

I-CUREUS Conference & **SaPP** Showcase



April 4, 2024
11:00 am - 3:00 pm



Carleton
University

Teaching and Learning
Services

PROGRAM SCHEDULE

11:00 am	Event Opens
11:30 am	Provost's Opening Remarks
11:45 am - 3:00 pm	Poster Session

For any questions, please email:
icureus@carleton.ca or sapp@carleton.ca

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LETTER FROM THE CARLETON UNDERGRADUATE JOURNAL OF SCIENCE

Welcome to the Internship - Carleton University Research Experience for Undergraduate Students (I-CUREUS) Conference and Students as Partners Program (SaPP) Showcase! Today, we gather to celebrate the incredible projects completed by undergraduate students at Carleton, who have been hard at work over the last year.

This program showcases the diversity of research conducted in the Carleton community. All of the projects being presented today serve to have substantial and tangible impacts on our society, such as by improving the efficacy of treatment for iris melanomas, awakening students' sociological imaginations through creativity, and understanding the impact of Greyhound bus line cancellations on survivors of gender-based violence in rural and remote areas of Canada.

These programs provide students with a unique opportunity to gain applied experience in research and course development, an opportunity that many students may not have been otherwise able to access. Having completed a term in the SaPP in 2020, I can speak firsthand to the valuable working relationships, strong critical thinking and communication skills, and deep understanding of pedagogy that I developed in the program. These skills have been indispensable to my academic journey, and I am incredibly grateful for the mentorship I received from my staff partners in completing my term. These programs are strong pillars of Carleton's community and I look forward to seeing the program continue to grow in the coming years.

The Carleton Undergraduate Journal of Science was created to showcase the exceptional work of Carleton's undergraduate community and the students participating in today's conference and showcase exemplify this mission. It has been a privilege to collaborate with Millie Close, the Future Learning Lab Program Coordinator, on this program and an upcoming Carleton Undergraduate Journal of Science special conference issue.

For all attendees, we hope that you leave this conference reinvigorated with academic curiosity, a drive for exploration, and a deeper understanding of the research of your peers. This conference is an invaluable opportunity to engage with research that is actively occurring in the Carleton community, to speak with others in similar research areas, and to have thought-provoking discussions with others who are just as passionate about research and pedagogy as you! Congratulations to all individuals participating in the program and thank you to all attendees for your support of the program.

Warmly,



Ellen Coady

Senior Editor

Carleton Undergraduate Journal of Science

Students as Partners Program

Note: Entries appear in order of station

FACILITATING EFFECTIVE AND MEANINGFUL COMMUNITY ENGAGEMENT PROJECTS

Phillipa MacDonald, *Bachelor of Arts in Environmental Studies*

Staff Partner: Dr. Deborah Connors

Abstract not available.

USER EXPERIENCE AND DESIGN IN A FIRST YEAR BRIGHTSPACE COURSE

Rosena Zhuang, *Honours Bachelor of Arts in Childhood & Youth Studies*

Staff Partner: Dr. Jennifer Gilbert

Power of Persuasion is a First Year Seminar (FYSM) course in Rhetoric. Student resources are important in this course because FYSMs are meant to introduce new students to university and to develop academic skills. In this FYSM, students practice their reading and analytical skills in the context of rhetorical concepts with current examples of persuasion and argument. Therefore, much of the course content is renewed annually to stay relevant with events and student interests. This approach resulted in the Brightspace course site becoming overwhelmed with course material, becoming cluttered and distracting. Our project worked to improve the user experience (UX) of the Brightspace page by updating the content and design.

Addressing the content-related needs, we provided rhetorical analysis material by sourcing up-to-date opinion articles of relevance to students and strategized how to guarantee the students would gain knowledge and give informed agreement to the Academic Integrity policies before beginning the course. Particularly, the student-partner was able to offer a valuable student and peer lens in searching for articles with a range of topics.

For the design, we resolved to improve the UX for both the students and the instructor. To do so, we decluttered the interface so the students could find what they needed with more ease and organized the platform and backend of the course site to create a simpler experience for the instructor. The student-partner's role was to generate and test possible solutions to the design problems and to implement the ones that best suited our goal to improve UX.

NSCI1000 REDESIGNED: CUPORTFOLIO EDITION

Mahnoor Nadeem, *Bachelor of Science in Neuroscience and Mental Health*

Staff Partner: Dr. Katie Lucas

In order to promote reflective and integrated learning and explore the interconnectedness and significance of themes discussed in science courses, CuPortfolio, Carleton University's ePortfolio system, was utilized. This project involved the redesign of the Seminar in Science courses. The Seminar in Science courses aim to provide a cross-disciplinary examination of contemporary scientific issues, with an emphasis on employing interdisciplinary approaches to problem-solving. The course was structured into four interconnected thematic units: Critical Thinking, Community Building, Experiential Learning, and Equity, Diversity, and Inclusion (EDI). This initiative is supported by the recognition of ePortfolios as a high-impact practice that enhances students' ownership of their learning. Additionally, students were encouraged to use CuPortfolio to create multimedia portfolios, facilitating the connection of explored ideas.

