

2014 TRU Undergraduate Poster Presentation Abstracts

Enrichment, Isolation, and Identification of Oil Degrading Bacteria from Abbotsford, BC, Canada

Alexander, J. Andrew

Abstract:

The petrochemical industry has provides immense benefits, allowing us to utilize energy sources and produce a myriad of useful chemicals, including medicines. However, many of these positive attributes have not come without environmental cost. Petrochemical contamination of the environment is extremely pervasive and has a deleterious impact on many ecosystems, sometimes directly affecting public health. In this study we endeavored to find and characterize bacterial species that could be useful for bioremediation of environments contaminated with used motor oil. Bacteria were extracted from soil and enriched for oil degrading and metabolizing capability. Following isolation, the bacteria were identified using 16S rRNA whole gene sequencing. Housekeeping genes such as *secA1*, whose gene product is involved in the export of proteins across the cell membrane and *gyrB*, which codes for the B subunit of DNA gyrase were also sequenced for additional confirmation of species identity where possible. Gram staining and biochemical tests provided further evidence when needed. This study documents the oil degrading capability of several isolated bacteria, including newly characterized *Gordonia* and *Rhodococcus* species. Future research in this area could lead to the discovery of novel petrochemical metabolism pathways and bacteria suitable for bioremediation.

Visualizing Patterns and Trends in British Columbia Court Data

Alwehaibi, Sultan

Abstract:

Recently, delays in the B.C. court system have become a major social issue. The average wait time for a two-day trial is more than 11 months, even 16 months in some cities. This might have been caused by a lack of financial resources or manpower. Some people believe that the government might have told police to stop arresting criminals. In order to truly understand what has been going on with the B.C. court system, the actual court data should be analyzed and studied. Since the volume of court data is very large, it is difficult to understand and analyze. Thus we developed a software tool that visually renders the court data in a particular way, so that it is easier to discover patterns and trends. Human eyes (and brain) are very keen in recognizing trends and patterns among huge numbers of elements when these elements are displayed in particular ways. The visualization tool that we developed incorporates many principles of information visualization to assist analysts in identifying existing patterns and trends in the court data.

Exploring Geography of Education: Undergraduate Research Conference Initiative and Development at a Small-city University

Andrews, Debra

Abstract:

The geography of education remains a relatively new, yet significant, sub discipline within geography, and its aspirations provide useful tools to examine the landscape of higher education. Organizational

and participatory processes of undergraduate research conferences provide a lens for examining higher education. Proactive involvement of three university constituents - administration, faculty, and students –is essential for successfully disseminating undergraduate research findings in scholarly communities as well as in broader non-academic civic communities. This paper explores the development of undergraduate research conferences at Thompsons Rivers University (TRU), a small post-secondary institute situated in Kamloops, a small city in the southern interior of British Columbia, isolated from the influence of a large city environment. Acknowledged as a centre for higher education in academics, technology, and trades, and for being a community of teachers and learners, TRU provides an excellent venue to examine the development of two models of undergraduate research conferences: the Research and Innovation Undergraduate Conference and the Philosophy, History, and Politics Undergraduate Conference (PHP). Analysis of this development offers insight into the influences of geographic location, socio-economic considerations, and regional influence in the implementation and sustainability of such conferences. A literature review of ongoing research into undergraduate education reveals that the recruitment of undergraduate students is crucial to the economic sustainability of universities and host communities, and that student retention and relevant learner outcomes are enhanced by institutional policies and teaching practices that include opportunities to instill research skill competency in undergraduate students. I suggest that, within the university community, support for undergraduate research is essential from all three constituents, and each plays a critical role in promoting undergraduate research conferences to provide a venue for dissemination of research results within the research community and beyond, into the small city in which the institute has its roots.

Diet Preferences of Northern Pikeminnow in the Southern Interior of B.C.

Arner, Jim

Abstract:

The main focus of this study is to identify the dietary selection of Northern pikeminnow (*Ptychocheilus oregonensis*) of various sizes from three Southern Interior lakes in British Columbia, and to determine any differences between the lakes in terms of diet composition. Available food sources such as aquatic invertebrates and fishes have already been collected and identified from an earlier Yellow perch project carried out by Carmen Tattersfield (2011/2012). The NPM being sampled in this project were caught as by-catch during the Yellow perch project. The gut contents of NPM will be analyzed in a lab, under microscope to determine which invertebrates or fishes are present, this provides information on the NPM diet composition. The gut content invertebrates will be identified to Order; the fishes will be identified to species (if possible). The gut analysis will determine the frequency/presence/absence of food items and then compared to the available food sources of the lakes. This analysis will also identify the differences between dietary compositions within the three lakes. Additionally NPM size classes may be determined to identify at what size other fish are consumed and the condition factor of the fish.

Effects of Habitat Characteristics on Nest box Selection and Reproductive Success in Mountain Bluebirds (*Sialia currucoides*)

Bailey, Jacob

Abstract:

Breeding site selection is crucial for the reproductive success of nearly all animals. This is especially true for secondary cavity nesting species (i.e., birds that require cavities created previously excavated by other species such as woodpeckers), in particular the mountain bluebird (*Sialia currucoides*). Over the past several decades, artificial nest boxes have been erected throughout Canada and the United States to combat declining bluebird populations. This effort was highly successful in stabilizing local populations, yet despite this success little is known about the factors affecting nest box selection and nest success in mountain bluebirds. Furthermore, there is still considerable variation in nest occupancy rates and reproductive success rates. An understanding of the factors affecting nest selection and reproductive success rates is critical for effective conservation and management. My objective was to determine the habitat characteristics that best predict nest success and nest box selection in a population of mountain bluebirds that inhabit approximately 350 nest boxes in Kamloops, British Columbia and surrounding area. I collected data such as nest box orientation, elevation and other habitat characteristics to analyze variations in nest success. Data was drawn from detailed information regarding nest occupancy and reproductive success (number of eggs, number of nestlings, number of surviving offspring) from the 2012 and 2013 breeding seasons obtained from the Kamloops Naturalist Club. Based on these results, I provide recommendations for nest box placement in an attempt to maximize the chances of nest box occupancy and reproductive success.

In vitro Inhibition of Methane Production in Bovine Rumen Fluid Cultures by Red Lake Earth

Belanger, Corrie

Abstract:

Environmental studies have shown that 25% of anthropogenic methane (CH₄) production is due to the release of this gas from methanogens living in the guts of farmed ruminants such as cattle. In this study, the effects of Red Lake Earth (RLE) on bovine rumen fluid methanogens were observed by measuring CH₄ production, *mcrA* gene and transcript copy numbers, and volatile fatty acid (VFA) production. Pure diatomaceous earth (DE), pure calcium bentonite (CaBe), and mined RLE containing a mixture of these two materials, were tested in vitro in three different granulations (Crystal, Granular and Powder), at six concentrations varying from 2.5 to 100 g/L. After five days of incubation, neither DE nor CaBe treatments resulted in decreased CH₄ production, but powder RLE treatment reduced CH₄ production by 54% and 67% at 50 and 100 g/L, respectively. Additionally, 20, 40 and 50 g/L powder RLE treatments reduced CH₄ production by at least 50% over the first three days of incubation, and 100g/L powder RLE reduced methanogenesis by up to 90%, an amount similar to the methanogen inhibitor 2-bromoethanesulfonate (BES). Quantitative PCR (qPCR) and reverse transcriptase qPCR showed that 100 g/L powder RLE reduced methanogen *mcrA* gene and transcript copy numbers while increasing the gene to transcript ratio to 6.2 from the 1.5 observed in no-treatment controls. Though RLE treatment did not significantly increase volatile fatty acid production, acetate to propionate ratios decreased by 15%. This research strongly supports the hypothesis that RLE has the ability to reduce rumen CH₄ production in vitro by reducing methanogen growth and activity and increasing reduced VFA production. Continued in vivo studies are warranted to assess the value and feasibility of applying RLE as a feed additive to reduce CH₄ production in cattle.

Detection of the Fungal Pathogen *Batrachochytrium dendrobatidis* on Spadefoot Toads in the Kamloops Region

Bennett, Katie

Abstract:

The Great Basin Spadefoot is an endangered amphibian found throughout the dry, arid region of western North America (Cannings 1999). The reason for the decline in spadefoot populations is not fully understood and thus the goal of this project is to determine whether it can be attributed to *Batrachochytrium dendrobatidis*, a species of chytrid fungus. *B. dendrobatidis*, an invasive fungal species, is well known to be responsible for the decline of many amphibian populations around the world (e.g., Longcore 1999). This chytrid fungus infects the skin of adult amphibians and the mouthparts of anuran larvae (Garner et al. 2005). While some research on the effect of *B. dendrobatidis* on amphibians has been undertaken in Western North America (Deguise & Richardson 2009), no one has yet studied its impact on the the Great Basin Spadefoot. During the summer of 2013, I caught and swabbed a sample of spadefoots present in the New Gold operating region just south of Kamloops. Throughout the fall, a real time PCR program that could detect *B. dendrobatidis* in the swabs was tested and modified. Currently DNA is being extracted from the swabs; it will be analyzed to check for the chytrid fungus.

Kinetics of Flavanoids and Polyphenols in Green Tea

Borden, Scott

Abstract:

Many of the key health benefits of drinking tea have been ascribed to polyphenols and flavanoids, as they are known to be effective scavengers of reactive oxygen species. Tea extracts containing flavanoids and polyphenols have entered the market in full force within recent years. The complete quantitative separation of closely related polyphenols and flavonoids, using micellar electrokinetic chromatography, has been reported in the literature, with some issues. This project aims to investigate how the concentrations of key polyphenols in a variety of green teas vary with respect to both varying brewing times and brewing temperatures. Tea was brewed at varying temperatures and samples were taken at different time intervals and then analyzed using micellar electrokinetic chromatography to achieve complete resolution of the analytes and to determine the concentration of these flavanoids and polyphenols in tea samples.

