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## Conference Agenda

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Saturday March 6, 2010 – Irving K. Barber Learning Centre, Jubilee Room

<b>9:30 – 10:00</b>	<b>Registration</b>
<b>10:00 – 10:20</b>	<b>Welcome</b> <i>Office of the Vice President Research &amp; International</i>
<b>10:30 – 12:10}</b> <b>11:00 – 12:10}</b>	<b>Oral Presentations</b> (Concurrent Session I – breakout rooms) <b>Morning Poster Presentation Session</b> (Jubilee Room)
<b>12:10 – 1:10</b>	<b>Lunch</b>  <i>Musical Accompaniment ~ Violins</i>  <i>Resource Fair ~ Undergraduate Research Opportunities (URO); UBC Library/cIRcle; SciTeam; Friends of the UBC Farm; Accessible Science Initiative; Faculty of Graduate Studies; Golden Key International Honours Society</i>
<b>1:15 – 2:00</b>	<b>“What’s On Your Mind?”</b> <b>Roundtable Panel Discussion</b>
<b>2:10 – 3:30}</b> <b>2:10 – 3:20}</b>	<b>Oral Presentations</b> (Concurrent Session II – breakout rooms) <b>Afternoon Poster Presentation Session</b> (Jubilee Room)
<b>3:30 – 3:40</b>	<b>Break</b>
<b>3:40 – 4:40</b>	<b>Oral Presentations</b> (Concurrent Session III – breakout rooms)
<b>4:45 – 5:30</b>	<b>Celebration and Awards Ceremony</b> <i>UBC Improv Theatre Society of AMS</i>

# THE UNIVERSITY OF BRITISH COLUMBIA



March 6, 2010

Undergraduate Student Presenters  
Supporting Faculty  
Conference Participants  
UBC Community

## **9<sup>TH</sup> ANNUAL UBC MULTIDISCIPLINARY UNDERGRADUATE RESEARCH CONFERENCE**

Universities, particularly great universities such as UBC, are the homes of great ideas. It is here that we create ideas, here that they get refined through open discussion, and here that they have impact through education and application. This role for universities is a vital one, and is unique to universities. Ideas are the currency of research, through research they are born, tested, and applied. Research is thus central to a great university's purpose, and key to a great university's future. One of the strengths of university research is that it is open and unfettered; the knowledge we create is made freely available to everyone. The undergraduate researchers at this conference are not only creating the new ideas so vital to our future, they are also sharing these ideas with the broader community. Thus, they are full participants in the mission of our great university, and all of us are here to celebrate their achievements.

Since our first conference in 2002, we have had hundreds of students present their research, spanning the spectrum of disciplines here at UBC. Once again this year, exciting results from all the frontiers of knowledge are being presented.

To the undergraduate researchers from our diverse Faculties; this conference is a celebration of your hard work and deliberate efforts. At this event, presentations of original research will illustrate the power of your ideas. You are the embodiment of the new university academic plan, Place and Promise, on your way to becoming exceptional global citizens, by conducting outstanding research to serve the people of British Columbia, Canada, and the world.

To the supporting faculty; with your invaluable dedication to undergraduate research mentorship, you are creating the forefront undergraduate education we are striving for at UBC, one that integrates frontier research into our undergraduate programs, and includes our undergraduate students into our exciting research enterprise.

UBC thanks all of you for helping fulfill the Trek vision, and wishes you continued success in your research efforts. At this 9<sup>th</sup> Annual UBC Multidisciplinary Undergraduate Research Conference, let us all join together as a vibrant community of thinkers, believers, and achievers. Thank you to the conference coordinator and assistants, volunteers, panel moderators, keynote speakers, graduate student judges, performers and other members of the UBC community for their outstanding efforts at creating this celebration of our students' achievements.

Yours sincerely,

A handwritten signature in black ink, appearing to be 'John Hepburn'.

John Hepburn FRSC  
Vice-President Research

A handwritten signature in black ink, appearing to be 'Brian Sullivan'.

Brian Sullivan  
Associate Vice-President Students

A handwritten signature in black ink, appearing to be 'Anna Kindler'.

Anna Kindler  
Associate Vice President  
Academic Affairs



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## œ “What’s On Your Mind?” ∞

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### **Roundtable Panel Discussion ~ 1:15-2:00pm**

The Multidisciplinary Undergraduate Research Conference is the kick-off event to UBC’s university-wide “Celebrate Research Week” (March 5–13, 2010). This special week, held at the beginning of March every year, showcases a week of diverse events highlighting areas of research and cutting-edge work that UBC’s faculties, departments, schools and partner institutions have to offer. These events include discussion forums, lectures, seminars, open houses, events for youth and kids, and symposia on topical and timely issues from every discipline imaginable. From Fine Arts to Chemistry, everyone is invited to participate in this week-long event.

This year, the Celebrate Research Week theme is “What’s On Your Mind?” since one of the featured events is the taping of Bob McDonald’s CBC radio show “Quirks & Quarks” at the Chan Centre on March 8<sup>th</sup>. On his radio show, audience members send in their question and Bob will find an expert to answer it. For example, have you ever wondered how sparrows survive the cold prairie winters? Or, why do we get dark circles under our eyes? Or, why do storms on other planets (like Jupiter) last for hundreds of years while storms on Earth last only weeks? Bob finds the answers to questions like these for us.



### **MURC’s mini version of Quirks & Quarks!**

We decided it would be fun to have a mini version of Quirks & Quarks at MURC! We have gathered together a small panel of experts who will answer a selection of your questions during a Roundtable Panel Discussion. And in case you didn’t get a chance to submit a question ahead of time, we’ll try and fit it in during the session!

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## **œ Oral Presentations œ**

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## Concurrent Session I. > 10:30am – 12:10pm

Panel #	Panel Title & Presenters	Page #	Rm.
<b>1</b>  <b>Joanne Fox</b>	<b>Violence &amp; Fear: Survivors &amp; Perpetrators</b> <ul style="list-style-type: none"> <li>Sara Yuen - 10:30</li> <li>Susan Kuo - 10:50</li> <li>Ashley Ng - 11:10</li> <li>Nicol Patricny (<i>UBC-O</i>) - 11:30</li> <li>Jesjiven Pannu - 11:50</li> </ul>	<b>9-11</b>	<b>156</b>
<b>2</b>  <b>Sheryl Adam</b>	<b>Children: Language, Thought &amp; Perception</b> <ul style="list-style-type: none"> <li>Bronwyn Cass - 10:30</li> <li>Camila Fujiwara - 10:50</li> <li>David Le - 11:10</li> <li>Angelina Lee - 11:30</li> <li>Maryam Noghondarian - 11:50</li> </ul>	<b>11-14</b>	<b>157</b>
<b>3</b>  <b>Santokh Singh</b>	<b>Plants and the Soil They Grown In</b> <ul style="list-style-type: none"> <li>Luis Calderon &amp; Alison Marshall - 10:30</li> <li>Gurpreet Dhanda - 10:50</li> <li>Natashia Bose Roberts (<i>UBC-O</i>) - 11:10</li> <li>Shamsher Sandlas - 11:30</li> <li>Shing Zhan - 11:50</li> </ul>	<b>14-16</b>	<b>355</b>
<b>4</b>  <b>Katja Thieme</b>	<b>Health Care: From the Personal to the Political</b> <ul style="list-style-type: none"> <li>Kulvir Kainth - 10:30</li> <li>Tamryn Law - 10:50</li> <li>Tenneille Loo - 11:10</li> <li>Gordana Panic; Linda Liu; Janny Ke - 11:30</li> <li>Trisha Taneja - 11:50</li> </ul>	<b>16-18</b>	<b>Dodson</b> (3 <sup>rd</sup> floor)
<b>5</b>  <b>Katharine Patterson</b>	<b>Power and Poverty</b> <ul style="list-style-type: none"> <li>Connor Cavanagh - 10:30</li> <li>Kristina Hess - 10:50</li> <li>Bahareh Mahmoodi - 11:10</li> <li>Heather Sarsons - 11:30</li> <li>Tiffany Tong - 11:50</li> </ul>	<b>18-21</b>	<b>Lillooet</b> (3 <sup>rd</sup> floor)
<b>6</b>  <b>Anneke van Enke</b>	<b>Race and Immigrant Experiences</b> <ul style="list-style-type: none"> <li>Parmis Behmardi - 10:30</li> <li>Erik Christiansen (<i>UBC-O</i>) - 10:50</li> <li>Zosia Kossowski (<i>UBC-O</i>) - 11:10</li> <li>Jasmine Luk - 11:30</li> <li>Pavandeep Pamela Toor - 11:50</li> </ul>	<b>21-23</b>	<b>460</b>
<b>7</b>  <b>Katherine Miller</b>	<b>Reproductive Issues: From Wolf Eels to Cows</b> <ul style="list-style-type: none"> <li>Christine Braun (<i>UBC-O</i>) - 10:30</li> <li>Haley Kenyon - 10:50</li> <li>Sean Kuling - 11:10</li> <li>Tehya Read - 11:30</li> <li>Whitney Rotzien (<i>UBC-O</i>) - 11:50</li> </ul>	<b>23-25</b>	<b>461</b>

## Concurrent Session II. > 2:10 – 3:30pm

Panel # & Moderator	Panel Title & Presenters	Page #	Rm.
<b>1</b>  Judy Feng	<b>Gold, Copper and Other Metals</b> <ul style="list-style-type: none"> <li>• Scott Yi-Heng Lin - 2:10</li> <li>• Chris Rock (<i>UBC-O</i>) - 2:30</li> <li>• Roger Sherwood (<i>UBC-O</i>) - 2:50</li> <li>• Dapinderpal Kaur Toor - 3:10</li> </ul>	<b>26-27</b>	<b>156</b>
<b>2</b>  Olga Pena	<b>Degradation of the Nervous System</b> <ul style="list-style-type: none"> <li>• Yi-shiuan (Frances) Lin - 2:10</li> <li>• Sharon May - 2:30</li> <li>• Nadya Moisseeva - 2:50</li> <li>• Sydney White (<i>UBC-O</i>) - 3:10</li> </ul>	<b>27-29</b>	<b>157</b>
<b>3</b>  Santokh Singh	<b>Interdisciplinary Applications of Evolutionary Theory</b> ~ special times for this panel ~ <ul style="list-style-type: none"> <li>• Ashley Smith - 2:10</li> <li>• Charlene Wong – 2:20</li> <li>• Yana Eglit – 2:30</li> <li>• Scott Newson - 2:40</li> <li>• Peter Wessendorf - 2:50</li> <li>• Annalise Kuester - 3:00</li> <li>• Ruth Hatch - 3:10</li> </ul>	<b>29-32</b>	<b>355</b>
<b>4</b>  Sheryl Adam	<b>Hearing Loss, Diabetes &amp; <i>Tetrahymena</i> sp.</b> <ul style="list-style-type: none"> <li>• Tahara Bhate - 2:10</li> <li>• Kiran Kalkat - 2:30</li> <li>• Keshika Nanda - 2:50</li> <li>• Cameron Sture - 3:10</li> </ul>	<b>33-34</b>	<b>Dodson</b> (3 <sup>rd</sup> floor)
<b>5</b>  Carrie Yodanis	<b>Ecology and Conservation Practices</b> <ul style="list-style-type: none"> <li>• Coral Voss - 2:10</li> <li>• Anelyse Weiler - 2:30</li> <li>• J. Ben Wilson (<i>UBC-O</i>) - 2:50</li> <li>• Hang Yu - 3:10</li> </ul>	<b>35-36</b>	<b>Lillooet</b> (3 <sup>rd</sup> floor)
<b>6</b>  Ingrid Price	<b>Issues in Pharmaceutical Sciences</b> <ul style="list-style-type: none"> <li>• Lourdes (Cynthia) Gunaratnam - 2:10</li> <li>• Ankur Midha - 2:30</li> <li>• Aishwariya Sharma - 2:50</li> <li>• Anthony Gador - 3:10</li> </ul>	<b>37-38</b>	<b>460</b>
<b>7</b>  Katherine Miller	<b>Aquatic Life</b> <ul style="list-style-type: none"> <li>• Carita Chan - 2:10</li> <li>• Daniel J. Field - 2:30</li> <li>• Natasha Lukey (<i>UBC-O</i>) - 2:50</li> <li>• Talia Sechley - 3:10</li> </ul>	<b>38-40</b>	<b>461</b>

