**Itinerary** **Zoom**

**September 17, 2020**

9:00 am ***Opening Remarks and Introduction of first presenter by Dr. John Klironomos***

9:10 am **Seamus McRae**, Biology (Dr. Andis Klegeris) NSERC-USRA

Histone proteins as mediators of microglial neurotoxicity

Dying cells release DNA-binding proteins called histones, which induce inflammatory tissue damage. Several organ systems are well-studied targets of histone activity, but the central nervous system (CNS) is not one of them. While histones’ direct toxicity to neurons is well-characterized, their ability to modulate the neurotoxic secretory profile of non-neuronal brain cells (specifically, microglia) remains mostly unexamined. We performed experiments wherein neurons were exposed to conditioned microglial supernatants – results indicate that histone treatment alters microglial neurotoxicity. This study improves our understanding of histones’ CNS activity and may inform future clinical trials targeting histone-mediated systemic inflammation in intensive care patients.

9:20 am **Sydney Bosetti**, Biology (Dr. Kirk Bergstrom) URA

High-throughput pipelines for quantitative analysis of the colonic mucus system in situ

The intestinal mucus barrier is a vital interface between an organism and their environment, particularly their gut microbiota, where the structural integrity of this barrier is essential for promoting health and preventing disease. However, no easily usable analysis software exists to rapidly measure varying mucus thickness along distances in situ to effectively study the overall intestinal mucus system. To address this, we developed imaging scripts for robust, high-throughput image analysis of the mucus barrier over large distances. Importantly, our pipeline can be applied to other curved biological structures, and requires only FIJI, a free, popular, open-access software.

9:30 am **Sakshi Khanna,** Biology (Dr. Soheil Mahmoud) IURA

Studying transcription factor genes regulating flower initiation in Cannabis sativa

Understanding the genetic mechanisms responsible for the transition from vegetative to reproductive phase is very important in the cultivation of Cannabis, a wind-pollinated plant. Since the MADS-box family of transcription factors (TFs) have a major role in this transition, an analysis of Cannabis MADS-box genes associated with flower development was conducted using publicly available genomic databases. Thirty-four MADS-box TFs were identified and characterized based on their phylogeny, protein structure, subcellular localisation, conserved, coding and non-coding regions. Collectively, this study provides an extensive and systematic analysis of the Cannabis MADS-box genes that will eventually be targeted to regulate Cannabis flower development.

9:40 am **Taryn Murray**, Biology (Dr. Andis Klegeris) IURA

The neurotoxic secretome of microglia

Microglia are the innate immune cells of the central nervous system. When microglia become activated, they release molecules which have direct toxic effects on surrounding cells, known as neurotoxins. The majority of currently available research on microglial neurotoxins focuses on a limited set of established neurotoxins and seldom considers the diverse range of other potentially neurotoxic molecules. Through an extensive literature review, we identify and describe several less-established neurotoxins secreted by microglia. An understanding of the full spectrum of microglial neurotoxins could facilitate the development of novel therapeutics for neuroinflammatory diseases characterized by excessive microglial activation and neuron death.

9:50 am **Anusha Shivram**, Biology (Dr. Karen Hodges & Mr N Sivasothi - Singapore) IURA

Smooth-coated otter (*Lutrogale perspicillata*) dynamics and occupancy in Singapore’s urban matrix

In Singapore, an increasing number of territorial conflicts were observed between four families of smooth-coated otters (*Lutrogale perspicillata*) in the Central Watershed. Records of territorial interactions, movements and occupancy from video footage and reliable reports by otter-watchers indicate the dominant otter family was unchallenged in their core territory. Two subordinate families achieved a spatio-temporal coexistence at the periphery of that territory. The lowest ranking family could not establish territories within waterways and were nomadic between multiple, suboptimal habitats and food sources within the urban matrix. This represents a novel adaption of the urban environment by a smooth-coated otter family in Singapore.