AWAKENING: “THE SOCIOLOGICAL IMAGINATION” THROUGH CREATIVITY

Karina Leclair, *Bachelor of Arts in Sociology*

Staff Partner: Dr. Tonya Davidson

For my SaPP, I was asked to research what creativity is, why it is important to students, and create activities for students to strengthen their creative skills. To form my activities, I used a sociological lens but also made my activities generic so that any professor could use my work.

Specifically, I used the sociological imagination to develop my activities. C. Wright Mills, coined the term “the sociological imagination”, explaining that we must use our imagination to understand why personal issues are connected to greater issues we face as a society. Through my activities, students will face personal challenges and be encouraged to reflect on how these challenges affect broader society. My activities can be used during tutorials or lectures. To break this assignment down: I developed a video about what creativity is and why it is important for students, a deck of 12 creative class engagement activities to strengthen students' creative skills, and an instruction manual for the creative class engagement activities. In my work I discovered that creativity is not an innate skill, such that we are not born with it, but it can be learned and strengthened. My findings concluded that engaging in creativity effectively is a process that requires observation, trial and error, and collaboration. Through this process, students can become critical thinkers, gain resiliency, and develop strong problem-solving skills.

REVITALIZING ENGL 2302 IN RESPONSE TO CHATGPT AND PANDEMIC-ERA DISRUPTIONS

Georgia Son, *Honours Bachelor of Arts in English & Law; Concentration in Business Law*

Staff Partner: Dr. Morgan Rooney

In the summer of 2023, we set out to refresh ENGL 2302: Literatures and Cultures 1500-1700 in response to two forces disrupting the teaching and learning experience: AI Chatbots, and students' performance struggles in test environments.

In response to the first, we developed a multi-stage Final Project that asked students, working in groups, to assess the utility of ChatGPT for literary studies. Students used ChatGPT to generate a response to an essay prompt, critiqued its output, wrote a revised version, and then reflected on the experience of using ChatGPT. To support this initiative, we created a series of instructions, templates, and rubrics. For the second issue, we developed a suite of resources to prepare students for tests/exams, including two new formative activities: 1) the Sight Passage Analyses (group assignments) and 2) the Test/Exam Preparation Modules (H5P lessons that introduce students to the style of the test questions, give them opportunities to practice answering them, and provide them with study tips for each question type). While it is difficult to establish causality, when we compared student performance in the previous cohort to the cohort that experienced the above interventions, we observed some promising results, including:

- Improved test/exam scores (a 10% increase in students earning As, Bs, and Cs on Test 1; a 24% increase on Test 2; and a 16% increase on the exam)
- Improved final grade scores (a 24% increase in students earning an A- or better, and an 8% reduction in students earning an F)

IDENTIFYING BARRIERS AND MOTIVATIONS FOR COURSE INSTRUCTORS AT CARLETON UNIVERSITY WHILE IMPLEMENTING COMMUNITY ENGAGEMENT PEDAGOGIES

Pragati Parajuli, *Bachelor of Science in Psychology*

Staff Partner: Dr. Deborah Conners

Community engagement pedagogies have many benefits for both students and community partners. However, smooth and successful integration of these pedagogies relies heavily on the instructor and resources available. This SaPP project focuses on identifying key barriers and motivations experienced by instructors while engaging in community engagement (CE) courses. A literature review was conducted to compile the significant factors that aide or discourage faculty participation in these courses. The results focus on the interconnected nature of motivations and barriers while focusing on the importance of institutional support as motivation for continued participation in CE courses. The major barriers identified were lack of time and funding along with the lack of recognition of the additional workload encountered by the instructors. Since Carleton University has been moving forward with institutional support for the instructors, future directions of this project will include interviews with Carleton professors regarding their experiences with CE courses.

REFLECTIVE AND ACTIVE LEARNING ON EDUCATION IN CANADA TODAY

Emma Davis, *Bachelor of Arts in Criminology*

Staff Partner: Dr. Patricia Kmiec

During my SAPP project, "Reflective and Active Learning on Education in Canada Today" with Dr. Patricia Kmiec from the Sociology Department, I used my previous experience as a student to redesign eight in-class activities. The activities included individual, small group (3-4 students), and large group (4-7 students) activities. I had completed the course in Winter of 2022 and knew my student perspective would be valuable when completing this project. My three goals for each activity were to develop: 1) clear instructions for students before beginning, 2) questions to consider during the activity, and 3) self-assessment questions to promote reflection and active learning. Thinking back to when I completed the course, I wanted to encourage students to speak up with their thoughts, opinions, and ideas of the course material. Helping students interact with their peers helps to build relationships, critical thinking skills, and abilities to collaborate with groups to reach a similar goal. Throughout my academic career, I have realized the value of smaller group class discussions and how these discussions can positively impact self-confidence in students. It is with our hope that each student that takes SOCI 3300 with Dr. Kmiec leaves with the belief that they can actively contribute, listen, and think about many different topics in all areas of life.

