



# Inquiry@Queen's

## 15<sup>th</sup>

### Annual

### Undergraduate

### Research Conference

## Program

March 11 & 12, 2021  
Online via Zoom

[queensu.ca/iatq](https://queensu.ca/iatq)

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March 2021

We are now in our 15th year of celebrating the discoveries of a new generation of scholars at the annual Inquiry@Queen's Undergraduate Research Conference. This year, in the age of COVID-19, we move to our first online format. Thanks to the generosity of our students, the conference will showcase scholarly and creative work over two full days. Many fields are represented including music, art, drama, literature, science, health, and community-based learning. We are very pleased to have student researchers from Carleton University, University of Ottawa, Western Ontario, University of Toronto, University of Guelph, and Queen's University at Belfast this year.

Inquiry@Queen's is more than a conference; it is an approach to learning where the teacher and the learner reside in the same person. It is a natural extension of a university that prides itself on the quality of undergraduate education and its scholarship and research.

We invite you to attend the oral paper and poster presentations, pose questions to our researchers, and most certainly to enjoy the breadth of undergraduate student scholarship. Drop by for an hour, an afternoon, a day, or two days! To all those who have supported us in many ways over the last fifteen years ... we thank you! Congratulations to all participants!

We give our sincere thanks to Dr. Jennifer Kennedy as our keynote speaker, to Principal Patrick Deane for closing out the conference for us, and to all our moderators who took the time to listen and talk to our students as they shared their learning with our community. Thank you one and all!!

On behalf of Inquiry@Queen's,

Vicki Remenda: Head, Department of Geological Sciences & Geological Engineering  
Cory Laverty: Research Librarian, Queen's University Library  
Patrick Patterson: Reference Assistant, William Lederman Law Library/Information Services  
Catherine DeNoble: Reference Assistant, Education Library/Information Services  
Carling Spinney: Reference Assistant, Information Services, Queen's University Library  
Morag Coyne: Research and Instruction Librarian, Queen's University Library  
Lauren Anstey: Educational Developer, Centre for Teaching and Learning  
Will Roy: Open Scholarship Services, Queen's University Library  
Jen Amos, Communications Coordinator, Queen's University Library  
Brittany Lovelock: Administration Manager, Smith School of Business, Queen's University

We recognize that Queen's University is situated on traditional Anishinaabe and Haudenosaunee Territory and that it is a privilege to learn together on this land.

## CONFERENCE AGENDA

### Thursday, March 11, 2021

- 9:30-10:15 Welcome: Dr. Vicki Remenda (Geological Sciences & Engineering)  
Keynote Speaker: Dr. Jennifer Kennedy (Art History & Art Conservation)
- 10:30-11:20 Session I: Communities: Evolution & Revolution
- 11:30-12:30 Session II: Good Health & Well-Being I
- 1:00-2:15 Session III: Poster Presentations with Q&A I
- 2:30-3:20 Session IV: Reducing Inequality
- 3:30-4:45 Session V: Explorations of History

### Friday, March 12, 2021

- 9:30-10:20 Session VI: Theatre of Care
- 10:30-11:45 Session VII: Natural World: Life on Land
- 12:00-1:15 Session VIII: Poster Presentations with Q&A II
- 1:30-2:20 Session IX: Good Health & Well-Being II
- 2:30-3:45 Session X: Identity & Transformation
- 4:00-4:30 Closing Remarks

## PRESENTATIONS

### Session I: Communities: Evolution & Revolution

Thursday, March 11, 10:30-11:20

Moderator: Dr. Claire Davies, Mechanical and Materials Engineering

#### **Folk-Inspired Neoclassical vs Folk-Inspired Compositions: The Comparison of Folk Inspired Music from 1929-1988**

Presenter: Kendra Klages, Dan School of Drama & Music

Faculty Supporter: Dr. Kornel Wolak

My research project focuses on folk inspired music of Poland, England, China, and Ireland. In my applied lessons on clarinet, I studied two neoclassical Polish folk pieces, so the question answered in the research is how the two neoclassical Polish pieces compare to folk inspired pieces from other countries. The pieces chosen for this study are mainly pieces that I have heard before. Therefore, I chose the pieces based upon my familiarity with them. Folk music expresses the sounds and rhythms that represent countries all over the world. Over time these sounds and rhythms evolve to reflect the country at that moment. This study will reflect how folk music was implemented into different pieces with a focus on Polish neoclassical folk pieces versus English, Chinese, and Irish folk pieces. There is a detailed analysis of two Polish compositions, while the focus of the other global pieces is to allow one to understand how folk music was being used in compositions specific to the country being studied. The purpose of this study is to understand how folk tunes and characteristics can be expressed through larger compositions, and how different countries and genres approached that. Furthermore, the study compares Polish folk music to the folk music of other countries and where Polish folk composers stand in originality and experimentalism in comparison with composers in England, China, and Ireland.

#### **Queer Space and Urban Development: Negotiating Liberation**

Presenter: Noah Chalifoux, Geography & Planning

Tension between anti-normative queer politics and the assimilative pull of liberal identitarianism are a fixture of queer life and queer space (Cohen, 2019; Warner 1999; Nash, 2006; Nash, 2013). Recently, this is visible in the actively contested commodification and gentrification of queer neighborhoods that often sterilize spaces of their queerness (Nash & Gorman-Murray, 2015; Bell & Binnie, 2004; Patrick, 2014; Doan & Higgins, 2011; Renninger, 2018). Through this lens, it comes as no surprise that a condo development proposed on the site of a prominent Toronto drag bar has been met with strong community concern or opposition. While the developer is leading a community consultation process that ostensibly seeks to maintain the presence of the bar and to support the cultural legacy of the community (Bousfields Inc., 2020), the possibility of the continued sterilization of Toronto's gay village demands critical investigation. This study applies a queer approach (Cohen 1997; Cohen 2019; Browne & Nash 2010; Foucault 1978) that makes visible the forces of normalization at work, to assess the capacity for community consultation to protect queer interests. I raise several concerns over the democratic limitations of community consultation in planning. The neoliberal logics of urban growth at work are fundamentally anti-queer. As such, the capacity of existing planning frameworks to make space for queer life in Toronto is questionable. At this nexus of shifting queer geographies, community consultation, and urban development in the neoliberal city lie important questions about how power is geographically structured, deployed, and contested.

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## **The Subtle Ostracism Faced by Women in Engineering: Psychological Effects of Learning in a Predominately Male Field**

Presenters: Sydney van Engelen and Jillian Henderson, Mechanical and Materials Engineering

Faculty Supporter: Dr. Claire Davies

In engineering, women face many obstacles ranging from underlying stereotypes to physical restrictions in certain environments. The deficit of women in University programs has created a hurdle for young women entering the field of engineering. The objective of this study was to identify the challenges experienced by female undergraduate and graduate students that contribute to the systemic issue of inequity. A total of 372 male and female students actively participated in a 21-question survey featuring both multiple-choice as well as open-ended questions. Three themes emerged relating to culture (built environment and attitudes), gender (stereotypes and lack of role models), and personal (sense of belonging and the imposter syndrome). It was found that the built environment created physical barriers, while the attitudes of male peers, teaching assistants, and professors led to negative experiences, limiting female student success. Comments made about gender disparities focused on stereotypes and the lack of role models, which were later determined to influence students' sense of belonging and feelings of imposter syndrome. Over half of the female students who participated in the survey felt discouragement due to the lack of gender diversity that has further impacted their experiences and education. This research may not reflect the experience of all females in engineering but does represent the challenges of those who came forward. Both equity and equality within engineering must be sought to make the predominately male environment more inclusive.

## Session II: Good Health & Well-Being I

Thursday, March 11, 11:30-12:30

Moderator: Dr. Nasser Saleh, Head Engineering & Science Librarian

### Dark side of helping: Escalation of commitment

Presenter: Rahul Patel

Faculty Supporter: Dr. Matthias Spitzmuller, Smith School of Business

In the real world, employees may be presented with difficult tasks that could be tackled in multiple ways and with available resources. On top of this, with deadlines, few external resources, and other tasks that employees typically face, thinking tends to be narrowed and so do the actions that follow. This could lead to a persistent course of action that leads to failure. We call this situation escalation of commitment. When our coworkers offer help and we are stuck and have invested time and effort into near-impossible tasks, is it worth accepting this offer of help? Or, would we rather risk more time and resources and instead persist in solving this near-impossible problem? In the latter option, the individual may experience burnout and stress. For the organization, deadlines would not be met, and objectives could not be accomplished. My research looks at these helping behaviours and whether they lead others astray in an escalation of commitment. Specifically, I predict that individuals who have invested in a failing course of action are less likely to abandon this path when they receive help from others. This intersection of escalation and helping behaviours are important because when employees attempt to help a coworker who is invested in an extremely difficult task, they may be doing more harm than good.