An Agent-Based Modeling and Simulation of Residential Burglary in the Urban Environment

Buckley, Alex

Abstract:

Residential burglary is common in the urban environment. It causes not only financial damage but also psychological and emotional damage. In order to prevent this kind of crime, it is important to understand residential burglars' behaviors. We developed a model of residential burglars based on criminology theories. Using three dimensional [3D] game technologies, we developed a simulation system that shows residential burglars' behaviors and their target selections in the urban environment. The system considers factors such as the burglars' mind, preferred time of burglary, their evaluation of space, and their spatial search strategies. The system visualizes a residential burglar's behavior using a

3D character animation technique in the realistic virtual environment. This system can be used for predictive target analysis and threat assessment in residential burglary.

Excretory Cell Outgrowth as a Model for Investigating Wnt Ligands as Upstream Activators of *unc-53* in *Caenorhabditis elegans*

Conway, James

Abstract:

The Wnt signaling proteins are involved in cell differentiation, proliferation, neuronal outgrowth, angiogenesis, cell adhesion, and a range of other functions. In *Caenorhabditis elegans*, the five ligands—encoded by *egl-20*, *lin-44*, *cwn-1*, *cwn-2*, and *mom-2*—are delegates of the Wnt signaling pathway. The cytoskeletal regulator gene *unc-53* is necessary for migratory and outgrowth patterns along the anterior-posterior axis in *C. elegans*. The excretory cell has been utilized as a model for Wnt and *unc-53* expression. As both UNC-53 and Wnt proteins are involved in excretory cell outgrowth, comparison between Wnt mutants, *unc-53* mutants, and *unc-53*/Wnt double mutants will give implication of whether the *unc-53* and Wnt pathways occur together or run independently of one another. GFP tagging with a *ppgp-12::gfp* reporter strain has facilitated excretory cell scoring. Truncation of the excretory canal has been observed in all five ligand mutants. Excretory cell outgrowth of Wnt;*unc-53* double mutants will be measured and compared to the phenotype of the single mutants. An enhanced phenotype will suggest two separate pathways. In contrast, if the phenotype is worsened, this suggests the Wnt pathway ligands and UNC-53 function in the same pathway—possibly as upstream activators of *unc-53*.

From Abstract to Concrete: A Poet's Journey

Curry, Lindsay

Abstract:

This collection of poems is the product of one poet's journey, from imagining abstract concepts through to the use of concrete and specific language to express those ideas and to evoke emotion in the attentive reader. The author uses images and figurative language to recreate vivid experiences, and she plays with techniques including sound, line breaks, and stresses to suggest various psychological states. The result is a collection that causes the audience to see fragments of life in a slightly different way, to perhaps shift perspective and gain new insight. "Breakup" shows the thought process of a person in the aftermath of a parting from a lover, noting and reacting to the indifference of the wider world to the state of individual relationships, regardless of how consequential those changes can be to the individuals involved. "Paper Doll" is an exploration of the sense of the feminine from the perspective of society and from the developing perspective of a little girl. It is also a statement that there is beauty in imperfect and perhaps scarred things, and a recognition that a child instinctively grasps that truth. "Suffering" is an extended metaphor describing the abstract idea of suffering; this poem explores the sacrifice that one person is prepared to make for the sake of a loved one. The form of this poem increases tension and creates an irritating feel that echoes the subject of the poem.

Effects of Natural and Urban Settings on Emotion Regulation Strategy Used

Davison, Tracy

Abstract:

Research shows that spending time in nature reduces stress and increases psychological well-being (Berman et al., 2008). Kaplan's Attention Restoration Theory (ART) (1995) explains how nature reduces stress. In ART, Kaplan proposes that urban settings demand directed/voluntary attention that requires effort and involves choosing to pay attention to certain stimuli while ignoring others (Fan et al., 2002). In contrast nature requires no effort as it relies on involuntary attention, whereby certain stimuli naturally attract our attention. Emotion regulation (ER) refers to "the processes by which we influence which emotions we have, when we have them, and how we experience and express them" (Gross, p. 281-289, 2002). Regulating one's emotions can be effortful (Ortner, Zelazo & Anderson, 2013; Sheppes, et al., 2011). Therefore, spending time in nature may facilitate adaptive ER, because attentional capacity is not devoted to other tasks. In contrast, spending time in urban settings is cognitively demanding, and so may reduce people's ability to regulate their emotions effectively. In the current study, participants receive a mild stress induction before viewing a video of either a natural or urban setting. Afterwards, they report what emotion regulation strategies that they used during the video. We predicted that people are more likely to report using reappraisal (an effortful ER strategy), when exposed to nature settings rather than urban settings, and as a result, experience greater reductions in negative affect.

A Community of Literacy

Doucet, Sarah

Abstract:

Early literacy skills have been recognized as a leading indicator in academic and success for children. This advantage continues throughout a child's life course, improving their education and employment opportunities as well as their general health. The primary purpose of this research project was to facilitate the creation of a strong literacy support system around preschool children and to identify opportunities and challenges that parents face in utilizing community literacy resources. An additional purpose was to examine challenges that local groups with literacy interests (e.g., Kamloops Early Language and Literacy Initiative (KELLI), Mother Goose program, Literacy in Kamloops (LINK), and the Kamloops Public Libraries) face in reaching out to families with small children. Another purpose of this study was to examine how parents and children define their 'sense of place' in relation to literacy and reading, and to use 'place-based' learning to introduce them to literacy resources spatially near to where they reside. The findings identified several concerns for literacy providers: unreliable funding, difficulties in reaching high risk families, and the dilemma of finding balance with ubiquitous technology.

Prevalence of Sleep Disorder Breathing in a Population of Dental Patients

Ganzert, Elizabeth

Abstract:

My study focuses on measuring the prevalence of sleep disorder breathing in a local population of dental patients. The project is carried out in cooperation with Dr. Ciriani, a dentist in Kamloops, B.C. Sleep disorder breathing is very common, and given that patients are generally healthy when they attend the dentist, we can eliminate other diseases such as fatigue and trouble sleeping. Most of the population attends annual or biannual appointments with their dentist, and therefore we are able to effectively keep track of patients because they regularly visit their dentist. This is a new research initiative that will provide a very accurate description of the prevalence of sleep disorder breathing in our community.

Investigation of Atorvastatin and Fenofibrate in the Vitreous Humour of Diabetic Patients

Gill, Jovan

Abstract:

Diabetes mellitus is an endocrine disorder caused by the improper secretion or recognition of the hormone insulin. This disorder is commonly associated with retinopathy, among many other problems, and is the leading cause of blindness in those under 75 in developed countries. In order to prevent diabetic retinopathy, tight control of blood pressure and blood glucose level is necessary. At the moment, the effect of lipid-lowering therapy on the disorder is being examined, as this could potentially decrease diabetic retinopathy. Statins, particularly atorvastatin, and fenofibrate are being studied as being important for reducing lipid levels, as they are both cholesterol-lowering molecules. Specifically, anti-inflammatory and anti-atherogenic effects in vivo are being examined. A local retinal surgeon and third year medical student have injected atorvastatin and fenofibrate into the vitreous humour of patients with diabetes mellitus, in hopes that they reach the retina in large enough concentration to act as an anti-inflammatory and decrease the chances that a patient with diabetes mellitus develops diabetic retinopathy. Six weeks after fenofibrate and atorvastatin are injected into a patient's vitreous humour, some of the vitreous humour will be removed and analyzed for its concentration of the atorvastatin and fenofibrate. By comparing the amounts of these molecules that were injected to the concentrations that remain in the vitreous humour, the amount that reached the retina can be quantified; this will determine whether one of these molecules, both, or neither can act at sufficient concentrations to have anti-inflammatory effects, and if further research into these two molecules and their influence in diabetes retinopathy should be pursued.

Student Motivations to Volunteer

Girouard, Felicia

Abstract:

This study will try to determine what main factors motivate a university student to engage in volunteer activities. Volunteering can offer the individual numerous benefits, such as networking opportunities (personal and non-personal), new skills, leadership opportunities, resume references, better job offers, confidence, chances to make new friends and self-satisfaction. On the TRU campus, many students

volunteer; some are very dedicated volunteers who spend most of their weekends working hard for no payment. Although university campuses have always been good places to find volunteers, students have little extra time for extracurricular activities, after juggling their work, study, and family responsibilities. I will be collecting data from 300 TRU students who have participated in volunteer activities in the past year. The students will have the option of filling out either an online or a paper survey. After collecting the data, I will be able to determine if there is any correlation between motivations of volunteers and numerous other demographic criteria. For instance, in my sample: What percentage of volunteering activities were done by people in the Bachelor of Business program? Were females (in my sample) more likely than males to volunteer? Are business students more motivated to volunteer for career related purposes? Volunteering promotes cohesion, unity, and leadership within the society. By discovering the characteristics of the student volunteer, we may be able to support them and encourage more students to participate in volunteerism. If we discover that volunteering is based on a certain motivation, we may be able to reduce barriers and support the volunteers, thereby sustaining them and encouraging others to provide assistance as volunteers.

Isolation of, and Screening for, Potential Antibiotic-producing Actinomycetes from Tupper Cave System, British Columbia

Golapkhan, Hayfaa Bibi Zafiirah

Abstract:

Bacteria that are adapted to thrive in extreme habitats such as caves may be candidates for a new class of antibiotics. The antimicrobial activity of 266 cave isolates was tested using Plug Agar Assay technique; the pathogenic bacteria used in this study were MDR-Staphylococcus aureus, Micrococcus luteus, ESBL-Escherichia coli and Acinetobacter baumannii. For optimal growth and antimicrobial production, these cave bacteria were cultured on R2A agar at 25°C for 7 to 14 days prior to the plug assay. To screen for antimicrobial activity, a bioassay plate was prepared with each pathogenic bacterium at a concentration of 1.5×10^3 cells/mL (OD₆₀₀ 0.132) in a 250mL molten nutrient agar. An agar plug of each of the cave bacterial species was transferred from the R2A agar plates to the prepared assay plates, and they were then incubated at 35°C overnight. Of the 80 cave isolates screened, nine showed antimicrobial activity against MDR-S. aureus and seven against M. luteus. These cave isolates are selected as potential antimicrobial producing candidates. In conclusion, isolation and preliminary screening of cave actinomycetes against pathogenic bacteria may contribute to the discovery of novel antibiotics against resistant pathogens.

