



undergraduate **RESEARCH AWARDS** symposium

EXPERIENCE. KNOWLEDGE.

September 20, 2017 - Schedule

UNC 200

9:30 am **Opening Remarks by Dr. Mike Evans**

Dr. Mike Evans to introduce first presenter

10:00 am **Brianne Newman, Microbiology (Dr. Dan Durall)**

Evaluation of wine yeast viability in chemically defined grape juice medium

Chemically defined grape juice medium (CDGJM) is often used to provide consistency to laboratory-based enological research. Research involving CDGJM has traditionally used strains of *Saccharomyces cerevisiae* which has been shown to perform comparably in both CDGJM and real grape juices. However, it is unknown how the fermentative performance and viability of other wine yeast species could be affected by CDGJM. Here, we compared the viability and fermentative performance of both indigenous and commercial yeast species in CDGJM as well as a Chardonnay juice. Results show no significant effect of media used on the viability of strains.

10:15 am **Adam Yasunaga, Chemistry (Dr. Isaac Li)**

Neutrophil Rolling Adhesion and Activation

Neutrophil rolling adhesion is mediated by P- or E-selectin which activates lymphocyte function-associated antigen-1 (LFA-1). Activated LFA-1 binds to intercellular adhesion molecule (ICAM)-1 causing neutrophil arrest at the site of infection. The chemical pathways involved in LFA-1 activation have been well studied; however, more information is needed about the physical forces involved. To study this, flow chambers were used where the glass surface was coated with p-selectin and/or ICAM-1 and neutrophils were flowed across the surface. Our results showed successful cell rolling using the flow chamber design, however much more data is needed to gain valuable information about LFA-1 activation.

10:30 am **Margaret Ingram, Psychology (Dr. Brian O'Connor)**

Assessment of Psychopathy Expression by Gender

The objective of this research was to explore gender differences in the expression of psychopathy. A literature review revealed an absence of gender behaviour norms for psychopathy in previous studies. It was hypothesized that some items in commonly used measures of psychopathy may show gender bias, and that existing measures may not contain enough items that are relevant to the manifestation of psychopathy in women. An exploratory investigation was conducted on statistical bias in common measures of psychopathy, and novel, relevant, but previously neglected items and measures were included in a new data collection. Preliminary analyses indicated only occasional and modest levels of item-level bias, and that some additional female-relevant items merit consideration for inclusion in measures of psychopathy. Further iterations of data collection and analysis are planned for this project.

10:45 am Jaclyn Salter, History & Sociology (Dr. James Hull)

Rural Agency and State Formation in British Columbia, 1914-1970

In British Columbian history, how much influence rural residents had over the development of their municipalities and province has not been clearly addressed. By examining the minutes and correspondence of the Farmer's Institutes of Winfield and Vernon and the Women's Institutes of Oyama, Rutland, Coldstream, and Summerland, this study shows that the Institutes in the Okanagan actively defined the roles and responsibilities of both their municipal and provincial governments. This research challenges the dominant historical narrative that provincial development has stemmed solely from urbanisation and the assumption that rural women lacked agency in this development.

11:00 am Shaharyar Syed, Statistics, (Dr. Jeff Andrews)

Novel statistical approach in the analysis of environmental impacts

Several types of wildlife crossing structures are implemented on highways to allow the safe passage and migration of a myriad of species. Data on the usage of the structures by these species was previously collected, but researcher's desire statistical tools to determine if preferences may change over time with respect to structure type. Despite widespread use of count data in long-term environmental monitoring, accounting for change over time in predictor effects has not been well-studied. We apply a zero-inflated poisson model that accounts for seasonal, spatial, and temporal effects in the data and demonstrate promising results with this approach for discovering how predictor effects change over time.

11:15 am Sara Vicaretti, Chemistry (Dr. Wesley Zandberg)

Improving infant formula through addition of complex carbohydrates found in human milk

Complex carbohydrates called human milk oligosaccharides (HMOs) are thought to be partly responsible for the noticeable differences in health outcomes between breast-fed and formula-fed infants. There are 100s of HMOs in human milk and these vary considerably between women, complicating efforts to identify the major health-promoting HMOs for supplementing infant formulas. We hypothesize that the maternal diet is a source of HMO variation. We tested this hypothesis by comparing the milk of grain vs. grass fed dairy cows. Our research disproved this hypothesis, but during this project we also discovered several new HMOs that are directly relevant to human health.

11:30 am Hogun Kang, Biology (Dr. Mark Rheault)

The expression of an insect organic cation transporter in an Sf9 insect cell line

Insects serve as agricultural pests and hosts for disease transmission, which may have vast environmental, economic, and medical-related effects on human populations; this demands for effective control measures to be developed. Two distinct genes, *orct* and *orct2*, have been cloned from the model organism *Drosophila melanogaster*, believed to be responsible for promoting immunity to certain toxins. Using molecular, physiological, and heterologous expression techniques a full characterization of these genes is being performed to assess their functional aspects and potential as novel targets for development of new insect controls. Preliminary results show proper cloning of the gene ready for functional characterization.

