Riley Morrell
Sameer Mithani
Sandip Dhaliwal
Sandy Rao
Shahnas Najimudeen
Sharon Dong
Sonia Khan
Varada Khot
AGENDA FOR
THURSDAY
FEBRUARY 25

START TIME:

12:30 pm Welcome
12:45 pm Talk 1: Sara Hassanpour Tamrin (Engineering)
12:58 pm Talk 2: Marit Biesheuvel (Medicine)
1:11 pm Talk 3: Courtney Miller (Education)
1:24 pm Talk 4: Mahsa Faryadras (Science)
1:37 pm Break (5 minutes)
1:42 pm Talk 5: Lisa Zhao (Engineering)
1:55 pm Talk 6: Harrison Campbell (Education)
2:08 pm Talk 7: Suzie Lee (Neuroscience)
2:21 pm Talk 8: Mohammad Raihan (Arts)
2:34 pm Break (2 minutes)
2:36 pm Talk 9: Lisa Yamaura (Medicine)
2:49 pm Talk 10: Neha Bhatia (Arts)
3:02 pm Talk 11: Tina Abedi Yarandy (Engineering)
3:15 pm Talk 12: Colton Unger (Science)
3:25 pm Transition to Poster Session
3:28 pm Poster Session begins
4:30 pm Networking begins

Each talk is a 10-minute presentation followed by 2 minutes for Q&As.

WIN PRIZES THROUGHOUT THE CONFERENCE!

PASSPORT CONTEST

At the end of each talk and in each poster session that you attend, we will give away a 6-digit code. Collect these codes in our passport contest to win valuable prizes!

Download the passport from the GSA Peer Beyond page:

gsa.ucalgary.ca/peerbeyond

NETWORKING

Attend the networking sessions and meet new graduate students. As a bonus, if you end up in the meeting room with one of our GSA Executives, you may win a small prize!

POSTER PRESENTERS

Amanda Foote
Annie Nguyen
Anthonia Anowai
Ashley Clarke
Brittany Lorentz
Catalina Barboza SolÃ­s
Danni Chen
Dante Prado
Ellen de Jong
Gabriela Alves
Hadi Zadeh Haghighi
Jenny Hyun
Jessica Youngblood
Jiafan Zhang
Katherine Stelfox
Kathryn Blair
Kristina Jelinkova
Lauren Seabrook
Lindsay Morrison
Masume Akbari
Mayara Luis
Milanpreet Kaur
Mitra Roustapishah
Mohammad Kiani
Mohammed Bakir
Mohsen Hassani
Noah Arney
Omid Aligholamioskooee
Ritul Sharma
Ruina Bao
Shefali Rai
Sherri Restorick
Tanille Shandro
### AGENDA FOR FRIDAY FEBRUARY 26

**START TIME:**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>9:00 am</td>
<td>Welcome</td>
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<tr>
<td>9:15 am</td>
<td>Talk 1: Myriam Tremblay (Arts)</td>
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<tr>
<td>9:28 am</td>
<td>Talk 2: Zoe Chan (Kinesiology)</td>
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<td>9:41 am</td>
<td>Talk 3: Ying Xiong (Engineering)</td>
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<td>9:53 am</td>
<td>Talk 4: Filip Rakic (Medicine)</td>
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<td>10:06 am</td>
<td>Break (2 minutes)</td>
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<td>10:08 am</td>
<td>Talk 5: Miho Lowan-Trudeau (Architecture, Planning and Landscape)</td>
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<tr>
<td>10:21 am</td>
<td>Talk 6: Kayla Atchison (Medicine)</td>
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<td>10:34 am</td>
<td>Talk 7: Rachel Pagaling (Education)</td>
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<td>10:47 am</td>
<td>Talk 8: Asher Patel (Nursing)</td>
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<td>11:00 am</td>
<td>Break (5 minutes)</td>
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<td>11:05 am</td>
<td>Talk 9: Davor Curic (Science)</td>
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<td>11:18 am</td>
<td>Talk 10: Brittany Lindsay (Arts)</td>
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<td>11:31 am</td>
<td>Talk 11: Jane Fletcher (Medicine)</td>
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<td>11:44 am</td>
<td>Talk 12: Maroro Zinyemba (Education)</td>
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<td>11:57 am</td>
<td>Break (2 minutes)</td>
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<td>11:59 am</td>
<td>Talk 13: Vincent Chiang (Medicine)</td>
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<td>12:12 pm</td>
<td>Talk 14: Emma De Vynck (Social Work)</td>
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<tr>
<td>12:25 pm</td>
<td>Closing Remarks</td>
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<td>12:35 pm</td>
<td>Award Ceremony</td>
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<tr>
<td>12:45 pm</td>
<td>Good bye</td>
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*Each talk is a 10-minute presentation followed by 2 minutes for Q&A.*
Janis Irwin was elected to the Legislative Assembly of Alberta as the representative for Edmonton-Highlands-Norwood on April 16, 2019. Janis serves as the Official Opposition Deputy Whip and the Critic for Status of Women and LGBTQ2S+ Issues.

Prior to serving as an MLA, Janis worked in rural Alberta as a high school teacher in Bawlf and as a vice-principal in Forestburg. She then moved to Edmonton and made it her home, working for Alberta Education as the Senior Manager, Social Studies, and then as the Executive Director for High School Curriculum.

Janis holds a bachelor’s degree in education from the University of Alberta, a master’s degree in education from the University of Calgary, and completed her PhD coursework at the University of Alberta. Over the years she has served as a board member for several nonprofit associations, and has volunteered with many community organizations. Janis loves getting outside, biking, running, and exploring Edmonton’s beautiful river valley.
12:00 - 12:12 pm: Self-Care and Resilience in First-Year Undergraduate Student
CLAIRE MCGUINNESS (EDUCATION - PSYCHOLOGY)
The current study investigates mindful self-care and resilience as predictors of flourishing in first-year undergraduate students. Mindful self-care includes a) mindful awareness and assessment of one's internal needs and external demands and b) intentional engagement in specific practices of self-care to address needs and demands in a manner that serves one's well-being and personal effectiveness. Mindful self-care has been shown to reduce stress in post-secondary students enrolled in a medical degree. However, there is a lack of research into the role that self-care plays in first-year undergraduate students. Resilience – the process of adequately responding to and adapting in the face of adversity – can also be a protective factor in the transition to post-secondary education. The three-factor model of personal resilience includes three core developmental systems (sense of mastery, sense of relatedness, and emotional reactivity). A sample of 177 first-year undergraduate students (26.9% males) completed online measures including Mindfulness Self-Care Scale and Resilience Scale for Young Adults. The present study supports the premise that aspects of mindful self-care and resilience predicts flourishing in first-year undergraduate students. In addition, resilience predicts flourishing above and beyond mindful self-care. Implications for practice and future research directions are discussed.

12:13 - 12:25 pm: The Ketogenic Diet’s Anti-Seizure Role in Infantile Spasms
ANAMIKA CHOUDHARY (MEDICINE - NEUROSCIENCE)
Infantile Spasms (IS) – a catastrophic, epileptic disorder of infancy – are often intractable to current antiepileptic therapies. The ketogenic diet (KD) has emerged as an alternative treatment for the intractable population, though the prospective validity and mechanism of action for IS remains largely unexplored. We investigated the KD’s efficacy as well as its mechanism of action using the triple-hit model of intractable IS. The triple-hit model was used to induce spasms in neonatal rats, who were then artificially reared and put on either the KD (4:1; fats:carbohydrates) or a control milk diet (CM;2:1). 31-phosphorus magnetic resonance spectroscopy and head-out plethysmography were examined in conjunction with continuous video-behaviour recordings in spasms and control rats. The KD resulted in a ketosis observed both in the blood and urine. The KD led to a robust reduction in the frequency of spasms observed, with a 1.5-fold increase in rate of survival. The respiratory profile of the KD-spasms rats was significantly altered resulting in decreased levels of expired CO2. This translated to an observed intracerebral acidosis in the brain. Sodium bicarbonate supplementation, acting as a pH buffer, reversed the KD’s effects and resulted in an increase in the spasms frequency. We conclude that the KD produces its anti-convulsant effects through respiratory-induced intracerebral pH disruptions in the brain, providing a novel platform for understanding KD’s mechanism in IS.
12:26 - 12:38 pm: Detecting Climate Change Impacts on Heritage at Qikiqtaruk

KATELYN O’KEEFE (ARTS - ANTHROPOLOGY & ARCHAEOLOGY)

The heritage features at Pauline Cove, on Qikiqtaruk (formerly known as Herschel Island), Yukon, represent a long period of occupation, from 800 years to the present. These features include Inuvialuit sod houses and buildings associated with the whaling period, fur trade, missionaries, and the RCMP. Coastal erosion and inland flooding events associated with climate change are damaging these features. My research aims to comprehend the impact these processes have on these valuable heritage resources by using a multi-pronged methodological approach. Drone-generated imagery of Pauline Cove from 2017 and 2019 will be compared first through visual inspection, followed by change detection analysis using open-source software. This analysis will elucidate the overall impact of flooding and erosion on historic structures in the main settlement area. The imagery analysis will be complemented with archaeological excavation. I will return to Qikiqtaruk in July 2021 to excavate two at-risk Inuvialuit sod houses alongside Inuvialuit youth. The excavation results will be compared to previously excavated (undamaged) sod houses at Pauline Cove. Together, these methods will yield an understanding of the impact climate change is having on the heritage resources at Pauline Cove.

12:39 - 12:52 pm: Climate Change: An Engineering Solution

MOJI HASHEMI (ENGINEERING - CHEMICAL & PETROLEUM ENGINEERING)

Global warming and climate change have increasingly attracted the attention of researchers and the public in the past few years. The world heavily relies on fossil fuels to supply the energy demand including electricity and automobile fuels. Although the share of renewable energies in the energy spectrum is increasing, fossil fuels will continue to provide the majority of the world’s energy demand over the next few decades. Therefore, in order to meet the energy demand of the world we must adapt with ways to produce energy from fossil fuels without emitting greenhouse gases into the atmosphere. Carbon capture and storage is a means to capture the CO2 from fossil fuel power plants and produce clean electricity. Another issue that fossil fuel power plants face is the inconsistency in the energy supply and demand in the electrical grid. This requires storage of the produced electricity during low demand periods, and recovering the stored energy during high demand times. Calcium looping is a process that can potentially solve both of these issues simultaneously by capturing the CO2 produced from power plants and storing the excess electricity as thermochemical energy. In my research I am investigating process schemes that allow for integrating calcium looping with fossil fuel power plants to address the two mentioned problems.

12:53 - 1:05 pm: The Unsolved Mystery of Natural Rubber Biosynthesis

KAYLA DIAS (SCIENCE - BIOLOGICAL SCIENCES)

Natural rubber (NR) is an irreplaceable raw material and constitutes 40-45% of the total rubber used. Currently, nearly all commercial NR comes from a single species, the Brazilian rubber tree, which poses risks to the global supply. Over 2500 plant species produce different quantities and quality of NR but few meet industrial standards. To diversify our sources of NR, we need to develop and improve alternate plant species, but our understanding of how NR is synthesized in plants is limited. The main objective of this research is to advance our understanding of NR biosynthesis using various plants within the Asteraceae family. Thus far, the field has established only two molecular components that are essential for NR biosynthesis, but it is suspected that there are many more. I will investigate the genetic variation present in one of the crucial components involved in NR biosynthesis in lettuce, guayule, and sunflower (Asteraceae), all of which produce different NR quality, even though they are closely related. I will also attempt to identify novel
proteins involved in this process by comparing the protein profiles of engineered lettuce plants that lack some of the NR biosynthetic components. The results of this research will bridge the gaps in our knowledge of NR biosynthesis and provide a foundation to develop and improve other plants as commercially viable sources of NR.
Spotlight onto Surfactant-Steam-Heavy Oil System Behavior  
MOHAMMADALI AHMADI (ENGINEERING - CHEMICAL & PETROLEUM ENGINEERING)  
Heavy oil and bitumen play a vital role in the global energy supply, and to unlock such resources, thermal methods, e.g., steam injection, are applied. Different additives, such as air, solvents, and chemicals, can be used to improve these methods’ performance. As a subset of chemicals, surfactants are potential additives for steam-based heavy oil recovery methods. Molecular interactions between surfactant/steam/bitumen have not been addressed in the literature. This project investigates molecular interactions between surfactants, steam, and real Athabasca oil sand in high-temperature and high-pressure conditions using molecular dynamics (MD) simulation. According to MD outputs, adding surfactant molecules to the steam phase improved the interaction energy between steam and bitumen. Moreover, surfactants could improve steam emulsification capability by increasing the interfacial thickness between bitumen and steam phase and decreasing interfacial tension between these phases. This research provides fundamental information which is essential in surfactant formulation for such heavy oil recovery methods, which provide greener technology for oil sands and bitumen production.

The Aims-Based Philosophical View of Scientific Integration  
ALICAN BASDEMIR (ARTS - PHILOSOPHY)  
Scientific integration is a practice of combining various scientific activities including modelling, explaining, experimentation and data-analysis. It is fundamental to the joint scientific work that allows scientists from different disciplines, fields, and sub-fields to coordinate and communicate their activities. There is a tendency among some philosophers of science to portray integration as the overarching aim of science (Kitcher, 1999; Mitchell, 2002). These accounts fall short of emphasizing different aims of scientists that allow, constrain, or preclude integrative activities. I claim that integration of different activities is not always desired or achieve in all contexts so there is a need to examine how integrative activities succeed or fail in relation to the aims that scientists pursue. I propose the integrating-for-purposes view stating that integration is not an overarching aim of science, but it is an activity that is associated with the achievement of various purposes in specific scientific contexts. This view provides the conditions of success and failure of integration by examining different aims that are associated with integrative activities in structural biology. I will articulate some cases of failure in which (i) scientists prioritize aims that are not associated with integrative activities, and/or (ii) the presence of some constraints prevents integrative activities. This view promises a better understanding of the practice of integration.

The Use of Graphene Oxide Nanosheets For Oil Recovery  
HECTOR BONILLA (ENGINEERING - CHEMICAL & PETROLEUM ENGINEERING)  
In recent decades the use of graphene components, such as graphene oxide, in different fields has proved the versatility and opportunities carbon based material can bring in the development of technologies. Novel applications for 2D graphene oxide (GO) nanosheets can be found for various industries like aerospace, food processing, energy storage, and petroleum. The oil and gas industry have tested and developed a wide range of nanofluids to extract the residual oil from reservoirs. The use of nanofluid with low concentrations of GO nanosheets has been proved to be an economically viable and efficient material to extract the remaining oil in conventional reserves. Researchers have been able to incorporate small quantities of this material
and significantly improve the oil recovery. Existing studies on flows of particle suspensions such as GO in porous media mainly focus on oil recovery in rock samples. Due to the opaque nature of rock structures, the mechanisms underlying the incremental oil recovery have not been fully discovered. In this study, we develop a visual micromodel resembling the network of pores and throats in a target sandstone rock. An advanced imaging system is built to record the flow events in micromodels. The interfacial tension and contact angles values properties of the oil-displacing fluid interfaces are obtained by a pendant drop and sessile drop apparatus. The visual models are used to unravel mechanisms underlying the oil displacement by water.