Integrin-Linked Kinase Regulates Cellular Senescence of Retinoblastoma Cells in an Rb-Dependent Manner

Goody, Joseph

Abstract:

Integrin linked kinase (ILK) plays a critical role in cell proliferation and cancer cell biology. ILK is upregulated in retinoblastoma, a retinal tumour usually characterized by the loss of Rb1, the first cloned tumour suppressor. ILK regulates Rb1 by activating G1/S cyclin-cyclin dependent kinase (cyclin-cdk) activities, a signalling pathway responsible for phosphorylating Rb and allowing cell cycle progression. ILK has also been shown to regulate microtubule dynamics and centrosome clustering, processes involved in cell cycle progression and malignant transformation. In retinoblastoma lines that do not express the tumour suppressor, ILK downregulation or ILK inhibition leads to altered mitotic spindle

organization, mitotic arrest and an increase in multinucleated retinoblastoma cells. The ultimate fate of these cells-- mitotic senescence, continued cycling, or cell death--has yet to be determined. Preliminary data from our lab indicate that ILK inhibition is oncosuppressive by a number of distinct mechanisms that increase senescence (i.e., β -galactosidase staining) and apoptosis (i.e., TUNEL-labelling). Evidence suggests that some of these effects are Rb-dependent-leading to early apoptosis or senescence in Rb+ve cells. In Rb-ve cells, we predict that ILK inhibition does not halt cells at the G1/S phase, but results in aberrant mitotic division and spindle formation preventing the cells from properly dividing and leading to delayed senescence or apoptosis. Future analysis will compare the role of ILK in cell cycle progression and senescence in cancer cell lines that are Rb+ve (i.e., Rb116 and T98GScr expressing scrambled shRNA Rb) and Rb-ve (i.e., Y79, Weri-Rb27, and T98GE3 expressing shRNA Rb).

Moult Conditions Influence Plumage Colouration and Breeding Dynamics in Bullock's orioles (*Icterus bullockii*)

Greaves, Orri

Abstract:

Feather replacement (moult) is an energetically expensive process for migratory birds. Bullock's orioles (*Icterus bullockii*) employ a unique strategy to reduce this cost, pausing during their migration from the breeding grounds to their tropical wintering grounds to moult in southwest America during monsoon season when resources are abundant. During this time, they produce carotenoid-rich feathers in brilliant orange and yellow. Carotenoids are pigments that cannot be synthesized by animals but must be ingested and incorporated into the plumage of birds. Carotenoid-based colouration is condition-dependent and often used by females for mate choice. Birds in good condition that have ingested abundant carotenoids, which can be integrated into their feathers, are more colourful, providing females with honest signals of male quality. In this study I used stable carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) isotopes to examine the influence of moult conditions on yellow/orange plumage colouration and breeding dynamics of Bullock's orioles in Kamloops, BC. I hypothesized that birds with more negative $\delta^{13}\text{C}$, indicating wetter habitat, and those with higher $\delta^{15}\text{N}$, indicating the consumption of foods items from higher trophic levels, would have oranger tails. Older males' tail feathers were more colourful, and birds with orange tails arrived earlier on the breeding grounds than those with yellow tails, which often results in increased reproductive success. Birds with orange tail feathers had lower $\delta^{15}\text{N}$, suggesting they are obtaining carotenoids from foods on a lower trophic level, potentially from fruit. This study is the first to demonstrate the relationship between moult conditions, feather colouration, and breeding dynamics in Bullock's orioles.

The SMART Filter as an Efficient Data Assimilation Method in Geophysical Fluid Dynamics

Grypma, Peter

Abstract:

Data assimilation (DA) is the process of optimally combining observations and model predictions to produce a best estimate of a system. DA is used extensively in geophysical fluid dynamics, such as numerical weather prediction. The Kalman filter is a commonly used DA algorithm, although it is very computationally expensive, which makes it intractable for large systems. The SMART filter was developed as an alternative to the Kalman filter for use in medical imaging. We applied the SMART filter to a one dimensional advection problem, and the SMART filter's computation time was over 3 times

faster than that of the Kalman filter. The SMART filter could be used as an alternative to the Kalman filter in large systems when computation time is a concern.

2- and 4(5)-Methylimidazole in Food Products by Capillary Electrophoresis

Guo, Zhi Chao

Abstract:

Products formed during the manufacture of caramel colour include 2- and 4(5)-methylimidazole. Since they have possible carcinogenic effects, analysis of these compounds has attracted considerable attention. Factors such as the UV detection wavelength, the pH of the buffer and the concentrations of each component of the buffer were investigated using capillary electrophoresis in order to determine the optimum conditions. Using a background electrolyte containing 3 mM β -cyclodextrin and 70 mM sodium phosphate at pH of 7.7, quantitative determination of 2- and 4(5)-methylimidazole was demonstrated by testing several food products including colas, sauces and alcoholic beverages.

Determination of Vitamin K2 in Canadian Cheese Using Liquid Chromatography-Mass Spectrometry

Hartling, Ivan

Abstract:

Vitamin K2 is a fat soluble vitamin required for the activation of several proteins that help prevent osteoporosis, heart disease, and cancer. Awareness of the role of vitamin K2 and its health benefits is growing rapidly, but the amount of this nutrient present in most foods is unknown. Studies in Europe indicate that dairy products are one of the best sources of vitamin K2, but this has never been investigated in Canadian dairy products. The goal of this study is to determine the amount of vitamin K2 in Canadian cheese using liquid chromatography-mass spectrometry (LC/MS). Fat soluble vitamins extracted from local supermarket cheese and cheese made from the milk of be quantified using LC/MS. Results will show whether cheeses made from the milk of these two types of cows differ in vitamin K2 levels and whether the vitamin K2 content of Canadian cheese differs from that measured in Europe. It will also help us determine whether Canadian cheeses are a good source of vitamin K2.

Best Phase Approximations using Allpass Filters

Hedrich, Natascha

Abstract:

In signal processing applications it is often desirable to control the phase response of a filter, e.g. to correct for phase distortion introduced by other components of a system, or to implement a frequency-dependent delay. One method of achieving this control is through allpass filters, which introduce a desired phase shift without modifying the spectrum of the signal. In this lecture I will introduce the concept of phase shifts in the context of digital signal processing and give an overview of digital allpass filters. I will also examine how to obtain the best approximation for a desired phase response in the L^∞ sense as well as how the approximation may be obtained using the Remez algorithm.

Ambulatory Blood Pressure Monitoring in the TRU Sleep Clinic: Should High Blood Pressure and Sleep Apnea be Tested for and Treated Simultaneously?

Holtslag, Kayla

Abstract:

Recent and ongoing research has demonstrated a strong correlation between obstructive sleep apnea (OSA) and high blood pressure (hypertension). Furthermore, studies have shown that treating OSA can lead to an improvement in blood pressure levels. Despite this knowledge, many sleep clinics still do not test their patients for hypertension and have yet to develop comprehensive treatment plans that aim to target both issues. The TRU Sleep Clinic currently sees patients referred by local physicians for overnight ambulatory blood pressure (ABP) monitoring and upon their first visit, the patients are also questioned regarding their sleep habits and complete questionnaires designed to illuminate possible sleep issues such as OSA. In light of this, I hoped to be able to identify patients who had visited the clinic for ABP monitoring, been identified as having OSA, had subsequently been treated for OSA, and then bring those patients back for another ABP test to determine whether the OSA treatment had been effective in lowering their blood pressure. Unfortunately, no such patients existed; files were being archived as soon as the ABP data was sent to the doctor and before the possible OSA issues were addressed. My project became about solving this issue and exploring ways that the clinic could achieve the goal of comprehensive patient care regarding the connection between OSA and hypertension.

Jane Jacobs - The Women Who Changed the Way We Think About Cities

James, Heather

Abstract:

In the mid-1950's city planners saw the opportunity to develop new areas outside of the city's core. Under the promise of urban renewal, there was a push to tear down the historical hearts of cities to build major highways in order to transport residents from the working city core to the green lawns and picket fences of the North American suburban dream. Journalist and activist Jane Jacobs's seminal 1961 book *The Death and Life of Great American Cities* took on one of New York City's key planners, Robert Moses, and fought back against his urban renewal philosophy. It was an attempt to salvage the heart and soul of the inner city core from what she described as the desecration of America's cities. The purpose of this paper is to gauge a better understanding as to how a woman with no formal education has changed the way in which many urban planners, geographers, sociologists and economists now view the development of cities.

Pyrethroid Insecticides Inhibit the Electron Transport Chain in Mammalian Mitochondria

Janz, Kevin

Abstract:

Pyrethroid Insecticides Inhibit the Electron Transport Chain in Mammalian Mitochondria Pyrethroid insecticides are used in both agricultural and home settings and are synthetic forms of a natural plant chemical, Pyrethrum. Most pyrethroid toxicology research has focused on the effects on ion channels, but few studies have investigated the effects on mitochondrial electron transport. An objective of this study is to develop a reliable in vitro mitochondrial particle assay system to examine electron transport by measuring oxygen consumption. The main objective of this study is to determine the effects of the

type I pyrethroid permethrin compared to the type II pyrethroid deltamethrin on electron transport. As expected, the addition of electron donors (e.g. NADH, succinate) induces oxygen consumption which can be blocked by inhibitors of the various complexes (e.g. rotenone, malonate). Permethrin blocked oxygen consumption with an EC50 of approximately 10 μM when NADH was the electron donor ($n = 41$) but blocked oxygen consumption much less when succinate was the electron donor being used. Deltamethrin had an EC50 of more than 100 μM ($n = 50$). Permethrin block was more potent (5-10X) with NADH compared to succinate opposite to the effects of deltamethrin. The results show that both permethrin and deltamethrin inhibit electron transport in mammalian mitochondria at micromolar concentrations and that permethrin has its greatest effect on complex I while deltamethrin has its greatest effect on complex II of the electron transport chain. This study supports the notion that mammalian mitochondrial electron transport may be another target for the toxic effects of commonly used pyrethroid insecticides.