### Concurrent Session III. > 3:40 – 4:40pm

<b>Panel # &amp; Moderator</b>	<b>Panel Title &amp; Presenters</b>	<b>Page #</b>	<b>Rm.</b>
<b>1</b>  <b>Megan Sherman</b>	<b>Emotions, Learning &amp; the Brain</b> <ul style="list-style-type: none"> <li>• Anthony Han - 3:40</li> <li>• Andrew Hughes - 4:00</li> <li>• Rylie Moore (<i>UBC-O</i>) - 4:20</li> </ul>	<b>41</b>	<b>156</b>
<b>2</b>  <b>Ingrid Price</b>	<b>Biases, Beliefs &amp; Wandering Minds</b> <ul style="list-style-type: none"> <li>• Ka Wai (Alice) Wong - 3:40</li> <li>• Faraha Rahman - 4:00</li> <li>• Maria Stanciulesca - 4:20</li> </ul>	<b>42-43</b>	<b>157</b>
<b>3</b>  <b>Santokh Singh</b>	<b>Coefficients and Balloons!</b> <ul style="list-style-type: none"> <li>• Chieh Shan (Jason) Chen - 3:40</li> <li>• Nicholas FitzGerald - 4:00</li> <li>• Nicole Jinn - 4:20</li> </ul>	<b>43-44</b>	<b>355</b>
<b>4</b>  <b>Olga Pena</b>	<b>Asteroids and Aerobic Fitness!</b> <ul style="list-style-type: none"> <li>• Paolo Dominelli – 3:40</li> <li>• Henry Ngo - 4:00</li> <li>• Dorian Gangloff - 4:20</li> </ul>	<b>45-46</b>	<b>Dodson</b> (3 <sup>rd</sup> floor)
<b>5</b>  <b>Carrie Yodanis</b>	<b>Critical Analysis: Gender Identity &amp; Social Justice</b> <ul style="list-style-type: none"> <li>• Hazel Hollingdale - 3:40</li> <li>• Lara Maestro - 4:00</li> <li>• Devon Wong - 4:20</li> </ul>	<b>46-47</b>	<b>Lillooet</b> (3 <sup>rd</sup> floor)
<b>6</b>  <b>Judy Feng</b>	<b>Textual Analysis: Turtles, Clothing &amp; Irony</b> <ul style="list-style-type: none"> <li>• Evan Craig Pagens – 3:40</li> <li>• Erin Samuda – 4:00</li> <li>• Zachary Schoenberger - 4:20</li> </ul>	<b>47-48</b>	<b>460</b>
<b>7</b>  <b>Katherine Miller</b>	<b>Reducing Animal Distress</b> <ul style="list-style-type: none"> <li>• Alex Chiu – 3:40</li> <li>• Carly Moody – 4:00</li> <li>• Christina Tse - 4:20</li> </ul>	<b>49-50</b>	<b>461</b>



## **Concurrent Session I. > 10:30am – 12:10pm**

### **PANEL #1 – Violence & Fear: Survivors & Perpetrators – Rm. 156**

#### **Social Anxiety, Depression, and Attention Biases**

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**Presenter:** Sara Yuen, Psychology

**Faculty Sponsor:** Jennifer Trew, Psychology

Attention biases can affect how individuals respond in social situations and how those social interactions are evaluated. For people who are socially anxious, attention biases have the potential to perpetuate that anxiety. Cognitive models suggest that socially anxious people are especially attentive to social threat cues, such as negative emotional expressions (e.g. Rapee & Heimberg, 1997). This maintains social anxiety because attending only to social threats serves to confirm their fears of being negatively evaluated. Conversely, research has also suggested that individuals with social anxiety tend to avoid attending to positive and negative emotional expressions (e.g. Mansell et al., 1999). Blind to interpersonal feedback, anxiety is perpetuated as these individuals are not able to re-evaluate successful social interactions to alleviate their fears. A vigilance-avoidance hypothesis has also emerged to bridge the two views. According to Mogg et al. (1997), socially anxious patients will briefly attend to the threatening stimuli but will then avert and avoid the perceived threat. Depression is often co-morbid with social anxiety. However, the effects of depression on cognitive biases are unclear. Some research suggests that depression and social anxiety have independent effects on cognitive biases (Trew & Alden, 2009). However, Musa et al. (2003) found that depression actually had a deleterious effect on attention biases when diagnosed together with social anxiety. The present study aims to untangle the nature of attention biases in social anxiety and clarify the role of depression in these biases. Regression analyses will be used to determine whether social anxiety and depression predict attention biases, as measured by the Picture Dot Probe Task, and will also determine whether these variables interact to predict attention biases. The outcome of this study will help to clarify the nature of attention biases in social anxiety and the role that depression plays in these biases, potentially helping to inform treatments for social anxiety.

#### **Are Extremely Biased Individuals Mentally Disordered?**

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**Presenter:** Susan Kuo, Psychology

**Faculty Sponsor:** Don Dutton, Psychology

The latest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM), the model of psychiatric diagnosis used in North America, is due to be published in three years. One of the most hotly debated issues in this revision is the proposal of a separate classification for pathological bias. This disorder would encompass all types of prejudice, such as racism, homophobia, and sexism. Clinicians and researchers alike have speculated about specific characteristics of extremely prejudiced people, but there has been no attempt to integrate the various case studies and assessments of prejudiced individuals such as hate crime perpetrators. The issue at hand is whether people with significantly elevated levels of bias (deviating markedly from social and cultural norms) are actually mentally disordered. My research addresses this question through a comprehensive investigation of the current psychological research on prejudice, discrimination, stereotyping, and hate crimes. Using the criteria for mental disorders laid out by the DSM, I argue that pathological bias is a valid mental disorder, not a case of overpathologizing (when a patient is diagnosed with a disorder even though he/she doesn't have one). One aspect of my assessment compares the results of various psychiatric tests on normal subjects with those done on clinical (mentally disordered) subjects. My aim in

examining a range of psychological features in severely prejudiced people is to determine common symptoms that may characterize pathological bias, and to understand specifically what differentiates these individuals from the rest of society. It is hoped that my evaluation will open up further areas for research, while providing the groundwork for planning effective therapies tailored to treat pathologically biased individuals.

## **Terrorism and Prosocial Behaviour**

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**Presenter:** Ashley Ng, Psychology

**Faculty Sponsor:** Eddie Tong, Psychology, National University of Singapore

The September 11 terrorist attacks were a collective trauma unprecedented in American history and raised the threat of terrorism to the forefront of the international communities' consciousness. Subsequent terrorist acts, such as the bombings in Bali on October 2002, further highlighted the importance of studying the impact of terrorism in the international psyche, as it has been repeatedly shown that the horror of terrorism extends beyond America's borders. The present study explores the link between terrorism and prosocial behaviour. Prosocial behaviour refers to behaviours that benefit others and may be performed for a variety of reasons. Currently, the commonly held view is that positive experiences stimulate prosocial behaviour, whereas negative life experiences engender antisocial behaviour. However, an exclusive focus on 9/11's negative impacts would be short-sighted, as extraordinary generosity, self-sacrifice, and growth has also been found in the aftermath of terrorist attacks, as evidenced in a multitude of media reports. Several studies have documented widespread prosocial behaviour as well as increased levels of prosocial traits in the American population post-9/11. The present study examines the impact of 9/11 on prosociality through the use of priming. Prosocial behaviour was operationalized as the number of pens gathered by the participants after they were "accidentally" dropped by the experimenter, as well as their willingness to engage in future studies one week or immediately after the present study. The Bali bombing event was used to control for negative emotionality that may arise due to being primed with terrorism. Our aims in this study are thus twofold: (a) to causally demonstrate that 9/11 primes can lead to greater prosocial behavior (b) to demonstrate that 9/11 primes can influence non-Americans.

## **Societal Perceptions of Offence-Related Guilt and Blame in Mentally Ill Individuals**

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**Presenter:** Nicol Patricny, Psychology, UBC-O

**Faculty Sponsor:** Michael Woodworth, Psychology, UBC-O

The general public typically holds strong opinions of mentally ill people who have committed violent offences. For example, there are many reports in the press of people who perceive mentally ill individuals as having little remorse or guilt for their offences, or who believe that these individuals are fully to blame for their actions. However, the importance of the general public's perceptions of offence-related guilt and blame attribution in mentally ill individuals has been largely disregarded. Despite the potential pertinence that the public's views on this issue may have in some important forensic-related matters (e.g., jury selection), there has not been sufficient investigation in previous empirical studies. To our knowledge, this is the first study that examined across different mental illnesses: a) the public's perceptions of how much guilt mentally ill individuals feel for their offences, and b) how much the public attributes the blame of these offences to external sources (such as outside social pressures) and mental sources (such as poor self-control), both of which denote a lack of personal responsibility. More specifically, these beliefs and opinions were examined in regards to individuals with schizophrenia, anti-social personality disorder, and major depressive disorder. The public's perceptions were gauged by the guilt and blame attribution they assigned to mentally ill

individuals who had committed homicide (as presented in an online vignette). Our hypothesis that the public's perceptions of mentally ill individuals and their offences would vary according to the individual's type of mental illness was supported; the public perceived individuals with schizophrenia and major depressive disorder more favorably than individuals with anti-social personality disorder in terms of their guilt and blame attribution. Further, potential differences in perception within the sample across factors including the public's age and gender were also explored.

## **Rwanda Genocide Perpetrators**

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**Presenter:** Jesjiven Pannu, Psychology

**Faculty Sponsor:** Peter Suedfeld, Psychology

This study will be looking at how perpetrators of the 1994 Rwanda Genocide cope with eight psychosocial crisis thought by Erikson to represent long term personality development. The eight stages are 1. Trust Versus Mistrust 2. Autonomy Versus Shame & Doubt 3. Initiative Versus Guilt 4. Industry Versus Inferiority 5. Identity Versus Role Confusion 6. Intimacy Versus Isolation 7. Generativity Versus Self Absorption 8. Integrity Versus Despair. According to Erikson Trust, Autonomy, Initiative, Industry, Identity, Intimacy, Generativity, Integrity are termed favorable outcomes and they represent a healthy personality. Whereas Mistrust, Shame & Doubt, Guilt, Inferiority, Role Confusion, Isolation, Self Absorption and Despair represent unfavorable outcomes and indicator a unhealthy personality. Moreover, we have established standard criteria for each crisis and will be using it to analysis the testimonies for all of Erikson's stages. We do not expect to find all the of the crises in each testimonial and will be rather using the eight crises to analyze if the perpetrators have a favorable or unfavorable personality. Specifically, we will be looking at female and male perpetrator's testimonials on e\Erikson's stages to determine favorable or unfavorable outcomes to determine similarities and differences between these two groups in terms of personality.

## **PANEL #2 – Children: Language, Thought & Perception – Rm. 157**

### **Comparing Optical Flow Analysis and Looking Time Measures in Infant Studies**

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**Presenter:** Bronwyn Cass, Cognitive Systems

**Faculty Sponsor:** Laurel Fais, Psychology

With this research I investigate how bodily movement coordinates with attention, particularly in infants engaging in word-association tasks. The methods involve comparing results from traditional looking time measures and optical flow, an algorithm-based analysis. Currently we know that looking time studies reveal a significant relationship between the amount of time an infant shares gaze with a researcher in the room during the experiment, and the amount of time that they will spend looking at a visual stimulus in a switch-task style experiment in which 14 month-old infants are tested for their discrimination between the verbal stimuli “bin” and “din” paired with novel objects displayed on a screen. My research examines whether the results obtained from optical flow analysis (an algorithmic approach which uses the programming language MATLAB to measure overall movement based on video footage of the experiment) can be used to complement, supplement, or perhaps replace the results obtained from looking time studies. Optical flow analysis measures the amount of movement of each pixel in a video from frame to frame, and produces a matrix of values representing the overall movement. These values can then be visualized in the form of a graph-like figure or a flow-movie which shows only the points that move (with brightness values based on magnitude) on a black background, and can also be further analyzed statistically. The

results of this methodologically-based experiment preliminarily reveal that we can indeed achieve comparable results using these two distinct yet complementary methods. With exciting implications for infant research, my hope is to further explore the methodology to determine the extent to which the correspondence of results is possible.

## **The MP Study**

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**Presenter:** Camila Fujiwara, Psychology

**Faculty Sponsor:** Susan Birch, Psychology

This study investigates who human infants choose to learn and imitate from in the form of a behavioral experiment. We are looking to see whether a human infant's preference for a novel food item will be influenced by a model's preferences. This model will be portrayed as either having similar food preferences or opposite food preferences to that of the participant. Preference for food will be demonstrated by reaching for food items for one trial, as well as eating and displaying the appropriate facial emotions in the second trial. After demonstrating this, we will present the model with a novel food item. We would like to see whether the infant will choose to imitate the model when also presented with the novel food item depending on perceived similarity or reliability. Our experiment is part of a comparative study done with primates at the Max Planck Institute in Germany. Previous results have shown that primates do take a model's food preference into account regarding novel food preferences. We would like to see whether human infants will also show similar results, and whether there is a developmental/age milestone for this behavior. The theories underlying this study are social perspective-taking and rational imitation. Social perspective-taking concerns our ability to take different perspectives, and the understanding that other mental entities other than our own exist. This cognitive ability is thought to be not entirely species-specific, but is quantitatively significant in humans, and as a result is qualitatively significant. This has great implications in understanding how we learn through others, and why we might possibly be the only species with culture.