### The Role of Bystander-initiated Basic Life Support in Sports-related Sudden Cardiac Arrest: A Systematic Review

Presenter: Braeden Hill, Health Sciences

Contributors: Nicholas Grubic, Dermot M. Phelan, Aaron L. Baggish, Paul Dorian, Amer M. Johri

**Background:** Sudden cardiac arrest is the leading medical cause of death amongst athletes and a common cause of death during exercise. The provision of cardiopulmonary resuscitation (CPR) and automatic external defibrillator (AED) use by bystanders can greatly improve survival outcomes in sudden cardiac arrest. However, the effectiveness of these interventions within exertional settings requires further investigation.

**Objective:** To evaluate the role of bystander-initiated CPR and AED use on survival outcomes in sports-related sudden cardiac arrest (SrSCA).

**Methods:** Several databases and grey literature sources were queried from inception until November 2020 using a comprehensive search strategy. Abstract screening, full-text review, and data extraction of eligible studies were conducted independently by two reviewers. SrSCA was defined as a cardiac arrest which occurred during (or within 1-hour of) physical activity, sport, or exercise. Bystander CPR and AED rates, as well as appropriate survival outcomes, were extracted from each study, and overall summary measures were calculated.

**Results:** A total of 2,850 unique records were identified, with 176 articles selected for full-text review, of which 32 studies were included in this review. The median rate of bystander CPR and AED use was 75% and 24%, respectively. Survival to hospital discharge ranged from 11%-93%, with a median rate of 33%.

**Conclusions:** The majority of SrSCAs received bystander CPR and achieved a high rate of survival to hospital discharge, yet AED use was low. These findings encourage layperson education in basic life support, the availability of AEDs in athletic facilities, and emergency action plans to ensure timely resuscitation.

## **Analyzing the past, rationalizing the present, and formulating the future of injection sites**

Presenters: Celina Lovisotto and Brooke Baker

The Opioid Crisis has historically been a major threat to the Canadian population, and continues to affect the health and well-being of Canadians today. This ongoing public health crisis demonstrates the exponential growth of opioid related deaths and drug overdoses, particularly in the midst of a global pandemic. The effects of Covid - 19 have shown a drastic increase in opioid related deaths over the past year. It is important to note that vulnerable individuals are facing a surplus of challenges both physically and mentally during this unprecedented time due to lack of shelter, resources, and support. To adequately care for struggling individuals, it is essential to consider the implication of supervised consumption sites, commonly known as safe injection sites (SIS). They provide a safe and clean environment for injections, a supportive community for drug users, as well as resources for preventative and extended healthcare. Though negatively perceived throughout society, these sites offer nutritious food, hygiene supplies and the basic necessities in order to sustain one's well-being and optimal health. Nonetheless, this would not be possible without greater funding from the government that will in turn allow for greater expansion and overall accessibility of these resources. This will hopefully assist in ending the stigma that lingers around SIS while closing divisions within society. Every individual is entitled to feeling supported and welcomed in a community where they can express their true self without being judged.

## **Interaction of race, ethnicity, insurance coverage, and community factors on breast cancer care**

Presenter: Sam Azin, Biology and Mathematics

Contributors: Dr. Cil, Houman Tahmasebi, Arash Azin, Amanpreet Brar, Andrea Covelli, Gary Ko; Faculty of Medicine, University of Toronto

Racial disparities in breast cancer are well established. However, there is a paucity of literature assessing the interaction of patient, socioeconomic, and community factors on breast cancer care. The objective of this study was to determine the influence of race/ ethnicity, socioeconomic status (SES), and insurance status on disease presentation, access to care, and survival in breast cancer.

A retrospective analysis was conducted of patients of Non-Hispanic White (NHW), Hispanic, and Non-Hispanic Black (NHB) patients with non-metastatic breast cancer in a large American national cancer registry. A total of 382,975 patients were identified. We demonstrated that NHB and Hispanic patients are more likely to present with more advanced stage disease, less likely to undergo surgery, and less likely to undergo breast-reconstruction than their NHW counterparts. We also demonstrated worse survival for NHB patients compared to NHW patients. Furthermore, we demonstrated that these disparities were compounded across worsening socioeconomic status and insurance coverage.

## **Session III: Poster Presentations with Q&A I**

**Thursday, March 11, 1:00-2:15**

**Moderator: Susan Korba, Director, Student Academic Success Services; Dr. Ian Garner, Manager (Outreach), Student Academic Success Services**

## **Analysis of suggestions and interventions in medical education during the COVID-19 pandemic**

Presenters: Naitik Acharya, Monica Elzawy, Guelph University; Abanoub Aziz Rizk, University of Ottawa



Contributors: Kirolos Hana, Queen's University Belfast; George Elzawy, University of Toronto

Medical education was heavily impacted by the public health measures implemented due to COVID-19 pandemic. This literature review summarizes and discusses the strengths and limitations of novel medical education interventions/suggestions during the pandemic to assist medical institutions with the evaluation of various interventions before their implementation.

A scoping review was conducted following the Arksey and O'Malley framework. MEDLINE and EMBASE were searched for publications from January 1st, 2019 - August 10th, 2020 that proposed novel medical education interventions/suggestions during the pandemic. The search included MESH searches, titles, abstracts, and keywords of studies. Inclusion criteria was comprised of articles that: used quantitative, qualitative, or mixed method designs; included medical students as the primary study cohort; involved suggestions for new medical education strategies to accommodate for the COVID-19 changes; involved studies that assessed the challenges and strengths of new COVID-19 medical school interventions; were primary studies, reviews, published letters to an editor, or opinion pieces.

A total of 54 articles were included in this review. Each article proposed one or more interventions. Ten articles reported integrating medical students in the workforce. Seven articles discussed efforts to manage medical students' stress. Five articles described changes to the residency program application process. Ten articles discussed changes to examinations. Twelve articles discussed changes clinical rotations and electives. Eleven articles discussed implementing online clinical experience. Thirty-six articles implemented or suggested online learning strategies.

The literature review suggests that quantitative studies to assess the efficacy of each intervention is required given the differences in suggestions offered by institutions worldwide.

### **Estimating Mass Balance of White Glacier using ICESat-2**

Presenter: Rachel Lackey, Engineering

Faculty Supporter: Dr. Thomson

White Glacier is located on Axel Heiberg Island in Nunavut, Canada, and has had its mass balance actively monitored since 1960. Due to COVID-19 travel restrictions it not possible for researchers to travel to White Glacier and perform the measurements required. This results in gaps in data required to determine the mass balance for 2018-2020. In this study we aim to collect and process laser altimeter data to be interpolated to calculate an estimate of the Mass Balance of White Glacier. This study will be completed using a geodetic technique that utilizes the Ice Cloud and Elevation-2 (ICESat-2) satellite altimetry data. ICESat-2 is carrying ATLAS which is an Advanced Topographic Laser Altimeter that is equipped with six laser beams divided into three pairs that measure lidar altimetry to derive surface height. The longitude, latitude, datetime, and land ice height values were extracted over the Expedition fjord region using MATLAB. The land ice tracks were brought into ArcGIS for analysis, three repeat tracks in the Expedition Fjord region were selected for analysis to determine the difference in elevation between the premelt seasons of 2019 and 2020 as well as one track comparing the premelt and melt seasons of 2019. These elevation differences will be interpolated as accumulation or ablation dependant on the location on the glacier and used to estimate mass balance.