Feminist Urban Geography: Intersections of Feminism and Sustainable Urban Design

Kallhood, Kathleen

Abstract:

This research will examine the evolution of feminism in urban geography, with an emphasis on connections between feminist perspectives and sustainable urban design. Critical aspects of feminist theoretical framework since the early 1970's will be discussed with an emphasis on the intriguing relationship that exists between feminism, environmentalism and urban structure. It seems although feminists and advocates of sustainable urban design have separate causes, the two ideologies both envision and strive for similar features within the built environment. Mobility and the fragmentation of land use are particularly contested topics for both groups. The report will be limited primarily to a North American focus on social, cultural, and political forces, which have transformed urban landscapes and have lead us to the current feminist concerns with urban development. Understanding this evolution and the connections made between feminist discourse and sustainable urban development are valuable to the creation of a more holistic and equitable city. This body of research may also be beneficial to planning practices or policy design.

Undergraduate Capstone Open Source Project – Kotlin

Keusch, Gavin

Abstract:

This semester I am one of 50 Canadian students chosen to participate in the Undergraduate Capstone Open Source Project. The goal of this program is to involve university students in open source development projects. Each participant is asked to join and contribute to a real-world open source project. This year the program has teamed up with Open Academy, a worldwide program. The benefit of an expanded program is that members of my team are from all over the world. My chosen project, Kotlin, focuses on a new programming language developed by JetBrains. My mentor is from the company JetBrains located in Russia. This year all teams and team members are participating in a code sprint at the Facebook headquarters in San Francisco. On February 6th-9th I will be traveling to San Francisco and meeting my teammates including members from Sweden and the US. Throughout the semester I will be learning the processes required to contribute to an active real-world open source project and contributing my code to this project. This is a great opportunity to get hands-on experience and add to my professional resume.

Undergraduate Language Research and Collaboration: Exploring the Possibility of Going Beyond the Empowerment Model

Lacho, David

Abstract:

The dialects of French spoken in the Magdalen Islands, Québec, are endangered, and their potential loss parallels the potential loss of cultural knowledge. Following six weeks of fieldwork for an undergraduate research project, I developed a community-based website to promote and maintain dialects and to illustrate how they are intertwined with the community's sense of identity, personhood, pride, and culture. Community collaboration was emphasized at various stages throughout the research, yet upon reflection on my fieldwork experiences, I believe that my approach towards collaboration followed the "advocacy model". In this case, community members contributed to my research goals. In this poster, I describe my research experiences, the different levels of collaboration in linguistic fieldwork and I suggest how future community-based research at the undergraduate level could be conducted under, or even go beyond the "empowerment model." In this case, the research is directed more closely by the community's needs. In future, the suggested models of collaboration could be employed in research with/for other endangered language and/or dialect communities, at all academic levels.

Computational Study on the Repair Mechanism of Damaged Tripeptides with Dihydrolipoate

Lee, JinGyu

Abstract:

A tripeptide is a molecular chain of three amino acids that could be used as a model representation of a protein. This study explores the mechanism by which a damaged tripeptide with varying aliphatic lateral chains is repaired, but not the damaging process itself. The damaged molecule is represented by its radical form and the damage site can vary on the different lateral chains. The lateral chains that are looked at are alanine, with two possible damage sites, and valine, with three possible damage sites. Different repair mechanisms are used to fix the radical tripeptide; the one used in this study used an oxidized form of dihydrolipoic acid (DHLA). DHLA is a reduced form of lipoic acid, and at physiological pH, it becomes deprotonated to form dihydrolipoate (DHL), which is used for the repair mechanism. Thus, the purpose of the study was to observe the reaction between the damaged tripeptide system and DHL to see if it is effective at repairing damaged proteins. The repairing of a radical would reduce the tripeptide by transferring hydrogen from a system that can donate it. DHL has two possible repair sites: the two thiol groups (-SH). To do this, density functional theory (DFT) calculation was used (M06-2X/6-31++G(d,p)). From the calculations, it can be determined whether the reaction is exergonic or endergonic. An exergonic reaction favours the formation of products, in this case the repaired tripeptide and the radical form of the DHL. Only the repaired sites with negative change in free energy of the reaction will be explored further. The transition state (TS) will be calculated and the rate constant for the repair reaction will be calculated applying the transition state theory (TST).

Plants & The American Pika: Comparing Vegetation Communities, Pika Harvesting and Plant Nutrition in Contradictory Habitats

Leung, Marisa

Abstract:

Understanding the relationship between small mammal populations and the vegetative heterogeneity of their native habitat is becoming increasingly important as natural resource extraction, such as mining, becomes a dominant influence on landscapes in the southern-interior of British Columbia. Identifying how wildlife (particularly herbivores) use anthropogenic plant species will allow us to better manage the quality and quantity of forage in these human-altered ecosystems. Reclamation initiatives at Highland Valley Copper Mine focus on converting waste-rock and dump site locations into land that supports plant communities composed of agronomic and some native species. The presence of American Pikas (*Ochotona princeps*) in these and surrounding landscapes creates an opportunity to investigate how the plant species selected for harvesting by these animals compares to what is available, and also to compare natural and anthropogenic habitats. In August 2013, I surveyed the plant communities surrounding a variety of pre-established pika den sites. I detected a total of 78 different plant species on native sites and 53 on anthropogenic sites. Six of the 14 most abundant plants in the native pika habitat were also present in the anthropogenic habitat. An examination of pika haypiles in October 2013 showed that although some common plants were harvested, the animals also used plants that were less common. I am currently conducting vegetation nutritional analyses in an attempt to determine the pikas' selection process. This study is revealing the plasticity of pikas occupying different plant communities, and through a larger, overarching project, enables a better understanding of the pika population inhabiting this atypical environment.

Habitat Restoration and GIS mapping of *Rana aurora* and *Monadenia fidelis* in Blaauw's Ecoforest

Loubser, Lara

Abstract:

The locations of individual Pacific Sideband snails and Red-Legged frogs in Blaauw's Ecoforest were logged using GPS to determine their distribution in this area. Detailed notes were taken on these locations in order to gain a better understanding of their preferred habitats. Throughout the period of this research, records were kept of any data that could assist future habitat restoration work targeted towards this frog and snail, both of which are blue-listed species.

Monitoring a Remediation Project on the Habitat of the Endangered Snail, *Allogona townsendiana*

Lowen, Janelle

Abstract:

The Oregon Forestsnail (*Allogona townsendiana*) is at the northernmost tip of its range in the Fraser Valley of British Columbia. The habitat and lifecycle of *A. townsendiana* has previously characterized during a study conducted at Trinity Western University, where a large population of this species lives on the campus in Langley, British Columbia. Due to a recent construction project, this population's habitat was fragmented. Restoration was done by planting native plants and creating a swale system to filter out road runoff. The main concern related to road runoff was from the salt that was spread during the winter, which had the potential to increase the salinity of the soil. Soil salinity was monitored by taking samples during different times of the year, before and after the construction of the swale system. I

monitored the size of the snail population by using a series of mark and recapture experiments over the course of one year. The population did not decrease significantly in the two years following the construction project. Ideally, in future years, the population will increase in response to the remediation work that has been done. It is difficult to quantify the long-term effects of this remediation work, however, as the long lifecycle of *A. townsendiana* prevents immediate results from being detected.

This Isn't Home: Reshaping Neekanan (Our Home)

Lucier-Laboucan, Kateri

Abstract:

This research project analyzes the current housing crisis found on reserves in Northern Canada – using the Fox Lake Indian Reserve as a case study. Poor, decrepit, substandard and overcrowded housing conditions on Canada's First Nations reserves continue to be a growing social concern, impacting the well-being of First Nations People across Canada. This crisis is often highlighted in the media, in which the conditions are comparable to those in developing countries. The deplorable conditions described may seem unbelievable, however, through the findings in this research, the reality facing First Nations People living on Canada's Indian Reserves is revealed in the words of community members living on the Fox Lake Indian Reserve. Through a series of interviews with community members, key themes emerged that offer valuable insight into how a revised house design, that better reflects a Peoples' way of life, can contribute to improved living conditions. The conclusions drawn from the research demonstrate the importance of understanding a Peoples' culture and letting this understanding guide further practice.

Investigating Prey Selection of the Western Rattle Snake (*Crotalus oreganus*) and Great Basin Gopher Snake (*Pituophis cotenifer deserticola*) in the Okanagan, British Columbia

Maida, Jill

McAllister, Jared

Abstract:

The western rattle snake (*Crotalus oreganus*) and the great basin gopher snake (*Pituophis catenifer deserticola*) are blue-listed species in British Columbia, and federally listed as threatened (COSEWIC). We dissected gastro-intestinal tracts of *C. oreganus* (n=50) and *P. c. deserticola* (n=50) road-killed specimens from throughout the Okanagan region of British Columbia. Specimens were collected opportunistically and brought into the Penticton Ministry of Forest, Lands and Natural Resource Operations (FLNRO) office between 2000-2013. Snakes are ectotherms and rely on thermoregulation to maintain their metabolic processes. Roads are often utilized for thermoregulation by snakes, thus making them susceptible to road mortality. Contents were examined for the presence or absence of prey, and identified using guard hair analysis. Prey selection varied between the two species, but deer mice, western harvest mice, water shrew, voles and bird species were found in both. The difference in selection could be attributed to differences in size and hunting methods. *C. oreganus* is a sit and wait predator, while *P.c. deserticola* is a larger and more active hunter. The purpose of this study is to provide baseline information on prey selection and road mortality of *C. oreganus* and *P.c. deserticola* in the Okanagan. This study will provide insight on the road ecology of both species and initiate further research into the impact of roads on snake populations in the Okanagan.

Levels of Atorvastatin and Fenofibrate in vitreous fluid from diabetic patients

Main, Taran

Abstract:

Diabetes mellitus (DM) is an endocrine disorder caused by the insufficient secretion or action of the hormone insulin. Diabetic retinopathy (DR) is commonly found in patients diagnosed with DM and DR is the leading cause of blindness in those patients in developed countries. DR can be prevented by controlling blood pressure and blood glucose. Researchers have begun testing statins, used as anti-inflammatory anti-cholesterol medications to reduce inflammation in several key areas that affect DR. In particular, Atorvastatin (AT) significantly reduces the inflammatory agents and could potentially decrease DR. Therefore, the anti-inflammatory and anti-atherogenic effects in vivo for the drugs AT and fenofibrate (FB) are being looked at. A local retinal surgeon (Dr. Kevin Ramsey) and third year medical student (Colten Wendel), have orally given patients who have been diagnosed with DM the drug AT or FB. The study proposes to examine the amount of AT and FB that successfully reach the retina to determine if it is in large enough concentration to act as an anti-inflammatory molecule and decrease the chances of getting DR, or even prevent DR all together. After the drug was administered, some of the vitreous humor was removed from the patients and analyzed to determine the concentration of AT and FB. By comparing the amount of the drug administered to the amount found in the vitreous fluid, one can determine the amount of drug that has been able to pass through the retinal membrane and reach the vitreous fluid. If the drug can enter the vitreous fluid of the eye in large enough concentrations, the drug can reduce the inflammation found in the eye. Further research into studying AT and FB and their influence on DR should be pursued.