## **The Role of Implausibility in Children's False Belief Reasoning**

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**Presenter:** David Le, Psychology

**Faculty Sponsor:** Susan Birch, Psychology

Previous research on theory of mind, or the ability to take another person's perspective, has found that younger preschool children (3 years old and younger) have a hard time inferring the thoughts and feelings of others. One explanation for this finding is that children experience a curse of knowledge, or the tendency to be biased by their own knowledge, when they are trying to take another person's perspective. In our study, we examine whether manipulating the subjective plausibility of information provided to children reduces this curse of knowledge, and thus leads to improved perspective-taking. Previous research with adults indicates that when adults find information to be less plausible, they are less likely to experience the curse of knowledge bias. To study the influences of subjective plausibility on children's ability to perspective-take, we employed a modified version of a common test of children's perspective-taking abilities, the false-belief task. In the original task, called the Sally-Ann task, children are presented with a story or a skit in which "Sally" takes an object and hides it in a basket and leaves the room. "Ann" then moves the toy to a box while Sally is absent. When Sally returns, the child is asked where Sally will look for the toy. Children who can successfully perspective-take, will realize that Sally holds a false belief about where the toy is hidden because she was absent when the toy was moved. In our modified version, we include an implausible hiding location, a Starbucks mug. We hypothesize that younger preschool children will tend to do better at taking Sally's perspective when the toy is hidden in the Starbucks

mug than when it is hidden in another box.

## **Infants' Use of Object Kind Distinctions in Word Learning: Upright Heads Versus Inverted Heads**

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**Presenter:** Angelina Lee, Psychology

**Faculty Sponsor:** Dilys Leung, Psychology (Development Centre)

When infants hear a novel word for an object, there are two possible accounts for their initial interpretation of the word. In a previous study, Hirsh-Pasek, Golinkoff, Hennon, and Maguire (2004) found that infants could interpret novel labels as proper names that label individual objects. On the other hand, Woodward, Markman, and Fitzsimmons (1994) showed infants' understanding of new words as count nouns that are extendible to other members of an object category. Then, how do infants determine whether a novel word is labelling an individual or an instance of a kind? Our hypothesis was that infants interpret labels for people as proper names and labels for artifacts as count nouns. Preceding studies have shown that infants process an upright face configuratively, but once the face is upside down, they process the inverted face as a collection of independent features (Cohen & Cashon, 2001; Kestenbaum & Nelson, 1990). However, there is a lack of studies that look at infants' interpretation of novel object labels for inverted faces as either proper names or count nouns. Unlike with upright faces, we hypothesized that infants would treat inverted heads as artifacts and interpret a label given to an inverted face as a count noun. To explore these questions, in our first experiment, 16- and 17-months-olds were shown a video of either two different female faces or artifacts of different colours. In the second experiment condition, infants saw an inverted version of the faces from the first experiment. We labelled the first object with a novel word ("DAXY!") and examined how likely infants generalized the word to the second object ("Find DAXY!"). If infants interpret the label as a proper name, they will look longer at the labelled object. Alternately, if infants interpret the label as a count noun, they should show no preference.

## **My Comic Book is Better Than Yours! Children's Use of Property Origins to Reason Flexibly About the Individual Identity of Books**

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**Presenter:** Maryam Noghondarian, Psychology

**Faculty Sponsor:** Mijke Rhemtulla, Psychology

Researchers (Rhemtulla & Hall, 2009; Gutheil et al, 2008) have looked at children's ability to understand a single object as being both an individual (e.g. plastic toy) and an abstract character (e.g. Spiderman), with attention to how children understand and extend properties associated with one representation to other representations of the same abstract character. Studies have shown that children use the origin of a property (whether it stems from the object itself or the abstract character) to decide whether or not the property is true of another representation of the same character. These research findings have been limited to toys and fictional characters (e.g. Batman). Our question was whether 4- and 5-year-old children can reason about a property as belonging to the physical individual or abstract character in a different medium than toys: print media. Four sets of stimuli were used: books, newspapers, magazines and comic books. Each set had a target object (e.g. a book), an identical copy, a copy of a different size, and a distracter (e.g. a different book). Children saw a property drawn (e.g. a star) on the target object and heard information about the property's origin- "I drew that there" (object condition) or "that star is part of the story" (story condition). Children were then asked whether they thought the property would be present in each other object in that set of stimuli. We hypothesized that children in the object condition would not extend the property to any other object, whereas children in the story condition would extend the property to other copies of the

target object. Properties were predicted to never be extended onto distracter objects. This pattern of results would reveal that 4- and 5-year-olds show conceptual flexibility in reasoning about books as physical objects or abstract individuals.

## **PANEL #3 – Plants and the Soil They Grow In – Rm. 355**

### **The Concentration-Dependent Effects of Various Naturally Occurring and Synthetic Cytokinins on Growth of Cucumber Cotyledons.**

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**Presenters:** Luis Calderon, Cell Biology & Genetics; Alison Marshall, Plant Biology

**Faculty Sponsor:** Santokh Singh, Botany

Cytokinin is a hormone synthesized by plants that controls developmental processes, including morphogenesis, the cell cycle and cell division (Motyka et al. 2001). Cucumber cotyledons are the embryonic leaves that first appear when the cucumber seed germinates. The growth of cucumber cotyledons is aided by cytokinins, specifically by cell expansion (Chastain et al. 1981). There is little research on comparing effects of different concentrations of each individual cytokinin and to different forms. Through this idea, the effect of the optimal concentrations of synthetic and natural forms of cytokinin on light and dark grown cotyledons will be studied. With this in mind, we set out to find out which cytokinins at which concentration has the strongest effect on cotyledon and cell growth and photosynthesis. This will be done by measuring cotyledon weight and size, cell size, and by performing chlorophyll analysis and measuring photosynthetic rates to determine the contribution towards the growth. Preliminary results suggest that dark grown cotyledons do not exhibit as much growth in comparison to those grown in the light. Furthermore,  $10^{-4}$  M appears to be the optimal concentration for most cytokinins, with the exception of Thidiazuron, which has the greatest effect at  $10^{-5}$  M, and is equally effective in the dark. Upcoming results will demonstrate whether natural or synthetic cytokinins have the greatest effect on growth in relation to the photosynthetic activities. Our studies should reinforce the importance of cytokinin and photosynthetic processes on the growth of cucumber cotyledons as well as provide insight into which cytokinin is the most active in cucumbers.

### **Investigation into the Importance of Cortical Microtubules and Cellulose Microfibrils in Root Epidermal Cell Elongation and Direction Using *mor1-1* and *rsw1-1* Mutants of *Arabidopsis thaliana***

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**Presenter:** Gurpreet Dhanda, Biology

**Faculty Sponsor:** Santokh Singh, Botany

Root elongation and direction are important processes in plant development and the structural uniqueness of the plant cell wall permits root expansion and direction under hormonal control. A major structural component of cell wall architecture and function is cellulose microfibrils synthesized by cellulose synthase complexes and the allocation of these complexes constitutes the direction of cell expansion (Sugimoto et al., 2001). It was postulated that cortical microtubules could be guiding the transport of cellulose synthase complexes, but later studies by Sugimoto et al. (2003) argued against this idea. This would suggest that microtubules regulate rate and direction of root elongation by another mechanism. This proposal suggests the investigation into the possible role(s) of cellulose and microtubule synthesis/ breakdown in orchestrating root epidermal cell elongation and direction in *Arabidopsis thaliana* with the hypothesis that microtubules coordinate synthase complex distribution. To examine the importance of these cytoskeletal filaments in root formation, *mor1-1* and *rsw1-1* mutants of *A. thaliana* in conjunction with the wild-type will be used. Temperature dependence

permits the disruption of the cortical microtubule organization in *mor1-1* and the deficiency of cellulose biosynthesis in *rsw1-1* (Whittington et al., 2001, Sugimoto et al., 2001). In combination with the mutants, the chemical drugs colchicine and oryzalin, inhibitors of microtubule polymerization and DCB (2,6-dichlorobenzonitrile)-a cellulose synthesis inhibitor will be used. Little is also known about the mechanism by which hormones regulate microtubules to dictate root elongation and direction. Hence, experimentation will include the hormones auxin and gibberellin which are known to be associated with the aforementioned processes (Fu and Harberd 2003). Our preliminary results indicate that roots of *mor1-1* and *rsw1-1* mutants exhibited lower relative elemental growth rates (REGR) compared to those of wild-type *Arabidopsis* seedlings. Future analysis will use brightfield/fluorescence microscopy to examine the involvement of cortical microtubules in cell growth.

## **An Investigation into the Mechanism of Action of a Biological Control for Post-Harvest Pathogens**

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**Presenter:** Natasha Bose Roberts, Microbiology, UBC-O

**Faculty Sponsor:** Louise Nelson, Barber Arts & Sciences Unit 2 - UBC Okanagan

The soil bacteria *Pseudomonas fluorescens* isolate 4-6 is currently being studied for its use as a bio-control agent against the post harvest pathogen, *Penicillium expansum*. I hypothesize that the inhibitory action of the bacterial strain is due to compounds it exudes which are detrimental to the growth of the fungal pathogen. I will determine if such exudates are released using cultural techniques; then separate the compounds using High performance liquid chromatography (HPLC) and test each of these compounds for inhibitory effects. I will then identify the compound(s) using the nuclear magnetic resonance (NMR). This information will aid in the development of a safe biological control for *P. expansum* and other pome fruit pathogens.

## **The Influence of Nitrogen and Calcium Stress on the Growth of Green Bean Plants**

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**Presenter:** Shamsheer Sandlas, Science

**Faculty Sponsor:** Santokh Singh, Botany

In this day and age, with a constant increase in human population there is an increasing demand for producing food in greater size and quantity. A number of studies have identified mineral nutrient stress as one of the major factors limiting growth and development of plants. How does nutrient stress affect plant growth and development? There is little information in the literature about the physiological and biochemical processes that regulate growth and development of plants growing under varying degree of nutrient stress (Taiz and Zeiger 2006). To address this important question, my research will focus on investigating the effects of varying nitrogen and calcium exposure on the key physiological (photosynthesis rate) and biochemical (protein profiles and pigment levels) changes and growth in green bean (*Phaseolus vulgaris*) plants. I have selected nitrogen and calcium for my studies because nitrogen is an important constituent of many critical biomolecules (proteins, DNA, RNA) and calcium is required by the plant for its structural role in cell walls and membranes and it also plays an important role in cell signalling (Marschner 1995, Taiz and Zeiger 2006). My preliminary results indicate that nitrogen and calcium deficiencies reduce growth and green bean plants by inhibiting the rate of photosynthesis. The results on the effects of nutrient stress due to nitrogen and calcium deficiencies on photosynthesis rate, proteins profiles, chlorophyll and carotenoid levels and their relationship with the growth of green bean plants will be discussed.

## **The Polyploidy Story of Ferns**

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**Presenter:** Shing Zhan, Botany

**Faculty Sponsor:** Mike Barker, Botany

Polyploidy, the evolutionary process leading to an increase in chromosome number due to genome-wide duplication, is believed to have originated the incredible diversity of chromosome number discrepancies observed amongst extant plant species. The pattern and mechanism of chromosome number change have remained unknown due to the lack of available tools and data. Our study aims to unravel the pattern and mechanism of chromosome evolution in ferns by employing novel bioinformatics tools and evolutionary models. This involves the phylogenetic analysis of 221 fern genera and the application of a series of probabilistic models that account for various modes of chromosome evolution. Our results indicate that genome duplication events mainly occurred during early fern divergence while the cytological counts remain relatively stable since. This supports the findings of previous genome-based studies that major genome duplication events occurred early in fern evolution.

## **PANEL #4 – Health Care: From the Personal to the Political – Dodson Room**

### **At Home-Mental Health Commission**

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**Presenter:** Kulvir Kainth, Psychology

**Faculty Sponsor:** Michael Krausz, Medicine

Homelessness and Mental Health issues are often found to coincide with each other throughout a population. Previous research studies have also shown that drug abuse is common in individuals who are homeless and have received treatment for mental health issues. Shelter is an essential necessity and may affect substance abuse patterns of individuals. The AT HOME mental health commission is a randomized controlled trial in which individuals are provided housing in an attempt to alter their drug habits and improve their mental health. The hypothesis of the project is that housing for subjects will act as a supplement to treatment of drug abuse and possibly decrease drug abuse. The project monitors short term as well as long term development and improvement of mental health over a two-year span. The goal is to change an individual's mental health and stabilize it. This goal may be achieved by changing the drug pattern of an individual from a self-harming pattern to a less harmful one. Progress of Individuals is tracked through standard tests that are administered every 6 months by trained psychology professionals. The population that is being observed is homeless and mentally ill individuals from Winnipeg, Montreal, Toronto, Moncton, and Vancouver. The Centre for Health Evaluation and Outcome Science at St. Paul's Hospital is conducting the Study in Vancouver.