### **Validation of a species distribution model through a comparative study to reciprocal transplant experiments at the northern range limit of *Camissoniopsis cheiranthifolia***

Presenter: Jacqueline Grubel, Biology

Faculty Supporter: Dr. Christopher Eckert

No species is distributed uniformly across the globe, however, the causative factors constraining species to specific geographic range limits (RLs) are largely unknown in ecology and biology. Species are constrained to geographic locations, the realized niche, where biotic (living) and abiotic (non-living) conditions, niche limits, enable population persistence. Absence from areas of habitat beyond the species' realized niche may also be a result of an inability to disperse to these locations. Beyond-the-range transplant experiments, are where populations are moved beyond their realized niche, and species distribution models (SDMs) are the primary methods used to infer whether species' RLs are caused by niche limits or dispersal limits. While beyond-the-range transplant experiments have previously been the gold standard test of factors causing species' RLs, SDMs have become a popular method as they utilize publicly available climate and species' occurrence data, are cheap, and do not require multi-generational in situ lifetime fitness data. This study synthesizes existing results from beyond-the-range transplant experiments and natural habitat survey data for *Camissoniopsis cheiranthifolia* (Onagraceae), a Pacific coastal dune plant, and the predicted habitat suitability of an SDM to test the validity and predictive accuracy of SDM outputs. Preliminary results indicate habitat suitability predicted by the SDM accurately coincides with the fitness of *C. cheiranthifolia* populations transplanted beyond the RL. The findings of this comparative study reveal the output of the SDM accurately capture regions where species persist beyond their realized niche and directly contribute to a gap in the literature describing the validity of SDMs.

## Estimating Energy Expenditure Using Wearable Sensors During Locomotion

Presenter: Mohammad Mohammad

Contributor: Megan McAllister

Faculty Supporter: Dr. Jessica Selinger

**Introduction.** Measures of metabolic energy expenditure can provide valuable insight into healthy and impaired gait, the design and control of assistive devices, and rehabilitation progress. The gold standard for estimating energy expenditure during locomotion is indirect calorimetry, where oxygen use is captured at the mouth. Although accurate, indirect calorimetry systems are expensive, cumbersome, and often limited to lab settings.

**Objective.** The aim of our research is to develop a lightweight, portable, and low-cost method for accurately estimating energy expenditure using wearable sensors. Our method must meet the following design criteria: i. estimate walking and running energy expenditure within 5% error of gold standard measures, ii. maintain accuracy given changes to terrain and external loads, iii. provide a continuous estimate with estimate intervals a maximum of one minute apart, and iv. cost under \$1000.

**Methods.** In pilot testing, we instrumented two participants (male, 21-22 years, 84-90 kg, 1.88-1.90m) with indirect calorimetry to measure gold standard energy expenditure, as well as the following wearable sensors: an accelerometer at the pelvis and foot, a heart rate monitor, and a respiratory belt. The participants walked and ran on a predefined outdoor route on Queen's campus, including sections with distinct average inclines (0% and 5%). Participants also wore ankle weights (3% body weight) for particular sections of the route. We will use a multiple regression analysis, with cross-validation design, to predict energy expenditure using custom metrics derived from the wearable sensors.

### Figures:



**Figure A.** Pilot participant setup. **Figure B.** Map of trial route with streets and sidewalks displayed. **Figure C.** Speed (m/s) vs. Time (min) and Elevation (m) vs. Time (min) from pilot data.

## **Does student awareness of mindfulness and of connection to nature correlate with consumption behavior, and do these relationships differ among undergraduate programs?**

Presenter: Brian Pham, Biology

Although climate change education strategies have succeeded in spreading awareness, they also create a sense of fear and urgency that not only fails to change environmentally unsustainable behavior but may increase this behavior. The failure of current strategies and the paradoxical increase of environmentally unsustainable behavior may be explained by a theory known as terror management theory. This theory posits that if people are faced with an existential crisis, like climate change, they may cling even tighter to their current ways. A novel solution to alleviate terror management theory is inspiring and empowering people. Inspiration and empowerment will teach people to see environmentally sustainable behavior as a healthier alternative to their current ways rather than an existential crisis. Therefore, they are more likely to welcome change rather than fear it. My study aims to see if mindfulness, connection to nature, and differing undergraduate programs affects sustainable consumption behavior. These factors are thought to inspire and empower people. If these factors can affect sustainable consumption behavior, then they may inspire and empower people to fight climate change. I predict that individuals who are more mindful and connected to nature will also have more sustainable consumption behavior. Furthermore, programs that highlight environmental issues will allow students to have a better connection to nature and more sustainable consumption behavior. If there is evidence to support my hypotheses, then factors that influence sustainable consumption behavior should be taught in schools. These factors would not only increase environmental behavior but increase the student's overall wellbeing.

## **NKR-P1B Receptor Expression and Function in the Different Innate Lymphoid Cells of the Lung**

Presenter: Lucas Vajko, University of Windsor

Group 2 innate lymphoid cells (ILC<sub>2</sub>) are the majority of ILCs in murine lungs at steady state. ILC<sub>2</sub>s are the main producer of type-2-cytokines, IL-4, IL-5, IL-9, IL-13, and amphiregulin, playing key roles in lung tissue homeostasis, airway responses to pathogens and allergens, and in cancer-related defenses. ILC functions are regulated by cell surface receptors. NKR-P1B is an inhibitory receptor, which recognizes C-type lectin-related protein (Clr-b) as its ligand. NKR-P1B is expressed on subsets of natural killer cells, ILC<sub>2</sub>, ILC<sub>3</sub>,  $\gamma\delta$  T cells, macrophages and dendritic cells in a tissue-specific manner and regulates NK cell and ILC<sub>3</sub> functions in the gut. Expression and function of NKR-P1B in the lung ILC populations is unexplored. Moreover, Clr-b, the ligand for NKR-P1B, is expressed in the bronchial epithelium, endothelial cells and in lung parenchyma, but its role in immune regulation in the lung is unknown. We hypothesize that ILC<sub>2</sub>s in the lung express NKR-P1B, and their function is regulated by the NKR-P1B:Clr-b recognition system. Using wild-type (WT) and NKR-P1B-deficient mice, we study the expression of NKR-P1B on lung ILC<sub>2</sub>, and the function of NKR-P1B:Clr-b recognition system in ILC<sub>2</sub> development and function. We compare the phenotype, frequency, numbers and cytokine production by ILC<sub>2</sub>s upon stimulation between WT and NKR-P1B-deficient mice using antibody staining and flow cytometry analysis. This study will reveal the role of NKR-P1B as a model system for its human homolog, NKR-P1A, in the regulation of ILC development and function, advancing our understanding of how immune responses in the lung are regulated.

## Session IV: Reducing Inequality

Thursday, March 11, 2:30-3:20

Moderator: Dr. Jacqueline Davies, Philosophy, Gender Studies

### Cultural Humility Addressing Racism and Microaggression (CHARM)

Presenters: Jenny Shu Jin Li, Nathaniel Gumapac, Clara Kim, Michaela Patterson, Crystal Sau, Nursing; Sumaya Mohamed, Hayan Yusuf, University of Ottawa  
Faculty Supporters: Dr. Marian Luctkar-Flude, Dr. Monakshi Sawhney, Queen's University; Dr. Jane Tyerman, University of Ottawa

**Introduction:** Racism, discrimination and microaggressions experienced by underrepresented nursing students contribute to a loss of confidence, and feelings of sadness and anger.<sup>1,2,3</sup> These experiences affect the students' academic performance, and personal wellness.<sup>1,2,3</sup> There is a need for innovative and accessible resources that provide instruction and promote critical thinking regarding racism and microaggressions in the classroom and clinical setting. The aim of the CHARM project is to provide a toolkit for nursing students regarding how to respond safely and effectively to microaggressions.

**Method:** The use of eLearning and simulation games have successfully been used to provide education and problem-solving skills in healthcare when interacting with various groups of individuals. A group of seven nursing students are collaborating with faculty to develop an eLearning Toolkit and virtual simulation games (VSGs) focused on addressing racism and microaggressions.

**Results:** To date, the outline of a website that includes access to a pre-learning module and 5 VSGs have been designed. The pre-learning module includes definitions and education regarding the 6-step method to responding to microaggressions.<sup>4,5</sup> The VSGs immerse the players into various scenarios where they are provided with options on how to respond in clinical situations and the potential consequences of the response they choose.

**Discussion:** This project is a work in progress, and it is hoped that this project will support nursing students, so that they feel less alone. In addition, we hope to improve their confidence and provide resources in managing encounters where racism and microaggressions occur.