10:00 am **Matthew McConnachie**, Chemistry (Dr. Thuy Dang) NSERC-USRA

Omics data analysis to gain insight into the biosynthesis of anticancer camptothecin in *Camptothecacuminata*

Camptothecin (CPT), extracted from *Camptotheca acuminata*, is an anticancer drug that inhibits topoisomerase I’s function leading to tumor cell death. Little is known about the enzymes responsible for the biosynthesis of CPT. This research aims to elucidate the enzymes involved in the synthesis of CPT in *Camptotheca acuminata*. Using previously published transcriptomic data, bioinformatic techniques such as self-organizing maps and Pearson Correlation analysis were used to identify candidate CPT biosynthetic genes. Molecular cloning and biochemical techniques were used to clone and express candidate genes and identify their enzymatic activity. This study paves the way for elucidation of CPT’s and other biosynthetic pathways through robust gene candidate identification by bioinformatics.

10:10 am **Abigail Law,** Chemistry (Dr. Robert Godin) NSERC-USRA

Examining the charge carrier dynamics in carbon nitride heterojunctions

The development of better photocatalysts for sustainable energy production is becoming increasingly essential due to the current environmental crisis. The way charges move is critical for the efficiency and can be controlled by joining two materials together to make heterojunctions. We did the first review of heterojunctions that contains a promising photocatalyst, carbon nitride. Our search found that the sources of information pertaining to the movement of charges comes from advanced spectroscopy. Various studies show a lack of correlation even among those that used the same materials. This indicates that we don’t yet understand all of the key aspects.

10:20 am **Marisa Aviani**, Chemistry (Dr. Frederic Menard) NSERC-USRA

Developing a cellular assay to study new ligands for voltage-gated calcium channels (CaV's)

Astrocytes are involved in synapse elimination, which is prevalent in neurodegenerative diseases, however, their exact role remains unknown. Voltage-gated calcium channels (CaVs) found in astrocytes have been found to respond to the neurotransmitter glutamate, providing a possible mechanism for how astrocytes communicate with neurons. CaVs must be labelled in live astrocytes to study their regulation of synapses. Chemical probes offer a new means of labelling CaVs in live tissue. CaV1.2 was expressed in HEK cells and imaged using a pyrimidine-2,4,6-trione-based probe, whose parent molecule is known to selectively bind CaVs. Future experiments will confirm probe selectivity and channel function.

10:30 am **Allison Leam**, Chemistry (Dr. Isaac Li) NSERC-USRA

Characterization of serial adhesion bond kinetics and their regulation in cell adhesion

It is widely known that cell interactions are primarily conveyed through chemical and electrical mechanisms, however, there remains a third unexplored mechanism - mechanical force. In cell adhesion, cells communicate by exchanging minute forces at the nanonewton level. This study aimed to design and construct DNA molecular force sensors as tools to measure these forces. Acoustic force spectroscopy (AFS) was used to test the molecular force sensors but determining their force range and modeling their kinetics continues. Characterizing these forces could lead to major implications as many cellular functions are directed by mechanical signaling that is not yet well defined.

10:40 am **Arantxa Da Fonseca**, Chemistry (Dr. Frederic Menard) IURA

Electrophysiological response of astrocytes exposed to kainic acid-based agonists of receptors in alpha-2-delta-1

Astrocytes are known to play a role in Neurodegenerative Diseases; however, the mechanism by which they contribute is unknown. There is evidence that suggests L-type calcium channels are involved. We can use fluorescent molecules and microscopy to identify the location and expression of these channels. In this project, I optimized the patch clamp electrophysiology technique to verify that the chemical probe binds to the targeted region of the calcium channel, the ⍺2δ1 subunit.

10:50 am **Destiny Ellenor**, Chemistry (Dr. Robert Godin) URA

Simulating the Charge Carrier Dynamics of Carbon Nitride Morphologies for a Greater Understanding of its Photocatalytic Efficiency

In the search for greener energy alternatives to combat climate change, carbon nitride (CNxHy )is an attractive technology for photocatalytic hydrogen fuel generation to capture and store solar energy. Sunlight shining on CNxHy generates electrons and holes, charges that can participate in reactions at the photocatalyst surface. However, CNxHy suffers from low photocatalytic efficiency due to consumption of electrons and holes by wasteful recombination. To achieve a greater understanding of how physical and energetic properties affect CNxHy’s photocatalytic activity, a MATLAB programming model is developed to simulate the movement and recombination of photogenerated charges.