### **CHIUS (Community Health Initiative by University Students): Who Are We Treating and How Can We Best Meet Their Needs?**

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**Presenter:** Tamryn Law, Medicine

**Faculty Sponsor:** Peter Granger, Medicine

CHIUS is a student-run health clinic based in the Vancouver Downtown Eastside, aimed at serving the local residents of the Downtown Eastside. Through this inter-professional clinic, students are supervised by a physician and a nurse, in addition to mentors from other departments. Through a retrospective chart review, this study aimed to characterize the current population served by CHIUS.



Patients seen by CHIUS students in 2007 and 2009 will be compared to data previously gathered in prior research projects. The sample size per year is approximately 393, and 459 subjects, respectively. Data will be gathered and analyzed, including the following parameters: demographics, chief complaint, past medical history, past surgical history, etc. Through the analysis of this data, it is expected that this study will elucidate the characteristics of the complex population currently seen at the CHIUS clinic. By more clearly identifying patient needs in addition to the services CHIUS currently offers, steps can be taken to address any issues, to adequately meet these needs.

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## **Informed-Decision Making: Personalizing Medicine for Neuropathic Pain**

**Presenter:** Tenneille Loo

**Faculty Sponsor:** James Henry, Health Sciences

In all aspects of medicine, there are decisions to be made. While some decisions are easy, other decisions can be difficult. Given the burgeoning era of personalized medicine, the movement away from paternalism, and a growing emphasis on informed consent, patients are becoming more and more comfortable with having more control over their medical treatments. However, other patients have struggled to adapt to this new paradigm shift in medicine, and have advocated for the development of guidelines that would help in a patient's decision-making steps. This has been named: informed decision-making. Starting in the area of neuropathic pain, the primary goal of this project was to evaluate the current scientific literature and to determine the level and amount of research on decision aids that would aid individuals (and their family) in making their decision. Other goals included incorporating stakeholder consultations on this very personal matter and developing key terms to contribute to this relatively new area of social medicine. The preliminary results have shown that while a lot of groundwork research for decision aids has been completed, the actual decision making tools have yet to be developed for pain sufferers (specifically aiding medical and lifestyle decisions). These initial results are indicating that either this area is still new and progressing, or that there are inadequate resources to support the knowledge transfer of basic science to applications.

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## **Using Drug Biographies to Evaluate How University Licensing Practices Affect Accessibility of Drugs by Patients**

**Presenters:** Gordana Panic, Life Sciences; Linda Liu, Science; Janny Ke, Pharmaceutical Sciences

**Faculty Sponsor:** Andreas Pilarinos, Health Sciences

A significant number of drug discoveries come from university research. Universities license their discoveries to a pharmaceutical company which gains an exclusive right to research, develop, manufacture and sell the product. Unfortunately, the high prices that are placed on the final product mean that patients in Lower and Middle Income nations can not afford the drug. Nonetheless, universities are in a position to negotiate licensing terms such that the price is not a barrier to patients. Two great examples are that of Stavudine and Amphotericin B. Stavudine, an effective anti-HIV drug created in Yale and licensed to Bristol-Myers Squibb, initially cost \$10,439 per patient per year. The price was reduced to \$87 when Yale and BSM were pressured to allow for generic production. At UBC, Dr. Wasan addressed accessibility by employing equitable licensing for his oral formulation of amphotericin B, (a drug that treats 2 fatal diseases disproportionately prevalent in developing nations). His licensing deal with iCo Therapeutics requires that the new formulation be provided at cost to patients in developing nations. There are a number of licensing options but are they getting used? Are there other examples where university research and licensing policies have affected how well the drug reaches people who need them? In our project, we would like to answer these questions by creating a database of drug biographies that detail the drugs profiles, the demographics of whom

they treat and how university licensing agreements have affected or might affect their accessibility. Potentially, we could use the format in which DNDi (a research and development organization that targets neglected diseases) tracks the development of their drugs. These biographies would be useful case studies that demonstrate how university research and licensing affects accessibility. This could in turn shape equitable licensing practices and policies at universities.

## **The Consistent Prevalence of Tuberculosis in Developing Countries**

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**Presenter:** Trisha Taneja, Microbiology & Immunology

**Faculty Sponsor:** Tracy Kion, Microbiology & Immunology

The aim of this project is to try and answer the question of why (despite all efforts) tuberculosis is so dominant in developing countries while it is almost eradicated in developed countries. This secondary research presentation will explore this subject in an interdisciplinary manner, integrating the fields of microbiology and political science. The presentation will start by reviewing the history of tuberculosis and its treatment. It will also investigate the pathogenesis of *Mycobacterium tuberculosis*, the immunological responses prepared against it, and how these processes are facilitated or hampered in developing or developed countries. It will also explore various methods used by the bacterium to bypass immunological responses. As well, this presentation will take into account political factors that result in limited access to health care and medicines in developing countries, especially taking into account medicines that are required for treatment of tuberculosis. These factors will be explored within the paradigm of good governance at an international and national level. Furthermore, this presentation will also talk about result challenges that have resulted resurgence of tuberculosis, such as the advent of HIV/AIDS and the development of multi-drug resistant tuberculosis. Once again, these challenges to the eradication of TB will be talked about from an interdisciplinary perspective. Hence, this presentation will aim to consolidate knowledge from different disciplines about the long existing threat of tuberculosis. Why tuberculosis is still a leading killer in only developing countries is a question whose answer lies not only in the pathogenesis of the bacterium, but also in the political climate that facilitates the spread of the disease and allows inequalities in access to treatment technologies.

## **PANEL #5 – Power and Poverty – Lillooet Room**

### **Jobs and Power: The Political Economy of Conservation at Mount Elgon National Park, Uganda**

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**Presenter:** Connor Cavanagh, Sociology

**Faculty Sponsor:** Paal Vedeld, Norwegian University of Life Sciences

Many recent debates in environmental sociology have been centered on the socioeconomic impacts of protected areas (PAs) on the livelihoods of local people. One way to measure the socioeconomic impacts of the PA on local people is to conduct a study of job creation, job multipliers, and revenue leakage in the area. A PA whose management regime creates jobs with high job multipliers for locals and minimizes the amount of revenue which is leaked to the national and international levels can arguably be said to have a positive socioeconomic impact on the lives of local people. By contrast, a PA which primarily creates jobs for non-locals and leaks the majority of its revenue to supra-local levels can be considered to have a detrimental socioeconomic impact on the lives of locals and may therefore foster both grievances and conflict. Between June and December 2009, I worked as part of a research project for the Norwegian University of Life Sciences at Mount Elgon National Park in southeastern Uganda. My role in the project was to appraise the positive job multiplier impacts of the

national park on local economies, and to investigate how these impacts translated into pro- or anti-park narratives. To accomplish this goal, I selected a “mixed-methods” case study design, and conducted twenty-four focus group interviews, fifty key-informant interviews, and approximately two hundred business interviews. Based on this data, I calculated the amount of employment generated by the park (in person-years of labour), the number of jobs leaked to supra-local actors, and the number of park-related businesses that were non-locally owned in sample populations. The findings from these calculations contrasted sharply with official park rhetoric, and may provide interesting implications for the way in which conservation efforts in Africa are viewed.

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## **Heterogeneous Peer Effects on School Enrolment of Mexico’s Progresa Program**

**Presenter:** Kristina Hess, Economics

**Faculty Sponsor:** David Green, Economics

The human development program "Progresa" introduced in 1998 in Mexico provides cash transfers to households conditional upon their children's enrolment in school. Receipt of the transfers was found to not only have a positive impact on enrolment rates of children who receive them, but also on their peers who do not. This is attributed to "peer effects", avenues through which the behaviour of peers affect a child's own behaviour. The program design permits decomposing the observed program effects into direct and peer effects by comparing the surveyed enrolment rates of children in localities receiving program benefits and those designated as controls. While the current literature imposes homogeneity on these peer effects in the sense that all peers are assumed to have an equal influence on an individual's behaviour, this paper investigates whether children are influenced more strongly by peers who are similar or different to themselves.

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## **Microfinance and Poverty Alleviation**

**Presenter:** Bahareh Mahmoodi, Economics

**Faculty Sponsor:** Catherine Douglas, Economics

Microfinance is a financial service for the poor and it mainly exists in developing countries with the unique technique known as group lending. Group lending means offering a loan to a group of people by MFIs, therefore, borrowers are jointly liable for loans. Group members screen each other's repayment ability, which is called adverse selection; also monitor each other, which lessens moral hazards. Microfinance allows the poor to have access to financial services, make investments and establish or improve their businesses as a result increase their income. MFIs also offer not only financial services but also trainings that enable borrowers to increase their productivity. Borrowers also learn how to deal with shocks and smooth their consumptions. As a result, MFIs help poor to increase their income, consumption and productivity, which contribute to lowering inequality and economic growth. Growing popularity and importance of microfinance draw scholars' attention. There is a wide range of literature on microfinance, its impact, its diverse services and its goal to combat poverty by reaching poor households. However, adequate empirical test of theory and impact evaluation remains a challenging task because of limited good quality, the difficulty to design an appropriate methodology and comparable data. Some studies have inconsistency in their results and misleading conclusions about benefit of microfinance because of non-random placement of MFIs, non-random selection of borrowers, difficulty to identify control and treatment groups and endogeneity. As a result the evidence is mixed, biased and subject to various critiques. Most studies show that MFIs and micro-credit programs have noticeable impacts on people's lives. As Shahudur Khandker says, "microfinance should not be considered a panacea for reducing poverty or reaching poor women." Microfinance is simply a tool to help poor people and provide them with opportunities to generate income.

## **Providing the Poor with Access to Credit: A Case Study from Swaziland**

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**Presenter:** Heather Sarsons, Economics

**Faculty Sponsor:** Siwan Anderson, Economics

In this presentation, I analyze the structure of a savings and credit program implemented by SOS Children's Villages, a non-governmental organization in Swaziland. SOS Children's Villages targets female-headed and child-headed households with the aim of improving the wellbeing of children who have been orphaned by HIV/AIDS. In the past, SOS's role has been that of a welfare provider, delivering food packages and paying for children's school and medical fees. It is now, however, trying to assist beneficiaries in becoming self-reliant by helping them to start "income-generating projects" that will provide the families with a steady source of income. To provide beneficiaries access to credit for purchasing capital, SOS is establishing a savings and credit program in four of its target villages. Beneficiaries within each community open a joint savings account where set, monthly contributions accumulate and earn interest. Members eventually begin to borrow the funds to start their project, repaying the loans within the course of 6 months to a year. The program has, however, been suffering from high default rates on savings payments which consequently affects the number of loans that can be issued. I use survey data to analyze the structure of the program and the incentives that the rules governing membership, savings, and loan repayment create. I argue that, given the beneficiaries' financial situations, preferences, and perception of risk, the structure of the current program does not provide members with adequate incentives to save and repay loans. The program's rigid savings structure leaves many members unable to make savings payments while the benefits of the program are realized too far into the future to make joining worthwhile. I conclude by comparing the program to alternative savings programs, evaluating them in terms of efficiency, equity, and financial sustainability.

## **Improving Livelihoods of Orphans in Mgeta, Tanzania Through Community-Based Action Research**

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**Presenter:** Tiffany Tong, Global Resource Systems

**Faculty Sponsor:** Cassandra Bergstram, Noragric, Norwegian University of Life Sciences

This research endeavour was aimed at improving upon a dairy goat project for orphans in the villages of Nyandira and Ndugutu in Mgeta, Tanzania. Conducted for a development initiative named "Programme for Agricultural and Natural Resources Transformation for Improved Livelihoods (PANTIL)," over a period of six weeks, I collected qualitative data using an action-based research approach in hopes of catalyzing a successful implementation process. The results indicate that the orphan-goat project can provide both immediate and enduring assistance to the orphans; however, the project needs much more community support. At the end of my fieldwork, many stakeholders have agreed upon establishing institutions to ensure a fair, accountable, and efficient process of distributing benefits from the project to the orphans. Concrete short- and long-term goals and a timeline for implementation are set. Financial sustainability is found to be possible without additional funding. Finally, risks and corresponding mitigating strategies have been discussed with the project steering board so that future problems can be anticipated and avoided.