Detection of Clostridium difficile Toxin B using Matrix-assisted Laser Desorption/ionisation Time-of-flight Mass Spectrometry

McClellan, Alison

Abstract:

Clostridium difficile, a Gram-positive, anaerobic bacterium, can readily be acquired from the environment. During antibiotic use, the normal gut flora of patients can be disrupted, which may trigger opportunistic C. difficile to multiply and overpopulate the gut. This bacterium is frequently involved in hospital-related illness and the effects of C. difficile infections (CDI) on patients can range from asymptomatic colonization to death. Therefore, early and accurate detection of CDI is of critical importance. The pathogenesis of C. difficile is largely dependent on the expression of two high molecular weight toxins: toxin A and toxin B (CDC 2012; Govind and Dupuy 2012). The goal of this research is to develop a protocol for the detection of C. difficile toxin B from clinically relevant samples using matrix assisted laser desorption/ionisation time-of-flight mass spectrometry (MALDI-TOF MS). Accurate detection of C. difficile toxin B using MALDI-TOF MS may show that MALDI-TOF MS is a commercially feasible detection technique for CDI.

Fate Mapping Resident Glial Progenitor Cells in the Central Nervous System Following Spinal Cord Injury

Michaels, Nathan

Abstract:

Following spinal cord contusion injury, the central tissue is often completely destroyed, forming a cavity devoid of axons surrounded by a spared rim of preserved neural tissue. Between these two areas lie intact axons that have lost their ability to conduct signals to and from the brain due to myelin loss resulting from oligodendrocyte death. (Oligodendrocytes are the myelinating cells of the central nervous system). In experimental models of spinal cord injury, spontaneous recovery has been observed, and remyelination of axons surrounding the lesion site by resident progenitor cells is posited as a potential source for this remyelination. In this study, we wanted to illuminate the behavior of these progenitor cells following contusion spinal cord injury to better understand their involvement in remyelination. We did this by genetically labeling progenitor cells in mice using the Cre-lox fate mapping system, subjecting animals to injury, and extracting tissue for analysis at the time of injury, one week following injury, and 3 weeks following injury. We then labeled the sectioned spinal cord with antibodies specific to different stages of the oligodendrocyte lineage (i.e., platelet derived growth factor α (PDGFR α), for labeling progenitor cells; Olig2, which labels all cells in the oligodendrocyte lineage; CC1, which labels mature oligodendrocytes; and YFP, which enhances the signal created from the Cre-lox system). The data derived from this analysis will provide information on the recombination frequency attained using the Cre-lox system in this model of injury as well as information on the cell types generated following injury.

The Effects of Rotenone on Zooplankton and Benthic Invertebrates

Michaelsen, Sophie

Abstract:

This study investigates the effects of rotenone on small ponds and in particular, on the dietary habits of perch when there is an absence of large prey species. Rotenone is produced from the root of a legume that is native to southeast Asia and South America (Robertson and Smith-Vaniz 2008). The chemical blocks oxygen uptake in the gills of fish and other aquatic species. The target species of this rotenone treatment is Yellow Perch. The objective of this study is to determine the effect of rotenone on non-target species such as zooplankton and benthic invertebrates. The sample location is Larch Pond in the Salmon Arm region. The pond was sampled to determine the abundance and diversity of benthic fauna and zooplankton before and after rotenone treatment. This gave baseline data on the pond as well as showing the effects of rotenone on these invertebrates. Perch are not native to BC and disturb ecosystem balance by preying on native fish species. Perch, which are killed by rotenone, were collected as the rotenone treatment was being applied. The stomach contents of the collected fish will be sorted and the length-weight measurements recorded to determine the productivity of the lake as well as the dietary habits of the fish. We wish to investigate if the larger perch will become cannibalistic when there are no other prey species or if the benthic invertebrates are plentiful enough to sustain them.

Determination and Quantification of Taurine in Energy Drinks through Capillary Electrophoresis

Milne, Tallon

Abstract:

A procedure using capillary electrophoresis (CE) with UV absorption detection was developed to determine taurine concentrations in Red Bull, Monster, and Rockstar energy drinks. The popularity of energy drinks containing taurine has been on a steady rise, since this ingredient is described as an energy-booster, and has been linked to increased athletic performance. Taurine is a non-essential, sulphur-containing amino acid that is present at high concentrations in humans. It is not incorporated into proteins and is the most abundant free amino acid in the heart, brain, and retina, as well as in skeletal muscle and leukocytes. The goal of this research is to establish optimal CE conditions for taurine detection and the determination of taurine concentrations in three different brands of energy drinks. The current literature describes taurine detection using high performance liquid chromatography (HPLC), a technique that lacks precision, requires a greater amount of sample for analysis, and is not as cost effective. By comparison, CE is a much more efficient detection and quantification method. In future, this research could lead to analysis of taurine metabolism in biological systems, to examine the potential of this molecule as a possible biomarker for disease.

Investigating the Effect of a Summer Science Camp on Elementary Children's Content Knowledge and Attitudes Towards Science

Morran, Spencer

Abstract:

Previous research has shown that hands-on learning is a highly effective method for delivering science lessons. The BIG Little Science Centre is a non-profit science centre that provides opportunities for hands-on learning in science through labs, shows, and a room filled with various hands-on activities. Based on my experience and that of others associated with The BIG Little Science Centre, it appears that quality learning is going on at this science centre. However, previously published literature has stated that learning does not occur at such facilities and they are only for fun. The previous literature does state that going to such science centres can influence children's attitudes about science. This research is focused on trying to determine whether science activities at The BIG Little Science Centre foster science learning as well as influence attitudes about science. A summer science camp for children aged nine to eleven was studied to try and make this determination. A questionnaire, video recordings, and audio recordings were used to collect data about the camp participants and track their progress based on attending the camp. Specific camp activities were also looked at to determine engagement level and relate the engagement level to specific questionnaire answers. The results showed that attending the summer science camp did increase the participants' knowledge about science. The attitudes of the campers did not change after attending the camp. It was difficult to determine whether engagement related directly to learning because it is difficult to determine whether a child is learning something based on video recordings. Overall, it appears that learning does occur during a science camp at The BIG Little Science Centre. This research can give insight into how science camps at other facilities can be structured.

Canada's Role In The Diffusion Of Ice Hockey In Japan

Oliver, Simon
Thorsteinsson, Russell
Raschke, Brittany

Abstract:

The diffusion of culture between Japan and western countries goes back hundreds of years. The introduction of sports to Japan, such as baseball or more recently downhill skiing, are notable examples. One aspect of the diffusion of sports to Japan that has received little attention is the growth of ice hockey. Organized ice hockey has been present in Japan since the 1920's, through several different leagues. Japan initially had its own professional league – the Japanese Ice Hockey League (JIHL) – but Japan's most talented players now play in a combined Asian league called the Asia Hockey League (AHL). This study in cultural geography examines the history of hockey culture in Japan, describes how Canada has influenced the sport in the past, and how it is influencing it in the present. We also examine the diffusion of hockey throughout Japan after its introduction to the country. The methods we employ include reviewing literature, relevant websites, interviews, and surveying Canadian university students on their knowledge of Japan and its hockey culture. Our preliminary results show that Canada has had a large influence on Japan's ice hockey culture. However, there also seems to be a strong Japanese hockey culture which is not influenced by outside countries or has been adapted and modified from Canada and other western countries. In conclusion, Canada has definitely influenced Japan's hockey culture; however, there are certain cultural traits that are examples of cultural hybridization or syncretism – all contributing to a fascinating cultural geography of Japan.

Utilization of the Hydridophosphorane $\text{HP}(\text{OC}_6\text{H}_4\text{NMe})_2$ as a Ligand in $\text{Ni}(\text{II})$ and $\text{Pt}(\text{II})$ Complexes

Parlane, Fraser

Abstract:

Metallophosphoranes consist of a pentacoordinate phosphorous bonded to a transition metal. We have previously synthesized metallophosphorane complexes of $\text{Ni}(\text{II})$, $\text{Pd}(\text{II})$ and $\text{Pt}(\text{II})$ using the method of deprotonation of a hydrophosphorane, followed by transmetallation to a metal chloride. In this work, the phosphorane ligand $\text{HP}(\text{OC}_6\text{H}_4\text{NMe})_2$ (1) was first lithiated and then allowed to react with $\text{NiCl}_2(\text{PPh}_3)_2$. This resulted in the replacement of the chloride, forming the compound $\text{NiCl}(\text{PPh}_3)_2[\text{P}(\text{OC}_6\text{H}_4\text{NMe})_2]$ (2). Secondly, 1 was refluxed with $\text{PtCl}_2(\text{C}_6\text{H}_5\text{CN})_2$, which appears to cause ring opening of the ligand, allowing for both the phosphorus and nitrogen to coordinate to the platinum center as a bidentate ligand, replacing the two benzonitrile ligands, and forming the complex $\text{PtCl}_2[\text{P}(\text{OC}_6\text{H}_4\text{NMe})(\text{OC}_6\text{H}_4\text{NHMe})]$ (3). Due to the phosphorus and nitrogen atoms both acting as stereocenters, the product consisted of two sets of diastereomers.