***Poster not available.**

Internship - Carleton University Research Experience for Undergraduate Students

Note: Entries appear in order of station

**Abstracts with an asterisk will be presented at the National Conference on Undergraduate Research in Long Beach, California (April 8-10, 2024).*

A SYSTEMATIC FUNCTIONAL LINGUISTIC ANALYSIS OF REMOTE REAL ESTATE LISTINGS*

Emily Udle, Honours Bachelor of Arts in Applied Linguistics and Discourse Studies & English

Supervisor: Dr. Rachele Vessey

In the aftermath of the Covid-19 pandemic, Canada's rural population increased faster than any other G7 country. The province of Newfoundland was a distinct outlier, seeing a 6.4% decrease during the same period, the most drastic drop of all rural Canadian regions. This is no surprise to Newfoundland communities: since the 1992 Cod Moratorium, these populations have faced a continuing period of socioeconomic hardship and decline. While Lynch (2007) traces decades of outmigration from Newfoundland's rural communities to urban centres, current research does not account for this post-pandemic phenomenon. Newfoundland's population decline has been analyzed from a linguistic viewpoint, noting a redirection of regional discourse towards a perpetuation of tourism development (Stoddart, 2016). While tourist discourse represents one apparent strategy for combating population decline, the linguistic implications upon the genre of real estate listings have not been investigated.

In an era of increased global mobility and urbanism, this project strives to investigate the linguistic implications of such changes on real estate listings. Drawing upon the theoretical framework of systemic functional linguistics (SFL), this paper analyzes the interpersonal, experiential, and textual metafunctions of a 2022 real estate listing from the remote town of Harbour Breton, Newfoundland. As the 2023 Linguistics Global Winner selected by the Global Undergraduate Awards Committee, this project not only strives to demonstrate the analytical value of SFL, but systematically reveals persuasive linguistic choices made by an author as they attempt to attract buyers to a declining rural region. Findings include the frequent use of declarative mood structures, a prevalence of relational attributive processes, and a majority of topical themes relating to the home. These features demonstrate a deliberate saturation of favourable details, and a foregrounding of the home's features above other notable factors (e.g., location, proximity).

ABANDONED BY THE BUS: UNRAVELING THE IMPACT OF GREYHOUND BUS CANCELLATIONS ON GENDER-BASED VIOLENCE SURVIVORS IN RURAL AND REMOTE CANADA*

Janina Winnicki, *Bachelor of Health Sciences*

Supervisor: Dr. Francine Darroch

The permanent withdrawal of Greyhound from Canada in 2021 raised concerns about transportation accessibility for gender-based violence (GBV) survivors in rural and remote areas. GBV survivors in these regions face challenges accessing safe spaces, as shelters may be distant and difficult to reach without inter-city bus services, which are often lacking in rural and remote communities. The purpose of this media analysis is to develop a nuanced understanding of how the cancellation of Greyhound bus lines impacts GBV in rural and remote communities, and subsequently synthesize the key issues and calls to action as a mechanism for informing policy. This mixed-methods media analysis involved a comprehensive search of 7 news databases and media websites, which yielded 2950 articles. To select articles related to the intersection of the bus cancellations and GBV, we conducted two levels of screening: (1) title-abstract, and (2) full-text. Frequency analysis of key article characteristics revealed that over half of news sources were national-level, and most were online press. Based on time trend analysis, a spike of articles published in 2018 coincided with Greyhound's withdrawal from Western Canada. Thematic analysis revealed three main themes. Firstly, transportation inequities serve as significant barriers for GBV survivors, limiting access to safe spaces and fostering the need for unsafe travel practices. Secondly, the discontinuation of Greyhound services disproportionately impacts already marginalized Indigenous communities, exacerbating their vulnerability. Limited transportation options contribute to unsafe travel practices, notably hitchhiking, and to violence against Indigenous women, as emphasized in the Missing and Murdered Indigenous Women report. Lastly, advocates emphasize the need for collaborative efforts between all levels of government to establish an integrated national transportation system as a solution.

MONTE CARLO MODELS FOR EYE PLAQUE BRACHY THERAPY TREATMENT OF IRIS MELANOMA*

Marwa Djedouani, *Bachelor of Science in Physics; Theory Stream*

Supervisor: Dr. Rowan Thomson

Eye plaque brachytherapy is an effective treatment for eye cancer that uses radioactive seeds (that emit low-energy photons) in an applicator. The purpose of this work is to model eye plaques used to treat iris melanoma and evaluate radiation dose (energy deposited per unit mass) using Monte Carlo simulations. The simulations are performed using the `egs_brachy` code using 125I (OncoSeed 6711) and 103Pd (TheraSeed 200) brachytherapy seeds. The plaques span 360°, 270°, and 180° arcs and are modelled at the center of a 30 cm³ water volume. Dose was scored in a 2.55 cm³ sub-volume made up of 0.5mm³ voxels for simulations with 10¹⁰ histories. Voxelized three-dimensional (3D) dose distributions for each plaque are calculated and compared to published BrachyDose data (Thomson et al., 2010). `egs_brachy` calculated doses are compared to BrachyDose considering absolute dose in gray, dose as a percentage of prescription dose, and dose relative to the TG43 approach currently used in hospitals (Rivard et al., 2004). Statistical analyses show agreement within a 95% confidence interval with published data at 6 points of interest in the eye (cornea, sclera, lens, eye center, macula, and optic disk). Along the plaque central axis, `egs_brachy` and BrachyDose results agree within statistical uncertainties. In conclusion, eye plaques used for treatment of iris melanoma were successfully modelled and benchmarked. These models will be distributed (open source) with the `egs_brachy` code on GitHub, enabling state-of-the-art dose calculations in hospitals that will improve patient treatments.