## **PANEL #6 – Race and Immigrant Experiences – Rm. 460**

### **Setting New Boundaries: A Case Study of the MY Circle Action Team and its Relationship to Immigrant Youth Integration**

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**Presenter:** Parmis Behmardi, Political Science

**Faculty Sponsor:** Priya Kissoon, Geography

Increasing flows of migration presents both challenges and opportunities for receiving countries (Castles and Miller 2009; Ray 2002). In light of this trend and the resulting consequences, scholars have given greater attention to studying how migrants adapt to the receiving country in order to understand their experiences of integration (Van Ngo 2009; Berry 2001; Berry et al 2006). A majority of research has focused on identifying the linguistic, social and cultural challenges faced by immigrant children or adolescent newcomers but has not sufficiently addressed the needs of young adult newcomers (Van Ngo 2009; Anisef and Kilbride 2003). An interest in understanding the difficulties faced by immigrant and refugee young adults of the Vancouver community led to discussions with members of the MY Circle Action team who are all graduates of the Immigrant Services Society of BC's MY Circle Program. This project seeks to understand the extent to which the activities and projects undertaken by the team have helped define their experiences of integration and assisted the broader immigrant and refugee youth population. This research will be conducted using qualitative methods. Data collected from grey literature and internal documents requested from the MY Circle Action team will be coded thematically and analysed accordingly. Ultimately, the goal of this project is to contribute one first small step to understanding the role of such initiatives and their capacity to help young adult newcomers develop the necessary skills to thrive in and contribute to their new homeland.

### **Italians in the Thompson/Okanagan and West Kootenays Between the 1880s and 1920s**

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**Presenter:** Erik Christiansen, International Relations, UBC-O

**Faculty Sponsor:** Maury Williams, History, UBC-O

The majority of research concerning Italian immigration to Canada typically focuses on eastern provinces such as Ontario and Quebec. However, Italians came to British Columbia's Thompson/Okanagan and Kootenay regions, primarily during the mid to late 19th century, and played an instrumental part in the province's developing economy and culture. Though information regarding Italian employment and settlements in British Columbia has been addressed to a limited extent, the details surrounding their everyday lives as unskilled laborers and newcomers in the province's smaller communities still needed to be examined. As part of the broad field of cultural history, my project aimed to uncover the day-to-day experiences and challenges Italians faced during their integration into several communities of British Columbia's interior, while serving also as a model for future research projects regarding British Columbia's heritage.

### **The Implicit Association of Race in Canada**

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**Presenter:** Zosia Kossowski, Psychology, UBC-O

**Faculty Sponsor:** Paul Davies, Psychology, UBC-O

My research is focused on implicit attitudes about Black Canadians. Previous research in the United States has shown a strong implicit association between Black Americans and Great Apes. We tested Canadian students as part of a worldwide study to find out if this relationship exists in other cultures.

First, students participated in an Implicit Association Task (IAT), a computer task designed to measure implicit attitudes. Students were measured on their speed while categorizing black and white faces, as well as words related to Great Apes or Big Cats, into two categories. For example, students were instructed to “Press 1 for Great Apes or Black Faces” and “Press 9 for Big Cats”. The animals were always in the same category, but the category and colour of face was different in each of four blocks. After the IAT, participants were given a questionnaire which asked for general demographic information, explicit attitudes towards different ethnic groups, and general beliefs about these groups. In the results, we found an implicit association between Blacks and apes did exist. Participants performed significantly faster in the block where Black faces and apes were categorized together than in any other block. Because Black faces were not significantly associated with cats, we concluded that the association is specific to apes and not just to Africa in general. Because White faces were not significantly associated with apes, we concluded that the association is specific to Black faces, and not just humans in general. There was also no significant association between White faces and cats. In addition, there was no significant correlation between a strong Black-Ape association and any of the demographic or explicit attitude information we collected. This indicates that the Black-Ape association does not appear to be predicted by explicit measures of racism.

## **Who Works Behind Your Local Tim Hortons Counter? An Examination of Immigrant Deskilling**

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**Presenter:** Jasmine Luk, Sociology

**Faculty Sponsor:** Jennifer Chun, Sociology

According to Statistics Canada’s 2006 Census, immigrants make up approximately 40% of residents in Vancouver and one-fifth of Canada’s total labour force. The level of education among immigrants has been increasing since the 1950s and 83% of immigrants in Vancouver hold a certificate, diploma, or degree in 2006. Interestingly, immigrants are more likely to have a university education than their Canadian-born counterparts in 2006. However, existing research finds that an immigrant’s level of education does not serve as an accurate predictor of labour-market performance. Instead, immigrants earn noticeably less than their Canadian-born counterparts and are likely to be unable to catch up for their entire lifetime. The process where an individual faces downward employment mobility and a devaluation of skills and/or experiences upon migrating to another country is generally known as immigrant deskilling. Some commonly cited reasons for immigrant deskilling include: a lack of English proficiency, a devaluation of past credentials and work experiences, a loss of social networks, and a lack of cultural capital that is necessary for integrating into the mainstream society as well as labour force. For my Honours project, I am qualitatively examining personal accounts of deskilling experienced by immigrants employed by Tim Hortons in the greater context of regional and national statistics. To do so, I am conducting semi-structured interviews with immigrants who have attained post-secondary education in their country of origin and are currently working at the establishment. Tim Hortons was chosen for my research because immigrants are more likely to be employed in the food services industry than those who are born in Canada, and it is the largest publicly traded fast-food restaurant chain in Canada. Ultimately, I hope to develop a more comprehensive understanding of immigrant deskilling in food sectors such as Tim Hortons by providing qualitative analysis in supplement of existing empirical research.

## **Inside the Mosaic: South Asian Youth's Perceptions of their Post-Secondary Education**

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**Presenter:** Pavandeep Pamela Toor, Sociology

**Faculty Sponsor:** Dan Zuberi, Sociology

Immigration and the settlement process has always been a topic of debate both in academic, policy and common discourses. Recent research in the field has shifted to exploring the process of integration not only among immigrants but also second-generation youth. For example, the youth's level of education is one of the measurable outcomes being used as a gauge the social mobility of larger ethnic and cultural groups. Although more and more Canadians now possess a university degree, controlling for other factors, certain second-generation youth, such as Chinese and South Asians Canadians, have rates between 2-3 times higher than Canadian average. Many scholars have linked these rates to quantifiable measures such as income, parental educational level or even cultural institutions, but little research exists on how this complex mix of factors impact individual actors. Therefore, this project intends to take a qualitative approach to explore how these various social factors shape individual South Asian youth's decision and experiences in a university environment. Uncovering these factors can assist in not only providing a richer understanding of the higher education rates for South Asians, but may also shed light on some of the gaps in educational attainment between different Canadian ethnic groups.

## **PANEL #7 – Reproductive Issues – Rm. 461**

### **Genetic Approaches to Distinguishing Reproductive Ecotypes in Wood Lake Kokanee Salmon (*Onchoryncus nerka*)**

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**Presenter:** Christine Braun, Biology, UBC-O

**Faculty Sponsor:** Michael Russello, Biology, UBC-O

Two reproductive ecotypes, shore and stream spawning, of kokanee salmon (*Oncorhynchus nerka*) exist in Wood Lake, British Columbia, a popular angler lake in the Okanagan. Shore and stream spawners differ in a number of ways including spawning date and location. Stream spawning kokanee show very distinct sexual characteristics such as hooked jaws and bright red colouration. Genetic variability in the two reproductive ecotypes in Wood Lake was investigated using microsatellite markers. The markers were used to determine differences between and within populations of kokanee in Wood Lake and if they showed similar population structure and variability as the previously studied Okanagan Lake populations. These markers were then used to examine if they exhibited similar outlier behaviours that were detected in Okanagan lake populations. An outlier locus is locus that deviates from neutral expectations and could potentially point to an area on the genome that is under selection. The markers were also used to determine if they were effective tools in individual assignment and estimating relative ecotype abundance in Wood Lake. It was found that loci used in the Wood Lake populations followed the same outlier behaviour as the Okanagan Lake populations. High levels of within population molecular variance were detected using differences in individuals at each of the microsatellite markers (95%) and two distinct populations were identified between the Middle Vernon Creek and Wood Lake samples. In regards to the effective use of the markers, there was 95% assignment accuracy in assigning individuals to the correct ecotype. It was also found that there are three times as many shore spawning kokanee as there are stream spawners in Wood Lake. This information can be used in further studies to detect differing patterns in similar populations of salmon and help to more accurately monitor population sizes.

## **Singing Toward Speciation: Bird Vocalizations in a Warbler Hybrid Zone**

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**Presenter:** Haley Kenyon, Zoology

**Faculty Sponsor:** Darren Irwin, Zoology

Identifying the mechanisms behind the formation of new species will help us to understand and appreciate the diversity of life on earth. Hybrid zones, or areas in which divergent taxa come into contact and interbreed, are considered to be “natural laboratories” where we can learn about how new species form. A hybrid zone between MacGillivray’s warblers (*Oporornis tolmiei*) and Mourning warblers (*O. philadelphia*), two closely related bird species, was recently discovered in northeastern British Columbia along the eastern foothills of the Rocky Mountains. These two species are very similar in appearance, but differ in several distinctive characteristics, most notably in the location of their breeding grounds; Mourning warblers breed to the east of the Rocky Mountains, while MacGillivray’s warblers typically breed to the west. In this study I test whether song, a strong signal in mate recognition in birds, is important in generating and maintaining barriers to reproduction between these two species in areas where they co-occur. To do this I analyzed field recordings of individuals of both species from within and outside of the hybrid zone. Digital recordings were analyzed for a number of quantitative song characteristics using sound analysis software. I then correlated this song variation with morphological and genetic data for each individual. I predict that if birdsong does play a role in maintaining reproductive isolation in this hybrid zone, then I will observe an association between a bird’s genetic profile and the song that it sings. By combining this data with research on similar contact zones that occur in the same area, this research will hopefully contribute to a broader understanding of the forces that are important in the formation of new species.

## **Inducing Reproduction in Captive Wolf Eels (*Anarrhichthys ocellatus*) via Implantation of a GnRH Hormonal Pellet**

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**Presenter:** Sean Kuling, Centre for Aquaculture & the Environment, Land & Food Systems

**Faculty Sponsor:** Shannon Balfry, Centre for Aquaculture & the Environment, Land & Food Systems

Populations of commercial finfish have been dramatically reduced over the past century due to irresponsible fishing practices and environmental degradation. Insufficient knowledge of species’ migratory routes, inter-specific relationships, and reproduction has prevented sustainable fish harvesting. It has been suggested that aquaculture (fish farming) could play an important role in conserving wild fish populations, while allowing humans to continue consuming diets rich in fish. Many aquaculture systems rely on capturing juvenile fish from the wild; a process that can damage food webs within marine ecosystems. Achieving captive reproduction in farmed fish has the potential to reduce the strain on wild fish stocks. Restoring natural behaviours such as reproduction in captive fish can be done by improving environmental factors, and by a process known as hormone supplementation. Gonadotropin-releasing hormone agonists (GnRH) are effective at raising testosterone levels and inducing ovulation (release of eggs) and spermiation (release of sperm). These hormone injections have previously been shown to synchronize spawning events and promote larger clutch sizes (more offspring). Understanding how to control spawning times and increase reproductive yields could bring aquaculture from the research level to the level of industry. In this study, the technique of hormone supplementation was utilized on a male wolf eel (*Anarrhichthys ocellatus*). Captive reproduction in this species has rarely been successful. The specimen was injected with a 150 µg sustained-release GnRH pellet and then placed in a tank with a pregnant female wolf eel. Courtship behaviours led to a fertilized egg mass appearing ten days after implantation of GnRH. The egg mass was quickly removed from the tank and incubated at the Vancouver Aquarium. Maturation of the egg mass and the emergence of viable offspring will demonstrate a degree of experimental success.



## Manipulation of Endometrial Gene Expression in Cows Through the Use of GnRH

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**Presenter:** Tehya Read, Animal Science, Land and Food Systems

**Faculty Sponsor:** Nina von Keyserlingk

Pregnancy rates in lactating dairy cows have declined and are a concern to the dairy industry. Uterine environment plays an important role in early embryo development. GnRH (Gonadotropin-releasing hormone), a neurohormone produced by the hypothalamus, is currently used post breeding to increase pregnancy rates in cows. However, whether it plays a role in uterine development is not clear. Therefore we used an in-vitro model to examine the effect of GnRH treatment on the mRNA expression of candidate genes in the inner membrane of the bovine uterus, the endometrium. This was done using real-time polymerase chain reaction to amplify and quantify the expression of the candidate genes. The results of this study will be beneficial to understand the underlying mechanism and for the potential application of GnRH post-breeding to increase pregnancy rates in lactating dairy cows.