Establishment of *Pseudoroegneria spicata*, *Festuca scabrella*, *Erigeron filifolius*, and *Gaillardia aristata* from Seed using Hydro-seeding and Straw Matting Treatments

Phillips, Michelle

Abstract:

Grassland restoration is exceptionally difficult; these ecosystems have hot dry climates that make vegetation establishment very challenging. Additionally, they are highly threatened by invasive plant species. As a result, it is common practice to use quick-establishing domestic species, such as *Agropyron cristatum* (crested wheatgrass), for restoration. This creates long-lasting monocultures that generally can't be outcompeted by native plant species. To address these concerns a study was conducted to establish four native grassland species from seed in Kamloops, B.C. A randomized block design was used to compare six treatments and a control, each replicated six times. Treatments consisted of 0.5m² plots with either biodegradable straw matting with seed above or below the mat, hydro-seeding only, hydro-seeding under or above straw matting or only seeding. The control plots were not seeded. Each treatment plot received 150 seeds of each of the four species used. These species were two key native bunchgrasses, *Festuca campestris* (rough fescue) and *Pseudoroegneria spicata* (bluebunch wheatgrass), and two native forbs, *Erigeron filifolius* (thread-leaved daisy) and *Gaillardia aristata* (brown-eyed Susan). Treatment did not impact soil moisture or temperature throughout the growing season. However, two-way ANOVA revealed that both *E. filifolius* and *F. campestris* showed significant differences in the number of seeds that established. In general the mat treatment resulted in higher plant counts than using hydro seeding combined with mats. This experiment provides a first step toward showing how the environment of a disturbed site can be easily modified to encourage the first year establishment of native grassland seeds.

Genome-wide Search for Type III Secretion System Effectors of *Edwardsiella tarda* using a Meta-analytical Approach

Porter, Vanessa

Abstract:

Edwardsiella tarda is an important pathogen of freshwater and marine fish; the disease properties are due in large part to their type III secretion system (T3SS). *E. tarda* uses a T3SS to secrete effector proteins directly into host cells for intracellular survival and replication. It is estimated that the T3SS of *E. tarda* contains about 30 effectors, only four of which have been studied. Using experimental approaches, 8 new effectors have recently been identified. The rest are thought to be included in the 1000+ hypothetical proteins in the genome. We used a bioinformatics approach to predict T3SS effectors based on identified attributes. An algorithm was developed to predict T3SS effectors using a machine learning method. Twenty-one attributes were used to identify new effectors in *E. tarda* EIB202. The machine learning method compared the 12 identified effectors to a negative group with about 2,600 non-effector proteins. We used various N-terminal lengths of effector protein sequences to determine the most appropriate length in *E. tarda* for T3SS effector prediction. The algorithms were optimized by selective removal or addition of features and re-training. The optimized algorithm was then tested against 1,000+ hypothetical proteins, and the top 50 scoring proteins will be subjected to experimental validation. We have successfully developed a prediction system for screening T3SS effectors in *E. tarda* EIB202's genome that can one day be applied to other organisms.

RFID Logging of Mountain Bluebirds

Roberts, Jerin

Abstract:

What attributes describe a good parent? One measure may be the amount of time spent feeding or otherwise caring for their young. Mountain bluebirds (*Sialia currucoides*) reside near Kamloops and provide an opportunity to observe parenting behaviors in birds. In previous studies on this population and other bluebird populations [4], captured video footage of bluebirds has been used to measure the time spent feeding their young. However this method is inefficient and time consuming and requires many hours analyzing footage, much of which is insignificant or irrelevant. Furthermore because of the equipment's cost, battery and memory limitations, and time/effort limits, only a small number of nests can be monitored during the season. Additionally, the value of the equipment raises the potential risk for loss due to theft, which has occurred previously in this study system. In this study, we developed and built circuits to record bird visits to the nest. The micro-controlled RFID loggers allowed for non-invasive identification of animals, which enabled the ability to record natural, unobstructed feeding provisions throughout the entire feeding period. Bluebirds in this project were tagged with RFID pits tags and monitored at regular time intervals using microcontrollers. The circuits built and the skills acquired will prove useful for the future study of multiple species of birds and their young.

Hydroponics Vs Aquaponics

Robinson, Jessika

Abstract:

The purpose of my project was to design and construct a small-scale aquaponics system and compare it to a hydroponics system. In an aquaponics system, plants receive nutrients from the waste water provided by fish, and fish receive filtered water in return. Whereas in a hydroponics system, liquid fertilizer is added to a water reservoir to provide nutrients needed for optimal plant growth. Both systems were erected in a greenhouse with temperature and humidity controls, and measurements of pH, oxygen, ammonia, and other essential parameters were consistently taken to ensure that both plant and fish needs were met. Fish growth rate, plant biomass and water nutrients were then analyzed at the completion of the experiment to show true differences between the two systems. While my hydroponics system showed greater plant biomass and nutrient levels, new research has shown that aquaponics systems that are run for longer periods of time actually have plant growth rates similar to hydroponics systems due to increased efficiency of mature bacteria.

ChemiMani: Visualizing Nucleic Acid Constraint Manifolds

Roosenmaallen, Morgan

Abstract:

The functionality of important biomolecules, such as proteins and RNA, is greatly dependent on their three-dimensional conformations; small changes in conformation can drastically impact their efficiency and even result in complete non-functionality. Via their relationship with steric hindrance, bond torsion angles are the primary determinants of conformational freedom. While hard-shell constraint manifolds for proteins have existed since the 1960's, in the form of two-dimensional Ramachandran plots, the high dimensionality of RNA has made similar, six-dimensional maps difficult to produce. I present here a novel program, ChemiMani, which generates and visualizes approximated one-, two-, three-, or four-

dimensional subsets of the full six-dimensional RNA constraint manifold. These subsets are user-definable (i.e., users can specify which bond torsion angles they wish to fix and at what angles, and which to allow free rotation), are generated in real-time, and have a resolution of up to 1 degree. Manifold subsets are produced as three-dimensional polygonal structures (or animated structures in the case of four-dimensional manifolds). ChemMani is not restricted solely to RNA structures, however; it can easily be extended to include custom chemical structures for the exploration of novel chemicals and their conformational limits.

Toxic Effects of Herbicides on Cellular Respiration in Mitochondria

Roy, Mikhail

Abstract:

The wide spread use of herbicides for agricultural and home use raises concerns about the safety of these chemicals. A number of studies have shown that commonly used herbicides can have toxic side effects and many previously used chemical herbicides are now banned by many countries. The mechanism of action of herbicide toxicity is the subject of many research papers. One cellular target for herbicide action is the mitochondria, which are responsible for the majority of energy production in cells. A useful tool to study the cellular toxicity of herbicides is the mitochondrial particle assay system. This investigation evaluates the toxicity of the substituted urea photosynthetic inhibitor DCMU, the phenoxy auxinic herbicide 2,4-D, and the amino acid biosynthesis inhibitor glyphosate, by evaluating the percent oxygen consumption blocked by each. These three classes of herbicides are used worldwide and are among the most commonly used in the Fraser Valley. The results showed that DCMU, 2,4-D and glyphosate impaired the oxidative functions of mitochondrial particles leading to lowered oxygen consumption when electron donors are added. Overall, DCMU and 2,4-D were significantly more potent than glyphosate at inhibiting oxygen consumption. Specifically, at 200mM concentrations there was an approximately 40-50% block by DCMU (n=8), ~20-30% block by 2,4-D (n=6), and less than 10% inhibition by glyphosate (n=9). The low toxicity level of glyphosate's revealed in this study is consistent with the literature. Conversely, DCMU and 2,4-D are seen to have a toxic effect. However, due to the low number of studies, this finding is not supported strongly in the literature. Thus, further studies on the toxicology of DCMU and 2,4-D are needed.

Restoration of Native *Camassia quamash* in Garry Oak Meadows: A Look at the Effect of Herbivory and Competition

Rumley, Jennifer

Abstract:

The Garry Oak ecosystem in Canada is considered endangered as it is only found in the southwestern-most corner of the country primarily on Vancouver Island and the Gulf Islands. *Camassia quamash* (Common Camas) is a perennial forb commonly associated with Garry Oak meadows. Prior to European settlement times, Aboriginal people encouraged the growth of *C. quamash* by controlled burning events that eliminated its plant competitors. Now that such disturbance is largely absent, it is difficult for *C. quamash* to thrive. Controlling plant competition was one variable I examined in a study attempting to understand how to restore of *C. quamash* populations. The study was conducted at Trinity Western University's Crow's Nest Ecological Research Area, on Salt Spring Island. A second variable studied was the role of natural herbivory by ungulates; overabundance of grazers is another major threat to *C. quamash*. These variables were controlled by fencing for herbivory (H), and mowing for plant

competition (C). I set up six 5x5m plots for each of four different treatments (C+/H+, C-/H+, C+/H-, C-/H-) with an additional plot at the camp (C+/H-). These 25 plots were planted with four *C. quamash* bulbs each on November 24, 2012. In the spring, growth was examined in all plots and the four different treatments were compared using ANOVA. The height of *C. quamash* was significantly greater in fenced, un-mowed plots on May 17, 2013. There was significantly less grazing on *C. quamash* in fenced plots than un-fenced plots between mid-April and mid-June. Thus, the fenced un-mowed plots were the most successful with respect to the goal of restoring this species.

Musical Hockey: The Sonification of Team Sports

Sadler, Steven

Abstract:

The analysis of hockey is usually grounded in watching the game, but what if you could analyze it by listening instead? I will be tracking and recording the puck location during hockey games and using this data to create music. I plan on translating the flow and momentum of a hockey game into a melody. Once the music has been created I hope to use it to analyze different aspects of the game including the momentum of each team at different times and the speed of the game at the beginning and end. For this poster I will summarize my research by using the puck location to create music therefore creating a way to analyze a hockey game by listening rather than watching.

Identifying GMOs in Canadian Organic Foods via a PCR-based Method

Sidhu, Harjit

Abstract:

The prevalence of genetically modified organisms (GMOs) in processed foods has been rapidly increasing in North America. It is widely believed that by eating organic foods, one can avoid eating GMOs: but is this really the case? The Canadian Food Inspection Agency (CFIA) states that there must be at least 95% organic ingredients for a food to be considered organic, meaning that 5% of the ingredients may contain GMOs. The objectives of this study were to: i) Develop a sensitive PCR assay to identify genetically modified (GM) DNA elements (from GMOs) in processed foods; ii) Determine the prevalence of GMOs in organic foods in the Canadian marketplace. Most foods tested contained corn or soy, which are the major GM crops in North America. To test for the presence of GMO DNA, a CTAB-based extraction assay was followed by PCR. The amplification targets were the 35S promoter and NOS terminator: the most common GM elements found in corn and soy. Overall, about 60% of the organic foods tested (n=26) were positive for GMOs. In particular, approximately 75% of foods containing corn as their major ingredient (n=15) were positive for GM elements. The presence of GMOs in organic foods is likely due to organically grown corn being contaminated with the GM form, or that companies use the 5% flexibility to their advantage to save costs. The results suggest that GMOs are pervasive throughout the processed food industry and that even foods labeled as organic have some level of GMO DNA in them.