11:00 am **Ryland Giebelhaus**, Chemistry (Dr. Susan Murch) URA

HormonomicsBD: A new tool for analysis of plant growth regulators

Online metabolomics tools have become increasingly popular for their ability to sort through data sets to hunt for molecules of interest. Many of these tools focus on compounds pertinent to human health, with few resources solely focused on plant metabolites, such as plant growth regulators (PGRs). Our overall goal was to develop such a tool for the analysis of PGRs. I developed, validated, then employed this tool, dubbed ‘HormonomicsDB’, in the analysis of dozens of samples. This uncovered potentially new PGRs which will aid in the generation of new hypotheses surround how plants produce and use PGRs.

11:10 am **Kaede Hirabayashi**, Chemistry (Dr. Susan Murch) IURA

Establishment of a model for Northern berry species to assess climate change resiliency

Canada’s Arctic is experiencing unprecedented climate change. As environmental conditions change, some plants are likely to be resilient while others may become endangered. *Vaccinium* are a diverse berry producing species and traditional food source that grow widely across North America. To better understand the impacts of climate change, I performed ecological niche modelling on two *Vaccinium* species with primarily Northern distributions and one with primarily Southern distribution. Northern species are predicted to be relatively stable while Southern species were less stable. Species experiencing the greatest decrease in suitable habitat were most dependent on precipitation, a phenomenon which requires further investigation.

11:20 am **Kamal Narayana**, Chemistry (Dr. Wes Zandberg) IURA

Assessment of the digestion of milk oligosaccharides by human gut bacteria

Breast milk is the gold standard for neonatal nutrition. A major reason for this is the high concentration of diverse, and chemically-complex milk oligosaccharides (MOs) it contains. MOs are produced by the addition of simpler monosaccharides to lactose. Over 200 MOs have been identified in human milk; cow milk, from which most infant formulas are made, contains ca. 60 MOs. Levels of these MOs change during lactation in both mammals likely to meet neonatal nutritional requirements. My IURA project focused on devising statistical tools to permit the multivariate analysis of MOs in human or bovine milk and several infant formulas.

11:30 am **Amir Sardari Romina**, Chemistry (Dr. Gino DiLabio) URA

The Role of Quantum Effects in Stability of D-ornithine 4,5 aminomutase

Radicals are highly reactive chemical species that are prone to react deleteriously with biological systems. However, enzymes such as ornithine 4,5-aminomutase (OAM) utilize radical intermediates to catalyze biological reactions. Such enzymes require mechanisms to control these radicals in order to prevent any destructive side reactions. It was shown that the interactions between the radicals and charged groups in the enzyme’s active site results in quantum Coulombic effects (QCE) that controls the reactivity of radical intermediates. The current study aims to determine the role of the QCE in controlling the reactions catalyzed within the OAM active site.

11:40 am **Darina Vekhova**, Chemistry (Dr. Frederic Menard) IURA

Synthesis of iodoacetamide molecular probe to study NOX2 inhibition

In the brain, excessive production of reactive oxygen species by specific enzymes, such as NADPH oxidase 2 (NOX2), is linked to various neurodegenerative diseases (e.g. Alzheimer’s disease). Most potent current NOX inhibitors, however, are non-selective and have side effects. Understanding the mechanism of NOX2 inhibition is key to developing more selective molecules. In this project, I aimed to synthesize the iodoacetamide probe to develop a procedure to label the NOX2 protein, that can be used to study its mode of inhibition. The iodoacetamide synthesis was optimized to obtain an intermediate containing the key azide functional group.

11:50 am **Sarah Wyse**, CMPS (Dr. Rebecca Tyson/Dr. Eric Foxall) URA

Modeling the effect of stochasticity on a mathematical predator-prey system

In mathematical modeling there rarely exists a single best-fit curve to describe a data set, and similar curves are typically considered interchangeable. Recent work, however, shows that similar predation curves may nonetheless result in different tipping points for the Rosenzweig-MacArthur predator-prey system. These tipping point behaviours include destabilising oscillations and extinction; predicting the occurrence of such behaviours is clearly important. I have extended this existing work by finding that the difference in tipping points also occurs in the Leslie-Gower-May predator-prey system. Additionally, I added stochasticity to both models to determine whether the convergence of tipping points can be achieved.