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## **Private Lives & Unspoken Truths: How does a Right to Privacy Contribute to Violence Against Women in Pakistan?**

Presenter: Hijaab Yahya, Carleton University

Faculty Supporter: Dr. Gopika Solanki

There were two core purposes of this research project. The first was to explore the impacts of the division of space within the public-private dichotomy onto women's experiences of domestic violence (DV) and intimate partner violence (IPV) in Pakistan. In this inquiry, emphasis was placed upon understanding the impact of the culturally produced notion of the "privacy of home" on a woman's ability to speak about and seek legal channels of assistance in her experiences of DV and IPV. The second purpose was to critically scrutinize Pakistan's legal system in its ability to protect women from the violence they experience behind closed doors in the perceived "private" sphere of social life. By placing Art 14(1) of the Constitution of the Islamic Republic of Pakistan, which states, "[t]he dignity of man and, subject to law, the privacy of home, shall be inviolable," as the focal point of my research project, I examined why Pakistan's legal system legitimizes the division of public-private space by constitutionally protecting a right to privacy of home. Informed by such inquiries, I developed the question, "why does Pakistan's legal system constitutionally entrench a right to privacy of home under Art 14(1), and how is such right balanced against a woman's right to be free from violence?" This project was conducted virtually and remotely from Canada, which presented significant challenges, including the nine-hour time difference and efficient participant recruitment. Nonetheless, completing this research study was the most fruitful experience of my academic career. It expanded my knowledge of contemporary gender-based socioeconomic and legal issues facing Pakistan's women and helped me to develop a network with relevant professionals and activists working in this field.

## **Depression, Gender and Childhood Maltreatment and their Relation to Stress Generation**

Presenter: Mariam Atnasious, Psychology

Faculty Supporter: Dr. Kate Harkness

**Introduction:** Individuals with depression have been shown to generate stressful events in their lives, particularly in their interpersonal relationships. The current study examines whether the relation of depression to stress generation is further moderated by gender and a history of maltreatment in childhood. Although the bivariate relations among depression history, gender, and childhood maltreatment on the generation of dependent interpersonal stress have been assessed, there has not been a recent study assessing the three-way interaction among these variables in predicting stress generation.

**Hypothesis:** Individuals with depression will report a higher rate of interpersonal events than non-depressed individuals. Then go on to your moderators: within the depressed group, (a) those with maltreatment will have higher rates of interpersonal stress than those without maltreatment, and (b) women will have higher rates of interpersonal stress than men. In contrast, in the non-depressed group, there will be no gender or maltreatment differences in rates of interpersonal events.

**Methods:** Participants included an archival sample of 247 adolescents and adults (86 men, 161 women,  $M_{age} = 23.26$ ,  $SD_{age} = 12.31$ , age-range = 13-66) recruited from the community. At Time 1, participants completed depression severity and diagnostic measures, along with a semi-structured interview to assess child abuse and neglect. At Time 2, life events in the subsequent 6 months were assessed using a semi-structured interview.

**Results:** As predicted, those with depression, and those with a history of emotional abuse, had higher levels of interpersonal events than non-depressed and non-abused participants. Contrary to the hypotheses, the interaction between overall childhood maltreatment and depression group was only significant for non-interpersonal events, not interpersonal events. Specifically, it was only significant for non-interpersonal threat

levels in non-depressed individuals.

**Conclusion:** This study has theoretical implications as it looks at new nuanced factors that support the stress generation hypothesis. Future directions include reconducting this study with a greater sample size to allow for a robust three-way interaction analysis between sexual abuse and physical abuse among all threat levels measures.

## **Session V: Explorations of History**

**Thursday, March 11, 3:30 -4:45**

**Moderator: Dr. Andrew Jainchill, History**

### **The Indian Girl-Wife: Not Even a Woman, But Already a Wife**

Presenter: Prishni Seyone, History

Faculty Supporter: Dr. Ishita Pande

The institution of child marriage throughout the nineteenth and early twentieth century not only stripped Indian girls of their agency, but also frequently denied them their education. In 1884, Rukhmabai, a young Indian girl of just eleven-years-old, was married to Dadaji Bhikaji, a man eight years older. Although Rukhmabai was able to resist the forced marriage and eventually went on to become India's first female doctor, Rukhmabai's victory was generally an anomaly of the time and reflected a tenacity to attain greater education. Throughout her writings, Rukhmabai expresses deep sadness from being denied the opportunity for an adequate education, and identifies female education as one of the chief disproportionate impacts of child marriage for girls. This project will trace the evolution of child marriage negotiations from the 1891 *Age of Consent Act* to the 1929 *Child Marriage Restraint Act*, specifically addressing the way that related discussions allowed Indian women to establish the importance of their adolescent years in their educational pursuit. By uncovering the voices of both child marriage victims and female reformers, we are able to garner an understanding of the changing Indian social landscape at the time and the way that Indian women negotiated their agency against the backdrop of globalization, the nationalist agenda, and caste, religious, and regional differences. This project will stress female adolescence as an evolving concept throughout twentieth century India, and will draw on the important relationship between education and female agency.

### **"Shut up and Dribble": The Intersection of Race and Capitalism in the History of the NBA**

Presenter: Philippe Haddad, History

Faculty Supporters: Dr. Martina Hardwick

This research paper seeks to explore the intersection of race, seen through the predominantly Black athletic body of the NBA, with the rise of the capitalist, consumer-oriented entertainment industry of professional sports throughout the late 20<sup>th</sup> and early 21<sup>st</sup> centuries. It will attempt to illustrate how racial identity and capitalism have reacted to one another to create one of the biggest – and one of the most complicated – entertainment entities in North America.

To explore this issue, I will outline the social setting from which Black athletes grew to participate in spectator sports, touching on notable persons such as Jackie Robinson, Muhammad Ali, and Bill Russell. I will then examine the importance of broadcasted sports and race's role therein during the 20<sup>th</sup> century to contextualise capitalist practices in entertainment. I will conclude with an examination of capitalist practice as regulators for Black identity in the NBA by focusing on its direct and indirect attempts towards regulation. This will be done

through an examination of Black athletes' participation in social justice movements as measures of regulation, using the 1992 Rodney King trial riots and the events of Summer 2020 as comparative case studies.

While this may appear to simply be an exploration of sports history, one should consider that sports are a primary form of entertainment in both North American and global popular culture. As such, this research project goes beyond an attempt to contribute to sports history, instead seeking to delve into the complementarity of social history, consumerism, and race.

### **Nationality, Authenticity and Food: A Revisiting on the History of Chop Suey**

Presenter: Yizeng Wei, History

Faculty Supporter: Dr. Emily Hill

In the early twentieth century, the authenticity of chop suey was challenged by mainstream American media, as journalists could not find evidence of the dish in China. This caused a decline in the availability of chop suey in the American restaurants. However, chop suey was simultaneously recognized as a Chinese food by educated Chinese elites such as Liang Qichao, who raised no concerns about its authenticity. This article examines the difference between Chinese elites and the American media and discusses the relationships among food, authenticity and nationality. It argues that despite the different perceptions of Chinese elites and the American media, they both used a single standard to determine whether chop suey was "Chinese food" and failed to realize the close relationship between the Chinese community and American society. Both were influenced by a common perception of Chinese communities as isolated within American society and separate from other groups and close contact with China.

### **The Proposal of a Prince or Delegation of a Duke? Britain's Involvement in the Diplomatic Revolution of 1756**

Presenter: Trevor Dale, History

Faculty Supporter: Dr. Andrew Jainchill

Out of concern for maintaining a 'balance of power' between states, the major European powers in the 18<sup>th</sup> century were continually shifting alliances with each other in what has been referred to as a "stately quadrille" (a quadrille being a dance characterized by a constant changing of partners). Most synonymous with this notion are the events of early 1756, a few months before the outbreak of the Seven Years War, where there was a dramatic reversal of alliances. It saw Austria and France put aside their centuries-old rivalry in response to an equally unlikely alliance between Britain and Prussia. This 'diplomatic revolution', as it has since been known, is often attributed to the clever machinations of the Austrian Prince Kaunitz who sought to dislodge France from their previous alliance with Prussia to win an alliance with France for himself. However, my research project seeks to emphasize Britain's role in this affair, where I will illustrate that the Duke of Newcastle, despite being adamant on continuing the 'old system', nonetheless contributed significantly to actualizing this reversal. Throughout this project, I have faced many exciting challenges that have led me to a fuller understanding of what actually constitutes 'historical investigation'. I find this to be especially true with the experience of thoroughly examining and responding to the full historiography of a particular topic; something that was both a challenging but immensely rewarding experience.