**Occupational Safety in Animal-Assisted Intervention Settings**

AMBERLEE BOULTON (MEDICINE - COMMUNITY HEALTH SCIENCES)

Animal-Assisted Intervention (AAI) is often considered a multisensory and somatic experience for human clients. These experiences range from petting an animal co-worker in an office, to interacting with horses in a barn, or walking a trail with a dog. Although multisensory aspects of AAI have been explored for humans, how an animal co-worker is impacted by sensory experiences in AAI locales has received perfunctory attention. Additionally, research and reflexivity in AAI remains anthropocentric, leaving the determination of environmental and emotional stressors on animal co-workers primarily in the purview and perception of the human practitioner. Using constructive grounded theory from 36 semi-structured interviews with AAI professionals and volunteers in Nova Scotia, Canada, this presentation will speak to practitioners’ understanding of their AAI locales in relation to their animal co-worker’s occupational health and well-being needs.

**Sex Differences in Quality of Life in Patients with POTS**

KATE BOURNE (MEDICINE - CARDIAC SCIENCES)

Postural tachycardia syndrome (POTS) is a common form of orthostatic intolerance that primarily affects female patients. We sought to identify quality of life (QOL) impacts in female and male patients with POTS using the RAND36 Measure of Health-Related Quality of Life. Survey data were collected between Jul 2015-Dec 2019. Data are presented as mean±SD. There were 6,301 patients with MD-diagnosed POTS included in this analysis (94% female). More female than male patients reported at least one comorbid diagnosis in addition to POTS (85% vs. 71%, p<0.001). QOL was reduced in female compared to male patients in the physical functioning(40±25 vs. 49±27, p<0.001), role limitations due to physical health(11±25 vs. 15±30, p=0.04), energy and fatigue(20±16 vs. 24±20, p<0.001), pain(45±25 vs. 53±28, p<0.001) and general health(28±18 vs. 33±19, p<0.001) domains. Role limitations due to emotional health(51±45 vs. 47±45, p=0.08), as well as social functioning(41±27 vs. 40±29, p=0.4) and emotional well-being(60±20 vs.59±21, p=0.2) were not different between females and males. Overall, females experienced lower physical health QOL(35±20 vs. 43±24, p<0.001) and overall health related QOL(51±21 vs. 54±24, p=0.02) than male patients. Overall mental health related QOL was not different between male and female patients(53±22 vs. 53±24, p=0.6). The increased burden of comorbid diagnoses in female patients may be a contributing factor to reduced physical health and general health QOL.

**Expanding Ways of Knowing: Theorizing the Process-As-Relatio**

HEATHER CANT (ARTS - DRAMA)

Cognitive imperialism is the overt and subliminal messaging that perpetuates colonialism by influencing how and what we think. In order to engage in decolonization practices, it is necessary to break this thought boundary and begin to hold an anti-imperial mindset. Engagement with Indigenous epistemologies can aid in developing a critical understanding of the anti-imperial thinking that is central to Indigenous ways of knowing, being, and engaging with the world. Process-As-Relation is the paradigm yielded from
my study of Indigenous worldviews in artistic praxis. While it was generated to shift my own artistic ontology – how I embody my worldview as a director – it is a system of thought that can aid other theatre artists in addressing their own relationship to imperial thinking in their artistic praxis. The framework and methodology of Process-As-Relation reflects the practices of intersectionality, anti-oppression, and heterarchical power distribution and ethically considers alternate ways of knowing through the ethnographic research of Indigenous peoples’ cultural perspectives and artistic practice in the theatrical medium. It can be understood to be a paradigmatic system that allows for the fluidity of paradigmatic substance to be generated through artistic process dramaturgy and the participants. It is intended to resist the fragmentation that underlies western philosophical thought patterns and encourage relational thinking.

**Museum Internship with Ancient Coins: Experiential Learning**

**BRITTANY DEMONE (ARTS - CLASSICS & RELIGION)**

This presentation looks at my current work experience with the ancient coin collection housed at Nickle Galleries, University of Calgary. This opportunity is part of the Transformative Talent Internship program offered by the Faculty of Graduate Studies. The internship provides me with a unique tangible experience with the ancient objects I study, which are rarely accessible to Canadian scholars of Classical antiquity. Additionally, it offers the museum and curatorial experience that can lead to a future career in the museum field. This talk will explore my work during these challenging times. I will highlight my project with ancient Greek and Roman coins, and my learning about collections and records management by working directly with ancient numismatic artifacts. Additionally, I am photographing the coins and developing a virtual exhibition to further engage students and public with the collection.

**Family Dynamics of Emerging Adults Navigating Blood Cancer**

**SANDIP DHALIWAL (NURSING - ONCOLOGY)**

Emerging adults, aged 18 to 25, are undergoing many developmental transitions in which they are becoming independent and differentiating from their family of origin. Therefore, a family consisting of an emerging adult is experiencing many normal changes and renegotiations of relationships. A diagnosis of hematologic (i.e., blood) cancer during this crucial time can create challenges and complicate the developmental tasks of these families; yet, family experiences of hematologic cancer during emerging adulthood have been under-researched and much of what is known has been extrapolated from studies focusing on adolescents and pediatric cancer survivors. Understanding how dyadic relationships, between emerging young adults and their parents and siblings, are affected by a diagnosis of hematologic cancer may provide nurses and other health care professionals valuable insight on how to therapeutically intervene in the courses that these families take and foster optimal outcomes. A hermeneutic research inquiry, as guided by the philosophical hermeneutics of Hans-Georg Gadamer, presents a meaningful approach to understand complex phenomena within human and social sciences such as nursing. Thus, my proposed thesis work is a hermeneutic study aimed at understanding how navigating hematologic cancer affects family dynamics between emerging young adult patients and their biological or adoptive parents and siblings.

**Breaking the Cycle of Intimate Partner Violence**

**KAITLYN DILLABOUGH (MEDICINE - SURGERY)**

Every 6 days in Canada, a woman is murdered as a result of intimate partner violence (IPV). Globally, 1 in 3 women experience IPV in their lifetime. Challenges associated with identifying and providing support for those in violent relationships are magnified by the COVID-19 pandemic isolation requirements. There is a critical need for focused collaboration, research, and education to protect the health and well-being of all Canadians. Our interdisciplinary team employs novel research methodology to have developed an IPV
educational program for medical trainees and learn with patients, healthcare providers (HCPs) and medical students, how to best identify and assist those in violent relationships. Patients report being inconsistently asked about IPV and the prevalence of IPV perpetrators in orthopaedic fracture clinics remains unknown. Furthermore, HCPs and medical students lack appropriate tools and report lack of comfort with IPV screening and responding to disclosures. To address these needs, we aim to achieve the following objectives: 1) assess our recently developed IPV educational program for medical students, 2) validate our new patient-informed screening tool for identifying perpetrators of IPV using non-accusatory language, 3) measure patient and HCP comfort with the new screening tool, 4) determine the prevalence of likely IPV perpetrators presenting to orthopaedic fracture clinics, and 5) develop streamlined access to IPV resources for patients and providers.

How mothers’ gut bacteria instruct fetuses during pregnancy

SHARON DONG (MEDICINE - MICROBIOLOGY)

During pregnancy, mothers not only protect and provide but also ensure the proper development of organs like the immune system. Some directing signals come from the mother’s gut microbiota: the plethora of resident bacteria, viruses, and fungi. Our microbial relationship in early childhood impacts our health well into adulthood. Many immune-mediated diseases are rising in incidence worldwide. Some attribute a link to differential players of the microbiota, especially during early life. I am creating tools to observe how signals from mothers’ guts delay or promote disease in mice genetically predisposed to developing Type 1 Diabetes. I am deleting genes in a bacterial strain’s genome so that it cannot produce amino acids required for its growth. Thus, I control when the bacteria proliferate by limiting nutrient access. All mice will be in an actively sterilized, germ-free environment. In exposing pregnant mice to these bacterial strains, the offspring will only receive bacterial signals during gestation and through nursing. I will compare when signs of disease occur, such as high blood glucose levels, in offspring born to completely germ-free mice or those briefly exposed to bacterial molecules early in development. These findings may support mothers during pregnancy by providing targets for microbial therapies to lower the risk of their children developing Type 1 Diabetes.

Liquid-in-Liquid 3D Printing of Graphene Oxide-based Inks

ELNAZ ERFANIAN (ENGINEERING - CHEMICAL & PETROLEUM ENGINEERING)

Graphene oxide (GO) is obtained via exfoliation of graphite; GO can be absorbed strongly to a variety of liquid-liquid interfaces. The ability of GO nanosheets to be closely jammed together at the interface and form a robust interface, combined with non-Newtonian characteristics and shear thinning behavior of GO suspensions make them an ideal candidate for 3D liquid-in-liquid printing. Herein, we study the liquid-in-liquid printability of GO aqueous suspensions in silicone oil in presence of a surfactant (POSS). GO suspensions showed excellent printability even at extremely low concentration of GO (0.3vol.%). All the printed configurations were stable over days, due to a special encompassing and elastic film created by the attachment of GO nanosheets and POSS at the oil/water interface, confirmed by IFT and interfacial rheology measurement. Additionally, the GO suspensions showed excellent electrical properties (e.g., electromagnetic interference (EMI) shielding of 99.99% of the incident wave). Hence, the unique electrical features of water/GO suspension, such as excellent EMI Shielding Effectiveness, and their outstanding liquid-in-liquid printability make them a versatile candidate for diverse advanced applications such as all-liquid EMI shields, all-liquid reconfigurable electronics, and on-demand, all-liquid electrochemical cells.

Nuclear terrorism: informal cooperation as a solution?
MARIANNE GRENIER (ARTS - MILITARY, SECURITY & STRATEGIC STUDIES)
The international approach regarding nuclear terrorism involves cooperative regimes: either formal agreements with embedded sanctions or informal organizations where collaboration is encouraged but without enforcement measures. Is it possible that the latter is the key to more effective prevention and tempered relations between states? Nuclear incidents have long been present in the media and popular culture, in part due to their grandiosity, but also because of their close reality. At the reach of non-state actors, nuclear material, weapons, and facilities can become enormous threats to our societies. Although many states attempted to prevent nuclear incidents, debates since the end of the Cold War on the likeliness of terrorist attacks have been very polarized. Numerous states have put forward and ratified formal treaties and UN accords, but these agreements still face staggering challenges regarding their implementation. Therefore, could informal collaborations through regimes that put forward norms, communication routes, resources, and expertise between various actors be a solution for efficient prevention of nuclear terrorism? The paradox is that flexible and far-reaching approaches to the regulatory framework would result in improved prevention, as opposed to formal regimes. This case study of the Nuclear Threat Initiative will illustrate the efforts and potentials of informal regimes to propagate broad contingency plans when assessing and preventing nuclear terrorism.

Solar powered bioconversion of carbon dioxide to blue dye
MARIANNE HAINES (SCIENCE - GEOSCIENCE)
We ran a photobioreactor pilot plant with ~ 1000 L of culture for 140 days in Calgary, Canada. Our system is unique in that it comprises a mixed microbial community of ~ 80% cyanobacteria and operates at high alkalinity and high pH (10+). Our community can be converted to a high value blue dye (phycocyanin) and the remaining fraction to methane which is used to power the operation. Cyanobacteria perform photosynthesis consuming CO2 as a carbon source while utilizing sunlight energy. By pulling CO2 from the atmosphere this technology has the potential to substantially reduce the carbon intensity of blue dye production. Over the season we generated 5.3 kg of dry biomass with no operational down time due to cyanobacterial predators. The initial growth rate was high, however after day 70 it more than halved. The decline in growth rate coincided with (1) a decrease in the volume of liquid exchanged in the reactor, (2) less available iron, (3) a change in community composition and (4) an increase in biomass density. The season ended when the photobioreactor exploded due to freezing tubes. Lessons learned from 2019 have been applied to a successful 2020 operation. Now we move forward with our spin-off company, Synergia Biotech.

Sum-throughput maximization in wireless powered IOT network
REZA JAFARI (ENGINEERING - ELECTRICAL & COMPUTER ENGINEERING)
This paper studies a cognitive wireless powered backscatter communication network. Such a network consists of some distributed secondary backscatter sensors (SBSs), capable of either conventional or backscatter communication, and a hybrid access point (H-AP) as a secondary network close to a primary network to use its spectrum, using an underlay spectrum sharing model. In this model, H-AP and SBSs operate in in-band full-duplex (I-FD) mode. Thus, they can simultaneously receive and transmit on the same frequency band as that of the primary network. As a consequence, spectral and time efficiency will be increased. Moreover, when SBSs have little available energy, they switch to the low-energy consumption backscatter method instead of a conventional transmission method. The first goal is to maximize the sum-throughput of SBSs, and it is shown that such a problem is a convex optimization problem. By proposing an algorithm called joint optimal time and energy allocation (JOTEA), the closed-form expressions for the optimal allocated time and energy to SBSs will be obtained. Numerical results illustrate that with the JOTEA algorithm, more sum-throughput will be achieved compared to the benchmark equal time allocation method. Even more, if the self-interference cancellation circuit considerably cancels self-interference in the H-AP, the I-FD mode achieves higher sum-throughput performance than the half-duplex counterpart mode.
Dexmedetomidine, a novel neuroprotective anesthetic agent

NEREA JIMENEZ-TELLEZ (MEDICINE - BIOCHEMISTRY AND MOLECULAR BIOLOGY)

Anesthetics are required for major surgical procedures, however, the precise mechanisms underlying their modes of actions remain poorly defined. Recent animal studies have raised alarms regarding anesthetics’ long-term cytotoxic effects, specifically on the nervous tissue. It is thus important to identify potential sites of anesthetic toxicity and then identify mitigating strategies. Here we define the cellular and molecular mechanisms underlying anesthetic-induced toxicity in a cell culture model. We demonstrate the effects of the anesthetic Dexmedetomidine (DEX) (0.05 µM to 10 µM) on rat neuronal viability. We show that DEX does not affect neuronal viability when used below 10 µM. However, in the presence of DEX, neurons exhibited hyperfused mitochondrial network, and more neurite branching - albeit with no differences in synaptic puncta formation. We next asked whether DEX could rescue neurons from neurotoxicity, induced by other anesthetics. Neurons were exposed to sevoflurane, either alone or following pre-treatment with DEX. Pre-treatment with DEX rescued neurons from cell death, and this neuroprotection involved changes to mitochondria homeostasis and morphology. This study underscores the importance of DEX as a conventional anesthetic agent and the one that also plays a neuroprotective role against other agents.