## Spawning Behaviour and Neurosteroid Synthesis in Zebrafish

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**Presenter:** Whitney Rotzien, Biochemistry, UBC-O

**Faculty Sponsor:** Bruce Mathieson, Biology and Geography, UBC-O

My research was on how waste water contaminants release estrogenic compounds into lakes, rivers and streams and how this can potentially affect different species of fish. The effects of these compounds are known as endocrine disruption. To study endocrine disruption in fish we looked at neurosteroid synthesis and spawning behavior in *Danio rerio* (zebrafish). We used two estrogenic compounds: estradiol and coprostanol. A pair (male and female) of fish were exposed to a specific amount of these compounds in 2.5L tanks for a period of three days. Their spawning behaviour was digitally recorded each morning during the 72 hour period. On the third day the fishes were sacrificed and their brain tissue was removed. By extracting the RNA from the brain tissue and performing various genetic techniques such as cDNA synthesis and PCR, the effects of endocrine disruption on proteins in the brain responsible for neurosteroid synthesis was observed. By changing the regulation and activation of enzymes in the brain upon exposure to estrogenic compounds, the production of neurosteroids and potentially spawning behavior in each male and female pair is affected.

## **Concurrent Session II. > 2:10 – 3:30pm**

### **PANEL #1 – Gold, Copper and Other Metals - Rm. 156**

#### **New Bifunctional Chelator for Cobalt, Copper, and Rhenium**

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**Presenter:** Scott Yi-Heng Lin, Chemistry

**Faculty Sponsor:** Chris Orvig, Chemistry

Radiopharmaceuticals have many applications in medical imaging, therapy, and drug development. The design of these agents involves coordination chemistry of a radioactive metal core with a ligand system that determines the stability and destination of these compounds *in vivo*. Bifunctional chelators (BFC), which can serve as a linker between the radioisotope and the targeting vector, have gained widespread interest as they provide an attractive design in creating target-specific radiopharmaceuticals. Factors taken into consideration when designing an ideal BFC include thermodynamic and kinetic stability, and BFC that satisfies both criteria can enhance localization of the radioisotope and minimize intoxication due to dissociation of metal *in vivo*. Two structural designs are possible for a BFC: it can be either have a cyclic or an open-chain structure. While previous findings favour the use of cyclic structures, our group has recently designed a novel open-chain BFC that can be radiolabelled with gadolinium with fast kinetics and good stability. In continuation of this success, the goal of the current project is to synthesize a new BFC that would be suitable for cobalt, copper, and rhenium, all of which have potential application in medical diagnosis and therapy. Once this BFC is synthesized and characterized, it will be conjugated to biomolecules to confirm its ability as a BFC. Binding experiments will then be done to study the coordination of both conjugated and non-conjugated BFC to the metal core. The result of this project will expand the current library of BFC for the three metal ions, and provide a candidate for the development of new target-specific radiopharmaceutical agent.

#### **Polymethacrylates Containing Transition Metals**

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**Presenter:** Chris Rock, Chemistry, UBC-O

**Faculty Sponsor:** A. Abd-El-Aziz, UBC-O Provost/Chemistry

Several polymers (compounds with large numbers of repeating subunits) were synthesized to contain both iron and cobalt. This was accomplished through a series of reactions that extend the length of the monomers (a single unit) to build the polymers. Within the monomer chain, several functional species are incorporated. These include a ferrocene iron species, a carbon-carbon triple bond that can be used to attach the cobalt species and a functional group that allows for the polymerization of the monomers. Polymerization was carried out via a radical (single electron) initiator known as AIBN. Different amounts of AIBN were used in order to maximize both the size of the polymer and its uniformity. Post polymerization, a cobalt species is added to the carbon-carbon triple bond in order to increase the metal content of the polymer. In addition to work done on this type of polymer, preliminary work was done on polymers containing varying numbers of cationic (positively charged) iron species. The size and uniformity of these polymers was determined using gel permeation chromatography, a technique that separates polymers based on their weight. Each compound, monomer and polymer that was synthesized was identified using analytical techniques.

## **Controlled Radical Polymerization Initiated by a Cobalt Alkyl Complex**

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**Presenter:** Roger Sherwood, Chemistry, UBC-O

**Faculty Sponsor:** W. Stephen McNeil, Chemistry, UBC-O

The utilization of metal-containing molecules in modern industry and synthetic chemistry is extensive and fascinating. One application of transition metal complexes is in the regulated production of polymers, which are large molecules with repeating subunits that are ubiquitous in our everyday lives (e.g. Polypropylene, Styrofoam, PVC, etc.). Some square planar cobalt complexes have demonstrated the remarkable ability to facilitate and regulate the production of polymers, and this is accomplished at the molecular level by trapping and releasing a propagating polymer through a process known as cobalt mediated radical polymerization (CMRP). By using transition metal compounds, polymers can adopt specific ordered forms and topologies that ultimately result in desired macroscopic properties, such as strength or flexibility. Since conventional methods for initiating radical polymerization involve starting materials that are dangerous and potentially explosive, research into a new and safer approach to an already widely recognized method of polymerization would be beneficial, and I ultimately hope to eliminate the need for dangerous radical initiators in polymerization reactions.

## **Gold Extraction & Thiosulfates**

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**Presenter:** Dapinderpal Kaur Toor, Materials Engineering

**Faculty Sponsor:** David Dreisinger, Materials Engineering

Gold is the largest precious metal commodity market in the world, with values increasing steadily. Because of this, research in to improving gold extraction is desirable. Currently, cyanide is primarily used to extract gold, however, it is hazardous to the environment and is not efficient. In order to improve gold extraction, thiosulfates are being tested to determine the reaction mechanism, efficiency, advantages and disadvantages.

## **PANEL #2 – Degradation of the Nervous System - Rm. 157**

### **Ch Interaction between U24 Protein from Human Herpesvirus 6 and Tcell Membrane Protein**

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**Presenter:** Yi-shiuan (Frances) Lin, Chemistry

**Faculty Sponsor:** Suzana K. Straus, Chemistry

Myelin plays an essential role in the insulation of nerve axon where it acts to increase the rate of conduction between nerve cells. Autoimmune degradation of myelin is a typical symptom found in Multiple Sclerosis (MS). Possible causes of MS arise from genetic or environmental (possibly viral) factors. Research has shown Human Herpes virus type-6 (HHV-6) to be associated with at least a subgroup of MS patients. Although the exact mechanism is not known, viral infection may play a role in the pathogenesis of MS potentially through the mechanism of molecular mimicry. The concept of molecular mimicry is that if foreign proteins such as viral particles present in our body and they share structural or sequential similarities with self-proteins, degradation of self-protein and tissue damage such as demyelination could be observed due to the action of our immune system. Myelin Basic Protein (MBP), important in holding myelin together, share similar sequence with U24, a protein isolated from HHV-6. Under normal condition, phosphorylation of MBP allows the integrity of the myelin to be maintained by blocking the action of protease; however, previous MS patient studies and MS mouse model have shown that there was much less phosphorylation detected.

Moreover, studies have shown that more than half of the T cells could be activated and cross-reacted with a synthetic peptide corresponding to U24 from HHV6-B. However, reports suggest the role of HHV-6 variant, HHV-6A in multiple sclerosis. Therefore, our goal is to study the interaction between HHV-6A U24 protein and T cell membrane/cellular protein. To confirm the interaction, we will first isolate and purify U24 protein from HHV6A strain. Then, several amylose-resin pull down experiments will be performed with T cell. Finally, the interaction will be identified using mass spectroscopy.

## **The Role of Brain High Density Lipoproteins in Facilitating $\text{A}\beta$ -Amyloid Degradation**

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**Presenter:** Sharon May, Pathology and Laboratory Medicine

**Faculty Sponsor:** Cheryl Wellington, Pathology and Laboratory Medicine

Alzheimer's disease (AD) is the most common cause of senile dementia affecting approximately 10% of persons over the age of 65 and 40% of persons over the age of 80. One of the hallmarks of AD is the presence of brain plaques which contain unlipidated apolipoprotein E (apoE), a major lipoprotein found on high-density lipoprotein (HDL) also known as "good cholesterol". Lipidated apoE has been shown to be involved in the breakdown of brain plaques and therefore has therapeutic applications to AD patients. By using a synthetic reconstituted HDL (rHDL) which uses the lipidated apoE pathway, we have been able to reduce major components of brain plaque in cell culture. These findings suggest that the apoE pathway can be therapeutically targeted in treatment for AD.

## **Brain Network Connectivity Dynamics in Adults with Down Syndrome**

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**Presenter:** Nadya Moiseeva, Earth and Ocean Sciences

**Faculty Sponsor:** Naznin Virji-Babul, Down Syndrome Research Foundation

Down syndrome (DS) is a genetic condition resulting from the presence of an additional entire or partial copy of chromosome 21 resulting in a disruption of many aspects of cognitive and sensory-motor development. Structural brain imaging studies have previously indicated that there are significant differences in the architecture of the brain in DS, however there are considerable gaps in our understanding of the functional significance of these differences and in particular how these differences relate to the dynamics of basic sensory-motor processes. The objective of this work was to study cortical brain activity during voluntary movements in a group of adults with and without DS. It has become long known that normally developed brain cortex is wired in a contralateral manner, i.e. right side of the body is connected to left side of the brain and vice versa. This fact has become trivial to both neurophysiologists and neuroscientists. This study, however, has shown that approximately half of adults with DS exhibit ipsilateral (same side) activation in the brain while performing a motor task. Brain activity was recorded using a magnetoencephalography system (MEG), located at the Down Syndrome Research Foundation in Vancouver. This imaging system is quite unique and available at only three locations throughout Canada (Vancouver location also being the only one on the west coast of North America). It enables visualization of changes in magnetic fields created due to brain activity and provides an invaluable insight into the nature of neurophysiologic differences between DS and typically developed adults.

## Modeling Inflammatory Reactions Relevant to Neurodegenerative Diseases

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**Presenter:** Sydney White, Biochemistry, UBC-O

**Faculty Sponsor:** Andis Klegeris, Biology, UBC-O

Inflammation is an important element of neurodegenerative conditions like Alzheimer's disease (AD) and Parkinson's disease (PD). During the inflammatory process, nicotinamide adenine dinucleotide phosphate-oxidase (NADPH oxidase) is often activated, and triggers the release of reactive oxygen species (ROS). An excess of ROS from NADPH oxidase can contribute to the detrimental effects of neuroinflammation by damaging surrounding cells. Activated NADPH oxidase is found in the brains of AD patients, while NADPH oxidase is upregulated in the brains of PD patients. It has also been reported that NADPH oxidase produced radicals are part of the damage induced by amyloid-beta ( $A\beta$ ), a hallmark of AD. Hence, antioxidant compounds capable of decreasing ROS production could be beneficial in AD and PD. To measure the antioxidant abilities of various compounds, a chemiluminescence assay was modified from existing methods to better model neuroinflammatory conditions like AD. The human immune cell (HL-60) was used as model cell and the bacterial peptide N-Formyl-L-methionyl-L-leucyl-L-phenylalanine (fMLP) was used on HL-60 cells to activate NADPH oxidase and stimulate the production of ROS. Using chemiluminescence, the production of ROS by HL-60 cells after fMLP stimulation was measured. The fMLP receptor formyl peptide receptor 1 (FPR-1) also acts as a receptor for  $A\beta$ . Compounds with antioxidant properties were able to reduce the amount of ROS present. The effects of novel pyrazolyl-2,4-thiazolidinediones, dipyrazole ethandiimides, dipyrazole diamide, and methyl pyrazolo[3,4-d] pyrimidine esters were tested. Several of these compounds were found to effectively inhibit ROS production. This effect is postulated to be based on either radical scavenging (rendering ROS inactive), or the inhibition of NADPH oxidase assembly and activation.

## PANEL #3 – Interdisciplinary Applications of Evolutionary Theory – Rm. 355 (*special times for this panel*)

### To What Extent Does Cultural Evolution Influence Genetic Evolution?

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**Presenter:** Ashley Smith, Biology

**Faculty Sponsor:** Santokh Singh, Botany

Cultural evolution is well established in humans, and support for its occurrence in other vertebrates continues to grow. In humans, cultural evolution has been occasionally known to effect genetic evolution, such as in the retention of lactase activity into adulthood in dairy using cultures. Little attention has been paid to the possibilities of cultural influences on animal evolution; however there are several examples in which culture may play a role in population genetics. In one case, a pair of species of Darwin's finches which have the ability to hybridize appear to maintain relative genetic isolation due to the learning of song in mate choice. In another, beneficial cultural traits which are passed on matrilineally may explain low genetic diversity in several whale species. Cases such as these might be better equipped to answer questions on how culture effects evolution than circumstances involving humans, as animal culture tends to be less complex, and in some cases very well studied. To this end, I plan to examine specific instances of animal cultural evolution effecting genetic evolution, and look for trends in why cultural evolution and genetic evolution interacted in each case. This involves examining two major questions: why did the cultural trait become widespread in the population, and how did it in turn affect the genetic evolution of the population? My preliminary research findings indicate that culture affects genetic evolution largely by changing a population's ecological niche – sometime expanding it and sometimes constraining it. A critical examination of the answers to these questions across a wide variation of vertebrates will allow me to

suggest some general criteria for a cultural trait to affect genetic evolution.