## Session VI: Theatre of Care

Friday, March 12, 9:30-10:20

Moderator: Dr. Craig Walker, Director, Dan School of Drama & Music

### Psychological Dangers in Participatory Theatre

Presenter: Hailey Scott, Dan School of Drama & Music

Faculty Supporter: Dr. Jenn Stephenson

The emerging popularity of participatory theatre encourages audiences to immerse their senses in the art form. My research aimed to analyze how artists can make their participatory performances psychologically accessible without compromising their creative intentions. The awareness surrounding mental health and psychological safety has grown alongside audiences' and artists' desire to engage with art intimately; thus, artists are encouraged to find a creative way to implement safeguards.

My research began with interviews with mental health professionals and studies of psychology texts. Understanding the way that emotions are constructed allowed me to explore how an individual's relationship with danger can fluctuate between feelings of exhilaration and the fear of harm. I analyzed Antonin Artaud's theory of the Theatre of Cruelty and examined the emerging theory of Theatre of Care. I investigated where the danger lies within these theories and how audience emotions can be exploited for the sake of immersion. To provide examples, I conducted case studies of various participatory performances that I have attended and researched to illustrate successful applications of audience safety and potential dangers. Finally, I highlighted dramaturgical elements to incorporate psychological safeguards in participatory performance.

My results suggest that individuals construct their emotions from past experiences. Although marketed as different audience experiences, Theatre of Cruelty and Theatre of Care theories present many potentialities for triggering psychological harm due to the immersive representation of reality. Consequently, artists must implement psychological safeguards, both dramaturgically integrated into the performance and externally available, to reduce the likelihood of psychological harm and trauma.

### Bodies Out of Time: Crafting a Theory of Temporal Embodiment in Participatory Performance Events

Presenter: Jacob Pittini, Dan School of Drama & Music

Faculty Supporter: Dr. Jenn Stephenson

My research into the exciting realm of participatory theatre examines the centrality of the body as a vehicle for experiencing dynamic performance events. I sought to investigate what embodied participation means in such experiences by discovering a way to study its relation to generating, recording and transmitting knowledge. To do this, I formulated a theory of temporal embodiment which reveals temporality as key to the affective potential that participatory performance events can possess. I applied this theory to the examination of various embodied participatory event case studies, including Zuppa Theatre Co's *VISTA20* and UnSpun Theatre's *Lost Together*, both of which are explicitly theatrical performance events. I then applied Joseph Roach, Diana Taylor and Freddie Rokem's work on how cultural performances transmit cultural memory, and enact culture itself, to my theory. Due to my interests in the way that these cultural processes parallel what my theory of temporal embodiment reveals is at work in these explicitly theatrical case studies, I then explore a final, paratheatrical example: Parque EcoAlberto's *Caminata Nocturna*. Through these case studies I uncovered complex interrelations that suggest embodied participation has the potential to simultaneously recontextualize, alter or develop both memory and identity and therefore impact action that a participant will take in the future. By accommodating these disparate examples, my theory gauges both the efficacies and the drawbacks of types of embodied participation. This insight reveals the relationship between form/content as integral to the efficacy of a performance event in using participation to promote future action or change. 16



## **Music and Theatre Making In Canadian Prisons**

Presenter: Tessa Maki, Dan School of Drama & Music

Faculty Supporter: Dr. Colleen Renihan

The benefits of engaging in theatre- and music-making have been well proven for various populations. (see Črnčec et al. 2006; Lehmborg and Fung 2010; Salur et al 2017, etc.) These benefits are particularly significant for individuals who have experienced trauma, especially incarcerated individuals. (see Kyprianides and Easterbrook 2020; Reid 2019, etc).

Music and theatre programs vary in Canada, and are present in many Canadian prisons. In this paper, I examine two programs more closely: the grass roots program *Pros and Cons* at The Joyceville Institution in Kingston, Ontario, which involves a collaboration between volunteer musicians and a group of incarcerated men, and Diane Conrad's work with a young offender's facility in Alberta Canada, where she employed devised theatre techniques to create meaningful theatrical pieces within the prison's walls. Both programs work towards a similar goal: to prepare the incarcerated individuals to return to society through practicing and rehearsing healthy community and citizenship through collaborative music and theatre. While this is an admirable goal for this work, the conversation surrounding music and theatrical work in prisons has been focused on its rehabilitative aims and properties. In this presentation I will explore the features of both programs, examine the rehabilitation goals and the focus on rehabilitation in the literature on prison-based music and theatre programs, and discuss ways that Transformative Justice and the Abolitionist movement can be supported through these arts-based initiatives.

## **Session VII: Natural World: Life on Land**

**Friday, March 12, 10:30 to 11:45**

**Moderator: Dr. Wendy Van Drunen, Postdoctoral Fellow, Biology Department**

### **Ecosystem Carbon Fluxes Analyzed Using Eddy Covariance Technique**

Presenter: Razz Routly, Carleton University

Faculty Supporter: Dr. Elyn Humphreys, Department of Geography & Environmental Studies, Carleton University

Eddy covariance (EC) is an important measurement technique used in physical geography and atmospheric sciences to measure the exchange of carbon dioxide between an ecosystem and the atmosphere at a specific location. However, EC produces a net exchange of carbon dioxide yet research questions require an understanding of component fluxes, carbon dioxide uptake by plants through photosynthesis and carbon dioxide emissions due to plant and soil respiration. There are two major methods to partition EC measurements into these component fluxes: night-time and day-time partitioning methods. In the night-time method, nighttime measurements are used to estimate daytime respiration and calculate photosynthesis as a residual and in the daytime method, a light response curve is created to estimate daytime respiration and photosynthesis. This study investigates the benefits and drawbacks of these partitioning methods on two carbon dioxide exchange datasets from ecosystems in Canada.

The research sites were a) Mer Bleue, a peatland bog near Ottawa, Ontario and b) Cape Bounty, a high arctic tundra in Nunavut. By using a combination of the REdy-Proc software package, developed by the Max Planck Institute for Biogeochemistry, along with additional Matlab processing, the differences in photosynthesis and respiration due to partitioning methods are presented and discussed.

## **Using variations in high arctic vegetation spectral properties to predict various types of plant, soil, and environmental variables**

Presenter: Sandra Yaacoub, Department of Geography and Planning

Faculty Supporter: Dr. Neal Scott

In comparison to other regions, the High Arctic is now known to be experiencing accelerated rates of warming (Meredith et al., 2019). Given these trends, changes in plant productivity across these landscapes is expected, influencing the extent to which these regions become either a source or sink of carbon into the atmosphere. Data collected during the 2017 field season at the Cape Bounty Arctic Watershed Observatory (CBAWO) located on Melville Island, Nunavut, included in-situ hyperspectral data, plant nutrient concentrations, gas flux data, and various environmental parameters for twenty-eight vegetation plots. These data were processed with the overall objective of determining if spectral information may be used as an aid in developing models that may help with High Arctic landscape change prediction and monitoring. Although the data did not yield significant results for the parameters assessed, soil NO<sub>3</sub><sup>-</sup> content showed the greatest promise. This indicates there may be increased merit to investigating the linkages between spectral information and soil NO<sub>3</sub><sup>-</sup> content if combined with robust sampling methods. Further research using remote sensing in High Arctic settings would help pave a way towards increased certainty on what kinds of responses are in store for these landscapes if warming is to continue at an accelerated rate. More importantly, this may bring increased monitoring frequency and scale of environmental assessment across the High Arctic, granting communities influenced by changes triggered by warming more tools to aid in safer regional navigation and improved emergency response preparedness.