Site-Selective C-H Amination in Azaheterocycles

MILANPREET KAUR (SCIENCE - CHEMISTRY)

In this talk, we will discuss about the development of a new catalytic system that can lead to site-selective C-H amination in azaheterocycles.

More than Emotions: Moving Beyond Emotional Regulation

DARRAH KENNEDY (EDUCATION - EDUCATIONAL PSYCHOLOGY)

Many interventions to assist individuals experiencing difficulties typically labeled as Borderline Personality Disorder (BPD) focus on developing emotional regulation skills. Briere reports that the impact of childhood trauma and maltreatment and the resulting psychological difficulties are categorically the same issues faced by those diagnosed with BPD: the instability of emotions, relationships and one’s sense of self. Briere’s theory on self-trauma conceptualizes these issues as disruptions to normal functioning or as altered self-capacities. Briere developed an assessment tool called the Inventory of Altered Self-Capacities (IASC) to understand the extent of the self-capacity disruption. Several studies have shown that altered self-capacities mediate the relationship between childhood trauma and resulting psychological. The focus on intervening to promote emotional regulation is only one of the potential pathways to assist childhood trauma survivors. In this presentation, I argue for the need to research interventions addressing the other components; relationships and sense of self. I also highlight the importance of using the IASC to fully understand disruptions to normal functioning experienced by individuals experiencing difficulties typically labelled as BPD.

Stable Cavitation Threshold for Safe BBB Disruption

SONIA KHAN (ENGINEERING - ELECTRICAL AND COMPUTER ENGINEERING)

Blood-brain barrier (BBB) is a major hinderance for tumour-specific therapies and drug delivery into the brain. Recent studies show focused ultrasound (FUS) combined with microbubbles as a promising technology for safe and reversible BBB disruption. When ultrasound is irradiated into the tissues, injected microbubbles will oscillate. This phenomenon is called acoustic cavitation which contributes to the BBB opening through stable or inertial cavitation. Stable cavitation is characterized by subharmonic and ultra-harmonic emissions of the frequency of ultrasound used for excitation, which produces a stable and repetitive contraction and expansion of microbubbles, forcing the tight junctions of BBB to open whereas
inertial cavitation is characterized by a wideband emission causing microbubble collapse and disruption and may cause permanent damage to the blood brain barrier. The objective of my study is to drive the ultrasound transducer at a pressure that sustains stable cavitation while avoiding inertial cavitation, by using data captured by a hydrophone. A series of open loop responses on a pre-clinical BBB system will be acquired by varying pressure and cavitation response will be observed. The acquired signals will be processed and studied to determine threshold of stable cavitation. My research will also target at comparing different signal processing methods to increase subharmonic detection and define clear patterns on subharmonic where stable cavitation is maintained.

**Confronting the experiences of disabled Muslim women in society**

MAIMUNA KHAN (SOCIAL WORK)

In this presentation, I outline my master’s thesis which seeks to examine and interrogate dominant ableist, racist, and neocolonial discourses as they shape the experiences of disabled Muslim women in social service settings such as social work. Grounded in transnational feminist, critical disability, and critical race theories, I unpack how such discourses and attitudes construct disabled Muslim women, govern their realities, and shape their experiences. I use a postcolonial lens to examine and question the ways deficit-based discourses typecast disabled Muslim women as pathologized and unproductive bodies/minds, as well as challenge the assumed homogeneity of their bodies and experiences. I critically analyze how interlocking systems of oppression have shaped the unique experiences of disabled Muslim women by problematizing the role of helping professions such as social work in reproducing dominant discourses.

**CANT-HYD: Show me the hydrocarbon degradation genes!**

VARADA KHOT (SCIENCE - GEOSCIENCE)

Hydrocarbons are found in many pristine environments, from natural sources such as petroleum reservoirs and gas seeps to man-made sources of pollution. Microorganisms that can utilize hydrocarbons as a carbon (“food”) source are of interest because they can be used to spot areas enriched in hydrocarbons and have the potential to remediate contaminated sites. But how do we know if a microorganism can degrade hydrocarbons? Discovery of microbial hydrocarbon degradation pathways has been exclusively dependent on laboratory isolation and characterization of microorganisms. With the advent of whole-genome sequencing and metagenomics, we can assess whether a particular microbe or a microbial community has the genetic potential to utilize hydrocarbons based on its genome or metagenome. However, no bioinformatic databases for annotating hydrocarbon degradation genes are currently available. Moreover, these genes are also often mislabeled since many of them share sequence similarity to proteins associated with other, more well-defined, metabolic pathways. We developed a database of Hidden Markov Models (HMMs), named CANT-HYD, for the annotation of 36 key hydrocarbon degradation genes using experimentally verified seed sequences. Our rigorous methodology for HMM development and thorough validation show that CANT-HYD will accurately identify microorganisms and microbial communities which have hydrocarbon degradation potential.

**Food Pedagogy for Transformative Social Change**

CHELSEA KLINKE, GERTRUDE SAMAR & VERONICA LEWIS (ARTS - ANTHROPOLOGY & ARCHAEOLOGY)

Food Studies, as an emerging and interdisciplinary field, has produced abundant theoretical, analytical and conceptual insights into contemporary agro-food system dynamics. However, space still exists for the convergence of classroom-based food pedagogy and transformative community work to promote social justice frameworks. While calling for a paradigm shift within educational systems, we ask, how can community-based experiential engagement in post-secondary food pedagogy enhance student
Food Insecurity and Maternal and Child Health in Nicaragua
MADELYN KNAUB (ARTS - ANTHROPOLOGY & ARCHAEOLOGY)
In Latin America, food insecurity rates are increasing faster than anywhere else globally, and 31.7% of the population in the region is experiencing food insecurity1. As a result, research into household food insecurity (HFI) is urgently needed. Studies on HFI in Latin America are incredibly few, with no studies undertaken in rural areas. People living in rural Latin America are more at risk for adverse health outcomes than urban areas2. Further, women and children are 13% more likely to be food insecure than males1. Therefore, it is critical that research must be focused on these areas. It is recognized that to increase the effectiveness of public health efforts, locally relevant data must inform these efforts3. My research will utilize previously collected data to study HFI in the rural community of Los Robles, Nicaragua, which has the worst maternal and child health outcomes in the country4. Using biomarkers (i.e. weight, glucose levels, immunoglobin E), I will study the mental and physical health of women and children within the community. The data will be used to build an allostatic load model - a long-term health outcome predictor that is essentially the cumulative ‘wear and tear’ on the body – to measure these individuals’ health. The results will be shared with the community to focus their public health measures on relieving the HFI burden of mothers and children in the area. This study is significant because it will be a pioneering study of HFI in rural Nicaragua.

A computational tool for site layout planning
AGNÉI MARCANO PINA (ENGINEERING - CIVIL ENGINEERING)
Site layout planning optimization has been defined as “the objective of determining the optimum arrangement of objects on a construction site”, which is important due to its interaction with other areas of project and construction management, such as scheduling, costs and planning. This topic has been studied for the past decades by proposing methods and techniques to solve different parts of the problem: site space modelling, objects representation (type, boundary, mobility), time dimension modelling, planning goals, and objectives, search approaches and optimization techniques. However, despite all the efforts made by academia to create better optimization tools, these methods have not been implemented among the industry, relying on experience and rules of thumb to achieve an organized layout in construction projects. In this sense, the objective of this study is to design a user-friendly planning tool for site layout, focused on the industry’s requirements and needs to comply with planning goals such as productivity, safety, security and functionality. For this goal, literature revision, industry surveys, and analysis will be performed to understand the current state of site layout planning in Alberta’s construction context, to design and implement a web-based tool capable of performing these duties for practitioners, in an efficient and practical way.

Challenges of Identifying Both as Autistic and LGBTQ+
KEELIN McKIERNAN & BRITTANY LORENTZ (EDUCATION - EDUCATIONAL PSYCHOLOGY)
Researchers are increasingly emphasising investigation of the intersectionality between LGBTQ+ and (neuro)disability, such as autism, as the autism community has been shown to over-represent individuals
also identifying as LGBTQ+. With the increased frequency of individuals identifying as both autistic and LGBTQ+, researchers are focusing on decreasing barriers and better understanding the perspectives of autistic individuals who identify as LGBTQ+ to support them across various life settings. The current review sought to consolidate research on autism and LGBTQ+ identity, and the challenges experienced by these individuals. A systematic review was conducted to include relevant articles from 2010 to 2020, using “autism”, “experiences”, “LGBTQ+” and “identity” as search terms. Reviewed studies noted challenges including mental health concerns, the coming out process, seeking services, and relationships. Further, a focus on the positives of having a dual identity, recommendations to promote inclusion, and future research directions were identified. Through the examination of this unique population’s challenges, it is hoped that discussion on how health professionals and schools can work together to decrease or improve the challenges faced by those who experience this double identity occurs.

End-of-Life Experiences of Family Caregivers During COVID-19
SAMEER MITHANI (NURSING - FAMILY MEDICINE)

The current COVID-19 global pandemic has impacted all of our lives, but the population most at risk are older adults. Moreover, older adults with chronic conditions, such as dementia, are even more at risk. It is well documented that family caregivers (FCGs) of people living with dementia (PLWD) face challenges in providing care for their family member, which are compounded with the introduction of policies related to the COVID-19 pandemic. The purpose of this study was to examine the experiences of FCGs where the PLWD passed away during the COVID-19 pandemic. FCGs were invited to participate in the survey with the option of participating in a follow-up focus group. Of the FCGs (n=16) who participated in the survey two PLWD died as a result of COVID-19 and 11 individuals felt affected by COVID-19 precautions. FCGs reported their biggest concern was the effect of isolation on their family member, with one participant reporting “not having family visits, no activities, virtually no interactions other than people dropping off meals was extremely difficult for my father.” The results of the survey demonstrated the strain felt by family caregivers when their family member became palliative and passed away. In addition to the survey, a follow-up focus group will be conducted in September to further examine the experiences of FCGs and how COVID-19 affected their ability to grieve. The results from this study will contribute to the evidence for the needed supports for FCGs.

How the boundary layer specifications affect the wake region
ALI MOHAMMADI (ENGINEERING - MECHANICAL & MANUFACTURING ENGINEERING)

The flow around wall-mounted bluff bodies is characterized by fluctuating velocity and pressure fields. Generally, the impinging flow separates along the sides of the body, giving rise to a recirculation region called wake. For finite wall-mounted cylinders, the incoming flow also separates over the free-end of the obstacle and on the obstacle-ground junction, adding to the complexity of the wake. In this study, the effect of incoming boundary layer (BL) specifications on the wake dynamics of two wall-mounted square cylinders (both with a height to width ratio of 4) are investigated. One cylinder is immersed into a laminar BL with a relative thickness to height of 0.053 and the other is immersed into a turbulent BL with a relative thickness to height of 0.32. This choice of parameters represents engineering applications, such as chimney stacks. In this particle case, the separated flow from the free-end may bring hazardous pollutants towards the ground. This problem can be avoided by inducing an upward flow at the junction. To perform this study, the coherent parts of the experimentally measured flow fields are expanded into discrete empirical functions using proper orthogonal decomposition. As these modes are energetically optimized, a low order model of the coherent contributions can be educed based on a finite number of modes, through which the differences in the wake dynamics can be identified and studied.
Parent perspectives of the IPP process for anxiety disorders

RILEY MORRELL (EDUCATION - EDUCATIONAL PSYCHOLOGY)

Anxiety disorders are estimated to affect 1 in 20 Canadian youth. Anxiety has an impact on educational outcomes, and when severe enough, Alberta schools are mandated to implement an individualized program plan (IPP; or individual education plan) to accommodate student learning and foster success. The Alberta Education Act states that “parents have the right and the responsibility to make informed decisions respecting the education of their children” (p. 11), and parent involvement in IPPs have been shown to positively influence academic outcomes and long-term success. However, one study found that 6% of parents reported that they felt IPPs had no effect or were harmful to their children’s success, and another study indicated that 62% of parents were unsatisfied with at least one part of the IPP. Parents’ complaints included barriers related to knowledge of disorder, poor parent-teacher communication, and perceptions that educators lacked competence with their child’s diagnosis. Most studies have focused on the parents of children with high impact and highly noticeable disorders such as autism or learning disorders, but research on anxiety disorders has been neglected. My research aims to examine the perspectives of parents that have a child with an IPP for anxiety. The study is in the development phase, and the poster will present the literature review and proposed method for the study.

Using Reflection-in-Action in Simulation to Improve Mastery

JESSICA MULLI (NURSING)

Background: To date, research on reflection in simulation has focused on reflection-before-action through pre-briefing, and reflection-on-action through debriefing, with a clear gap in research focused on reflection-in-action within simulation. However, some have argued reflection-in-action is the hallmark of mastery of a subject, therefore, simulation facilitators should support reflection-in-action to help students develop mastery and artistry of their discipline. Purpose statement: The purpose of this research was to develop an in-depth understanding of the concept reflection-in-action during high-fidelity simulation. Methods: I reviewed literature with open date parameters using key terms reflection-in-action AND simulation, resulting in 22 articles. Data were analyzed, compared, and extrapolated into a matrix table to identify defining attributes, antecedents, consequences, and empirical referents of this concept. Results: Reflection-in-action must occur during simulation at a critical learning juncture with a pause in action to share knowledge. Implications: Reflection-in-action may help students gain new understanding, skills, and self-confidence in mastering their discipline. Future research should focus on how to identify and support reflection-in-action; students’ perception of learning, safety, and self-confidence related to reflection-in-action; and, the long-term benefits of students developing reflection-in-action practices as they transition into practice.

IBV 4/91 - A Nephropathogenic Poultry Virus in Eastern Canada

SHAHNAS NAJIMUDEEN (VETERINARY MEDICINE)

Infectious bronchitis virus is a highly contagious avian coronavirus, which challenges the world poultry industry. Chickens are the primary host of IBV. The virus causes a clinical disease called infectious bronchitis in the respiratory tract of chickens. Following the initial establishment of the virus in the respiratory tract, they can infect the kidney, reproductive tract, gastrointestinal tract, and immune organs leading to economic losses. Infection in the reproductive tract can result in egg quality, egg production problems with low or no egg production. Besides, the produced eggs can be miscolored, misshaped, with watery albumin which is not suitable for marketing. Weight loss and high death rate are the main problems caused by IBV in broiler farms. Although vaccination is the main control measure for infectious bronchitis disease, the continuous emergence of the new IBV variants challenges the vaccine efficacy. There are dozens of types of IBV present in the world, which need different vaccines to control. The characteristics of the virus,
pathogenicity, and tissue tropism vary for different IBV viruses in different geographic areas. Therefore, knowledge of the IBV type and its pathogenesis is important to develop effective vaccines. The project involves IBV 4/91, one of the well-known poultry viruses in most parts of the world. IBV 4/91 emerged in Canada in 2013 and was the commonly isolated IBV variant in Eastern Canada from 2013-2018.