NAVIGATING EDUCATIONAL HURDLES: THE IMPACT OF ATTENTION AND HYPERACTIVITY PROBLEMS ON SCHOOL ABSENTEEISM*

Shine Soki, *Bachelor of Arts in Psychology*

Supervisor: Dr. Maria Rogers

Attention deficit hyperactivity disorder (ADHD) is a chronic neurodevelopmental disorder that, left undetected and untreated, can devastate and impede the life trajectory of thousands of children. Unfortunately, children and youth afflicted by this disorder often go unnoticed and unsupported within the Canadian and American education systems. Studies show that successful completion of education plays a critical role in equipping students with ADHD with the skills and resources to effectively manage their condition, leading to better overall life outcomes. Research has connected the lack of childhood skill development in managing ADHD symptoms with severe, interconnected psychosocial outcomes such as school failure, bleak employment outcomes, high crime and incarceration rates, and even premature death. Unfortunately, the COVID-19 pandemic has exacerbated children's educational outcomes, disproportionately impacting school attendance rates among children with ADHD. This scoping review aimed to investigate the relationship between attention and hyperactivity problems (AHP) among school-age children/youth and school absenteeism in both pre- pandemic and post-pandemic studies. The main objective was to investigate whether children with AHP were missing school at higher rates than their non-AHP peers. Through a systematic literature search across numerous databases, 1282 studies were assessed, identifying 35 studies focusing on the association between AHP and school absenteeism. Preliminary analyses revealed that students with AHP were more prone to experiencing increased school absenteeism, including cases of school refusal, avoidance, suspension and expulsion from school. These findings are troubling, given that numerous studies have linked school absenteeism to adverse educational and psychosocial outcomes. In light of these findings, there is an urgent need for educational and policy reforms that prioritize the support and accommodation of children with attention and hyperactivity problems within the educational system.

THE TAP-TAP: A WEARABLE DEVICE TO MAKE MUSIC LEARNING MORE ACCESSIBLE

Ainonimechi Eze-Anyanwu, *Bachelor of Industrial Design*

Supervisor: Dr. Audrey Girouard

Music learners who are blind or have low vision may miss non-verbal cues such as head nods and gestures during music lessons. As a result, certain musical information is inaccessible to them. The aim of this study was to explore the long-term use of wearable haptic devices for real-time communication between teachers and students in a music learning context.

ELECTRICAL IMPEDANCE SPECTROSCOPY FOR TISSUE CLASSIFICATION

Elizabeth John, *Bachelor of Engineering in Biomedical and Mechanical Engineering*

Supervisor: Dr. Carlos Rossa

The present study utilized electrical impedance spectroscopy (EIS) techniques for classifying various types of ex-vivo biological tissues. To conduct this research, a quantity of five 20x20x20 mm specimens per tissue type was used for collecting impedance data. This data was measured using a Quadra Impedance Spectroscopy Device, in which impedance was measured over a range of 15 frequencies from 1 kHz to 349 kHz. Machine learning-based approaches were then used for classifying the tissues based on the impedance data. The results showed that frequency was negatively correlated with impedance magnitude, whilst having a positive correlation with impedance phase; there was also greater error when measuring the impedance at lower frequencies. It was also revealed that the most accurate classifier was Ensemble at roughly 99.13%. Overall, this study proves that EIS can be an effective tool for classifying biological tissues through impedance acquisition and that its applications could aid doctors in differentiating types of tissue for surgery.

THE WELL BUILDING STANDARD: A SYSTEMATIC LITERATURE REVIEW AND BIBLIOMETRIC ANALYSIS OF A NASCENT FIELD

Fatima Faris, *Bachelor of Engineering in Architectural Conservation and Sustainability Engineering*

Supervisor: Dr. Elie Azar

Both the natural and built environment can affect our health and well-being through similar means. The WELL Building Standard (or "WELL") is a voluntary rating system that aims to support, maintain, and promote occupant health and well-being in buildings. The literature indicates increased documentation and evaluation of WELL implementations in buildings. The goal of this research is to shed more light on this newly growing field by studying the extent of the effectiveness and impact of the use of WELL in buildings, how it compares to more established rating systems, and promising directions for future research. A three-step methodology was conducted for this systematic literature review, including (i) an article search, screening, and selection using the Scopus database; (ii) a detailed review of articles evaluating the effectiveness of WELL and comparing WELL to other rating systems; and (iii) a bibliometric analysis of the studies to map and understand how the field has evolved and where it could be heading. Results indicate that WELL-certified buildings generally have higher satisfaction with mental health, well-being, and productivity than non-WELL-certified buildings but do not show improvements in physical health satisfaction. As different subjective satisfaction measures were recorded in each article, a clear conclusion spanning various articles cannot be accurately drawn. To overcome this, both a meta-analysis of the results of case studies and a more comprehensive and long-term study are needed to determine if WELL upholds its premise and goals and whether it is an effective and cost-effective investment.