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## **Supporting Student Visualization of Molecular Processes Through Diagram Drawing**

Presenter: Tara Thachet, Carleton University

Faculty Supporter: Dr. Martha Mullally, Department of Biology, Carleton University

Historically, scientists and researchers have accompanied their observations with drawings, indicating that visual models are an effective way of communicating science. Studies show that students should draw images that are either interpretational or transformative, regardless of artistic ability, as they help to improve learning. However, many educators do not utilize this practice in their courses. In this study, we investigated if making simple and schematic drawings can help students understand complex molecular processes, and to contextualize complex plant biology processes in an undergraduate plant biology course. When students were introduced to a complex plant process, the instructor accompanied their explanation with a simple schematic drawing. Students were told by the instructor that 1-2 drawing questions would appear on the midterm. For the final exam, no questions explicitly asked students to include a schematic drawing. Students who drew often scored higher on questions related to the topics where drawings were introduced in the course and the lab. Students who drew on the final exam did 12.3% better on the exam than those who didn't draw. Students who had continuous exposure to drawing style questions during the midterms, did 6% better in the course compared to students who did not write the midterms. Students also gave an overwhelmingly positive response to drawing, and 94% of the surveyors believed that making simple drawings helped them to learn complex molecular processes. This could indicate that exposure to drawing style questions helped reinforce the learning of these processes.

## **Phenotypic selection on mating systems and floral traits of *Aquilegia canadensis***

Presenter: Chloë Dean-Moore, Biology

Because plants are sessile, they depend on biotic and/or abiotic vectors to transfer pollen from the male pollen-producing anthers to the female pollen-receiving stigmas. As a result, plant mating systems evolve through selection on the floral traits that influence how much pollen is transferred from anthers to stigmas within flowers (self-pollination) vs. between flowers on different individuals (outcrossing). The traits that control the amount of outcrossing versus self-pollination are key targets for selection on the mating system. *Aquilegia canadensis* has a mixed mating system and can produce through both self-pollination and outcrossing. Yet the mechanisms and the fitness consequences may differ between the two. Herkogamy, the distance between the anthers and stigmas, is known to influence a plant's capacity to self-pollinate, while other floral traits such as sepal and spur size are known to attract pollinators and increase outcross pollination. Using multivariate linear regression to measure selection, I expect to find that the fitness effects of selection will depend upon the ecological context in which the flower is found, and upon the values of other traits. I predict that in plants exhibiting little herkogamy, whereby self-pollination may be inevitable, the fitness advantage of having large floral traits that attract pollinators will decrease. Likewise, if plants with large floral traits are selected for, through the benefit of attracting pollinators, the advantages of having little herkogamy and being able to self-pollinate will decline.

### **Session VIII: Poster Presentations with Q&A II**

**Friday, March 12, 12:00 - 1:15**

**Moderator: Susan Korba, Director, Student Academic Success Services; Dr. Ian Garner, Manager (Outreach), Student Academic Success Services**

## **The Line Between Politics and Conspiracy Theories: Tracking Disinformation using #StopTheGreatReset**

Presenter: Ashli Au, Carleton University

Faculty Supporter: Dr. Michael Christensen, Dept. of Law and Legal Studies, Carleton University

Have you heard? In today's pandemic, the Trudeau administration has been using the widespread lockdowns to impose socialism in Canada. This conspiracy theory has been mobilized under the hash tags #StopTheGreatReset, #Scamdemic and #CancelTheLockdown amongst others. With the COVID-19 pandemic, as with previous major events, there has been an influx of dis- and mis- information on social media platforms. This rapid spread of information can have strong influences on people's behaviour which can impact the effectiveness of public health measures taken by governments (Cinelli et al. 2020; González-Padilla and Tortolero-Blanco 2020). My research is part of an ongoing project that aims to identify and map the spread of disinformation, and its effects on Canadian society. For this sub-project, I created a database of social media posts from Twitter accounts that promote or spread disinformation narratives directed towards Canadian politics and public health measures. From this, we were able to identify some of the most common narratives of disinformation in circulation on Twitter; the hash tag #StopTheGreatReset was chosen as the focus of the project to study the fine, and often blurred, line between legitimate politics and conspiracy theories. Going forth, my aim is to conduct a qualitative analysis on the links attached to social media posts fueling disinformation to understand what kinds of information are being circulated and identify common themes. This project has been an opportunity for me to learn about how social media research is conducted and allows me to engage with urgent issues in contemporary media culture.

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## Investigating the species-specific association between anuran calling phenology and air temperature

Presenter: Samantha Wong, Biology

Faculty Supporter: Dr. Diane Orihel

Climate change has been associated in phenological shifts for a variety of taxa. Amphibians, specifically the order Anura (frogs and toads), are considered particularly vulnerable due to their sensitivity to anthropogenic and environmental change. Previous research has documented shifts in the timing of anuran breeding that can be attributed, in part, to climate change, with potential implications for reproduction, survival, and development. This study aims to investigate how air temperature is associated with anuran calling phenology. I will examine the temporal trends in spring and summer air temperature in a lake in northern Ontario, Canada, and quantify seasonal patterns of calling anuran species using acoustic monitoring over a four-month period. I predict that there will be interspecific variation in peak calling associated with air temperature. Additionally, I expect to find asymmetrical association between air temperature and anuran species' calling behaviour – wherein prolonged breeding species will have a larger optimal temperature range for calling compared to explosive breeding species. The findings of this research will aid in future conservation and provide insight for management strategies of anurans in Canada in response to anticipated climate warming.

## Changes in Knowledge Across Time: What do Children Know About What They Know?

Presenters: Della Boudreau & Lily Toutounji

Contributors: Kenda Parsons, Institute of Cognitive Science, Carleton University; Vivian Rigg; Ellen Doucet; Lojain Hamwi; Deepthi Kamawar

Our study focuses on children's understanding of their own knowledge and how it changes over time. Preschool-aged children perform above chance when asked about current knowledge, but only children older than 5 years of age performed above chance for past, future, or intraindividual knowledge (Atance & Caza, 2018; Caza et al., 2016). However, we do not currently know whether awareness of past and future knowledge is related. While this type of awareness seems conceptually related to metacognition (the awareness of one's own ignorance or knowledge; Rohwer et al., 2012), the relation to this skill is unknown. Thus, the goal of the current study is to investigate how children's awareness of their own epistemic knowledge is related to their metacognitive abilities.

This study will explore children between the ages of 3.5- through 5-years-old, who will be assessed on their understanding of their current, past, and future knowledge, as well as other tasks assessing metacognitive skills. Further, we will explore the role of theory of mind and inhibitory control. We predict that children who do well on the epistemic knowledge task for the past will display better performance on the task asking about the future, and that both will be related to the other cognitive skills measured.

Due to the current global situation, we converted our study materials to an online format. Our poster will highlight this process and discuss ways to approach challenges in online developmental testing. Though data collection is ongoing, we present initial insight into the process, drawbacks, and benefits of online testing.

**Keywords:** Epistemic Knowledge, Metacognition, Theory of Mind, Child Development

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## In Light of the Lamps: A Comprehensive Analysis of the Ceramic Oil Lamps from the Roman Fort at Humayma

Presenter: Lilly Hickox, Classics

The archaeological site of Humayma, located at the northwest corner of the Hisma desert of Jordan, has a long history of permanent settlement; beginning with the Nabataeans, followed by Roman, Byzantine, and Islamic occupations. Shortly after Emperor Trajan's conquest of the Nabataean Kingdom in 106 CE, a Roman fort emerged alongside the pre-existing trade route, which the Romans renamed the *Via Nova Traiana*.

Excavations at the fort, directed by J. P. Oleson in 1995, 1996, 2000, 2004, and 2005 and M. B. Reeves in 2012, unearthed a collection of ceramic oil lamps, comprised of four complete lamps and fifty-eight fragments. The author recently carried out a complete evaluation of the fort's ceramic lamp collection, remotely analysing the lamps based on project images, descriptions, and contextual information in order to produce a catalogue and report.

Results included Nabataean, Roman, and Byzantine types, dating from the 1<sup>st</sup> to 5<sup>th</sup> century CE, revealing an intricate and diverse account of material culture at the fort. The Nabatean rosette lamp and Byzantine slipper lamp were the two most prevalent types, while few Roman lamps were found. The author interpreted data and made suggestions in light of the history, regional trade, stratigraphic complexities, and evolving cultural identity of the site. This poster summarizes the ceramic lamp findings, identifies anomalous items, and considers the significance of chronological aberrations in relation to the fort's military and civilian occupations over 400 years.