**Perception of Serbian pitch accents by English speakers**

**DUSAN NIKOLIC (ARTS - LINGUISTICS)**

The Serbian Language contrasts words based on pitch accents. Pitch accents are defined as tones present on words. They can be high or low, or they can represent a combination of high and low tones. For example, two identical words in Serbian, such as ‘rád’ (work) and ‘ràd’ (willing to act), or ‘grád’ (city) and ‘gràd’ (hail), have different meanings because they have different pitch accents. Unlike Serbian, words in English may differ in the position of word stress, the loudest part of a word. For example, English words exPORT (to ship a commodity to another country) and EXport (a commodity sold abroad) contrast mainly in the position of the word stress. Since an individual's first or native language (L1) influences their ability to hear and produce aspects of a sound system of a second (L2) or non-native language, in this study, I asked whether English speakers would have difficulties perceiving differences in Serbian pitch accents? There were two groups of participants: English and Serbian speakers. They were required to carry out a sequence recall task, in which they listened to the sequences of four, five and six words contrasting in pitch accents, whereby they had to recall the sequence played to them. The results of the data analysis showed that there was no significant difference between English and Serbian speakers’ performances. This finding indicates that non-native speakers can perceive unfamiliar categories as a result of the universality of language structures.

**Developing global indicators for health data quality**

**LUCIA OTERO VARELA (MEDICINE - COMMUNITY HEALTH SCIENCES)**

Background: Health data is generated at every patient encounter with the healthcare system, then collected and stored as administrative health data. These are widely utilized to monitor diseases, measure patient responses to medical care, or evaluate patient outcomes. High quality data is fundamental for improving the lives of patients in Canada, and worldwide. However, there is currently no international and standardized approach for data quality assessment, thus, we aimed to develop such method. Methods: To identify a set of candidate data quality indicators (DQIs), we performed a thorough environmental scan of grey and academic literature on existing methods to assess data quality. Then, we coordinated a Delphi review panel, in which we asked international experts to evaluate and rate the appropriateness of the DQIs, to later finalize them based on their quantitative and qualitative feedback. Results: The final 24 DQIs developed encompass the 5 data quality dimensions: Relevance, Accuracy and reliability, Comparability and Coherence, Timeliness, and Accessibility and clarity. These will be key for stakeholders (e.g., World Health Organization) to assess health data quality using the same standard across countries. Conclusion: Emphasis should be placed on these novel DQIs, which will be valuable to compare the healthcare system performance internationally in terms of data quality, and to ultimately further initiatives for improving the quality of health data globally.

**Climate Change and Cultural Heritage: A Case Study**

**KELSEY PENNANEN (ARTS - ANTHROPOLOGY & ARCHAEOLOGY)**

The complex interactions with anthropogenic climate change have had a lasting impact on world heritage that continues to be threatened. The landscape of the southern lakes in the Yukon territory is experiencing change because of increasing temperatures associated with anthropogenic climate change. The land is a collection of fresh lakes full of fish nestled between high mountain peaks riding to the sky and has been cared for by First Nations for millennia. The area has seen continued use of the high-altitude mountainous
ice patches for hunting purposes as the cool refugia is sought by caribou and sheep. Impacts of climate change are causing the melting of ice patches, and this reveals further evidence of the antiquity of long-standing traditions. A community-based approach to research has determined a need for new and innovative ways for community members to connect and engage with remote and changing landscapes. The use of innovative virtual reality and 3-dimensional modeling software as developed through collaborative partnership with three self-governing First Nations in the southern Yukon territory will be explored. The integration of these datasets to showcase these significant sites is proposed for public tourism and education alternatives. The data collected will also be used to document and monitor change to the locations. This case-study is concluded with a suggestion for how virtual modelling might aid in heritage management in the face of climate change threats.

Access to Mood Disorders: An Unfair Race
SANDY RAO (SOCIAL WORK)
Mood and anxiety disorders are the most prevalent mental illnesses in Canada for all ages, affecting over 4 million Canadians, increasing to 4.9 million Canadians by 2041.1,2,5 The highest rate of mood disorders is among young adults 20 to 29 years of age, with the impacts of mental illness, more than one-and-a-half times that of all cancers when taking into account years of life lost due to premature death and years of reduced functioning.1,2 Canadians with mood disorders are also at the highest risk for suicide.1,2,5 Not only an individual issue, the economic burden of mental illness in Canada is estimated at $51 billion dollars per year.1,10 In addition to the stigmatic and structural barriers to access, such as institutionalized racism and social determinants of health, there are more nuanced issues at the clinical level.1,2,5,7,10 Canadians with mood disorders are particularly disadvantaged in traditional health systems as all voluntary points of access are predicated on personal motivation or agency; and the same symptoms that warrant a diagnosis for a mood disorder interfere with those functions that are necessary to gain access to health care.5,7,9 The result is a fragmented system not designed for, or by, young adults with mood disorders (YAMD). Access models, intended to accelerate pathways to treatment, instead become barriers for YAMD’s. This presentation will discussed the innovative patient-oriented mixed-method study.

Floating Between Truth and Fiction
HESAMADDIN REZAEI (ARTS - ART)
In this digitalized world, for many people, Google map street view a source for sightseeing. People can easily see and explore most of the streets and sights in the world through Google map street view. This experience would give viewers who are not from those areas the sense of the (digitally) examined area. In this paper, I explore how our perception is different from the Google map street view and how that perception is related to our aesthetic experiences. For this reason, I examined the Google map street views of different areas in Calgary, then after choosing a place, I went there to actually see the selected neighborhood. By taking photographs of those places I want to show my own perception of the places. However, simple photos could not satisfactorily represent my perception. Therefore, I borrowed deadpan aesthetics and used digital manipulation to depict my perception of the area completely. After editing the photos and presenting my online exhibiting with a link to the Google map street views, I invite people to challenge their perceptions with mine and also with the Google map street views. Audiences/participants are welcome to see my photos as representations of my perception from the designated area and also they are encouraged to visit the actual places by having the exact addresses as the name of each photo. They can also use the provided links to explore the Google map street view and see the place as it has changed through time by using the timeline function.
Knowledge practices among inpatient mental health nurses

HALLEY SILVERSIDES (NURSING)

How do mental health nurses use knowledge to enact their practice working in inpatient mental health environments? While there are often accepted knowledge bases for practice in different nursing contexts, as well as theories about nursing knowledge and development, the ways in which mental health nurses use knowledge, the influences on this knowledge, and how knowledge is used to make sense of their role and nursing practice is poorly understood. Utilizing theories and tools from both nursing and information studies, this proposed transdisciplinary research project is a unique, critical ethnographic study involving three inpatient mental health units in Calgary, Alberta. This study will attempt to understand the ways in which organizational and unit culture, as well as the power dynamics that are inherent within it, promote, incentivize, and influence the ways in which mental health nurses use knowledge to assess and provide treatment to patients. This research could yield results that would be of particular interest to those in nursing education, as well to health authorities that provide continuing education and development opportunities to mental health nurses.

Dilemma of the 21st century: can we regulate cyber warfare?

KATERYNA SOLDATENKOVA (ARTS - MILITARY, SECURITY & STRATEGIC STUDIES)

For various diplomatic, arguably ethical, and legal reasons, the idea of engaging in cyber warfare appears to be increasingly attractive for modern nation-states. In the last ten years, the world witnessed the rise in cyber offensive operations perpetrated by state and non-state actors. Similarly, several states already expressed their eagerness to respond with traditional means of armed conflict after cyberattacks. This field’s lack of legal regulations leads actors to overlook the harm that offensive cyber operations may inflict upon civil societies largely unprotected from cyber warfare. Even more alarming is the number of challenges that precludes the establishment of a successful regulatory framework to oversee cyber warfare activities: the classified nature of the field, the idea that the use of cyber warfare is a more humane way to resolve conflicts as opposed to traditional armed attacks, and finally, the technologically complex process of attributing cyberattacks to one particular actor. Current evidence suggests that rather than overcoming these difficulties, states are trying to develop more sophisticated ways to exploit them for their benefit. Therefore, it is crucial to understand whether there is a chance to overcome these challenges and establish necessary regulations to ensure more responsible cyber warfare practices.

Control of Highly Maneuverable Transitional UAV

MARYAM TAHERINEZHAD (ENGINEERING - MECHANICAL & MANUFACTURING ENGINEERING)

This project will develop autonomous control technology for aerial safety, security and defense missions in confined spaces including urban search & rescue, and surveillance. We address the problem with a fully-scalable highly-maneuverable autonomous Vertical-Takeoff-and-Landing (VTOL) Unmanned-Aerial-Vehicle (UAV) capable of safely and autonomously navigating at high-speeds in highly obstructed urban environments. To provide adequate monitoring coverage in urban environments requires UAVs capable of positioning and orientation their sensors in suitable locations impossible to reach by conventional mobile robots. The aircraft and its mechanisms to be further developed, based on previously developed prototypes, is a portable UAV suitable for indoor/urban settings. The system will demonstrate the safe operation of a smart UAV capable of performing missions in GPS-denied spaces. The UAV will be tested in dynamic settings that will exemplify via diverse scenarios which require fast adaptation to mission/environment changes. The results will show a UAV that responds/adapts to the environment while being unaffected by potential adverse aerodynamic ground/wall disturbances or atmospheric buffeting, environment changes, and mission objectives. The project will develop mechanisms to enable autonomous control enabling the UAV to fly at high speeds within confined spaces by performing pitch-hover and other maneuvers taking full advantage of the aircraft’s dynamics.
Precision Measurements on Antihydrogen with ALPHA-g

POOJA WOOSAREE (SCIENCE - PHYSICS & ASTRONOMY)

The ALPHA (Antihydrogen Laser PHysics Apparatus) collaboration aims to provide a possible solution to the baryonic asymmetry problem by testing CPT (charge conjugation, parity reversal, time reversal) theory and observing whether antimatter follows Einstein’s Weak Equivalence Principle (WEP), where the acceleration due to gravity that a body experiences is independent of its structure or composition. A measurement of this nature has never been done before, as previous experiments used charged particles which meant the experiments were dominated by electromagnetic forces. The ALPHA-g apparatus will trap electrically neutral antihydrogen produced in a vertical Penning-Malmberg trap and hold the antihydrogen in a magnetic well. Once the antihydrogen is released, the position of the resulting annihilation can be reconstructed with a radial TPC (time projection chamber) surrounding the trapping volume. This data will be used to measure the gravitational mass of antihydrogen, making this a crucial step in testing the fundamental symmetry of matter and antimatter. The ALPHA-g apparatus is currently being commissioned at CERN and TRIUMF, and the first gravitational measurements of antihydrogen are expected in 2021. I will be presenting some key components of the ALPHA-g apparatus and their functions, then proceed to discuss my current project regarding the laser calibration of the ALPHA-g apparatus.
12:45 - 12:57 pm: Exosome Isolation Technology for Early Diagnosis of Cancer

SARA HASSANPOUR TAMRIN (ENGINEERING - BIOMEDICAL)

Cancer is the second leading cause of death worldwide. In Canada, 225,800 individuals were diagnosed with cancer in 2020, and there were 83,300 cancer-related deaths. Cancer survival rates tend to be poor, due in large part to a lack of robust, early stage diagnostic methods. Early detection of cancer is critical for the positive long-term prognosis of cancer patients. There is now evidence to suggest that cancer cells secrete huge numbers of nanoparticles, known as exosomes, into a wide variety of biological fluids (e.g. blood, urine) very early in the disease process. These exosomes contain cancer specific biomarkers, which could be used to determine the identity and physiological status of the cancer cells. Being able to isolate and analyze these exosomes would enable much earlier than other known biomarkers that are routinely the targets of current diagnostics. My project focuses on a microfluidics technology platform capable of isolating and identifying cancer-specific exosomes in biofluids. A low cost, simple to use device with a high degree of accuracy for detecting cancer-specific exosomes would enable early diagnosis. Such a device could be used initially in a clinic for diagnosis, and thereafter by patients at home to routinely monitor disease progression. This technology has the potential to revolutionize the cancer diagnostics industry, save countless lives and significantly reduce the financial burden associated with cancer.

12:58 - 1:10 pm: Farmers’ behavioural studies related to cattle diseases

MARIT BIESHEUVEL (VETERINARY MEDICINE)

Understanding farmer behaviour can help successfully implement intervention measures for behavioural change and contribute to overcoming the assumption of farmers’ homogenous and constant behaviour in infectious disease models. To incorporate a human factor in mathematical models, understanding the complex behavioural structures is essential. This review was conducted to identify farmer behavioural studies and corresponding key behavioural constructs relative to infectious disease control on cattle farms. Worldwide, 26 countries conducted behavioural studies, resulting in 151 reviewed papers with 60.9% based on no theoretical framework. The use of theory in behavioural studies is important because it is known that explicit use of theory can help identify influences on behaviour change, understand the mechanisms of behaviour, and shape intervention implementations. It became clear that veterinary science is aware of behavioural studies’ importance, but it seems the main focus was on identifying influences on behaviour and not on behavioural change. The fact that theoretical underpinnings are often missing indicates the lack of understanding of how to perform behavioural studies, resulting in an overrepresentation of similar studies. Future recommendations are based on using recent advances in health psychology literature, which incorporate wider frameworks and establishing evidence of farmer successful behaviour change to identify key constructs.
1:11 - 1:23 pm: Childhood Trauma and ADHD: A Review

COURTNEY MILLER (EDUCATION - EDUCATIONAL PSYCHOLOGY)

Attention-Deficit/Hyperactivity Disorder (ADHD) is a common childhood disorder. Many children with ADHD have experienced some form of trauma. Previous research has approximated that nearly one-third of children with severe trauma met criteria for an ADHD diagnosis. However, there is limited research in this area. It is necessary for professionals to understand how these factors affect this association, and the role that these factors may have in prevention, assessment, and treatment. The purpose of the current study is to review recent literature on the association between childhood trauma and ADHD, with respect to the roles played by environment, symptom severity, and Post-Traumatic Stress Disorder. Method. A systematic literature search of peer-reviewed journals was completed using the university digital library. Key phrases included ADHD, trauma, PTSD, ADHD severity, and ADHD risk factors. Articles were included if they discussed 1. Ages six to early adulthood with ADHD, 2. Trauma exposure in childhood, and 3. Internal and external ADHD symptoms. The search yielded 10 articles published between 2000 and 2019. Results. Participants who experienced trauma and ADHD are influenced by both external and internal factors. Conclusions. By understanding external and internal factors that affect ADHD symptom severity in relation to trauma exposure, professionals may be better equipped to support clients impacted by trauma and ADHD.