Unraveling the Effect of Retinoblastoma Tumour Suppressor Expression on the ILK Interactome

Sikkema, William

Abstract:

ILK is involved in many processes that are critical to cancer cell biology, including cell cycle progression, anchorage-independent growth, and tumour initiation, growth and invasiveness. ILK regulates Rb by activating G1/S cyclin-dependent kinase (cyclin-cdk) activities, a signalling pathway responsible for phosphorylating Rb and allowing cell cycle progression. Loss of Rb expression or function causes cell cycle dysregulation, and is characteristic of a number of cancers, including retinoblastoma. In retinoblastomas that do not express Rb, we have shown that ILK inhibition may be an anticancer therapeutic, causing altered mitotic spindle organization and mitotic arrest. However, preliminary data from our laboratory indicate that in retinoblastomas that express Rb, ILK inhibition does not result in mitotic arrest, but rather increased senescence and apoptosis. By studying ILK-protein complexes in Rb expressing and deficient cancer lines, we will: first, gain important insights regarding ILK's protein-protein interactions within molecular pathways involved in cell cycle progression; and second, determine how Rb may be involved in these molecular events. ILK protein complexes will be compared between cancer cell lines expressing shRNA Rb and a scrambled control. These complexes will be compared by a high-throughput, mass spectrometry analysis of the proteins that immunoprecipitate with flag-tagged ILK. Using the power of MALDI-TOF mass spectrometry to resolve specific from nonspecific protein interactions, we hope to identify novel ILK-binding proteins, in Rb-dependent and -independent signaling pathways.

Directed Ortho-Lithiation of Biphenyl Containing Different Tertiary Amide Directing Groups at the 4 and 4' Positions

Sirianni, Quinton

Abstract:

Directed Ortho-Metalation (DOM) is a synthetic technique in which an aromatic ring containing a directing metalation group (DMG) has its ortho hydrogen deprotonated, allowing for an electrophilic group to bond to the ortho site. While work has been accumulating on DOM and various aromatic compounds, there is little research focusing on DOM and biphenyls that contain two DMGs. Of particular interest, is how a biphenyl with two different DMGs will react when exposed to a limited amount of base and electrophilic reagent. In order to discover how biphenyls with two different DMGs react, an investigation of DOM on a biphenyl diamide reagent was performed. The reagent was first synthesized in-house from a commercially available biphenyl with carboxylic acid groups at the 4 and 4' positions. The reagent was synthesized in such a way that the resulting biphenyl diamide possessed two different tertiary amide groups at the 4 and 4' positions. DOM of the reagent was then performed using t-butyl lithium (this reaction is also known as directed ortho lithiation). Proton NMR was used to confirm the structures of synthesized compounds throughout the research.

Interaction of Nisin with Enzymes in Beef by Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF MS)

Sparrow, Katie

Abstract:

Nisin, a lantibiotic widely used in the food industry as a natural preservative, is produced by *Lactococcus lactis* spp. *lactis*. It is effective against bacteria such as *Listeria monocytogenes*, *Staphylococcus aureus*, spores of *Bacillus cereus*, *Clostridium botulinum* and several other pathogenic Gram-positive bacteria and is permitted as a food additive in over 50 countries. However, its lantibiotic properties are largely ineffective when used in meat products such as beef. The enzymes present in beef react with the nisin molecule, deactivating it, so that its addition to meat products has been largely unsuccessful. A clear picture of the kinetics, or how fast nisin is deactivated by the enzymes in beef, is needed in order to understand the inhibition of nisin. If the kinetics of the inhibition is known, then the shelf life of meat and how to handle meat products, can be determined more accurately, saving time, money, and preventing potential illness. This project investigates how nisin is deactivated by the enzymes present in beef through the use of time study. Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF MS) is used to characterize the reaction. In addition, the study investigates whether the extent of inhibition is different for (i) ground and processed beef, and (ii) grass-fed and grain-fed beef. The findings will aid in understanding the inhibition and thus improve nisin's antibacterial activity.

When Was Thin, In?: Examining the Thin Ideal and How It Coincides with the Rise of Feminism

Spooner, Kendall

Abstract:

This presentation examines feminism from the 1950s to the 1990s as it coincides with the emergence of the thin ideal. It discusses the traditional image of women as child bearers and investigates possible factors that lead it to change so dramatically. Furthermore, it outlines that as women rejected their conventional gender roles, the thin trend took root and grew remarkably. This study outlines that this skinny craze is a recent phenomenon, in the hope that it will evolve into a healthy acceptance of all body types.

The Cognitive Costs of Emotion Regulation with Positive and Negative Stimuli

Ste Marie, Mark

Abstract:

The study of Emotion regulation (ER) examines cognitive and behavioural control over emotions under the framework of Gross' process model of emotion regulation. The process model of ER takes into account the trajectories of various emotions and the regulation strategies that regulate those emotions—including both the antecedents and the response to an affective stimulus. The main ER strategies examined in ER research to date are reappraisal (re-evaluating an emotional eliciting stimulus in a less emotional way), suppression (refraining from expressing any overt behavioral responses to an emotional eliciting stimulus—staying straight-faced as it were), and distraction (avoiding attending to an emotional stimulus altogether by purposely focusing on a neutral stimulus). Evidence has shown that employing ER strategies is cognitively effortful. This has been shown through slowed reaction times on

reaction tasks when a concurrent ER strategy is employed compared to no strategy implementation. To date, the majority of research examining the cognitive costs of ER has looked at the effects of regulating one's emotions with negative emotional stimuli. The purpose of the current research is to compare the cognitive costs of ER—specifically reappraisal and suppression—when employed with both positive and negative emotional stimuli. This study is noteworthy because, as far as the authors are aware, it is the first of its kind. By comparing positive and negative emotional stimuli, this study will show whether there is a difference in the cognitive effort it takes to emotionally regulate dichotomous emotional stimuli (i.e. positive/negative) of equivalent intensities.

Using Stable Isotopes To Determine The Overwintering Grounds Of An Aerial Insectivore: Vaux's Swift (Chaetura vauxi)

Steele, Lauren

Abstract:

Globally, aerial insectivore birds are declining, yet the causes of this decline remain unclear, largely due to the lack of basic information on the year-round ecology of most of these birds. Vaux's Swifts (*Chaetura vauxi*) are long-distance migratory insectivores that have a unique behaviour of roosting in large numbers (up to several thousand) in residential and commercial buildings during migration. In this study, I investigated roughly where individuals from a single Vaux's swift roost were overwintering, and whether or not this overwintering ground was consistent for all the birds in the sample, or whether there were age and sex specific differences. Geographical locations of overwintering animals can be determined using stable isotope signatures ($\delta^2\text{H}$, $\delta^{15}\text{N}$, and $\delta^{13}\text{C}$) in tissues, such as claws, that are grown prior to migration. Stable isotopes can give an approximate global position ($\delta^2\text{H}$) by comparing tissue signatures to isotopic base maps, and can also provide information on habitat quality and trophic position ($\delta^{15}\text{N}$, and $\delta^{13}\text{C}$). In this study, I examined 100 Vaux's swifts, recording age, sex, and body size measurements. I then analyzed, hydrogen, carbon and nitrogen isotopes from claw samples. My results demonstrate that rather than overwintering at a single location, Vaux's Swifts migrating through Vancouver Island, BC appear to originate from a broad range of winter locations, and eat a broad range of insect prey.

A Computational Study on the Effects of Multiple Acid-base Equilibria on the Acidity of Acetohydroxamic acid in Aqueous Solution

Sternig, Connor

Abstract:

Acetohydroxamic acid (AHA), commonly known as Lithostat, is a drug used with antibiotics and/or surgery to treat certain types of bladder infections. AHA exists in four different isomers (the amide and imide forms, each in Z and E conformations) each of which possesses two acid sites. Hence, each neutral form can dissociate in aqueous solution and exist in equilibrium with its corresponding anionic forms (of which there are eight in total). These multiple dissociation equilibria contribute to the relatively low overall pKa (the quantitative measure of the strength of an acid in solution) of this compound. The goal of this computational project is to account for the existence of all these equilibria and come up with an approach to accurately calculate the pKa of AHA in water-- a challenging task. The initial methodology makes use of continuum solvation methods, in which the solvent is modelled as a continuum. The cluster approach, making use of explicit solvent molecules together with the continuum has also been

applied. Once a successful methodology is discovered for accurate reproduction of the experimental pKa value of AHA, the study will be extended to other hydroxamic acids.

The Effects of Grazing on the Seed Production and Soil Seed Bank Germinability of Invasive Weeds

Strangway, Katelyn

Abstract:

Invasion of natural plant communities by noxious weeds can result in economic and environmental losses. Traditional control methods for these invasions mostly revolve around herbicide use which can lead to both environmental damage and health problems for farmers. Using grazing animals (goats) is an alternative control method already being utilized in Europe and the United States. Goats will consume almost anything edible and moderate grazing can positively influence vegetation regeneration and biodiversity. However the impacts of grazing on specific life history stages of the targeted plants are scarce, and increased knowledge could provide more effective use of grazing animals. I investigated the impact of grazing on vegetation biomass, seed production, and seed bank dynamics of plant communities dominated by plumless thistle (*Carduus acanthoides*) and spotted knapweed (*Centaurea maculosa*). There was a significant difference in net biomass increase for treatments subjected to goat grazing compared to those without; Thistle (t-value=2.22 p=0.045), Knapweed (t-value=2.84 p=0.023). As well goats provided significant control over seed proliferation by consuming seed heads Thistle (t-value=-3.37, p=0.014), Knapweed (p=0.030). Seed bank dynamics are still undergoing investigation.

When is Speeding, Speeding?