## **How Memetics Can Inform Cultural Anthropology**

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**Presenter:** Charlene Wong, Anthropology

**Faculty Sponsor:** Santokh Singh, Botany

Some researchers have proposed that a culture is made up of smaller units called memes, akin to how an organism is composed of genes. Because researchers have not yet agreed on a working definition of what a meme is, the definition I will be using is: memes are patterns in neural networks, akin to how genes are patterns in DNA. Other definitions have included vague references to information and ideas stored in brains, which must replicate, but these definitions do not point to any observable physical matter that can be tested empirically and assume if a meme exists, it must replicate in a similar manner to genes. Before genetics, researchers thought hereditary traits were blended in offspring through some vague, overarching mechanism—like culture is thought of at present. Researchers define a sequence of DNA as a gene when they knock it out and observe an effect in its absence. While it would be more difficult to knock out a meme from someone’s brain, I argue using literary review that we can postulate the process of memetic replication by explaining how memes blend (recombine) for imaginative and creative purposes within one person’s head, and mutate between heads during communication errors—which is the opposite of how genes recombine (between organisms) and mutate (within an organism). The explanatory power of memes lies beyond reduction; memetics can inform cultural anthropology by the provision of a proximate causation in addition to the ultimate cultural explanation by which anthropologists are already familiar.

## **Not Everything is an Adaptation: Applications of Neutral Evolutionary Models Outside Biology**

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**Presenter:** Yana Eglit, Botany

**Faculty Sponsor:** Santokh Singh, Botany

Academic disciplines tend to focus on elite groups of particularly charismatic topics. Evolutionary biology traditionally favoured animals; a particularly bizarre offshoot in the world vastly dominated by unicellular lifeforms, thereby not particularly representative of the general mechanisms of evolution. The integration of microbial and molecular evolution has brought some paradigm shifts to biology, such as the neutral theory of evolution (Ohta 1992 *Annu Rev Ecol Syst*). However, the popularized version used outside biology remains predominantly zoocentric. Much of “traditional” evolutionary theory, as applied outside biology, tends to focus on heavily selectionist explanations, especially for instances of increased complexity. In evolutionary biology, it is becoming evident that not all increased complexity is adaptive (eg. Stoltzfus 1999 *J Mol Evol*; Lynch 2007 *PNAS*), and it would be interesting to extend this paradigm shift to areas of applied evolutionary theory, such as linguistic and cultural evolution. For example, it has been known in biology that the effective population size impacts the selective “tolerance” in a system, placing heavier pressure on efficiency when these populations are larger, as in prokaryotes, and exhibiting greater lenience in smaller populations, promoting the evolution of cumbersome lifeforms such as mammals (Lynch 2007 *PNAS*). A recent study (Lupyan & Dale 2010 *PLoS ONE*) found a tendency for small isolated (esoteric) languages to exhibit higher morphological complexity than their exoteric counterparts. I would like to explore this phenomenon using effective population size, in conjunction with or as a replacement of some explanations offered in the paper, such as simplification by bilingual speakers. I intend to examine these and other case studies in attempt to examine whether the application of neutral evolutionary models can aid our understanding of non-biological evolution. It is evident that

strictly selectionist explanations are insufficient to explain non-biological evolutionary phenomena, which may benefit greatly from a more pluralistic approach.

### **To What Extent Does Imitating Biological Evolution Benefit Genetic Algorithms?**

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**Presenter:** Scott Newson, Cognitive Systems, Science

**Faculty Sponsor:** Santokh Singh, Botany

Genetic algorithms are a set of computer algorithms that have been inspired by biological evolution [Holland, 1975]. They have been used in applications from engineering [Koza, 1992] to creative design [Thorp, 1992], and emulate biological mutation, fitness-based selection, and populations. Over the years, the benefits provided by emulating biology have been debated. For example, the inclusion of sexual recombination, which is a part of nearly all plant and animal reproduction, drastically degrades the performance of genetic algorithms [Banzhaf et al, 1998] and still does not have a sound computational explanation in biology (R. Redfield, personal communication, February 4, 2010). On the other hand, biological evolution has been able to produce functional solutions to many different environmental conditions, suggesting that there is still something to learn from it. The existing literature on genetic algorithms would allow a reviewer to explore which aspects of biological evolution are worth emulating, and which have been unhelpful to the field of computer science. By summarizing the state of the art of genetic algorithms - and comparing that with an introductory understanding of biology - I hope to: describe several mechanisms of biological evolution, discuss how they transfer to genetic algorithms, and present a simple comparison of which seem useful in computer science. In general I hope to address the question: To what extent does imitating biological evolution benefit genetic algorithms?

### **An Autopsy of “Thorn”**

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**Presenter:** Peter Wessendorf, Linguistics

**Faculty Sponsor:** Santokh Singh, Botany

While many people have written about the changes that occurred in English, not nearly so many have written about the mutations in the writing. Of these, only a very few have discussed the adoption and abandonment of particular characters. The letter thorn, which started out as a representation of the sound in modern English modeled by the “th”, is a perfect example of such a case. The question is, why would English start using this symbol amidst the otherwise Roman alphabet, only to stop using it a couple centuries later? The first step toward answering this question will be to look at the dates during which thorn was used. These can be established fairly easily by examining texts, so as to find its first appearances and its final appearances in the English language. Once these are known, examining the culture and language of the time should be indicative of the rough context in which the thorn was preserved; once these have been established, I would only need to find a set of factors that were lost at roughly the same as the thorn in order to suggest a conclusion about its reasons for disappearance. Such factors would include prestige of the “standard” Roman alphabet (without the thorn), increasing numbers of Christians in a population, and increasing use of the symbol “th” to represent the same sound.

## **Revolution as Evolution: Genetics and the Development of Ideas**

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**Presenter:** Annalise Kuester

**Faculty Sponsor:** Santokh Singh, Botany

How transferable are concepts and theories from the realm of the hard sciences to that of the social sciences? Yevgeny Zamyatin – mathematician, writer, and revolutionist – posited that political and social revolutions are merely manifestations of universal laws of physics. But what of biological evolution? Are there not similarities between political upheaval and mutation, between peaceful transfers of power and heredity? Just as Hobbes' Leviathan is the organization that allows its parts to subsist in relative security, so too is an organism a means of the survival of genes. Thus states Dawkins' *The Selfish Gene* – evolution is not, after all, a steady march towards a perfect organism, but a process that enables alleles to be passed on through inheritance. If we consider a government to be analogous to an organism, and the traditions, ideals, and cultural memes of its people analogous to genes, then it becomes possible to explore political revolutions in a novel fashion. I intend to research the extent to which this metaphor is useful, and attempt to use it to answer such questions as (1) is revolution inevitable? (2) why does revolution occur? and (3) can the transfer and origins of ideas (i.e., republicanism and communism) be mapped phonetically?

## **A Map Out of Eden: How Evolutionary Theory Can Be Used to Trace Change in Religious Ideologies**

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**Presenter:** Ruth Hatch, Biology

**Faculty Sponsor:** Santokh Singh, Botany

I am interested in examining whether evolutionary theory can be applied to document the changes in religious institutions and ideals over time. While some work has been done relating evolution and religion, much of it has been in the field of evolutionary psychology, in trying to discern the adaptive role of religion in terms of biology and psychology, rather than examining religions themselves (Sosis and Alcora 2003). A small amount has also been done in the newer field of memetics, treating religious beliefs as a type of meme (Rachlin, 2007), but evolutionary theory hasn't been directly to religion without the somewhat undefined intermediary of the meme. For example, does the geographic split between the Eastern and Western Orthodox churches represent a form of selection? Can we apply the concept of lateral gene transfer – the idea that genetic information can be transmitted to peers rather than to descendants – to ideas? Given these things, is it then possible to construct phylogenies of religious sects based on when a given theory was accepted or rejected by the sects? To answer these questions, I plan on examining major theological schisms in Christianity and the historical events that lead to them, to see if a historical map of the branchings can be constructed. I am particularly interested in dealing with Christianity as a model, because it's large, with a long history, and has had a large number of ideological schisms over that history, resulting in a multitude of sects which share some central ideals but are otherwise very diverse, to the point of seeming like entirely different religions to outsiders.



## **PANEL #4 – Hearing Loss, Diabetes & *Tetrahymena sp.* – Dodson Room**

### **Antagonizing the Glucagon Receptor: Development of a Bioassay to Identify Novel Small Molecules with Therapeutic Potential**

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**Presenter:** Tahara Bhate, Biochemistry

**Faculty Sponsor:** Timothy Kieffer, Cellular and Physiological Sciences

Type 2 diabetes mellitus is a disease characterized by severely elevated levels of blood glucose, or hyperglycemia. This hyperglycemic state is perpetuated by various mechanisms, including over production of the hormone glucagon, or hyperglucagonemia. As one of the primary effects of glucagon is to stimulate the production of glucose, there has consequently been great interest in developing a therapeutic treatment to limit the effects of glucagon in the body, either by correcting the hyperglucagonemia, or by reducing the effects of glucagon on its target cells. Choosing to focus on the latter of the two approaches, we created a bioassay to screen various compound libraries for novel small molecules that can act as antagonists of the human glucagon receptor. Upon binding to its receptor, glucagon generates increased levels of the signalling molecule cAMP. We generated a novel cell line that stably expresses the human glucagon receptor and a cAMP sensitive reporter gene that couples glucagon signalling to the production of light, readily detectable with a luminometer. The amount of luminescence, or light output, is proportional to amount of cAMP present, and thus indirectly reflects the level of glucagon activity. Once assay conditions are further optimized, we plan to use this high-throughput method to screen a compound library composed of sea sponge extracts for a compound that reduces luminescence in the presence of glucagon. Sea sponges have been shown to contain a number of compounds with therapeutic benefits, particularly in the anti-cancer field, and we are hopeful that our screen will ultimately yield compounds of similar efficacy and utility to the diabetes field.

### **Newborn Screening and Congenital CMV Infection-related Hearing Loss in Childhood**

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**Presenter:** Kiran Kalkat, Psychology

**Faculty Sponsor:** Eliana Castillo, Internal Medicine

Cytomegalovirus (CMV) is the most common congenital infection (an infection present at birth) and is thought to be the second most common cause of hearing loss in childhood (Dollard, Grosse, and Ross 2007). It is estimated that between 0.7 – 2% of babies are born with this infection each year (Dollard, Grosse, and Ross 2007). While the majority of these babies show no symptoms of infection, at least 10-15% will develop late-onset hearing loss (Dollard, Grosse, and Ross 2007). Currently, the Newborn Screening Program (NSP) in BC tests newborns for genetic and metabolic conditions using dried-blood spots (DBS) collected 24 hours after birth. The BC Early Hearing Program (BCEHP) also offers hearing tests to all newborns. However, BCEHP would miss at least half of the CMV-infected newborns who do not show signs of hearing loss at birth, but are at risk for developing late-onset hearing loss during their childhood. However, there is no published evidence suggesting that screening can decrease the burden of CMV-related hearing loss. Data on the validity and utility of CMV screening in the prediction of late-onset hearing impairment is expected to be available by 2015. However, the results of this US study may not necessarily translate to our population, due to our different ethnic make up. There is also a shortage of data on the cost-effectiveness and emotional burden of the screening process. This pilot study collected preliminary data on CCMV infection in BC, and looked at the practicality of screening at birth within our two pre-established newborn screening programs. The study has recruited 600 mother-baby pairs at BC Women's Hospital. For

each pair, we collected an additional DBS from the newborn, had parents complete a parental attitudes survey, and collected data from health records. We will also be testing maternal prenatal serum samples for CMV.

### **Targeting Pancreatic Beta-Cell Survival As a Potential Treatment of Diabetes.**

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**Presenter:** Keshika Nanda, Biology

**Faculty Sponsor:** Jim Johnson, Cellular and Physiological Sciences

Diabetes is a condition in which a person has high blood glucose (sugar) levels. The high blood sugar levels can be a result of two things. First, the body may not produce adequate amounts of insulin, which is a pancreatic hormone that allows for glucose re-absorption, (typically a cause for type 1 diabetes). Or, diabetes may be a result of the lack of response from the body's cells to insulin (typically a cause for type 2 diabetes, where cells become insulin resistant). The Beta cells, in the pancreas, are stimulated by various signals to produce insulin and therefore can be a potential target for diabetes treatment. In order to stimulate insulin production, chemicals or secreted factors must attach to specific receptors on the pancreatic Beta cells, allowing them to function. It is found that many secreted factors have analogous receptors on the cell surface. In my directed studies project, I studied the interaction between Slit2 (a secreted factor) and Robo1 (a receptor for Slit2), which are found on pancreatic Beta cells. In the project, I show the presence of Slit2 and Robo1 in the Beta cells and their effect on Beta cell survival. If the secreted factor allows for Beta cell survival, then the findings in this study could be used for possible future treatments for patients who are diabetic. In that, it could be possible to promote Beta cell survival using such factors and thus increase the production of insulin. And, an increase in insulin production could ultimately help treat the Type 1 form of diabetes.