12:00 pm **Nicholas Rieske**, CMPS (Dr. Javad Tavakoli) NSERC-USRA

Splitting of Primes in Monogenic Cubic Fields

Every ring of integers has a finite set of elements called an integral basis so that every element of the ring is an integer linear combination of this basis. Additionally, each algebraic integer in the ring has an index that measures how close the powers of this algebraic integer are to forming an integral basis. We will describe the index of any element in a ring of integers given by a family of cubic trinomials in terms of a norm equation. This will give a necessary condition for a field to be monogenic related to the splitting of primes.

12:10 pm BREAK

12:20 pm **Nicholas Kayban**, CMPS (Dr. Shawn Wang) NSERC-USRA

Proximal-Like Algorithms for Non-Convex Functions

The fixed-point sets of convex functions are often crucial in solving mathematical optimization problems. However, describing the fixed-point set of a composition of several functions may be difficult even when the fixed-point set of each individual function is known. This project determined the fixed-point set of the composition of finitely many subspace reflector operators under mild conditions. Exact requirements for the commutability of two reflectors were also obtained. Finally, an algorithm was designed to compute the fixed points of a composition of affine reflector operators. This algorithm was compared to two other standard projection algorithms and was found to be advantageous. This study will allow researchers in optimization both theoretical and computational tools in determining the fixed-point sets of reflector compositions.

12:30 pm **Stephanie Hamilton**, CMPS (Dr. Donovan Hare) NSERC-USRA

Discrete Optimization Solutions for Exam Scheduling

Examination scheduling is a computationally difficult problem that has been approached from numerous perspectives within mathematics and computer science. This work introduces a constraint programming model that incorporates graph colouring theory to provide exam schedules for UBCO that reduce student hardships and meet examination requirements. Specifically, we propose an exam schedule that has 11 examination days and 0 student hardships, whereas the corresponding schedule that was in use had 14 examination days and 10 student hardships. Furthermore, this model minimizes the number of occurrences where a student has two exams on one day.

12:40 pm **Matthew Currie**, CMPS (Dr. Ramon Lawrence) IURA

Matching People in Historical Metis Records

The project’s goal is to develop a semi-automated algorithm to discover and recommend matching records with a given probability for the Digital Archive Database Project (DADP), a historical archive of primarily Métis records. This archive consists of many historical data sets collected from a variety of sources. Currently, the records are not linked, which results in issues including the same person appearing multiple times. A key result of the project is the program’s ability to find possible matches in the DADP. Record matching will improve the archive’s quality and enable historians to discover interconnections between people in diverse data sets.

12:50 pm **Meng Tian**, CMPS (Dr. Mohamed Shehata) IURA

Improving crowd counting accuracy for deep learning architectures

Crowd counting via deep learning neural network has demonstrated a great ability to provide accurate crowd counts for a given image. Current research aims to construct new architectures to further expand its potential but does not put much effort into improving existing ones. This research explored various preprocessing methods of the feeding image and tested them on a pre-trained architecture to try to increase its performance without varying its constitution. Data collected shows improved accuracy for some methods, and this finding can provide inspirations for improving present neural network applications (e.g. surveillance camera) and future deep learning architecture designs.

1:00 pm **Kendra Scarrott**, CMPS (Dr. Andrew Jirasek) NSERC-USRA

Raman spectroscopic analysis for monitoring radiation induced damage in biological systems

As individual cancer patients respond differently to radiotherapy, a current bottleneck in cancer care is the need for personalized treatment methods. Raman spectroscopy is a non-invasive optical method that has been shown to reveal biochemical changes in radiation-treated tissues. One limitation of this method occurs because of fluctuations in signals acquired in a dynamic cellular environment. This project used statistical methods to deconstruct and then rebuild an existing library of biochemical signatures. Reconstructions were achieved with correlations of 0.99. These results will assist in better characterizing the radiation response signatures required for effective patient monitoring.