12:00 – 1:00 p.m. LUNCH BREAK

1:15 pm **Norbert Eke, Statistics (Dr. Jeff Andrews)**

Feature Based Customer Opinion Mining – A Modern Approach

In a world where customers can buy products with a few clicks online, future customers must consider the opinions and satisfaction levels of previous customers. In order to allow one to understand what previous customers have said, the design of an automated technique that summarizes opinions of thousands of customers is desirable. A promising technique has been developed that combines continuous vector representation models, natural language processing techniques and statistical machine learning models. This technique has been tested on labelled datasets and it extracts over 80% of opinions correctly. Future research can focus on improving the technique's limitations on edge cases.

1:30 pm **Michael Gauld, History & Sociology (Dr. Luis Aguiar)**

A Brief Oral History and Current Trends of Organized Labour in the Okanagan Valley

Like the rest of Canada, labour in the Okanagan has faced obstacles to growth from neoliberal policies. Due to the lack of documentation on labour in the area, this project focused on creating an oral history of local unions, using primary documents to enrich the narrative. The study's findings show that the Okanagan's low industry density creates difficulties for labour organizations. Additionally, many unions in the area are international, resulting in widely varying organizational roles and resources. To become more visible throughout the Okanagan, labour will need to overcome the continuing obstacles of community engagement and membership growth.

1:45 pm **Morgan Alford, Biology (Dr. Andis Klegeris)**

Treating Alzheimer's disease: a therapy to remember

Alzheimer's disease (AD) is a debilitating neurodegenerative disorder that causes a progressive cognitive decline in patients, invariably resulting in dementia. AD is characterized by the presence of plaques around brain cells. These plaques activate microglia, the immune cells of the brain. When chronically activated, microglia excessively secrete pro-inflammatory molecules that may exacerbate the symptoms of this disease. The goal of this project was to assess the anti-inflammatory potential of two compounds in AD-like conditions. Analyzing microglial secretions revealed that various pro-inflammatory molecules were reduced by treatment with either of the compounds. The results of this project suggest these compounds could be promising AD therapeutics.

2:00 pm **Megan Buers, Biology (Dr. Karen Hodges)**

How biosolids affect American Kestrel (*Falco sparverius*) nest site selection and diet

Biosolids, the semisolid residuals after wastewater treatment, are often applied to pastures to increase vegetation growth for rearing livestock. I examined whether the American Kestrel (*Falco sparverius*) is impacted by biosolids. I identified nests and collected regurgitated prey remains on sites with and without biosolids. I found 18 nests of which 10 are in dead trees and 8 in live trees. 14 American Kestrel nests were in pastures with biosolids, indicating that Kestrels are not negatively affected by biosolid use. I will be analyzing prey remains throughout the winter to see if diets differ between treatments or year of application.

2:15 pm Adriane Peak, Anthropology (Dr. David Geary)

The Royal Canadian Legion: A Community and Organization at a Crossroads

A decline in participation has led to the closure of several branches of the Royal Canadian Legion: due to the lack of participation by younger vets, an aging veteran population, and the growing costs of maintaining the buildings and activities of members. The landscape of veteran's services is changing despite the continuing need for community and social support, which has been proven integral to mental and physical health. Through interviews and observation fieldwork, an examination has been conducted of the social, political and economic challenges of a declining Legion membership and how veterans grapple with an institution at a crossroads.

2:30 pm Anton Hsu, Biology (Dr. Melanie Jones)

Mycorrhizal Fungi Species Involved in Nitrogen Distribution in Lodgepole Pine Germinant

When associated with plant roots, ectomycorrhizal fungi typically increase a plant's access to nutrients such as nitrogen. Nevertheless, recent laboratory research at UBCO has suggested that ectomycorrhizal fungi can draw nitrogen *out* of seedlings under certain conditions. To determine if this occurs in nature, I sampled pine seedlings from the Okanagan throughout the summer. I found that pine seedlings became colonized by fungi in the ninth week after germination. DNA sequencing will identify fungal species involved, and with this information I can determine if plant nitrogen status depends upon its fungal partner.

2:45 pm An Goto, Chemistry (Dr. Gino DiLabio)

Making beets blue: A multi-disciplinary approach to chemical modification of betanin

Beets are a source of red food dye regarded as safe for human consumption. But what if we could produce beets with different colours? Could we take advantage of the industrial production of beets to generate other human-safe dyes on a large scale? My project focuses on making chemical modifications to the red pigment in beets to make it blue. I will describe the use of computation methods to design, and chemical synthesis methods to make, a blue dye based on the pigment in beets. The results of my work may lead to the mass production of blue dyes from beets.

3:00 pm Mackenzie Campbell, Biology (Dr. Adam Ford)

Modeling wildlife habitat in the Canadian environmental assessment process

Our work this summer involved extracting data from the environmental impact assessments of 30 Alberta oil sands projects. These assessments are mandated by law and inform how the reclamation process is to take place upon project completion. We looked specifically at the wildlife habitat modelling used to estimate the amount and quality of habitat affected. We found discrepancies between projects for which methods, species and habitat types were used, suggesting the need for greater objectivity and standardization. These considerations will be the focus of an honours thesis and presentation in April 2018.

3:15 pm Closing Remarks

5:00 pm Reception