## Computational Model of the Influence of a 835 MHz Patch Antenna Distance on Specific Absorption Rate (SAR) and Temperature Change in the Human Head

Presenter: Samantha Green, Physics

Human exposure to mobile phone radio frequency (RF) radiation has caused public concern for human health. Mobile phone RF exposure depends on many different parameters. The aim of this study is to examine the effects of both the RF source distance from a human head and of output power levels on the temperature change and the Specific Absorption Rate (SAR) in the head. The peak spatially-averaged SAR over 1 g of tissue is also identified to compare the study results to Health Canada's Safety Code 6 exposure limits. The SAR and temperature change in the head are simulated in this study using a Specific Anthropomorphic Mannequin (SAM) head model with heterogeneous dielectric properties and a microstrip patch antenna operating at a frequency of 835 MHz. The microstrip patch antenna distance from the head is varied from 0-15mm and it is operated at three different time-averaged output power levels. The simulation is performed using COMSOL Multiphysics software and is solved with the Finite Element Analysis (FEA) method. The results show that both SAR and temperature change in the head model increase as the distance between the head model and the

patch antenna decreases. The peak spatially-averaged SAR over 1 g of tissue is found to triple as the phone moves from 4mm from the head to 0mm from the head. The results from this study indicate that to mitigate possible health risks from RF radiation mobile phones should be kept at least 4mm from the head.

### **Automated Emotion Classification in Free-Moving Rats: Exploring a machine learning pipeline to improve emotion-data in animal models**

Presenter: Andre Telfer, Carleton University

Contributors: Frances Sherratt, Oliver van Kaick, Alfonso Abizaid

Studies involving emotion often use animal models and currently rely on manual labelling by researchers. This human-driven labelling approach leads to a number of challenges such as: long analysis times, imprecise results, observer drift, and varying correlation between observers. These problems impact reproducibility, and have contributed to our lack of understanding of fundamental mechanical questions such as how emotions arise from neuronal circuits. Recent success of machine learning models across similar problems show that it can help to mitigate these challenges while meeting or exceeding human accuracy.

We developed a classifier pipeline that takes in videos and produces an emotion label. The pipeline extracts body part positions from each frame using a pose estimator and feeds them into an Artificial Neural Network (ANN) classifier built using stacked Long Short Term Memory (LSTM) layers. The data was collected by treating nine rats with Lypopolysaccharide (LPS) injections (10mg/kg). First, rats were recorded for 10 minutes under control conditions with no manipulation and no observed symptoms of stress or malaise. A week later, rats were injected with LPS and filmed for 10 minutes two hours post-injection.

The classifier pipeline developed correctly labelled 78% of the 125,040 video segments from 8 test videos. When combined with a vote-based system, this led to 7 of the 8 test videos being classified correctly which was the same accuracy attained by a human expert from the lab. The test videos had varying environments and used rats that were different from the training videos, providing evidence of a degree of robustness in the model. Future work will focus on expanding the test data and incorporating models for 3D pose estimation and behavioral classification.

### **Impact of a NICU parental engagement model of care on emergency room visits and hospital readmissions in preterm infants**

Presenter: Stephanie Nagy, Department of Pediatrics

Contributors: Sandra Fucile, Amanda Bates, Kimberly E Dow

**Introduction:** There is an increased occurrence of emergency room visits and hospital readmission in preterm infants compared to full-term infants after their initial hospital discharge.

**Objectives:** This study analyzes the effects of parental engagement programs, specifically the Family Integrated Model of Care (FiCare) on emergency room visits and hospital readmissions within the first 30 days after discharge from the NICU.

**Methods:** A retrospective cohort study was completed at the Kingston Health Sciences Centre (KHSC) and Quinte Health Care (QHC) Centre. The sample consisted of two groups of preterm infants born at or less than 33 weeks gestation: infants who participated in a parental engagement program (FiCare program), and those who were not involved in the FiCare program. Infants in both groups were matched for gestational age and birth weight ( $\pm$  500 grams).

**Results:** A total of 73 infants (36 pre-FiCare, 37 FiCare) were enrolled in the study. Infants in the FiCare group had significantly fewer emergency room visits within the first 30-days post-discharge than the pre-FiCare group (7 vs 1 visits,  $p=0.025$ ). There was a no significant reduction in the number of hospital admissions between the two groups.

**Conclusion:** Parental engagement programs have dual benefits of enhancing infant outcomes as well as serving as an effective method to reduce the number of emergency room visits in preterm infants after discharge from the NICU.

## **Session IX: Good Health & Well-Being II**

**Friday, March 12, 1:30 - 2:20**

**Moderator: Dr. Karalyn McRae, Educational Development Fellow, Centre for Teaching and Learning**

### **Uncal apex movement and positioning in Alzheimer's Disease**

Presenter: Rahul Patel, Psychology

Faculty Supporter: Dr. Jordan Poppenk

Alzheimer's Disease (AD) patients have consistently shown declines in declarative memory, consolidation, and in many other cognitive areas. These changes are associated with atrophy and volumetric declines in medial temporal lobe structures, such as the hippocampus. Hippocampal atrophy has been associated with AD. However, the influence of AD atrophy on the position of the uncal apex—an anatomical landmark for the hippocampus—has not been longitudinally examined. The current study's objective is to investigate changes in the position of the uncal apex of AD patients over the course of two years. The current study draws upon the Alzheimer's Disease Neuroimaging Initiative (ADNI) data set ([adni.loni.usc.edu](http://adni.loni.usc.edu)). For each participant, I obtained demographic data, anatomical MRI images in native space, hippocampal segmentations from the subcortical stream of FreeSurfer (v.5.3.0), and linear transforms to MNI space. Using uncal apex y-positions transformed in MNI space, I found that the uncal apex fell in a more posterior position in AD patients relative to control and that over time, the uncal apex migrates toward a more anterior position in both groups. These results suggest that part of the neuroimaging examinations that are done on AD patients should examine uncal apex positions as a biomarker of early AD progression. Future directions and limitations are discussed.

### **The Effects of Targeted Temperature Management Quality on clinical outcomes of post-cardiac arrest patients: a retrospective study**

Presenter: Abdulsamie Ali, Western University

Contributors: Dr. Jason Chui, Dr. Ahmed Hegazy, Annie Li, Western University

In 2002, The Hypothermia After Cardiac Arrest (HACA) group conducted a prospective study comparing clinical outcomes of normothermic and hypothermic temperature management in successfully resuscitated post cardiac arrest patients. Patients who were cooled to between 32-34 °C showed significantly improved neurological outcome and survival compared to patients who did not receive this intervention. Further studies suggested that maintaining a body temperature of 36 °C provided equivalent neurological outcomes as compared to maintaining a body temperature between 32-34 °C. Based on the above results and supporting scientific research, the Canadian and American guidelines for post cardiac arrest care recommend the routine use of targeted temperature management (TTM) for all successfully resuscitated cardiac arrest patients not obeying verbal commands. Despite these guidelines, a prospective cohort study published in 2018 found not only decreased use of TTM in North America from 2012-2015, but also poor quality when it was implemented.

The primary purpose of the present study is to describe the quality of TTM provided at London Health Sciences Center (LHSC). Secondary objectives include exploring whether neurological outcome and patient death are related to the quality of TTM.

## **Ad26.COV2.S viral vector vaccine's safety and immunogenicity: A review of literature**

Presenter: Sherry Eskander, University of Toronto

COVID-19 is a respiratory infectious disease that spreads through droplets. This disease has brought immense changes that impacted all countries around the world and the healthcare system in many ways. Developing an effective vaccine has been a high priority and clinical trials are continuously conducted to improve their efficacy. There are two current competing forms of the vaccine: the first is mRNA vaccines, where they act as a carrier for immunological information encoding for the antigen (spike proteins) and induce an immune response without interacting with the genome. Although they have an effectiveness of 95%, they do require two doses to be fully effective. On the other hand, viral vector-based vaccines use a vector to deliver the genetic code for the antigen and, like a normal infection, uses the body cell's machinery to produce more antigen, triggering an immune response. Many clinical trials are being done to improve and evaluate its efficacy as this vaccine provides substantial potential advantages, one of which includes requiring only one dosage to be vaccinated to reach greater effectiveness in inducing antibody and CD4 T cells production. In consideration of the WHO SAGE Roadmap for vaccine prioritization, the aim of this study is to provide a review of the current literature and clinical trials being conducted on the viral vector vaccine Ad26.COV2.S's safety and immunogenicity. In addition, it assesses potential future directions, implications and the substantial benefits towards the health care system and at-high-risk populations.