1:10 pm **Ella Block**, EESC (Dr. Ed Hornibrook) NSERC-USRA

Methane uptake kinetics in arid grassland and upland forest soils

The consumption of methane in soil by bacteria known as methanotrophs is the exclusive biological sink for atmospheric methane. While there have been numerous studies evaluating the potential size of this global sink, there remains significant uncertainty in parameterizing the bacterial response to environmental factors in process-based models. An automated system based upon low microcontrollers and a C++ program was designed to incubate soil to determine methane oxidation rates as a function of temperature and without methane supply being diffusion limited. The physical system is being constructed and will be tested during the next academic year.

1:20 pm **Jasmine Lamoureux**, EESC (Dr. Bernard Bauer) URA

Use of Spatial Analysis to Identify the Potential Effects of Trails and Forest Roads on Water Quality in Streams

Watersheds with a dense network of roads and trails often face water quality issues when sediment is washed into streams during intense runoff events. Identifying high-risk locations within the watershed is pertinent to informing management intervention and remediation efforts. The Bear/Lambly Creek watershed was chosen for this study because it has experienced intense logging activities and frequent recreational use. Several datasets were incorporated into a GIS to identify areas at risk, including a recent high-resolution LiDAR digital elevation model. The resulting tool is useful to resource managers interested in mitigating the impacts of human activities in watersheds on Crown land.

1:30 pm **Luke Williams**, EESC (Dr. Ed Hornibrook) URA

Designing an Automated Chamber to Measure Methane Gas Emissions from Trees in Wetlands – Luke Williams, Earth & Environmental Science

Recently it was discovered that stems of wetland trees provide a conduit for escape of methane from anaerobic soil to the atmosphere. Measurements are limited however, and little information exists about the seasonality and daily characteristics of tree-mediated methane fluxes. Automated collection of emissions will significantly improve the temporal record of this new emission source. A new ultra-portable chamber system was designed and coded to operate a tree-mounted chamber, collect discrete gas samples, and monitor and record environmental variables. The physical system is being constructed and will be tested during the next academic year as part of my B.Sc.(Hon.) project.

1:40 pm **David Shifflett**, Psychology (Dr. Liane Gabora) NSERC-USRA

The Evolution Toolkit

The Evolution Toolkit will be an interactive computer program that enables users to visually depict, and to compare and contrast, biological and cultural evolution processes. The user will generate an artificial society of 'sims', depicted as circles of different colors, which represent their traits. Sims go through a lifespan referred to as a generation, at the end of which, if they are sufficiently ‘fit,’ they reproduce offspring for the next generation. This NSERC USRA focused on making the user interface more user friendly, and adding generational overlap such that one generation can transmit cultural traits to the next.

1:50 pm **Lydia Wood**, Psychology (Dr. Maya Libben) URA

The Validity of At-Home Video Teleconference-Based Neuropsychological Assessment

Neuropsychological assessments are used to determine the presence, nature, and severity of cognitive dysfunction. The objective of this pilot study was to examine the validity, feasibility, and acceptability of video teleconference (VC)-based neuropsychological assessment conducted from participants’ homes. Community participants completed a battery of neuropsychological tests, via VC, and fatigue and satisfaction surveys. Initial results show test scores were within the predicted range for age and education matched in-person norms and participants showed good endorsement of VC assessment. The findings will inform neuropsychologists using remote services during the COVID-19 pandemic and in the long-term, particularly for patients in remote locations.

2:00 pm **Reagan Zinck**, Psychology (Dr. Carolyn Szostak) URA

Shaping opinions: An analysis of Canadian press coverage of climate change

Despite evidence of climate change, Canadians’ beliefs are not unanimous. Attitudes are strongly influenced by the media, and there is a growing body of literature concerning factors in print media that shape attitudes about climate change. However, research on Canadian media coverage of climate change is limited. A content analysis was conducted on articles published in three national Canadian newspapers before and after the UN climate summit. Newspapers approached the issue in ways that created variation in how climate change is conceptualized. The results suggest that the Canadian press participates in the politicization of anthropogenic climate change.