1:24 - 1:36 pm: A network neuroscience approach to a brain disorder

MAHSA FARYADRAS (SCIENCE - PHYSICS & ASTRONOMY)

Individuals diagnosed with developmental topographical disorientation (DTD) are impaired in their ability to perform spatial navigation, and in some extreme cases they get lost even inside their own homes. This lifelong inability is present in the absence of any neurological disorder or acquired brain damage, with intact sensory and intellectual functions. Network neuroscience is an approach for identifying how different brain areas interact and communicate to perform a task and has proven to be effective in the studies of different brain disorders such as Alzheimer’s Disease. I will employ network neuroscience to investigate DTD-affected functional brain networks and their related properties. I will compare and contrast brain networks from DTD-affected individuals against a control group, and determine how communication between brain regions differs from one group to another.

1:42 - 1:54 pm: Physical Layer Security Relay Selection for 5G vehicles

LISA ZHAO (ENGINEERING - ELECTRICAL & COMPUTER ENGINEERING)

Autonomous vehicles (AV) are the natural extension of active safety technology. 5G enables self-driving cars (SDC) to communicate with ultra-reliable, low latency communications. Still, the challenges for SDC’s are just starting. Traffic infrastructure, such as intersections, need SDC’s to make a multitude of decisions in order to pass through safely. Using relay vehicles to communicate information prior to reaching the intersection is one way to ensure a vehicles safe passage. In addition, security threats from passive eavesdroppers in the environment provide an added layer of difficulty. Eavesdroppers are a serious threat because they steal information and use it for nefarious purposes. Physical layer security (PLS) can be used to enhance cryptographic techniques. Enhancing communication with PLS effectively protects information from eavesdroppers. These two issues of relay communication and security are what my research focuses on. This research investigates how secure communication in the presence of multiple passive eavesdroppers can be achieved with multiple relay nodes. The goal is to transmit information from the source to destination SDC with cooperative communication. In addition, the optimal communication path must also
be chosen as an optimization problem such that the source and destination achieve the best possible secure communication. Advancing the security of relaying between SDC’s will ensure that people have power over privacy without compromising security.

1:55 - 2:07 pm: Exploring lived experiences of spiritual distress
HARRISON CAMPBELL (EDUCATION - RESEARCH)
Spiritual distress is a complex experience that can have significant impacts on our mental health. This distress may include a troubled relationship with the divine, feelings of chronic shame and doubt, and conflicts in religious settings (Ellison & Lee, 2009). Many studies confirm the relationship between religion and positive mental health, while a smaller body of literature addresses spiritual distress (Captari et al., 2018; Exline, Yali & Sanderson, 2000). This research emerges predominantly from psychology and often utilizes quantitative methods with American populations. I will use qualitative interviews to explore experiences of spiritual distress in the Canadian context. There is a growing call in social work to incorporate understandings of spirituality. I hope to contribute to this endeavor in my research. I will interview 6 participants from a Christian background to understand the experience from this faith. While examining spiritual distress in multiple traditions is important, this is beyond the scope of my project. The knowledge gathered from the research project will be shared through workshops for university classrooms, religious institutions, and mental health agencies. Furthering our understanding of spiritual distress can improve outcomes for individuals seeking mental health care, inform approaches and programs in mental health and religious organizations, and contribute to social work research and education on spiritual and religious matters.

2:08 - 2:20 pm: Gut-Brain Connection in a mouse model of ALS-FTD
SUZIE LEE (MEDICINE - NEUROSCIENCE)
Trillions of microbes such as bacteria and fungi inhabit our body, harboring communities called the microbiome. Scientists are starting to make an important connection between microbiome and health. In particular, gut microbes are responsible for numerous functions within our body and help shape our brain activities. Abnormal changes to the gut microbiome are associated with numerous brain diseases. Within this group is amyotrophic lateral sclerosis-frontotemporal dementia (ALS-FTD), a spectrum of clinically and genetically overlapping diseases characterized by gradual paralysis (ALS) and cognitive decline (FTD). Recent findings suggest that the gut may play an important role in ALS-FTD: the microbiota of ALS patients and mice were found to be very different from healthy controls. I investigate the changes in gut microbiota using an ALS-FTD mice model by collecting fecal samples and sequencing them to study bacteria diversity. I also examine how gut microbiota-derived molecules such as lipopolysaccharide and bacterial metabolite may change the disease outcomes. Through my research that examines the gut-brain connection in ALS, I expect to clarify the poorly understood mechanisms underlying neuronal degeneration in these diseases. With the lack of current treatments available for ALS-FTD, I hope that the findings of this research will contribute to identifying biomarkers and future therapeutics (such as modifying the microbiota) to improve the lives of ALS-FTD patients.

2:21 - 2:33 pm: Involuntary Delayed Retir and Mental Health of Older Adults
MOHAMMAD RAIHAN (ARTS - SOCIOLOGY)
Objectives: Involuntary Delayed Retirement (IDR) is a potential stressor that is likely to cause strain and lead to impaired mental well-being among older adults. No studies examine how IDR influences the multiple aspects of mental health among older adults. To fill this gap, the purpose of this study is to investigate whether IDR is associated with the multiple measures of mental health. The second aim
is to examine whether involuntary delayed retirement affects mental health through lower sense of control. The third aim is to examine whether sense of control buffers the association between involuntary delayed retirement and mental health by conditioning the extent to which involuntary delayed retirement influences the loss of sense of control. Method: Data for this study come from the Health and Retirement Study (HRS), an ongoing nationally representative longitudinal survey in the United States. This study will combine both waves collected in 2010 and 2012, just following the Great Recession and focus on respondents at retirement age and older (age 65 and older). Associations will be examined using OLS regression models. Results: I expect to find that respondents who are experiencing IDR report higher levels of both anger-in and anger-out, depression, anxiety and lower levels of life satisfaction. Discussion: These findings will describe how job lock following the recession may have critical repercussions for multiple aspects of mental health among older adults.

2:36 - 2:48 pm: Hypercoagulability in Patients with Metastatic Bone Disease

LISA YAMAURA (MEDICINE - SURGERY)

Metastatic bone disease (MBD) occurs when cancer spreads from its initial site to bones. The weakened bones of patients with MBD are prone to fracture and often require surgical repair. Patients with MBD are at very high risk of developing venous thromboembolism (VTE), or blood clots. In patients with VTE, large blood clots form in the legs that can travel to the lungs and cause pulmonary embolism (PE). PEs are often life-threatening as clots in the lungs can prevent adequate oxygen delivery throughout the body. Unfortunately, despite these known risks, the optimal type, amount, and duration of blood thinners for prevention of blood clots in this high-risk population is unknown. The ability to identify patients with MBD who are at the highest risk for blood clots is critical so that surgeons can prescribe the best preventative medication. Using our novel thromboelastography (TEG) analysis, blood samples are tested to identify individuals at high risk of developing VTE. Currently, repeated TEG testing in patients before and after surgery has not been performed in patients with MBD. Therefore, by measuring changes in blood clotting over time in this study, we can determine those at risk for VTE and for how long after surgery. This novel patient-oriented information is clinically significant as it can be used to develop individualized medication guidelines for patients with MBD that consider their personal risk factors, in order to help reduce DVT and life-threatening PEs.

2:49 - 3:01 pm: New Indian Film Production Culture: A Case Study of Film Bazaar

NEHA BHATIA (ARTS - LINGUISTICS LANGUAGES AND CULTURES)

This research concentrates on ‘behind the scenes’ of recent Indian-European film co-productions such as ‘The Lunchbox’ (2013). Film Studies focused largely on the interpretation of cinematic texts underemphasizing the institutional and industrial contexts (McDonald 147). Therefore, film industry scholarship is a novel yet burgeoning interdisciplinary field of research that scrutinizes professional experiences, policies, and political-economic discourses behind the production of film and media content. Focused on the National Film Development Corporation of India (NFDC), the research addresses these gaps in the literature by interrogating the relationship between film policies and production stories of Indian independent producers unfolding against the conflicting backdrop of current right-wing nationalism and neoliberalism in India. This research calls for a hybrid methodology: through industrial-cultural analysis, the shifting macro-level cultural policies of the Indian state and micro-level cultural practices of independent film producers are examined to understand the construction of a new transnational cinema in India.
3:02 - 3:14 pm: Value added products from Calgary Biocell mining
TINA ABEDI YARANDY (ENGINEERING - CIVIL ENGINEERING)
Waste disposal practices have evolved over the years from open dumping to the current conventional practice of sanitary landfilling using the dry-tomb landfill approach. However, in recent years, the practices have further advanced with the introduction of the landfill bioreactors. In landfill bioreactors, waste degradation occurs relatively quickly; therefore, allowing the option to mine the waste cell to recover degraded waste residue and the landfill space. The excavated waste residue may contain material of value, including recyclables, refuse derived fuel and others, depending on the characteristics of the excavated waste. This paper presents the preliminary results from a characterization study of waste samples excavated from the Calgary BioCell. The results from the waste characterization study showed that the level of waste degradation increases significantly as the depth increases. The waste samples from the near-surface layers of the waste cell appear to be almost fresh whereas the samples from the bottom layers are mostly made of unidentifiable fine material which is completely degraded. Moisture content, ranging from 50 to 70 %, increased with the depth of the waste cell highlighting the effectiveness of leachate recirculation system. The results were used to further investigate the level of degradation and to determine the most feasible and rewarding end-use for the excavated waste.

3:15 - 3:27 pm: Investigating Skull Evolution in Mice Bred for Longer Limbs
COLTON UNGER (SCIENCE - BIOLOGICAL SCIENCES)
The mammalian skeleton is one of the most diverse biological structures and is important for animal movement and feeding. While extensive work has characterized the development and evolution of individual bones in detail, less is known about the relationships between sets of bones and how this influences the ability of bones to independently evolve. To study skeletal evolution, our lab used selective breeding, much like how dog breeds are made, to produce the Longshanks mouse. Longshanks mice were bred exclusively for increased shin bone (tibia) length compared to controls. However, other bones have also indirectly changed over time. Thus, Longshanks provides a unique opportunity to investigate how underlying relationships can cause evolutionary change in several bones. We investigated skull shape using 3D-xray scans of Longshanks mice spanning several generations of the tibia elongating selection process. We found that as the tibia got longer over time, the skulls in Longshanks mice also became longer and narrower. Next, we analyzed adolescent Longshanks and found that skull elongation is driven by enlargement of the growth centers in the base of the skull, similar to changes noted in the Longshanks tibia growth center. We show that changes to one part of the skeleton can affect other parts of the skeleton due to changes in shared bone processes. Thus, our work has implications for understanding the evolution of the limb and skull, which has applications in human evolution.
Lithospheric Flexure Modelling in the East Sea

MASUME AKBARI (ENGINEERING - GEOMATICS ENGINEERING)

The development of basins has important implications in geological and societal sciences. The study of the lithosphere helps to understand the mode of extension during basin opening. The Earth’s outer layers deflect under loads. Over broad regions, the lithosphere responds regionally to the loads. Plates resist bending (i.e., flexure) in response to loading-induced deformation. The flexure will be studied at the east of South Korea over the Ulleung Basin (UB). The Fourier transform of gravity anomaly and topography can be used to study flexure. Shipborne Gravity, and bathymetry data are available through Korea Institute of Ocean Science and Technology (KIOST) over this area. Gravitational admittance, the wavenumber parameter that modifies the topography to produce the gravity anomaly, provides a nonlinear system of equations. The model parameters (unknowns) are regional gravity, regional depth, location of the load, flexural rigidity, flexural wavelength, and the density of the load. The Levenberg-Marquardt inversion model will be used to estimate the model parameters. The estimated flexural rigidity, density and location of the load will help to understand the development of the UB. Modelling the contribution of flexure in the formation of UB helps to recognize the long-term mechanical properties of the lithosphere over this region. The elastic thickness of the lithosphere can be estimated through flexural rigidity, which is a measure of the strength of the lithosphere.

A Color center as a repeater for large-scale quantum network

OMID ALIGHOLAMIOSKOOEE (SCIENCE - PHYSICS & ASTRONOMY)

A quantum network has important applications including distributed quantum computing and secure communications. Since long-distance quantum networks need quantum repeaters, there are many attempts to make practical, more efficient, and cheaper repeaters. We are studying carbon trimer defect in hexagonal boron nitride which seems promising as a quantum repeater at room temperature. We plan to use nuclear spins as the quantum memory needed for repeaters because the nuclear spins have higher coherence time. There are two main things that we have to figure out. First, we will study the hyperfine coupling of the defect. Then, we will determine optical selection rules to find out the allowed optical transitions. These will pave the way to build a repeater that will be much cheaper, simpler, and widely usable compared to other repeaters since they all need temperature close to zero kelvins to operate but this repeater can operate at room temperature. Ultimately, the repeaters will let us have secure quantum communications and distributed quantum computation over long distances.

Alberta Indigenous Housing: Green Energy and Prefabrication

GABRIELA ALVES (SCHOOL OF ARCHITECTURE, PLANNING AND LANDSCAPE - ENVIRONMENTAL DESIGN)

The Indigenous housing system in Canada has been in crisis for years. It is characterized by culturally inappropriate housing and unhealthy living conditions. Although the literature review exposes enough content advocating for solving their homelessness, there is still little progress on the appropriate renewable energy technologies and prefabricated methods that may improve Indigenous homes in Alberta. This study examines the cultural appropriateness and availability of resources in Alberta on a twofold basis. First, exploring green energy technologies that conserve the natural environment and resources. Second,
examining relevant prefabrication techniques, that in addition to enabling a high number of houses to be built, may allow self-construction and self-determination to Indigenous communities. The methodology includes key-informant surveys, mapping, and elements of strategic analysis to determine cultural appropriateness and the availability of resources for each technology and method. By collecting data from a mix of Indigenous peoples and architects, this research provides insights and identifies potential culturally appropriate solutions to both green energy technologies and prefabrication. The findings of this thesis may affect how Indigenous housing is designed and built. Ultimately, it challenges the condition of Indigenous housing in Alberta and creates a basis for future research employing the technologies and methods judged appropriate in this research.

**Indigenous Students & Work Integrated Learning**

**NOAH ARNEY (EDUCATION)**

What ways, if any, does Work Integrated Learning (WIL) benefit the Indigenous students who participate? The purpose of this study is to identify the value of Work Integrated Learning for Indigenous students, to discover how Indigenous students perceive the value they gain and examine the quantitative pre-graduation value gained, and to discover if Indigenous students receive the same benefit from WIL as others. Research Question • What value do Indigenous students gain from Work-Integrated Learning? • Do the benefits as seen by the students fit within those outlined by McRae & Johnston (2016)?