EXTENSIONAL VISCOSITY MEASUREMENT USING FORCE TENSIO METER

Myar Mosleh, *Bachelor of Engineering in Biomedical and Mechanical Engineering*

Supervisor: Dr. Prashant Waghmare

A K100 force tensiometer was used to find the extensional viscosity of Newtonian fluids such as water and oils. We tracked the thinning of fluids driven by capillarity while considering resistance from inertia, viscosity, and other stress induced by the extensional deformation.

Results help to understand extensional viscosity characteristics, the K-100 force tensiometer's versatile utility for viscosity analysis, and to validate mathematical models for D10, S60, and D1000 type oils.

EXPLORING THE GENDERED NATURE AND PREVALENCE OF ADVERSE CHILDHOOD EXPERIENCES, DEVELOPMENTAL TRAUMA, AND COMPLEX TRAUMA IN A SAMPLE OF SOCIAL JUSTICE-INVOLVED YOUTH

Eva Huppe, *Honours Bachelor of Science in Psychology*

Supervisor: Dr. Shelley Brown

In Canada, under Section 34 of the *Youth Criminal Justice Act* (YCJA), courts can order psychological assessments for high-risk youth to aid in informed sentencing and rehabilitation decisions. Our study utilizes these assessments to examine the prevalence of adverse childhood experiences (ACEs), developmental trauma, and complex trauma among 1205 youth charged with serious offences, assessed at a youth justice clinic under Section 34 of the YCJA. Additionally, we investigate gender differences in the presence of adversity and trauma within the sample. We hypothesize that the accumulation of ACEs, developmental trauma, and complex trauma will increase the likelihood of criminal behavior in youth. This hypothesis is in line with previous literature, which has shown that ACEs may not fully capture the extent of adversity experienced by youth, implicating developmental and complex trauma in crime trajectories as well. Our preliminary analysis of a subset of the sample reveals high levels of ACEs, with parental divorce being the most frequently reported. While females generally report higher victimization rates, significant victimization is observed across genders. Currently, coding of Section 34 assessments is underway, spearheaded by a collaborative effort between students from Carleton University and the University of Toronto. We anticipate that our findings will illuminate the co-occurrence of ACEs, developmental trauma, and complex trauma within this sample, shedding light on their contributions to criminal behavior. Moreover, we hope that our study will offer insights into how these adversities can be mitigated by identifying individual strengths which increase youths' desistance from the criminal justice system.

INROADS FOR RUSSIAN INFLUENCE IN THE MEDIA LANDSCAPES OF NEIGHBOURING STATES

Gabriella Pickton, *Bachelor of Arts in European and Russian Studies*

Supervisor: Dr. Paul Goode

"Inroads for Russian Influence in the Media Landscapes of Neighboring States" is a timely look at the proliferation of Russian war narratives in the context of the current war in Ukraine. It functions primarily as a tool to provide crucial background research for the Russian Media Observation and Reporting (RuMOR) project, based out of the Institute of European, Russian, and Eurasian Studies.

HUE/VOWEL COUPLING? TESTING HUE WITH VOWELS IN PSEUDOWORDS

Justin Hannah, *Bachelor of Cognitive Science; Concentration in Language and Linguistics*

Supervisor: Dr. David Sidhu

Sound symbolism is the connection between certain features of sound and certain traits in non-linguistic items. In previous research, sound symbolic associations have been found between the height and backness of vowels and the brightness (the trait of a colour being lighter or darker) and saturation (the intensity of a colour) of colours. These same studies have also found no consistent association between colour hue (the element of colour which defines its colour classification, such as red or blue) and vowel position. We examined whether there is an association between hue and vowel position features after controlling for saturation and brightness. We selected three colour pairs matched on saturation and brightness, but differing on hue: blue/yellow, purple/orange and red/green. Participants were shown each pair, along with a pseudoword, and asked to choose the colour that best matched the word. Three pseudowords contained the front-high vowel /i/ (as in see), and three pseudowords containing the low back vowel /ɑ/ (as in saw). We examined whether participants were more likely to choose a certain colour in each pair, for either type of pseudoword. We found no relationship for purple/orange and blue/yellow colour pairs. However, there was a statistically significant relationship for the red/green colour pair, such that green was associated with high front vowel pseudowords, and red with low back vowel pseudowords. This study was conducted as a pilot study in which we will attempt to artificially create associations between vowels and different hues.

RECREATION & PHYSICAL ACTIVITY ACCESSIBILITY IN THE CANADIAN CONTEXT

Maimonah Al-Dulaimi, *Bachelor of Health Science in Global Health*

Supervisor: Dr. Francine Darroch

This presentation will investigate the role of recreational programs in minimizing financial burdens in low-income Canadian families. Fee assistant programs (FAPs), such as Jumpstart and KidSport, are subsidized programs that create opportunities for citizens with low-income to participate and access physical public activities. However, FAPs have limitations, including equipment fees, tournament fees, transportation barriers, and lack of communication, that low-income families face when accessing recreational and physical activities. These limitations are a concern as there is a positive correlation between time spent on physical activity and the overall mental and physical health wellbeing of an individual. This research focused on identifying current available resources for low-income families to use along with FAPs to reduce barriers that permit their physical activity and recreational access.