2:10 pm **Dela Hini**, CCGS (Dr. Carlos Teixeira) URA

The Visibly Invisible II: Exploring the Barriers and Coping Strategies of Houseless and Low-Income Women in Kelowna, BC

This exploratory study builds on the current work of the UBCO Pink Backpack Project by investigating the barriers and coping strategies of houseless and low-income women in Kelowna, BC. This exploratory study will add to the growing literature on the experiences of houseless and low-income individuals in Kelowna, of which limited data is available. Data was collected by conducting interviews with women from the general Kelowna population and key informants in areas of service provision. Findings indicate that stereotyping and public perceptions of high-risk female populations hinders their access to public resources and services. Additionally, existing resources are insufficient for sustainably addressing the growing houseless crisis, especially in light of COVID-19.

2:20 pm **Hanna Paul**, CCGS (Dr. Fiona McDonald) URA

Unpacking Cultural Relativism of Menstruation and Moon Time

This anthropological project uses a mixed methods approach of autoethnography and Métis methodologies to unpack the complexities of cultural perceptions surrounding Moon Time (menstruation) and how this relates to women’s body images. Through a community partnership with the Elizabeth Fry Society and their Girls United program, qualitative and quantitative data collected over the summer informs connections between Moon Time teachings and body images. This presentation captures the meaningful outcomes of this project and the co-creation of a holistic module guided by Métis methodology, which encourages reconnections between young Indigenous women’s teachings, while creating an empowering counter-narrative for non-Indigenous menstrual teachings.

2:30 pm **Camille Morissette**, HSS (Dr. Deana Simonetto) URA

Support Systems in Athletes that have Suffered Traumatic Brain Injuries

This research project is an investigation of the resources available for sports-related concussions (SRC) in Canada. In this research I did an analysis of websites specializing in SRCs and compared the resources offered to the needs expressed by athletes. The main research objective is to gain a better understanding of the supports and resources available to athletes living with SRCs in Canada. I found that the current resources offered centered around the bio-medical understanding, devoid of the sociocultural context and lack information on social supports that athletes are looking for. The findings will help facilitate the creation of adequate resources in the future.

2:40 pm **Jonathan Romaniuk**, HSS (Dr. Ben Nilson) URA

Faith and Works: A History of Canadian Community Service in the Diocese of Kootenay

During WWI & WWII

This study explored ‘community service’, understood as efforts supporting social wellbeing, during the world wars within the Canadian Anglican Church’s Kootenay diocese, a district that includes the Okanagan. Using materials from the diocesan archives, including minute books, leaflets, and correspondences, **it** was found that community service endured in both periods. New challenges were addressed, such as through donations to the Red Cross and local services. Importantly, by continuing pre-war endeavors, such as fundraisers for churches and missionaries, community service maintained social bonds and promoted stability. Ultimately, understanding this response of outreach and self-preservation can assist modern responses to social challenges.

2:50 pm **Shao Yuan Chong**, EPPS (Dr. Manfred Elfstrom/Dr. Benjamin Cheung) IURA

Evaluating Trauma from Protests in the Hong Kong Community Since 1997

Reports have suggested growing psychopathology symptoms amongst Hong Kongers in recent social movements. Little details are provided on whether these trauma symptoms may have developed on individually and collectively. A mixed method research was conducted amongst Hong Kong community members in Vancouver and Hong Kong on trauma levels vis-a-vis protests since 1997. Trauma levels were higher for those who knew about the events than those who didn’t for events after the 2011 National Education Program given the events’ local and global outreach. Knowledge increased involvement and exposure towards the violence associated with the movements, increasing experiences of fear and fatigue.

3:00 pm **Paige Kinniburgh**, EPPS (Dr. Adam Jones) URA

The Effectiveness of Supervised Consumption Sites and the Opioid Crisis: An Examination of the Effectiveness of Supervised Consumption Sites from a Multidisciplinary Perspective.

In 2016, the government of British Columbia declared the use of opioids to be a public health emergency. In response to this crisis, the use of supervised consumption sites (SCSs) became a widespread harm reduction strategy. Because the successful operation of SCSs depends on several different goals and academic disciplines, it is difficult to analyze the overall effectiveness of these sites from the perspective of a singular discipline. This project aims to examine the definitions of “effectiveness” proposed by the fields of economics, harm reduction, and public policy development and analyze the potentially conflicting aspects of each of these definitions.