## **Session X: Identity & Transformation**

**Friday, March 12, 2:30 – 3:45**

**Moderator: Dr. Petra Fachinger, English Language and Literature**

### **Prosodic Interactions in Anishinaabemowin Verbs**

Presenter: Sonja Frazier, Languages, Literatures and Cultures

Supporter: Dr. Bronwyn Bjorkman

This research aims to better understand the link between prosody and verbs in Anishinaabemowin by investigating pitch placement in relation to verb placement in Anishinaabemowin utterances. The data is from a story by Ogimaawigwaebiik archived in *Dibaajimowinaan; Anishinaabe Stories of Culture and Respect*.

Anishinaabemowin, also known as Ojibwe, is a member of the Algonquin language family and is spoken throughout Southern Ontario and the Northern United States (Fairbanks, 2017). It is a polysynthetic language meaning it primarily uses affixes to convey meaning, particularly on the verbs. Prosody is the organization of various linguistics units (words, pitch, tone) into an utterance in the process of speech production. It conveys not only linguistics information but also contextual cues, intentions and attitudes (Fujisaki, 1997).

This research utilized two audio softwares, *Audacity* and *Praat*, to clean and segment the audio into utterances and then token sentences were selected based on verb placement (verb initial, verb second and verb final). These token sentences will be analyzed for pitch placement and then compared to see if verb placement affects prosody, further expanding on the current literature which states that pitch defaults to the verb (Frazier, accepted). This research is particularly important because there is a gap in existing literature on prosody in Anishinaabemowin and there are no experimental studies such as this.



### References:

- Fairbanks, B. (2017). *Ojibwe Discourse Markers*. Lincoln, NE: University of Nebraska Press.
- Frazier, S., Déchaine, R.M, & Dufresne, M. (accepted). The Syntax of Discourse: What an Anishinaabemowin Oral Text Teaches Us. 2020 CLA Proceedings.
- Fujisaki, H. (1997). Prosody, models, and spontaneous speech. In *Computing prosody* (pp. 27-42). Springer, New York, NY.
- Ogimaawigwaebiik [Nancy Jones] 2013. Gakina Dibaajimowin Gwayakwaawan. In *Dibaajimowinaan; Anishinaabe Stories of Culture and respect*; Nigaanigiizhig [Jim Saint-Arnold] (ed.), Great Lakes Indian Fish & Wildlife Commission, 9-10.

## Interpretation and Analysis on the Polychromy of Attic Korai from Votive and Funerary Contexts

Presenter: Lilly Hickox, Classics

The characteristic woman of Archaic Greek sculpture, the *kore* (pl. *korai*) stands proud, rigid, frontal, and omnisciently smirking at her viewer with the famous Archaic smile. She has been interpreted as an attendant, goddess, or deceased maiden, wearing representations of draped diaphanous robes, jewelry, and bearing offerings. Yet where her now clean marble surface exists once was intricately illuminated with vibrant pigments, inlaid stones, metals, and often accompanied by accessories of various materials. Recent advancements in analytical techniques have enabled scholars to delve deeper into the study of these sculptures, uncovering traces of pigments which would otherwise be left undetected. However, the image that these colours paint has yet to be thoroughly analysed and a history of intentional removal and surface cleaning has postponed a complete evaluation of the sculptures. In Attica, from the sixth to the early 5<sup>th</sup> century BCE, *korai* reflect stylistic progression and variation within and between archaeological contexts. A palette of colours was used to display features now lost to the modern eye. This paper examines the *korai*, proposing meaning through colour, patterns, and representations. Using polychrome reconstructions, spectral data, pottery, archaeological evidence, and ancient literary sources, the author interpreted the polychromy and decorative elements of Attic *korai* from votive and funerary contexts. Asking questions on symbolism, utility, cultural connection, and identity of the sculptures; this paper explains the use of pigments in relation to the symbolism of the sculptures and to their role in the greater framework of the Archaic Greek world.

## The Tempest and A Tempest: Evolving Representations of Colonialism

Presenter: Jessie Fraser, English

Shakespeare's 17<sup>th</sup> century *The Tempest*, written during early British colonial times, tells the story of Prospero, the Duke of Milan, who arrives at an island with his infant daughter and enslaves its Indigenous natives, Caliban and Ariel. The play is an allegory of European colonization and imperialism that both promotes colonization and begins to question it. Césaire's *A Tempest*, written in 1969 and approaching a post-colonial era, takes the political and ethical questions surrounding colonialism even further. These questions in both plays are rooted within the relationship between Caliban, one of the island's Indigenous natives, and the European settler, Prospero. Though Césaire's *A Tempest* is an adaptation of Shakespeare's original play, it differs significantly from *The Tempest* in that Césaire's narrative is a post-colonial work and thus presented from the perspective of the native population, represented by the character Caliban, rather than Prospero's settler perspective which was the focus of Shakespeare's narrative. This post-colonial perspective alters our understanding of Prospero and Caliban from civilizing settler and savage to abusive colonizer and abused colonized, or master and slave. This power relationship is demonstrated through the two characters' portrayals in the two plays, their power dynamics, and their use of language as a tool both of colonization and rebellion.

### **'All my Relations' in Ruby Slipperjack's *Silent Words* (1992)**

Presenter: Katie Doreen, Geography/Global Development Studies

Faculty Supporter: Dr. Petra Fachinger

This presentation examines the extent of which Nature in Ruby Slipperjack's *Silent Words* (1992) serves to reconnect 11-year-old protagonist, Danny, to his Anishinaabe identity. When Danny flees his run-down house in a settler-colonial town, he finds limitless support from the plant and animal life of Northern Ontario. The relationship between boy and Nature transcends the boundary between the human and the more-than-human world and becomes that of a student and teacher. Danny's reconnection to Nature and his willingness to listen to its many abstract teachings are central to the reclamation of his indigeneity. With the help of some human interpreters, Danny develops the epistemological tools and the humility to allow Nature to heal his past traumas as well. The Anishinaabe medicine wheel teachings profess that a holistically healthy person seeks to find balance among their intellectual, spiritual, emotional, and physical self. Danny achieves this on his journey through the woods while decolonizing and re-indigenizing himself. This reading of the role of more-than-humans in *Silent Words* also identifies Nature's propensity to share Anishinaabe teachings in subtle and unexpected ways for those who are willing to listen. Though it is a fictional text, the transformative learning and healing processes Danny goes through after reconnecting with Nature are generalizable to the real-world. In many ways Danny's reclamation of his Indigenous identity mimics the large-scale Indigenization movement happening throughout Turtle Island today.

### **A good man is a trickster to find: The Gothic in Flannery O'Connor and Drew Hayden Taylor's *The Night Wanderer***

Presenter: Taylor Tye, English Language and Literature

Faculty Supporter: Dr. Petra Fachinger

In my presentation, I will demonstrate the contrast between the pioneer of the Southern Grotesque, Flannery O'Connor, and her famous story "A Good Man is Hard to Find" with Taylor's use of the gothic in his YA novel. O'Connor adapted her version of the gothic from her predecessors such as Shelley and Poe. But she veers away from the creation of a fantastical monster tradition of the Romantics to drive the focus of the "monstrous" to the very human but harmful behaviours of her characters. Similarly, Taylor's narrative does away with the over-the-top fantasy of the Romantic tradition and instead chooses to set the narrative in a realistic space with relevant characters. The difference between O'Connor and Taylor is that in O'Connor's Southern Gothic the setting is the pinnacle of her story while Taylor's Indigeneity shines through with his humour, traditional storytelling, and orality in his narrative. Differences aside, it is clear that the motive of each text is a call for social reform in O'Connor's criticism of the social structure of the American South and in Taylor's criticism of colonization.

## Alphabetical List of Presenters

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Van Engelen, Sydney*	Session I
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Yusuf, Hayan*	Session IV

**SESSION III & VIII** are Poster Sessions.

Asterisk (\*) signifies a group presentation.

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