INVESTIGATING THE CROSS-STAGE IMPACTS OF HIGH TEMPERATURES DURING EGG DEVELOPMENT IN *GRYLLODES SIGILLATUS*

Hunter Brzezinski, *Honours Bachelor of Science in Biology*

Supervisor: Dr. Sue Bertram

Temperature significantly influences metabolism and growth in insects. Most insects are ectotherms, animals that do not produce useful body heat internally and whose body temperature closely matches their environmental temperature. While previous studies have primarily examined the impacts of short-term stressful changes in temperature or constant temperature exposure throughout all life stages, the extent to which early thermal history affects cross-stage development remains unclear. Addressing this gap in knowledge, we distributed the eggs of a commercially-relevant cricket species raised as food and feed, *Grylloides sigillatus*, across a thermal gradient ranging from 22°C to 40°C to assess relative hatching success and rate. It was indicated that higher temperatures (above the optimal 32°C) resulted in an increased hatching rate, while treatment groups with lower temperatures had a slower hatching rate or failed to do so at all. Further, decreased performance was observed for the highest temperature group (39°C), showing that the thermal limit has not yet been achieved. Better understanding these interactions with temperature will allow for more informed decisions for commercial rearing conditions.

INTER-RATER VARIABILITY IN NOCIFENSIVE BEHAVIOUR TESTING OF RODENTS

Emma-Lee Procher, *Bachelor of Science in Neuroscience and Mental Health*

Supervisor: Dr. Michael Hildebrand

Chronic pain is a critical health problem with a need for new effective treatments. Nocifensive behaviour testing, which is used to evaluate responses of an animal to noxious or painful stimuli, is important in basic pain research for understanding pain mechanisms and developing new treatments. A major problem in this technique is that there can be large differences in baseline measures even when the same strain and sex of rodent is used. This project explored factors that contribute to the inter-rater variability observed in nocifensive behaviour. Adult Sprague Dawley rats underwent evoked somatosensory testing using von Frey filaments and the simplified up-down (SUDO) approach with two different testers, while other environmental conditions such as location, testing time, and acclimation periods were carefully controlled for. Each tester produced different baseline scores with the paw withdrawal threshold ranging from 3 grams to 18.5 grams for individual rats. These results support that most observed variation in behavioural outcomes is due to experimenter differences compared to any other factors. Experimenter differences that could contribute to this variation include sex, genetics, or odour, and highlights the importance of maintaining one experimenter for a series of experiments. We conclude that inter rater variability is an important factor that must be considered when conducting von Frey nocifensive behaviour testing.

CE-UV/LIF ANALYSIS OF ORGANIC FLUORESCENT DYES FOR DETECTION OF NANOPLASTICS IN WATER FOR QUALITY CONTROL

Elbaraa Abdelsadek, *Bachelor of Science in Chemistry; Concentration in Nanotechnology*

Supervisor: Dr. Edward Lai

Nanoplastics are a type of plastics that form because of the degradation of bulk plastics due to several natural factors, and they are everywhere around us. Nanoplastics are a global concern due to their diverse composition. Additionally, detecting and analyzing these particles in water samples is challenging, as they also often bind with organic pollutants. Current water treatment methods are ineffective against nanoplastics, and these plastics can take years to degrade completely. One of the promising methods to detect nanoplastics is by using organic fluorescent dyes that can bind to the nanoplastics by interactions with their surfaces, and capillary electrophoresis with UV detection or laser-induced fluorescence are feasible techniques for this, especially laser-induced fluorescence as it can give much more sensitivity and selectivity for the fluorescent dyes.

The research aimed to validate capillary electrophoresis (CE) with UV spectrophotometer/laser-induced fluorescence detection (LIF) for the quantitative analysis of micro/nanoplastics in lake/ground/well/tap water samples using organic fluorescent dyes. CE was used with a blue laser, a photodetector, and a UV detector. A 50%/50% mixture of R6G & DCM (Rhody dye) was used as it showed the most promising results. It was found that the CE-UV/LIF method, especially CE-LIF, has shown a potential to analyze the nanoplastics contents of real-world water samples. Rhody dye mixtures showed good binding to the polystyrene nanoplastics, especially at lower concentrations. However, with the rise of cheminformatics and artificial intelligence-machine learning, fluorescent dye-based chemosensors will be better designed for future applications of CE-UV/LIF.