3:10 pm **Isabel Sofia Melgarejo**, FHSD (Dr. Jonathan Little ) IURA

The impact of a low carbohydrate versus low-fat breakfast on blood glucose control in type 2 diabetes

The prevalence of Type 2 diabetes (T2D) is increasing worldwide, with about 380 million people currently suffering from this chronic debilitating disease. Studies show that the largest spike of blood glucose occurs during breakfast thus targeting this meal may be a simple and easy strategy to improve blood glucose levels and insulin resistance. Using a parallel-group randomized controlled trial we aim to compare a low carbohydrate (LCHF) versus a low fat breakfast on blood glucose control in T2D. In our pilot study, we find out that the consumption of LCHF breakfasts seems to provide health benefits in T2D patients but more accurate dry blood spot tests are needed.

3:20 pm **Sayra Gorgani**, FSE (Dr. Jonathan Holzman) IURA

Hemispherical Retro-modulator for Terrestrial Free-Space Optical Communication Links

Free-space optics (FSO) employ lasers for communication, offering higher data rates than other methods. Some FSO links implement retro-modulators, which are reflective devices that return an incoming signal from any angle back to its source. While most retro-modulators are limited to a ~35° field of view (FOV), this study proposes a novel hemispherical retro-modulator (HSRM) that is capable of a 50° FOV—as determined through MATLAB simulations and geometrical analyses. This result suggests the HSRM can improve efficiency and omnidirectionality in future short-range FSO links. The HSRM was recently developed in the lab setting, and performance tests are currently underway.

3:30 pm **Sheikh Daryus Ahmed**, FSE (Dr. Mahmudur Fatmi/Dr. Khalad Hasan) IURA

Investigating Pedestrians Response to Autonomous Vehicles using Virtual Reality while crossing an intersection

The interaction of Autonomous Vehicles with pedestrians is critical for a safer transport network. In this project, we created a Virtual Reality (VR) environment to collect users’ data on simulated road-crossing scenarios by considering approaching vehicle type (e.g., autonomous, human-driven) and pedestrian condition (e.g., distracted, not distracted). The VR environment was deployed on Head-Worn Displays to collect participants’ responses such as their road crossing-time and waiting-time. Results revealed that participants took longer time crossing the road while they were distracted. In a post-experiment survey, participants expressed that their stress levels were high while the autonomous vehicles were moving on the road.

3:40 pm **Eric Laksmono**, FSE (Dr. Ahmad Rteil)

Effect of Fabric-Reinforced Cementitious Mortar (FRCM) on Steel Corrosion in Concrete

Steel corrosion in reinforced concrete structures increases the vulnerability of North American infrastructure, resulting in millions of dollars in annual repairs. This issue highlights the growing need for an innovative and effective repair method, in which fabric-reinforced cementitious mortar (FRCM) presents a novel means of strengthening deficient concrete structures. In this study, thirty-six concrete cylinders will be tested with varying conditions to assess the effectiveness of FRCM in controlling the corrosion process in concrete structures. The success of this study could be used for future research and potentially lower the cost of corrosion repair in reinforced concrete structures.

3:50 pm **Patrick Feng**, MGMT (Dr. Ying Zhu) IURA

How people make decisions on service and goods across two digital devices (touchscreen and PC)

Since the outbreak of the pandemic this early year, people’s shopping patterns have been shifting online. Under such circumstances, the effects of touchscreen technology on consumer behaviour have yet to be studied. This research was conducted in a survey format from Amazon Mechanical Turk. The between-subjects design allows us to depict a relationship between device type (touchscreen, non-touchscreen) and the type of goods (tangible good, service). Finally, the findings can then provide retailers or industries with insights into the promotion strategies.