**Friction Reduction using polymers and surfactants**

**MOHAMMED BAKIR (ENGINEERING - CHEMICAL & PETROLEUM ENGINEERING)**

In hydraulic fracturing (fracking), firefighting, and marine transportation, adding dilute amounts of friction reducers (i.e. polymers, surfactants) in these turbulent flow processes have been used to reduce friction in multiple fields including pipe flow by over 80%. In oil recovery processes such as slick water fracking, water mixed with proppant (sand) and chemicals (biocides, scale inhibitors etc.) underground at high flow rates (turbulent flow) and high pressures. As a result, these processes require high energy costs, high energy consumption, pumping power, and water consumption. To minimize these detriments to fracking, mixing water with dilute amounts of friction reducers (polymers such as polyacrylamide, surfactants and/or polymer surfactant blends) can reduce the water & energy consumption resulting from fracking. In addition, these processes reduce the high pumping rates resulting in energy-intensive processes such as fracking. To expand, friction is reduced in pipe flow by reducing the friction factor and consequently the pressure drop in the pipe under turbulent flow conditions.

**Inhibitory effects of endolysins on bacteria causing BRD**

**RUINA BAO (VETERINARY MEDICINE - MICROBIOLOGY)**

Bovine respiratory disease is a leading cause of economic loss in the beef and dairy industry despite the extensive use of vaccines and antimicrobials. The primary bacterial pathogens associated with bovine respiratory disease are Mannheimia haemolytica, Pasteurella multocida and Histophilus somni. The first line of treatment are macrolides, however bacterial pathogens associated with BRD are increasingly becoming multi-drug resistant. Thus, alternative strategies against MDR bacteria are needed to minimize antimicrobial resistance. Bacteriophage derived lysins are an alternative strategy against multi-drug resistance in treating bovine respiratory disease. Endolysins are produced at the end of the lytic replication cycle when bacteriophage hydrolyze the host cell wall to release their progeny. There is extensive literature on lysins developed against clinically relevant to human disease, Gram- positive pathogens such as methicillin resistant Staphylococcus aureus. However, this is the first time that endolysins derived from Mannheimia haemolytica phages are being engineered and assessed for antimicrobial.
Infectious laryngotracheitis virus: A vaccine efficacy study

CATALINA BARBOZA SOLÁS (VETERINARY MEDICINE)

Most of the chicken meat consumed in Canada is breed within the country. This means that the price of meat in the market is dependent on the local production and availability in the farms. Infectious laryngotracheitis (ILT) is a respiratory disease caused by a herpesvirus more commonly referred as Infectious laryngotracheitis virus (ILTV). Outbreaks of the disease causes drop in production and performance of the birds, therefore results large economic losses for the industry. The ILT outbreaks are common in the non-commercial flocks. Alberta does not vaccinate its commercial birds as routine, leaving them exposed to the disease. The objective of this study was to determine the efficacy of one of the safer options of vaccines commercially available against the second most common strain of ILTV encountered by backyard poultry in Alberta. For this experiment we separated 44 chickens in four different groups. Two groups were vaccinated. At 3 weeks of age, one of the vaccinated groups and one of the non-vaccinated groups were infected. For 2 weeks birds were observed twice a day for clinical signs. At 3, 7, 10 and 14 days post-infection, performance and viral shedding were evaluated. At day 4 and 11 post-infection, blood was collected to assess the immune response in each group. At 14 days post-infection the chickens were euthanized, and tissue samples were collected. Results showed that the vaccine provided a partial protection in the infected group that was vaccinated.

Public Installations on Computational Ontologies

KATHRYN BLAIR (SCIENCE - COMPUTER SCIENCE)

Today, machine learning and predictive algorithms find patterns in large stores of data and make predictions which corporations and governments then use to support decision-making. Yet, the system’s representation of reality can be more influential to outcomes than the complexities of daily life. I call these situations “computational ontologies.” They become problematic when they undermine the responsiveness and inclusivity of public decision making, and when their use makes, introduces, or perpetuates social or economic inequality in society. To address these challenges, the broader public must be able to participate in discourse about the social implications of this reality and provide input into the design of these systems. To this end, I will explore: How might participatory art experiences provide a context for the public to explore computational ontologies and their impact on society? In this talk, I discuss a methodology for engaging with the public with these topics, and for better understanding their experience through semi-structured interviews. I use installations exploring the impacts of computational ontologies, providing contexts for enactive exploration of these concerns. The experience is followed by phenomenographic interviews about how visitors experience the art installations. The data provides insight for subsequent installations and members of the computer science research community to better engage the public.

Culture representation in ESL textbooks

DANNI CHEN (EDUCATION)

English learning textbooks play a crucial role in supporting language learners to construct their views of new academic life, their progressed understandings of new values, beliefs, and practices, and their social relationships. This is particular so with English as Second Language (ESL) learners whose success in a new cultural environment is conditioned not only by their English skills, but also by apprenticing certain and dominant ways of doing and being of a new environment. This has made it a critical issue to explore how ESL learners examine the embedded dominant cultural values in ESL textbooks and to identify how they are constructed within unequal relations of power to indicate learners’ cultural practices in a new cultural environment. Thus, this research is designed to explore the construction of cultural values in ESL textbooks to which ESL learners are read. Furthermore, my research will look at how the unequal power relations between dominant cultural values and ESL learners’ cultural traditions are established and to what extent it affects ESL learners’ cultural practices in a new cultural environment.
Defining Risk for Blood Clotting Following Major Fractures

ASHLEY CLARKE (MEDICINE)

The development of blood clots, known as venous thromboembolism (VTE) are serious and common complications following major fractures. Pelvic and acetabular fractures are reported to have the highest incidence of symptomatic VTE, which carries a significant mortality risk on its own. However, even less severe non-life threatening VTE can still result in physical activity limitations and a decrease in functional abilities. It is unknown for how long following a pelvic and acetabular fracture a patient remains at increased risk for VTE. There are currently no guidelines to direct which medication is best and for how long it is required to prevent blood clots. Thrombelastography (TEG) will be utilized to address this gap in knowledge. TEG analysis takes a small amount of blood and provides an accurate and almost immediate picture of the change in clotting ability of the patient’s blood. Samples taken over a time period, determined a priori, will help to give an expanded view of the duration of increased clotting risk. This research will help inform how TEG analysis can be used as a point-of-care assessment tool to help identify which patients are at greater risk of abnormal clotting following a major fracture. Understanding increased VTE risk in this high-risk population will help inform clinical practice guidelines for future VTE prevention and provide insight into personalized preventative medicine.

New Songs and Old Ones; Museums & Indigenous Ownership

AMANDA FOOTE (ARTS - ANTHROPOLOGY & ARCHAEOLOGY)

Museums are important sites of representation where issues like identity, history, culture, and value are built and entrenched. Yet museums have traditionally been operated by an elite community of scholars, who do not represent the diverse cultures that are put on display. Indigenous people have been diligent advocates in seeking greater control of and access to their cultural belongings. Much scholarship exists on the criticality of this work for the health and sustainability of institutions and Indigenous communities, yet museums still grapple to accommodate notions of ownership and care from outside western norms. While policies have changed, Indigenous and critical scholars argue that museums are inherently vested in upholding colonialism, and a paradigm shift is needed for reconciliation to occur. Working in the museum field and in Indigenous community, I have learned much about nuanced challenges in supporting Indigenous people towards greater access and control of their material cultural belongings. This research furthers the work that I have been doing to steward access and control for the Îethka Nation, and asks: how have formal structures impacted Indigenous access to, and control of, cultural belongings in museums and collections? This work is being done in collaboration with the Îethka Nation through guidance from a community council, and the research protocols and intended outcomes have been determined through community engagement and discussion.

Radical pairs role in xenon-induced general anesthesia

HADI ZADEH HAGHIGHI (SCIENCE - PHYSICS & ASTRONOMY)

Understanding the mechanisms behind anesthesia as an unconscious state could help explain the emergence of consciousness. Studies show that administrated xenon anesthetics induce electron transfer, and that xenon anesthetic potency has isotope dependency. We propose that, during electron transfer, xenon’s nuclear spin could influence the spin state of the transferred electron and consequently the recombination processes. A well-established quantum model that includes such interactions is the radical pair mechanism. Based on this model we show that xenon anesthetic potency depends on its nuclear spin magnetic moment which is compatible with experimental findings. This suggests that Nature might harness quantum machinery in the complexity of our brains.
Degradation Monitoring of Pipelines Using Novel Sensors

MOHSEN HASSANI (ENGINEERING - MECHANICAL & MANUFACTURING ENGINEERING)

Pipelines are mainly used for transporting oil and gas products from producing fields to refineries and petrochemical plants. They are susceptible to degradation from defects such as cracks and corrosion, eventually leading to pipeline failure. Degradation monitoring of pipelines is of great importance to prevent catastrophic incidents and to mitigate environmental damages. Existing methods used for monitoring of pipelines conditions mostly rely on visual inspection or localized measurements. They suffer from lack of portability and incur high costs. More importantly, these methods only monitor pipeline integrity at discrete time intervals and certain locations. To overcome these challenges, a comprehensive technique using nanocomposite sensors is proposed for monitoring the strain and stress on pipelines. This information is important for monitoring of the degradation of pipelines, especially stress concentration and crack propagation on river-traversing pipelines due to soil erosion. The novelty of this research is that the proposed sensors will monitor pipeline integrity continuously along the length of pipe in real time. The outcome is vital for environmental protection and financial security, as it allows remediation and repair efforts to be made before catastrophic failure occurs, which is aligned with Alberta Energy and Utility Board’s objective of ensuring the safety and durability of pipelines.

Lytic Phages against Escherichia coli ST131 Clones

JENNY HYUN (VETERINARY MEDICINE)

Escherichia coli sequence type 131 is a causative agent for nosocomial and community-acquired urinary tract and blood stream infection. While the widespread of antibiotic-resistant (AR) ST131 clones is a global burden, treatment options are currently limited. Especially, strains that form biofilms are of a major concern as they are resistant to antibiotics and evade host immune responses. Using bacteriophage (phage), a virus that kills bacteria, as an alternative treatment against biofilm-forming AR ST131 is a feasible option. Phages that have lytic activities against ST131 have been isolated from various environment sources including wastewater. The aims of this study are; 1) to assess lytic activity of phages against clinical isolates of potential AR ST131 and the biofilms; and 2) to characterize phage morphology and genome. We have isolated 10 phages from wastewater obtained from the Bonnybrook Wastewater Treatment Facility and 6 phages from the Regina Water Treatment Plant. The lytic activity of phages against clinical ST131 isolates (n=44) and the biofilms will be assessed using varying concentrations of phages via a virulence assay and a biofilm assay, respectively. Furthermore, the morphology of isolated phages will be examined through a transmission electron microscopy and phage genome will be characterized using bioinformatics. Identification and characterization of lytic phages can facilitate the development of efficacious treatment against biofilm-forming AR ST131.

Developmental Topographical Disorientation Brain Structure

KRISTINA JELINKOVA (EDUCATION - EDUCATIONAL PSYCHOLOGY)

Background: Persons with Developmental Topographical Disorientation (DTD) never develop normal navigational abilities and frequently get lost in their daily lives. Presently, little is known about the biomechanism of DTD. Human navigation is a complex process that utilizes numerous skills and abilities. Some functions are handled by the caudate nucleus (procedural memory) and the hippocampus (formation of cognitive maps). The amygdala is a brain structure also located in the medial temporal lobe but is not related to navigation, making it an ideal control region. Hypothesis: Participants with DTD have increased/reduced volumes of the hippocampus and caudate nucleus but not the amygdala. Methods: 37 participants underwent an MRI scan. The hippocampus, caudate nucleus, and amygdala were manually segmented for volumes and results were analyzed via MANOVA. Results: There was no significant difference in hippocampal volume between control and DTD participants. However, there was a general trend for DTD participants to have larger volumes in both hippocampal tails. There were no significant results or trends
found for the amygdala or caudate nucleus. Discussion: Results found a trend towards larger hippocampal tail volume in participants with DTD. These regions are associated with autobiographical memory and utilizing cognitive maps therefore an enlargement implies a compensatory mechanism. Further neuroimaging research may guide future interventions for persons with DTD.

**Selectively treating clinical mastitis in dairy cows**

**ELLEN DE JONG (VETERINARY MEDICINE)**

Antimicrobial use is one of the main drivers for antimicrobial resistance. In the dairy industry, the majority of antimicrobials are used to prevent and/or treat clinical mastitis (CM). Reducing antimicrobial use by treating CM cases based on a selection protocol, whereby only cases caused by Gram-positive bacteria are being treated, is not very common. Dairy producers (n = 146) in 5 Canadian provinces (British Colombia, Alberta, Ontario, Quebec and Nova Scotia) were asked to indicate on a scale from ‘Very Important’ to ‘Not Important’, which factors guided their decision to treat. 59% of producers used a selective treatment protocol. Cow production was mentioned as ‘Very Important’ or ‘Important’ by 42% of producers with a selective CM treatment protocol. The need to fill quota was only indicated as ‘Very Important’ or ‘Important’ by 18% of the producers. Cow age, genetics and cull and replace costs were not often taken into consideration (only mentioned as ‘Very Important’ or ‘Important’ by 23, 20 and 7% of producers, respectively). Confirmed or suspected bacteria was listed as ‘Very Important’ or ‘Important’ by 66% of producers who selectively treated CM. In conclusion, a large proportion of dairy producers selectively treat CM cases and use criteria to make informed treatment decisions. Describing current practices is an important step in understanding CM treatment decisions and highlighting possibilities to reduce antimicrobial use on dairy farms.

**Nature hues**

**MILANPREET KAUR (SCIENCE - CHEMISTRY)**

Photographs portraying different colors shown by nature.