IDENTIFICATION OF MOUNTAIN PINE BEETLE FUNGAL ASSOCIATES USING WHOLE GENOME SEQUENCE DATA

Roqeeb A. Akinbile, *Bachelor of Science in Biology; Concentration in Health Sciences*

Supervisor: Dr. Catherine Cullingham

The mountain pine beetle (MPB), *Dendroctonus ponderosae*, is a forest pest in western North America, infesting millions of hectares of pine forests and causing extensive tree mortality. As the MPB infests trees, it introduces fungal symbionts to the tree. These blue-stain fungi facilitate the beetle's colonization and reproduction within the tree. The blue stain fungi comprise multiple species, and our understanding of the diversity and prevalence of these individual species remains limited. This study aims to identify and characterize the fungal associates of the MPB, to gain insight on fungal distribution, and to aid in forest management strategies. The study was conducted by collecting 26 MPB specimens from various locations across North America and extracting DNA for whole-genome sequencing using NGS Illumina sequencing. A bioinformatic pipeline was developed to analyze the sequencing data and characterize the fungal community associated with individual MPB sequences. Here we show that it is possible to use whole genome sequencing to identify the fungal associates transmitted by MPB. Our results align with previous literature characterizing the presence of *Grosmannia clavigera* and *Ophiostoma montium* as primary fungal partners in MPB populations across various regions. The aim of the analysis is to understand the geographic distribution trends of these fungal species in different habitats. Furthermore, this project provides valuable insights into the role of these various fungi species in supporting MPB during range expansion.

CO-CRYSTALLIZATION OF PHOTORESPONSIVE MOLECULES WITH METAL PERCHLORATES

Marshall Atherton, *Bachelor of Science in Chemistry; Concentration in Nanoscience*

Supervisor: Dr. Katherine Marczenko

The interaction between photoresponsive molecules and potent oxidizers such as metal perchlorates is of interest to the Marczenko lab for their potential to control energetic material reactivity, leading to increased energy release and improved detonation. Metal perchlorates, such as manganese ($\text{Mn}(\text{ClO}_4)_2$), nickel ($\text{Ni}(\text{ClO}_4)_2$), and aluminum ($\text{Al}(\text{ClO}_4)_3$), are known for their oxidizing strength, releasing oxygen during decomposition to enhance the combustion capabilities of energetic materials. Additionally, they are thermally stable, making them suitable for higher temperature applications.

Photoresponsive molecules can transfer energy from light to matter. The photoresponsive molecules of interest for this project were azobenzene and styrylpyridine derivatives. Co-crystallization of photoresponsive molecules with Mg, Ni, and Al perchlorate salts using slow cooling and evaporation methods yielded positive preliminary results. Characterization techniques, including nuclear magnetic resonance (NMR) spectroscopy and powder X-ray diffraction (PXRD), were utilized to assess molecular identity and phase formations. Successful synthesis of diethyl benzylphosphonate was achieved, which was required for the successful synthesis of (E)-4-styrylpyridine. Future work will involve continuing to characterize the products from these reactions, generating co-crystals of (E)-4-styrylpyridine with metal perchlorate salts, and assessing the photoreactivity of these new materials.

CASPASE ACTIVATION IN AN IN-VITRO MODEL OF PARKINSON'S DISEASE

Aurora Tracy, *Honours Bachelor of Science in Neuroscience & Biology*

Supervisor: Dr. Matthew Holahan

The Holahan lab is currently investigating the effects of an aptamer on the pathology of Parkinson's Disease (PD). To test the properties of this aptamer, an in-vitro model of PD using SH-SY5Y cells must be developed. This study investigates caspase activation (activation of cell apoptosis) in a model of PD using full cell media (10% FBS) to test its ability to serve as a sufficient PD model. No significant caspase activation was found over a 4-day test period, at which point the plates became overgrown with S-type epithelial-like cells. To solve this issue, a new model of PD using reduced cell media (1% FBS) was tested and shows less cell proliferation and less S-type cells over a 4-day test period. Future studies can investigate if the use of reduced media serves as an appropriate PD model over a longer test period to investigate the aptamers' properties.

EXPLORING IDENTITY THROUGH TWO-EYED SEEING: INSIGHTS INTO 2SLGBTQ+ STUDENT EXPERIENCES AT CARLETON UNIVERSITY

Aanya Baidur, *Honours Bachelor of Commerce in Marketing*

Supervisor: Dr. Rick Colbourne

This research examines the experiences of 2SLGBTQ+ students at Carleton University, aiming to gauge their perceptions of institutional support for their diverse needs. The study is grounded in equity, diversity, and inclusion (EDI) qualitative research, focusing on the unique challenges faced by 2SLGBTQ+ students. It employs a methodology informed by indigenous concepts of two-eyed seeing and positionality, alongside the Eight Principles of Community-Based Participatory Research. Through qualitative methods such as interactive interviews and focus groups, participants are treated as co-creators of knowledge, ensuring their voices remain central. Snowball and purposive sampling techniques are used to ensure diverse representation.

Preliminary findings reveal significant challenges in accessing support services and navigating campus life for 2SLGBTQ+ students, compounded by intersecting social identities. Recommendations for policy improvements are anticipated outcomes. The analysis identifies intersectionality as a key determinant of university experiences, along with challenges in resource access and the prevalence of the gender binary. While the university is perceived as 2SLGBTQ+-friendly, this perception largely arises from community efforts rather than institutional support. The study emphasizes the need for greater inclusivity and support in university environments. In conclusion, it highlights the importance of understanding and addressing the diverse needs of 2SLGBTQ+ students and stresses the role of community initiatives and institutional policy in fostering inclusive campus environments.