Todd, Jenna

Abstract:

Speeding is the most common driving violation, occurring on a daily basis. Royal (2004) noted that at least two thirds of drivers report frequently exceeding the posted speed limit, and most by a significant amount. Drivers' perceptions of speeding should be considered when speed limits are changed. Many drivers consider speeding in small amounts as acceptable and even safe. Mannering (2009) found a relationship between how drivers perceive the safety and the legality of speeding. For every 1% increase in speed that a driver believed they could be ticketed for, people believed the speed to be 1.97% less safe, for up to 5km/h over the posted limit. They found results for higher speeds as well. Williams, Kyrychenko, and Retting (2006) found similar characteristics among speeders; they were under 30 and most likely male. Speeders also had more accidents and traffic violations than the non-speeders. This study looks more closely at this relationship to determine if there is a specific speed over the limit when the driver no longer perceives speeding as safe or as more illegal. One hundred undergraduate psychology students at Thompson Rivers University in Kamloops, BC completed questionnaires in which they rated, on semantic differential scales, (1) how safe/unsafe and (2) how legal/illegal they believed incrementally increasing speeds over the posted speed limit to be. The current study examines university students' perceptions of speeding. At what point do they see travelling over the posted speed limit, in both a city setting and a highway setting, as reflective or "speeding". Or in other words, when does speeding really become "speeding". It is expected that males will see higher speeds over the posted speed limit as more permissible than will females.

The Impact of Mortality Salience on Treatment Endorsements for the Marginalized Patient

Van Zyl, Christa

Abstract:

According to Haidt (2001), making judgments about others has a moral component and moral decisions are intuitively culturally influenced. Biases are often invoked at an unconscious level and can influence decisions and interactions despite conscious intentions. Such biases contribute to systematic discrimination in health care (Mahoney, 2009). According to Terror Management Theory (TMT) when people experience death reminders (mortality salience), they tend to align themselves more closely with their personal cultural worldview and are prone to reject and harshly judge those who do not share those beliefs (Greenberg, Pyszczynski, & Solomon, 1997). For example, Greenberg, Pyszczynski, Solomon, Simon, and Breus, 1994, found that municipal court judges who were reminded of their mortality prior to setting a bond for an alleged prostitute, decided on fines that on average were almost ten times higher than those set by judges who had not been reminded of their mortality. If TMT is accurate, unconscious subtle reminders (primes) of one's eventual death may impair health care workers' abilities to empathize and work with a diverse patient base. The study examines the effects of unconscious death related primes on medical decisions involving a culturally marginalized patient. We hypothesize that unconscious mortality salient primes will increase biases against those (for example: prostitutes) who violate traditional moral beliefs. Unconscious death related primes and unconscious cultural worldview biases will, to a greater extent than explicit death related primes, lead to a difference in health care treatment.

Perceptions of Motivation for Criminal Behaviour in Male and Female Offenders

Vance, Nicole

Abstract:

One of the core goals of criminologists relates to determining the causes of and explanations for criminal behaviour. Although previous research on this topic has generated many theoretical approaches, it is arguable that the perceptions or opinions regarding these theories are equally valuable, as both professional and especially public opinion may drive changes in legislation and policy. Previous research has demonstrated that opinions of criminal offenders may be affected by perceived moral character, beliefs about culpability and punishment goals. In addition, it has been found that the gender of an offender can have a significant effect on opinions of perceived accountability, positive evaluation, and sentence severity, with female offenders being largely advantaged over male offenders. The purpose of this proposed research is to examine whether the gender of the offender impacts perceptions of morality and personal responsibility for criminal behaviour, as well as whether or not the gender of the offender impacts sentencing goals. In addition, we plan to examine whether or not the responses to these scales (i.e., moral character, attributions, and punishment goals) correlate with responses to the endorsement of broad criminological theories. Approximately 100 participants will be recruited from introductory psychology courses at Thompson Rivers University. Participants will complete a questionnaire consisting of a series of statements regarding immutability of an individual's character, internal attribution endorsement, and sentencing goals. For half of the participant sample the questionnaire items will state that the offender is "male" and for the remaining participants the questionnaire items will state that the offender is "female".

Reactions of α -Perfluoroalkoxides with Transition Metals

Voth, Chris

Abstract:

To date, reported examples of synthesis of α -perfluoroalkoxide metal complexes have been limited to two: the gold and copper analogues of 1,3-dimesitylimidazolin-2-ylidene metal trifluoroalkoxides [(SIPrMes)M-OCF₃] (M = Cu, Au). The scarcity of these compounds is due to a property called negative hyper-conjugation, which results in the tendency of α -perfluoroalkoxides to readily lose alkoxide functionality in favour of the corresponding acyl fluorides. A recent development involving the preparation of stable quaternary ammonium salts of a α -perfluoroalkoxides, such as [N(CH₃)₄]⁺[CF₃CF₂CF₂O]⁻, has opened up opportunities to explore the reactivity of these compounds. In this project the preparation of a wide range of transition metal complexes with these α -perfluoroalkoxides is explored.

Web Content Management via Direct Page Editing

Wassing, Jason

Abstract:

This project sought to discover the viability of a website content management system, one that allows the building and editing of web content in an easy to understand user interface that resides directly on the page of the website itself. The system would allow users to view web pages, and when an administrative user logs in, the interface expands on the page to show a suite of page editing tools without leaving the existing page. The result is a webpage editor that displays direct editing results, so there is no disconnect between the management interface and a public facing page.

Personality and its Effects on Sustainability

White, Chantal

Wright, Jason

Abstract:

This study examines the relationship between personality and sustainability values. Previous research has been limited in this area, but has offered evidence that some dimensions of personality predict specific sustainability factors — such as showing a concern for the environment (Milfont & Sibley, 2012). The current study builds on this existent research by looking at the relation between personality and all dimensions of sustainability, — outlined by the United Nations in the Millennium Declaration (Freedom, Equality, Solidarity, Tolerance, Respect for Nature, and Shared Responsibility) — as well as consumer habits. In addition, the study is part of a larger cross-cultural study examining sustainability values in students from Canada, Austria, China, Germany, and Iran. Currently, data has been collected from approximately four to six hundred participants from the Thompson Rivers University campus. We shall present correlational and regression analyses to examine how personality predicts sustainability values and consumer habits.

Canadian Construction Companies in Japan: Challenges and Rewards

Wilson, Mike
Hanna, Derek
Rivette, Tiffany
Tardif, Rene

Abstract:

Canada and Japan share important cultural, economic and historic ties. The Canadian construction industry has provided technical expertise in wood-frame construction to the Japanese, and Canadian companies have exported complete home packages to Japan. In general, Japan has been an important export customer for the Canadian lumber industry. This project focuses on Canadian contributions to the residential construction sector in Japan. The main objective is to investigate the scope and size of Canada's contribution to the Japanese residential construction sector. Another objective is to define challenges, opportunities and rewards for Canadian companies wishing to do business in Japan. Methods for the project include a literature review related to Canadian companies that have undertaken, or are currently undertaking, building projects in Japan. The research also involves informal interviews with companies that have completed construction projects in Japan and a short questionnaire that probes the knowledge of Canadian university students with regards to Canada-Japan trade. Our preliminary findings show the Canadian construction industry has contributed to reconstruction efforts in the aftermath of the 2011 Great Eastern earthquake/tsunami. Canadian companies are also involved in helping Japan with home energy efficiency, a factor that has gained additional priority following the shutdown of most of Japan's nuclear power plants. Nevertheless, many Canadians are unaware of the accomplishments of Canadian firms in Japan. The research highlights the prominence and effect Canadian firms have on Japan's construction industry. It also outlines the benefits of doing business in the Japanese market, as well as difficulties, such as the language barrier, cultural challenges, and lack of awareness among the Canadian population.

An Investigation of Japanese Influence in the Canadian Food Industry since the 1980s

Wooldridge, Hardy
Bazergui, Jesse
Majcher, Blake

Abstract:

The diffusion of Japanese culture around the world, specifically Canada, has coincided with an increase in the number of Japanese restaurants, especially across Canada. This study examines when the influx of Japanese restaurants in Canada took place and the specific regions of Canada where it occurred. It also examines certain difficulties Japanese restaurateurs have faced or are currently facing in their businesses. Furthermore, the study investigates the exchange of culture that has occurred by modifying Japanese food to make it more palatable to Canadians and the diffusion of Americanized Japanese food into Canada. The methods of this study include a literature review, an examination of Japanese restaurant websites, and informal interviews with members of the Kamloops Chamber of Commerce, local Japanese restaurant owners, and the Japanese Restaurant Association of Canada. A survey of Canadian university students provides information regarding the awareness and appreciation of Japanese food in Canada. The preliminary findings show that the number of Japanese restaurants in Canada is rapidly increasing, and this increase is related to a greater acceptance of Japanese food and culture. The principle conclusion is that the diffusion of Japanese restaurants to Canada has been going

on since the Japanese economy started to grow rapidly in the 1980s. In the last twenty years, however, Japanese restaurant food has fused with North American culture— an example of syncretism -- which has led the Japanese government to try to certify authentic Japanese restaurants.

Directed Ortho-Lithiation of Biphenyl Containing Identical Tertiary Amide Directing Groups at the 4 and 4' Positions

Yiu, TszYeung (Matthew)

Abstract:

This study is about an attempt to selectively mono-ortho-lithiate a biphenyl molecule with identical tertiary amide directing groups at the 4 and 4' positions. The product of this synthesis will then be subjected to further directed lithiation reactions. In this research, we are developing a method to give an improved yield of the initial mono-ortho-lithiation product, based on chemistry developed by a previous student. Our hope is to be able to produce enough of the mono-substituted product in order that further substitution of it by directed lithiation chemistry can be studied. The broad goal of this project is the synthesis of previously unreported compounds that are related in structure to known liquid crystals and a variety of pharmaceuticals.

A Comparative Analysis of Leadership Styles used at NOLS and Outward Bound

Young, Bradley James

Abstract:

The purpose of this study is to compare leadership styles used by facilitators in Outward Bound and NOLS; two of the leading outdoor education organizations in North America. Outward Bound and NLOS both practice alternative types of education, which are experiential education, adventure education, environmental education, adventure education, and place-based education. Although both organizations seem very similar they are truly very different in how they interact with participants. By studying the various forms of education they use I will be able to gain an understanding of how they lead their participants to success, and find the differences between them. I also hope to find trends between different types of education and what leadership styles best suit them.