4:00 pm **Gabriel Tan**, MGMT (Dr. David Walker) IURA

Analysing Customer Service Interaction Audio

Many employees in the service industry encounter mistreatment from customers during their daily work wherein customers yell at, belittle, or ignore the employee. This research investigated whether audio characteristics, like pitch, of customer behavior in a service interaction can predict customer mistreatment towards the employee and whether these characteristics can influence employee behaviors. This project took existing service interaction audio, converted them to numeric data, built variables representing audio characteristics, and examined the relationship between these variables and customer service. The ability to predict customer behavior, especially mistreatment of employees, could allow employees to avoid or diffuse customer mistreatment.

4:10 pm **Shiven Khera**, MGMT (Dr. ) IURA

The Role of Leadership during the COVID-19 Pandemic: A Cross-Cultural Study

The COVID-19 pandemic has caused numerous disruptions globally. How various governments and world leaders manage the invasive virus in a timely and responsive manner determine the mortality rate and the level of outbreak. This paper serves as a comprehensive case study on government structures, leadership styles and responses of various top leaders of the world to tackle the crisis. The study examines COVID-19 data associated with the responses from 5 governments namely Brazil, Canada, USA, Newzealand, Taiwan and the U.K to analyse as well as compare and contrast each country’s response from the day the virus arrived till the first half of 2020. In this study we examine the impact of different leadership styles on the effectiveness of managing the COVID-19 pandemic. In our multiple cases that related to leaders’ responses to COVID-19 in the first half of 2020, we identified six categories of political leaderships: (i) transactional/economic-driven leaders, (ii) humanity-driven leaders, (iii) scientific-driven leaders; (iv) symbolic leaders. All these leaders are playing different roles in the COVID-19 pandemic. Ultimately, our study seeks to provide insights of how leadership contributes to the development of community resiliency.

4:20 pm **Nithi Santhagunam**, MGMT (Dr. Jennifer Davis) IURA

A Theoretical Framework to Understand and Improve Adherence among Older Adults who Fall

Falls are a “geriatric giant’ of aging. Even though falls can be prevented through lifestyle interventions such as exercise or environment modification, and medication adjustments, adherence rates to falls prevention interventions are often low. Our objective was to develop a theoretical framework to understand intrinsic and extrinsic factors that impact adherence to inform future strategies to improve adherence. The results of this review suggest that intrinsic factors such as high socioeconomic status, high health literacy, being married and extrinsic factors such as low healthcare cost, better communication and useful policy interventions are associated with greater adherence.

4:30 pm **Vinil Sood**, MGMT (Dr. Eric Li & Amir Ardestani-Jaafari ) IURA

Food Banks Operational Strategy for Perishable Products

Food waste is a global challenge with economic, environmental, and social impacts. Food banks play a critical role in the reduction and management of food waste. This systematic review is conducted to study food waste literature and discusses the role of food banks in food waste management.

4:40 pm **Mohana Rambe**, MGMT (Dr. Eric Li & Amir Ardestani-Jaafari) IURA

Food bank operations specifically inventory management systems for the Central Okanagan Food Bank and Helen’s Acres Community Farm

Food insecurity is a worldwide concern that is addressed by food banks in affluent countries. They have been an adjunct solution in addressing food poverty and thus have a number of papers focusing on various food bank concerns. Therefore, our systematic review paper analyzes these garnered papers on food banks’ operations to address these concerns. The gathered research papers focused on different operations dimensions such as food supply chain, distribution and inventory. Additionally, we analyzed papers that used operations research methods such as optimization and dynamic programming. Therefore, to optimize our analysis we utilize operations research methods in our systematic review paper. This allows us analyze the collected papers in depth.

4:50 pm **Beyond Zhao**, MGMT (Dr. Ying Zhu) IURA

How people make decisions on different marketing promotion messages

Currently, research about consumers’ behaviour on touchscreen devices is in its infancy. The primary goal of this research is to provide better understanding of the impact of touchscreen vs. non-touchscreen devices on consumers’ judgements and decision making. To examine trends in consumer preferences specific to the COVID-19 pandemic, which have shifted to online, we also look into the concept of bulk-buying. We designed a between-subject survey to investigate the impact of shopping context on consumers’ purchase decisions across different devices (touch, non-touch), and the quantity of items (single, bulk). Our research is able to provide insight into consumer preferences during this global pandemic, allowing organizations to derive effective promotional strategies.