SIMULATION OF LABORATORY MICE FOR TRAINING OF COMPUTER VISION SYSTEMS*

Rhishita Mondal, *Honours Bachelor of Computer Science; Artificial Intelligence and Machine Learning Stream*

Supervisor: Dr. Oliver van Kaick

A common type of experiment in neuroscience involves the observation of laboratory animals for learning about their behaviour under different conditions. For example, collecting statistics on what regions of a cage a mouse spends most of its time during an experiment can indicate if the mouse's behavior has changed due to stressors. To evaluate the outcome of these experiments, a person typically has to watch and manually score several hours of recordings of multiple animals. Thus, to speed up the evaluation, computer vision systems have been adopted to automatically analyze and annotate the recordings. However, these systems are usually based on supervised learning, requiring a considerable amount of training data such as videos of experiments with ground-truth annotations in a similar setting as the target experiments.

The goal of this project is to simulate laboratory animals for creating video data with ground-truth annotations that can be used for training a computer vision model. In this manner, we intend to prioritize animal welfare and minimize their use for creating data, according to the ethical 3R principle that recommends replacement, reduction, and refinement in experimentation. Specifically, we focus on experiments with mice as this is an unexplored area in current research efforts, as previous publications have been based on fish datasets. Thus, the main task of the project consists in developing a simulation of a 3D mouse model in a cage using computer graphics techniques. We currently obtained a preliminary simulation which will be refined and transformed into a video sequence for training a computer vision system (CVS). We will enhance the CVS with the simulation data and evaluate the impact on the mice detection results. Our final goal is to validate the approach by analyzing real experiments with help from collaborators in neuroscience.

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BUILDING QUEER UTOPIA: A FRAMEWORK FOR COLLECTIVITY AND CREATIVITY

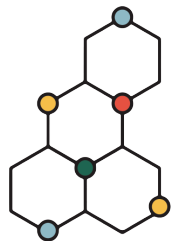
Maya Chorney, *Honours Bachelor of Arts in English; Concentration in Creative Writing*

Supervisor: Dr. Sarah Brouillette

A critical or queer utopia is a space where we can dream radically different potentialities than those dictated to us by the myriad oppressions of daily life. Beyond glimpsing alternative futures, collective spaces such as hybrid art-social events centre desire, joy, and curiosity. They can also create room for different modes of being in the world, room to breathe. Although this world is neither utopic nor queer in many regards, it is still possible to make pockets that are both in the here and now, if only fleetingly. I believe queer people are actively fostering such spaces within their intimate social circles and beyond. This experimental research-creation project combines queer theory, qualitative interview data, and the process of making art in group settings to understand how and why 2S/LGBTQIA+ student artists use their creative practices to explore the self and build community. It also offers a foundational framework for future projects in this area—academic, creative, sociopolitical, or a combination thereof. An open-access zine documents the workshop guide I designed for this project, artwork and stories by myself and participants, interview excerpts addressing desirable futures, and some reflections on the project.

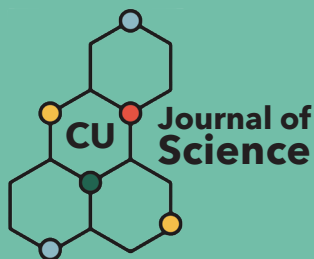
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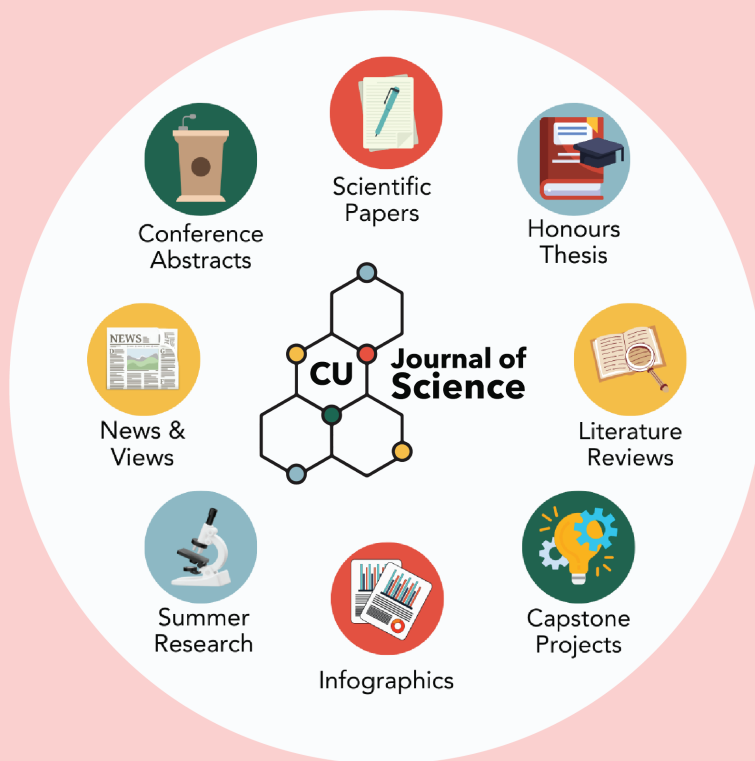
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