**Links between Early Adversity and Self-Harm in Adolescents**

**MAYARA LUIS (NURSING)**

Background: Adverse Childhood Experiences (ACEs) are traumatic events that occur before 18 years of age and linked to poor lifespan outcomes. Experiences during gestation, early childhood and adolescence are foundational to healthy relationships, social-emotional and behavioral development (Shonkoff, 2017). Particularly, insecure attachment has been linked to children’s behavioural problems (Cooke et al., 2019) and increased probability of self-harm (Monirpour, 2019). As a Brazilian Master’s student and Visiting Student Researcher at the UofC (February-August 2021), I will investigate links among ACEs, attachment, child behaviour and self-harm in children and adolescents, to identify prevention strategies. Objectives: 1) Understand how the family environment and ACEs can place children on a trajectory of risk for behavioural problems and self-harm by completing a systematic literature review and preliminary analysis Alberta Pregnancy Outcomes and Nutrition (APrON) Study data. Method: Under Dr. Nicole Letourneau’s supervision, I will undertake a systematic review to understand how ACEs and attachment negatively impact children’s behaviour and propensity for self-harm. Then I will conduct secondary analysis of APrON data to determine how ACEs impact children’s behavior outcomes, especially those that increase risk for self-harm. I will employ regression-based modeling such as path analysis or conditional process modelling.
COVID-19: Changes in older adults’ activity participation

LINDSAY MORRISON (KINESIOLOGY)

Public health measures in response to COVID-19 (C-19) have disrupted social and physical activity opportunities. This study examined older adults’ (65 years and older) current and pre-pandemic (retrospective) reports of physical and social activity participation and barriers, satisfaction with participation, and perceptions of precautionary measures and alternative program delivery. Participants who had attended City of Calgary exercise classes before C-19 completed an online survey (N=200). On average, social participation (t143=-23.79, p<.001), moderate-to-vigorous exercise (t140=-2.34, p=.02), and resistance (t106=-5.18, p<.001) and flexibility (t106=-2.78, p=.006) exercise declined from pre-pandemic levels. Since C-19, most (79.86%) participants had not attended in-person exercise classes, though 33.57% had attended online classes. Only 20.00% were satisfied with their physical activity levels during the pandemic. The top physical and social activity barriers were accessibility and range of activities, respectively. Participants indicated that most safety precautions (e.g. enhanced cleaning policies) would make them more comfortable attending in-person classes, while wearing a mask during strenuous exercise and exercising outdoors would not. While, older adults’ physical and social participation has been negatively affected by C-19, they are interested in being more active and are open to precautionary measures.

Identification of genes for infectivity of STEC phages

ANNIE NGUYEN (VETERINARY MEDICINE)

Bacteriophages (phages) have been considered as a potential alternative to antibiotics for the treatment of bacterial pathogens, including Shiga Toxin-producing Escherichia coli (STEC) – a diverse group of foodborne pathogens that are transmitted to humans through fecal contamination of agri-food or water. This study investigates seven environmental phages from Tequintavirus, that can infect diverse STEC serogroups. We predict that extensive gene rearrangements may occur in phage tail regions to respond to distinct STEC hosts. The tail genes encoding for L-shaped tail fiber proteins (TFPs) and receptor binding proteins (RBPs) are highly diverse compared to other known host attachment proteins. Bioinformatic analysis on protein sequences of newly found proteins suggests that low amino acid similarity in TFPs and RBPs of our phages (16– 70%) may lead to observed differences in host recognition and attachment. This study will provide novel insights regarding gene variance and generate new knowledge regarding the molecular mechanisms underlying host recognition and infection of STEC phages.

The Crisis of Laughter at the Beginning of the 20th Century

DANTE PRADO (ARTS - LANGUAGES, LINGUISTICS AND CULTURES)

The last decades of the nineteenth-century and the first decades of the twentieth-century reveal a particular interest for laughter as a theoretical problem, as observed in the considerable production developed by different disciplines of continental Europe, such as philosophy and psychoanalysis. These disciplines recognized that literature made important insights into laughter, as literature itself reflected on laughter. I will consider, then, how literature represents –in consonance with a context that reflected on and represented itself as an epoch of crisis and endings– a ‘crisis’ of a laughter tied to the Aufklärung and education through the notion of Bildung. Thomas Mann’s Der Zauberberg serves as an apt example for two reasons: first, it offers a compendium of nineteenth- and twentieth-century’s discourses and ideas; and secondly, because of its dialogue with the Bildungsroman tradition. The research will analyze the novel’s textual representation of laughter in relation to the Bildungsroman and the fin-de-siècle discourses of decadence, and will define and describe the parodic forms in which these discourses are portrayed in the novel. I will also distinguish the different functions of laughter and smiling, insofar as smiling could be considered its partial realization or counterpart. The research has implications for the scholarship produced on this novel but also for other European and Modernist literatures.
Precision Mapping of Functional Brain Networks in Children
SHEFALI RAI (MEDICINE - NEUROSCIENCE)
A major issue in Autism Spectrum Disorder (ASD) is the wide range of symptoms children exhibit. Characterizing an ASD brain then seems like a next to impossible task. Yet, without establishing a baseline for typical child brains, we cannot even begin to understand an ASD brain. Therefore, our first task at hand is to precisely map a typical child’s brain. Functional magnetic resonance imaging (fMRI) is a tool that takes a picture of your brain activity. These fMRI scans allow neuroscientists to characterize or map how a brain is behaving. Regrettably, most fMRI studies look at group averages. By combining all children into a group, we end up missing key features within each child’s brain. Given that each child is unique, their brains should be studied individually as well. My study will collect brain scans over several weeks from typically developing children. With repeated scans, we can collect more accurate data per child. Successfully mapping a typical child’s brain will in turn help to precisely diagnose an ASD brain. For children with ASD, this could further provide each child with a specific and highly effective therapy.

How and why are youth acquiring illicit substances?
SHERRI RESTORICK (ARTS - SOCIOLOGY)
The purpose of this exploratory research study, to determine why youth in Central Alberta are feeling they need to use illicit substances. Plus, this study will be investigating how it is that youth are able to afford to procure these drugs. The reason this study will be looking into how youth are acquiring illicit substances is to examine if there is a correlation between criminal behavior and illicit substance usage. Part of what this study will be trying to ascertain is how young youth are when they first begin to use illicit substances to see when youth are introduced to these drugs and how they are being influenced into taking these drugs. Also, this study will be collecting information on gender identity to establish if there is any difference in illicit substance usage depending on one’s gender. To answer these questions, information will be collected from adults recovering from illicit substance usage, who began using drugs as youth. This study will be completed by employing a semi-structured qualitative approach to obtain each person’s personal narrative describing their drug history and any criminal behavior associated with their drug dependency. Approximately twenty adults will be interviewed for this study. The advantage to utilizing a semi-structured interview style is that it will provide an accurate reflection of the culture of drug use among those who have had a history of using illicit substances. This information will be beneficial for those agencies.

Development of Efficient Sensing Material for Methane (CH4)
MITRA ROUSTAPISHEH (ENGINEERING - CHEMICAL AND PETROLEUM ENGINEERING)
Methane is the second-largest source of (GHGs), accounting for 16% of global GHG emissions. It is considered the primary constituent of natural gas (70-90%), the primary fuel for heating and power generation worldwide. Oil and gas downstream and heavy industry’s total emissions accumulate around 40% of 729 annual MMT CO2 equivalency, and CH4 alone represents 7% of the emissions. Cutting methane emissions is a cost-effective way to reduce greenhouse gas emissions. Due to colorless, odorless, flammable nature of methane, it is hard to detect; therefore, the development of an inexpensive methane sensor that is stable, reliable, sensitive, and selective is essential. Regeneration of sensor surface, continuous record of data, ability to connect to operation site or remote-control will complement existing technologies advantages. This research aims to develop CH4 sensing materials based on metal-organic frameworks (MOFs) due to the high flexibility of material structure to reach an optimum detection range. Various deposition methods will study the sensitivity and selectivity of methane leak detection. Characterization methods, such as ellipsometer, X-ray powder diffraction, Scanning electron microscopy, for estimating the sensing layer’s quality will be applied. Study for commercialization by using fast preparation methods such as microwave, or safe material such as Ionic liquid will be done.
Obesity: neural circuits in decision making

LAUREN SEABROOK (MEDICINE - NEUROSCIENCE)

The lateral orbitofrontal cortex (lOFC) receives sensory information about food and integrates these signals with expected outcomes to guide future actions, and thus may play a key role in a distributed network of neural circuits that regulate feeding behaviour. Here, we reveal a novel role for the lOFC in the cognitive control of behaviour in obesity. Goal-directed behaviour is biased in obesity such that in obese animals, actions are no longer influenced by the perceived value of the outcome. Obesity is associated with reduced lOFC inhibitory drive, and chemogenetic reduction in GABAergic neurotransmission in the lOFC induces obesity-like impairments in goal-directed behaviour. Conversely, pharmacological or optogenetic restoration of inhibitory neurotransmission in the lOFC of obese mice reinstates flexible, goal-directed behaviour. Our results indicate that obesity hinders an individual’s ability to make value representations about rewards, which in turn may influence how individuals make decisions in an obesogenic environment.

Developing a molecular-level gout biosensor

TANILLE SHANDRO (SCIENCE - CHEMISTRY)

Crystal arthropathies are forms of arthritis caused by the formation of crystals in the body, of which gout is the most prevalent. Sometimes called ‘the disease of kings,’ because it primarily affected the politically and socially powerful, gout can be triggered by a lifestyle of rich food and excessive alcohol consumption that was once affordable only by the affluent. However, gout is no longer restricted to the upper-class as the diet and lifestyle that predispose individuals to it have become increasingly common, and gout now affects 1-4% of adults in industrialized nations. Sufferers experience severe pain, redness and swelling of the affected region that negatively impacts the quality of life. Although it is one of the oldest recognized diseases, we lack fast, accurate tools to diagnose it, leading to the misdiagnosis and consequent mismanagement of the disease. This study aims to develop a new technology platform using peptide engineering that can accurately and selectively identify gout and other crystal arthropathies. These precision molecular diagnostics will lead to improved treatment and management of these common conditions, aid in our understanding of their complex pathogenesis, and enable the development of novel therapeutic strategies to improve the quality of life of those suffering from gout.

Evaluation of TK216 in Pre-clinical Studies for Leukemia

RITUL SHARMA (MEDICINE - ONCOLOGY)

Introduction: The ETS (E26 transformation-specific) family of transcription factors regulate various cellular functions and are aberrantly expressed in several cancers. However, there is a lack of detail understanding of the role of ETS proteins in pediatric leukemia and the potential of ETS inhibitors in future clinical trials. TK216 has been shown to inhibit ETS function in various solid tumours. The purpose of this study is to explore the feasibility of using TK216 as a novel therapeutic agent for the treatment of pediatric leukemia.

Methods: In vitro cytotoxicity assays were performed on pediatric leukemia cell lines. The effect of TK216 on apoptosis and cell death pathways was studied by western blotting for apoptotic markers. Additionally, drug combination studies were carried out with established anti-leukemic agents using Chou and Talalay methodology. Results: IC50s for the pediatric leukemia cell lines treated with TK216 were in the range of 240-650 nM. Synergistic activity was observed when TK216 was combined with Bcl-2 inhibitor, Venetoclax. Conclusion: My initial studies have demonstrated the anti-tumour activity of an ETS inhibitor, TK216 across several pediatric leukemia derived cell lines. Drug combination studies have shown effective synergism with distinct anti-cancer agents such as Venetoclax. My studies will further explore target modulation critical for defining biologically important interactions between the drug and its molecular target.
Understanding Palliative Care Self-Efficacy among Health Care Aides

KATHERINE STELFOX (NURSING)

Since the beginning of the fight against Covid-19, Health Care Aides have been on the front lines of the battle, caring for societies’ most vulnerable citizens: seniors living in long-term care facilities. A mostly female-dominated workforce, Health Care Aides provide the majority of care in these facilities. However, they are not regulated, nor do they receive standardized education nationally. While it can be assumed Health Care Aides receive some training surrounding palliative care, it is not known how Health Care Aides see their palliative care self-efficacy, or their capacity to provide palliative care during the unprecedented circumstances of the Covid-19 pandemic. Already disproportionately affected by the pandemic, and with greater adverse health outcomes compared to the general population, seniors living in long-term care facilities have had to rely on Health Care Aides to provide the supportive roles previously assumed by family members, who have been unable to visit during times of lockdown or visitor restrictions. To gain a deeper understanding of how Health Care Aides experience palliative care self-efficacy when taking on primary support roles, and possibly moral injury, the researcher will use a qualitative approach, Grounded Theory, to complete semi-structured interviews, participant observation in the Spring of 2022.

Family Experiences in an Adapted Physical Activity Camp

JESSICA YOUNGBLOOD (KINESIOLOGY)

Recreational physical activities are important for children and adolescents with disabilities who tend to be less active than typically developing children. Moreover, families caring for a child with a disability face higher levels of stress and isolation. The objective of this study was to examine family members’ perspectives on the ways in which participation in an adapted summer camp for families with a child with a disability affect family relationships. A collective case study was conducted with five families who participated in a week-long summer camp where children and adolescents with disabilities participated in physical activities with their parents and siblings. A focus group was conducted with each family (n = 5 mothers, n = 5 children or adolescents with a disability, n = 3 siblings). Data were analyzed using reflexive thematic analysis. Family relationships were affected in five ways (1) dedicated family time away from daily stressors increased family bonding, (2) change in family members’ understanding of one another, (3) family members appreciating having a common experience with the child with a disability, (4) increased independence of child with a disability impacted family interactions, and (5) increased sibling responsibilities to support child with a disability. These findings can be used to inform future programs by creating a better understanding regarding family experiences as they relate to adapted physical activity.

Listening Errors in Chinese Syllable-initial sounds

JIAFAN ZHANG (ARTS - LANGUAGES, LINGUISTICS AND CULTURES)

In recent years, the study of heritage language (HL) has developed rapidly in North America and has attracted widespread attention in applied linguistics. However, research on Chinese heritage learners (CHL) is still in its infancy. Existing literature mainly focuses on influencing factors (e.g., motivation, family role, ethnic identity, etc.) and learning characteristics of heritage language acquisition, with few studies on listening. Distinguishing initials are significant for the acquisition of Chinese listening. The purpose of this research is to investigate the errors of initials between CHLs and non-heritage learners (NHL), then compare the differences and analyze reasons. Thirty participants will complete an online questionnaire on their learning background and self-assessment of their listening proficiency, and a 35-minute listening test to investigate possible perception errors and to measure their proficiency in Chinese listening. Finally, a random sampling of five qualified CHLs will be selected and invited to complete a semi-structured interview, during which they will be observed. The results demonstrated that although Chinese heritage learners’ listening level is higher than that of non-heritage learners, they have specific problems in distinguishing syllable-initial sounds. The analysis of these differences helps teachers better guide students’ Chinese learning, and it is the first step toward the development of pedagogical practices.
9:15 - 9:27 am: Coming home a veteran: The military-civilian transition

MYRIAM TREMBLAY (ARTS - MILITARY, SECURITY, & STRATEGIC STUDIES)

The military-civilian transition (MCT) is the last stage of a career in the military. In Canada, many former Canadian Armed Forces (CAF) members experience a difficult transition. My research aims to understand the transition from former CAF members who have had a chance to re-integrate into the civilian world through semi-structured interviews to answer the following questions: What is the MCT in Canada and how is it experienced by members of the CAF? What is Canadian military identity and how is it negotiated in the MCT? What challenges occur throughout this process and what aids this process? 9 former CAF members were interviewed about their experiences in the Canadian military and releasing from the military. This will be understood through Social Identity Theory and Foucault’s docile bodies. Results will understood based on the shared experiences of these members. These results may have implications for further research, especially research that can happen within the context of Operation TRANSITION, and implications how equitably military service is understood. Further research should focus on intersectional identities and the CAF, which could have an impact on recruitment and retention within the Canadian military.

9:28 - 9:40 am: A Novel System to Measure Knee Kinematics during Drop-jumps

ZOE CHAN (KINESIOLOGY)

Knee separation distance during drop-jumps is often measured to determine the risk of incurring an anterior cruciate ligament injury. However, screening for individuals with a high risk of injury require sophisticated equipment, thus limiting the screening to a small population. Therefore, a novel wearable system to assist screening in a clinical or school setting has been developed. For practicability, the system was designed to be simple to use, portable and inexpensive. This innovative approach could assist coaches in on-field screenings of athletes. The system comprises of two sensors - an ultrasonic distance sensor and an inertial measurement unit, which are connected to a Raspberry Pi 3 single-board computer through an Explorer Hat Pro. The system was developed and tested on a single participant. It was validated against the knee separation distance obtained from 2-D video analysis. On average, the wearable system was found to overestimate the knee separation distance by 6.2 mm (± 60.4 mm). Future work should focus on optimizing the sensor mounting on the knee joint and validate the system on a larger population.

9:41 - 9:53 am: Cancer risk for exposure to hazardous VOCs in Calgary

YING XIONG (ENGINEERING - MECHANICAL & MANUFACTURING ENGINEERING)

Oil and natural gas (O&G) extraction operations emit hazardous volatile organic compounds (VOCs) in quantities that have adverse effects on human health. Our current understanding of the exposure risks associated with upstream O&G exploitations remains limited, and very few quantitative on-site remediation strategies have been proposed. To this end, we assessed the health risks associated with the
emission of hazardous VOCs and presented a set of remediation goals for the city of Calgary, which is a major center of the Canadian oil industry. Results suggested that although VOCs had a negligible impact on chronic non-cancer-associated risk, inhalation-associated cancer risk remained a significant concern. Carbon tetrachloride, benzene, and 1,3-butadiene were the dominant VOCs, representing 88% of the integrated inhalation cancer risk (= 7.8 x 10^-5); background, solid fuel combustion, and O&G extraction were among the primary sources that posed the greatest threat to human health. Results of a Monte Carlo simulation revealed that the probability of developing cancer due to inhalation of hazardous VOCs was ~13.1% on clean air days and 45.9% on days with significant levels of air pollution. Preliminary remediation goals (PRGs) included reductions of 24.2–65.1% and 11.4–50.9% targeting priority VOCs and their sources, respectively. Taken together, our findings suggest that stringent control of the sources of VOCs, particularly fossil fuel combustion, is an urgent priority.

9:53 - 10:06 am: A Multi-metric Health Assessment of Bluenose-East Caribou

FILIP RAKIC (VETERINARY MEDICINE)

The Bluenose-east (BNE) herd of barren-ground caribou (Rangifer tarandus groenlandicus) is locally and federally important and has declined by 84% from 2010-2018. Individual and population indicators of health are valuable predictors of caribou herd health that may be applied to population conservation status. Few studies have examined multiple health indicators in the BNE caribou herd simultaneously, and there currently exists a gap in health information in general. The objective of my research is to provide a multi-metric health assessment of the BNE herd by considering pathogen exposure, infection, physical condition, stress, and trace minerals in relation to sex, age, and season using archived samples from 2012-2019. I have access to 105 hunter sampling kits from Kugluktuk Nunavut, as well as 165 samples from capture/collar activities from the Government of the Northwest Territories. The effect of age, sex, and season in comparison to pathogen prevalence will be analyzed using Generalized Linear Models to explore the patterns of interactions and associations, that may be applicable to host-pathogen dynamics. Preliminary serological findings demonstrate an increase in Toxoplasma gondii prevalence, a reproductively limiting pathogen, where prevalence is higher by 40% compared to prevalences in 2007-2009 in the Sahtu Region. This research project was developed in direct response to local community concerns and aims to fill gap within our current understanding of BNE herd.

10:08 - 10:20 am: Exploring Calgary’s Natural Playgrounds: Emerging Findings

MIHO LOWAN-TRUDEAU (SCHOOL OF ARCHITECTURE, PLANNING AND LANDSCAPE)

Concern for the curtailment of children’s experiences in outdoor natural spaces in a progressively more urbanized and electronically mediated society has garnered increasing attention in both popular mainstream society as well as academic research. In response, a diverse body of research has accumulated to demonstrate a variety of physical, social, and psychological benefits for children from access to nature. Motivated in part by this growing body of evidence, playgrounds that incorporate natural materials and features have emerged within northern industrialized countries, such as Canada, and beyond. This presentation explores several natural playground sites in Calgary and describes emerging findings from a study investigating people’s experiences using and creating natural playground sites. Primary research objectives include understanding people’s perceptions of and experiences with using and developing sites, including the perceived benefits and challenges to these sites, and people’s perceptions of nature within natural playground sites.
10:21 - 10:33 am: Treating Anxiety in Long Term Care Residents
KAYLA ATCHISON (MEDICINE - COMMUNITY HEALTH SCIENCES)
Background: Anxiety in older adults living in long-term care can lead to increased suffering, decreased well-being, and increased health service use. Treatment options for anxiety exist, however, we do not know which treatments are most effective for long-term care residents. We must identify evidence-based treatment strategies for anxiety, specific to long-term care residents, to reduce additional suffering and improve care for this complex and vulnerable population. Aim: We aim to identify behavioural interventions for care providers that improve how evidence-based anxiety treatment strategies are implemented into practice. Methods: First, a systematic review will be completed to identify and compare the effectiveness of anxiety treatments used in long-term care. Second, through interviews with care providers, we will explore the perceived barriers and facilitators to treating anxiety in long-term care. Interventions that address the barriers to treating anxiety will then be identified to improve how evidence-based treatment is delivered to residents. Significance: The present research is critical to advancing knowledge on how to best treat anxiety in long-term care. Treatment planning and the care delivered to residents can be improved by identifying actionable interventions informed by best practice. Improved care can then lead to improved resident well-being downstream.

10:34 - 10:46 am: Resources For Teachers To Support Students with Autism
RACHEL PAGALING (EDUCATION - PSYCHOLOGY)
The purpose of this study is to investigate learning leaders’ perspectives on the most effective resources and strategies provided to general education [GE] teachers to enhance their understanding of autism, as well as build their capacity when working with students with autism in an inclusive classroom. A qualitative design was used, whereby five semi-structured interviews were conducted with learning leaders from a large urban school board in Alberta. Interviews were transcribed and data was analyzed with thematic analysis, with four themes arising: (1) Having conversations around building knowledge; (2) Working relationships; (3) Professional development; and (4) Providing teachers with specific strategies that produce results in the classroom. The present study identifies resources that are most effective in supporting GE teachers’ work with students with autism in inclusive classrooms and will inform programs and services provided to teachers to improve their educational practice. Implications for practice and future research directions are discussed.

10:47 - 10:59 am: Wearable Technology for Heart Failure Monitoring
ASHER PATEL (NURSING)
Background: Heart Failure (HF) management is complex. Patients with HF experience frequent and complicated hospitalizations. New technologies are being developed to ease the complexities of ambulatory HF management and mitigate negative outcomes. Objective: The aim of this study is to examine the effectiveness of wearable monitoring devices on ambulatory HF management in an adult population. Methods: We will conduct a systematic review. Five databases will be searched for peer-reviewed literature: MEDLINE, EMBASE, PsycINFO, CENTRAL, and CINAHL. Citations will be independently screened by two reviewers. Data items extracted from the full-text citations will be informed by the Template for Intervention Description and Replication (TIDieR) checklist Results: The review is currently in progress and the following results are based on findings from preliminary search data. Four types of wearable devices were found: Activity trackers, Smartwatches, patches, and vests. Data suggests good reliability and validity of commercially available activity trackers and Smartwatches as pedometers, however, are inferior to standard electrode electrocardiography for heart rate monitoring. Wearable
multisensory patches and vests successfully detected impending rehospitalization, with a predictive accuracy comparable to implantable devices. Conclusion: Monitoring technologies have the potential to mitigate acute decompensation and reduce hospitalization in adult patients with HF.decompensations.

11:05 - 11:17 am: Propagation of brain wave oscillations
DAVOR CURIC (SCIENCE - PHYSICS & ASTRONOMY)
Collective neural dynamics often display oscillations with distinct frequencies. These oscillations are known to be spatio-temporally localized within the brain, and a large body of work has emerged employing these frequencies as behavioural correlates. However, due to technological constraints little is actually understood about how these frequencies propagate in the brain. New advances in recording techniques that employ both high resolution spatial and temporal recordings are finally opening avenues with which to tackle this problem. To address this, I apply time-frequency analysis to wide-field optical recordings of fast responding voltage sensitive dyes applied to the mouse cortex. By identifying regions of the cortex displaying high power in certain frequency bands (specifically in this case theta and delta oscillations), the time-evolution of these frequencies is studied. We then apply this method to animals afflicted with Alzheimer’s to study how disease can alter these dynamics.

11:18 - 11:30 am: Wellbeing initiatives for students during online learning
BRITTANY LINDSAY (ARTS - PSYCHOLOGY)
The shift to remote learning at UCalgary during the COVID-19 pandemic was difficult, especially since online learning was new for many students and instructors. This shift negatively impacted many students’ mental health and learning experiences. As part of the Teaching and Learning Subcommittee of the Campus Mental Health Strategy, we felt it was important to explore students’ learning experiences during Winter 2020 to inform development of strategies to support their online learning and wellbeing in the Fall 2020 term. For Part 1 of this study, over 300 students from three departments were surveyed during Summer 2020 about their experiences (e.g., least and most effective elements) with remote learning during Winter 2020. These responses were used to develop eight recommendations for instructors for online course design and to create seven wellbeing check-ins that were distributed to Faculty of Arts’ students throughout Fall 2020. In Part 2 of this study, students who completed Part 1 and received the wellbeing check-ins (two departments) were invited to complete a second survey about their online experiences in Fall 2020, including feedback on the wellbeing check-in initiative. These results from about 60 students have been used to improve the wellbeing check-in initiative for Winter 2021 and better understand students’ needs after completing a full semester of online learning.

11:31 - 11:43 am: Control of Escherichia coli through bacteriophage cocktails
JANE FLETCHER (VETERINARY MEDICINE)
E. coli O157 is a particularly dangerous pathogen that causes 2.8 million infections per year globally, and can lead to long-term illness and death. New methods are needed to combat bacterial infections and reduce the bacteria at the source. One potential method is the use of bacteriophages—also known as phages, a natural predator to bacteria—to kill E. coli. Like other viruses, phages are not able to reproduce on their own and must infect a host to be able to produce progeny, often killing the host at the end of the process. Bacterial pathogen control through phages is a growing area of research as it allows targeting of specific bacteria, however there are some barriers in development, mainly due to bacteria rapidly acquiring phage
resistance through mutation. Therefore, our approach is to use multiple types of phage in a cocktail against a bacterial culture, as a single bacterium is theorized to be unlikely to develop resistance to all of the phage. Currently we are using four different types of phage both on their own and in combination with each other as cocktails against multiple strains of E. coli. Each phage combination and bacterial strain will be grown together and monitored over a period of 24 hours. Growth will be compared between single phage, cocktail, and control cultures to determine what the most effective combination is. Preliminary results indicate the cocktails are most effective, but more experimentation is needed with different strains of bacteria.

11:44 - 11:56 am: Diversity, Inclusivity & Post-Secondary Leadership

MARORO ZINYEMBA (EDUCATION - RESEARCH)

Leaders of some post-secondary institutions in Alberta have stated that the institutions they lead are committed to diversity and inclusion. The current context in which post-secondary leaders practise is one where there is increased diversity in the student demographic and there is increased demand for social justice issues to be addressed. How do post-secondary leaders make meaning of diversity and inclusivity in educational settings? There is a dearth of research on how leaders of post-secondary institutions in Alberta that have a publicly stated commitment to values of diversity and inclusion make meaning of these concepts. To answer this question, I engaged a qualitative case study methodology as described by Merriam (1998, 2009). I gathered data from semi-structured interviews, reflective research journal, field notes, and artifacts shared by leaders. Data were analyzed and five themes that were interpreted through the integrated social justice leadership framework for diversity and inclusivity emerged: leaders draw on personal socio-historical experiences; leaders challenge political assumptions; leaders engage their institution’s strategic direction on diversity and inclusivity; leaders encounter issues of representational diversity; finally, leaders situate diversity and inclusivity issues in the provincial socio-political context. The knowledge generated from this research is intended to contribute to knowledge on postsecondary leadership and succession planning.

11:59 - 12:11 pm Exploring clinical reasoning between health professionals

VINCENT CHIANG (MEDICINE - COMMUNITY HEALTH SCIENCES)

Background: Prescribing is part of the expanded scopes of practice for pharmacists in Alberta. Given the responsibilities associated with prescribing, the ability to reason through and apply clinical information becomes essential for pharmacists. However, the study of clinical reasoning has been limited in the field of pharmacy. Given there is reasonable overlap in the outpatient presentations seen by both family physicians and pharmacists, an opportunity exists to study clinical reasoning processes between these professions. Objectives: The objective of the research is to understand the similarities and differences in the clinical decision-making of prescribing pharmacists and family physicians Methods: This research consists of two phases. Phase 1 will use an online survey to capture an overview of the diagnostic and therapeutic patterns demonstrated by both groups. Phase 2 will use integrated, psycho-physiological tools (EEG and eye-tracking) to gain a deeper understanding of the processes underlying the decisions made by both groups. Findings: This research is a current work in progress, preliminary data from Phase 1 will be reported in the final poster Conclusions and Significance: The results of this research could provide foundational knowledge regarding the decision-making processes within and between these groups of health professions, leading to a greater understanding of how to train learners in diagnostics and treatment selection.
Exploring Lived Experiences of Spiritual Distress

Spiritual distress is a complex experience that can have significant impacts on our mental health. This distress may include a troubled relationship with the divine, feelings of chronic shame and doubt, and conflicts in religious settings (Ellison & Lee, 2009). Many studies confirm the relationship between religion and positive mental health, while a smaller body of literature addresses spiritual distress (Captari et al., 2018; Exline, Yali & Sanderson, 2000). This research emerges predominantly from psychology and often utilizes quantitative methods with American populations. I will use qualitative interviews to explore experiences of spiritual distress in the Canadian context. There is a growing call in social work to incorporate understandings of spirituality. I hope to contribute to this endeavor in my research. I will interview 6 participants from a Christian background to understand the experience from this faith. While examining spiritual distress in multiple traditions is important, this is beyond the scope of my project. The knowledge gathered from the research project will be shared through workshops for university classrooms, religious institutions, and mental health agencies. Furthering our understanding of spiritual distress can improve outcomes for individuals seeking mental health care, inform approaches and programs in mental health and religious organizations, and contribute to social work research and education on spiritual and religious matters.