### **The Effect of Oxidative Stress on the Doubling Time of *Tetrahymena* sp.**

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**Presenter:** Cameron Sture, Zoology

**Faculty Sponsor:** Carol Pollock, Zoology

An active area of research is the effects of oxidative stress on cells, and whether or not the accumulation of damage over an organism's lifetime can contribute to the reduced function of a cell, along with aging and eventually the death of the organism. The free-radical theory of aging was proposed by Denham Harman, who actively undertook and found links between cell damage and aging (Harman, 1983), with research subsequently being followed by scientists like Bruce Ames. In modern experiments such as theirs, researchers tend to focus mainly on mitochondria, an organelle thought to be a central site of free-radical production, finding ways in which reactive oxygen affects other cellular components (Shigenaga et al, 1994). Our intention is to investigate direct oxidative damage on the organism, by both observing how their biomolecular structures and doubling time is effected. To test this, we propose using the simple celled organisms *Tetrahymena* sp. to examine if their being in an environment with oxidative stress would affect these factors. We would achieve this by placing the organism in a medium containing various concentrations of methylene blue, a free-radical generator, and light. Over the period of six to eight hours, the number of cells in 25 uL of culture would be counted from samples taken every two hours. The null hypothesis is that doubling time of *Tetrahymena* would decrease or stay the same when exposed to methylene blue, and the alternative hypothesis is that the doubling time of *Tetrahymena* would increase when exposed to methylene blue. This study would bring more information into reactive oxygen's role in cellular damage, as well as the methods used in similar investigations.

## **PANEL #5 – Ecology and Conservation Practices – Lillooet Room**

### **Conservation Policy, Co-Management and Traditional Ecological Knowledge: Collaborative Efforts with the Maori of New Zealand and the Haida of Haida Gwaii**

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**Presenter:** Coral Voss, Interdisciplinary Studies

**Faculty Sponsor:** Sarah Gergel, Dept. of Forest Sciences & Centre for Applied Conservation Research

Traditional Ecological Knowledge (TEK) is “a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment” (Berkes, 1999, p. 8). All forms of knowledge including traditional and scientific knowledge should be respected (Mauro & Hardison, 2000) and this research will investigate the utilization and success of TEK by examining the employment of TEK in the establishment of conservation policies and co-management systems. Researchers have rarely investigated diverse systems of TEK and its integration in conservation and co-management undertakings. My study will compare the use and subsequent outcomes of TEK application in two distinct indigenous groups: the Haida of Haida Gwaii, British Columbia, and the Maori, of New Zealand. In carrying out this research I will conduct a comparative analysis of the current literature, that will focus on the differences or similarities in the deployment of TEK in the two regions, whether the variances are cross-cultural and the overall impact of TEK on regional conservation activities. Researchers in the field of TEK consider the potential integration of TEK in conservation policies and co-management schemes an important consideration in conservation efforts. The incorporation of TEK in environmental policy is a critical step in conservation efforts and indigenous rights. My research will illustrate how the integration of different knowledge paradigms may provide for improved conservation efforts.

### **A Flowering of Bees: Ensuring the Seasonal Constancy and Abundance of Food Sources for Bees at the UBC Farm**

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**Presenter:** Anelyse Weiler, Land and Food Systems

**Faculty Sponsor:** Art Bomke, Land and Food Systems

Currently, there are scarcities and temporal discontinuities in floral food sources throughout the growing season for honey bees at the UBC Farm. It is known that these gaps in bee forage availability occur when floral food sources are abundant in other nearby locations, and thus there is an opportunity to integrate appropriate flowering plants within the agroecosystem. The UBC Farm Production Coordinator has identified that the greatest potential for incorporate these flowering plants likely lies in adjusting cover cropping practices. The Coordinator has also observed that indigenous bees (non-honey bees) play a primary role in pollinating crops at the UBC Farm. Although many species of local indigenous pollinating insects are known to exist, little data are available regarding the population sizes and presence of these pollinators despite the vital ecological service that they provide to humans through pollination. To inform UBC Farm management decisions, I am inventorying existing bee forage sources for approximately one year at the UBC Farm. Inventorying involves conducting weekly transect surveys of field areas at the UBC Farm to assess the predominant species of flowering plants and their bloom period. Factors I am considering in evaluating the quality of bee forage include flower morphology, colour, nectar guides, and length of blooming. I will also be measuring average Nectar Production Rate (capillary tube method) and the concentration of nectar sugar (refractometer method) for a select number of the most extensive bee

forage sources. To identify some of the indigenous bee pollinators that frequent the UBC Farm, I am conducting non-destructive, visual observations of pollinating insects that seasonally visit UBC Farm insectary flowers. Recognizing the current concern of global bee population decline, this research attempts to both resolve shortages of bee forage at the UBC Farm and provide a model for accommodating pollinators at the agroecosystem level.

## **Wild Bee Dispersal in a Varied Landscape**

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**Presenter:** J. Ben Wilson, Mathematics, UBC-O

**Faculty Sponsor:** Rebecca Tyson, Mathematics, UBC-O

Insect pollination is crucial for many crops that the human population relies on. In recent years there have been large population crashes in honeybees that are kept for that purpose. However, wild bees may be able to provide that service for us. Over the last few decades many ecologists have studied wild bee populations in an effort to better understand how they behave. There have been many individual studies that look at certain aspects of behaviour, but it is difficult to piece all of the information together. This is where mathematical modelling can be helpful. Using differential equations I can collect the different bee behaviours into a single model that can explain the behaviour of the population as a whole. This is especially useful as it is difficult to study how large populations of bees behave in the natural environment. Previous mathematical studies have taken some observational data to try and match curves to dispersal data; differential equations allow us to take behavioural data that can give us predictions that are biologically informed. This new model allows us to observe how bees can behave in multiple environments, with many different influences on their behaviour. It allows us to look at different sustainability and pollination questions that can be difficult to answer otherwise.

## **Long-term Effects of Timber Harvesting on Bacterial and Eukaryal Communities**

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**Presenter:** Hang Yu, Microbiology and Immunology

**Faculty Sponsor:** William W. Mohn, Microbiology and Immunology

Forest soil microbial communities provide essential ecological services, but we have a poor understanding of how these communities are affected by disturbances, particularly disturbances associated with forest harvesting. This project will be linked to a Long-Term Soil Productivity (LTSP) study in British Columbia. Soil samples have been obtained from sites where field experiments are examining effects of two key disturbances associated with harvesting: soil compaction and organic matter removal. Other factors including geographic location, biogeoclimatic zone, soil horizon as well as physical and chemical condition will also be investigated. The project involves profiling microbial communities in the samples by terminal restriction-fragment length polymorphism (T-RFLP) analysis of small-subunit rRNA genes for bacteria and ribosomal intergenic spacer analysis (RISA) for eukaryotes. The analysis of community structure will be used to assess the effects of soil compaction and organic matter removal on community structure and develop hypotheses about the mechanisms of those effects on particular microbial populations and the functional roles of those populations. The results from this study will give new insights how particular microbial populations respond to different levels of forest management and, over the long-term, aims to provide guidelines for sustainable management of forest soils.

## **PANEL #6 – Issues in Pharmaceutical Sciences - Rm. 460**

### **Screening for Small Molecule Inhibitors of Bacterial Citrate Synthase**

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**Presenter:** Lourdes (Cynthia) Gunaratnam, Microbiology and Immunology

**Faculty Sponsor:** Michel Roberge, Biochemistry and Molecular Biology

The high incidence of bacterial resistance to commonly used antibiotics is now a major health concern. To overcome this problem, it is necessary to find new antibiotics which target new bacterial components. To be effective and safe, novel antibiotics must also target proteins that are essential for the life cycle of bacteria but not expressed by humans. One such protein is type II citrate synthase, an enzyme that is required for the growth of Gram-negative bacteria. The goal of my project was to identify novel inhibitors of type II citrate synthase. It was observed that expression of type II citrate synthase in yeast cells interferes with their growth. I hypothesized that inhibitors of citrate synthase would restore the growth of yeast. This simple and convenient growth restoration assay was used to identify potential citrate synthase inhibitors from a collection of over 4000 chemicals from commercial sources and natural sources.

### **The Role of P-glycoprotein in Intestinal Cholesterol Homeostasis**

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**Presenter:** Ankur Midha, Pharmaceutical Sciences

**Faculty Sponsor:** Kishor M. Wasan, Pharmaceutical Sciences

Cholesterol has been implicated in many health problems, most notably heart disease. Despite the importance of cholesterol, both in essential life processes as well as in disease, the many ways in which the body handles this substance are not fully understood. Of particular interest is cholesterol movement in the intestine. P-glycoprotein (Pgp) is a protein found on the surface of many different types of cells in the body. Pgp actively pumps potentially harmful chemicals, such as drugs and other toxins, from the inside of cells to the outside. Some experiments have hinted that Pgp may also be involved in the movement of cholesterol, which in its unaltered form is toxic to cells; therefore, we hypothesize that the absence of Pgp from intestinal cells will cause an increase in the intestine's usual cholesterol elimination protein, ABCG8. After conducting a study in mice which were fed diets high in cholesterol, we observed a significant increase in intestinal Pgp expression. This result suggests that Pgp may help the body eliminate cholesterol when it is present in high amounts.

### **Effects of Hyperlipidemia on the Penetration of Clozapine into Brain Tissue**

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**Presenter:** Aishwariya Sharma, Biotechnology

**Faculty Sponsor:** Kishor M. Wasan, Pharmaceutical Sciences

Schizophrenia is a devastating psychiatric disorder characterized by abnormalities in one's perception or expression of reality. Around 1% of the population has shown symptoms of the condition at some point in their life. Of the various antipsychotic drugs available for the treatment of schizophrenia, clozapine is currently amongst the most effective options available, and it is thought to act on receptors found in the brain. It has been reported that patients with elevated lipid levels in their plasma (hyperlipidemia) seem to respond better to the clozapine treatment. It was also found that hyperlipidemia causes minor changes in the pharmacokinetic profile of clozapine, leading to the hypothesis that the improved response to the treatment was a result of clozapine penetrating the brain more efficiently in hyperlipidemic patients. In this study we assessed the effect hyperlipidemia might have on the ability of clozapine to penetrate into the brain from the plasma, in a rat model. The ratio of concentration of clozapine in the brain to concentration of clozapine in the plasma was used

to measure the effect of hyperlipidemia on the distribution of the drug into the brain. A technique called High Performance Liquid Chromatography (HPLC) was used to determine the clozapine concentrations in the plasma and brains of the treated rats. It was found that there was no difference in the distribution of clozapine into the brain in hyperlipidemic animals when compared to animals with normal levels of lipid. Therefore, the more effective response to clozapine treatment observed in hyperlipidemic patients is most likely not a result of the hyperlipidemia itself.

### **The Role of Caveolae in Nitric Oxide/PKG Mediated Phosphorylation and Inhibition of RhoA/ROCK Activity in Cultured Rat Aortic Smooth Muscle Cells**

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**Presenter:** Anthony Gador, Pharmaceutical Sciences

**Faculty Sponsor:** Kathleen MacLeod, Pharmaceutical Sciences

Caveolae are flask-shaped cholesterol enriched invaginations found on the cell surface. Studies investigating the function of caveolae have established these membrane features in integrating and compartmentalizing cell signalling by co-localizing elements of signalling apparatus through the caveolin scaffolding domain. Caveolae have been implicated in many cardiovascular diseases: cardiomyopathy, pulmonary hypertension and atherosclerosis. Of interest, is the role of caveolae in regulating contractility of vascular smooth muscle cells; reports have indicated that disruption of caveolae impairs the relaxant effect of nitric oxide (NO). The relaxant response to NO is mediated by a complex signal cascade that results in activation of protein kinase G which then negatively regulates a pro-contractile protein, RhoA. Previous studies demonstrate components of the NO signaling cascade co-localize in caveolae. Localization of RhoA to caveolae has also been documented by other investigations. With the above findings in mind, it has not been yet determined the extent to which phosphorylation and deactivation of RhoA by NO requires caveolae as a platform to integrate the relaxant effect of NO in vascular smooth muscle cells. Experiments will be carried out in cell cultures of rat aortic smooth muscle cells and biochemical investigations will be completed through western blots to measure p-RhoA, RhoA, p-MYPT, MYPT, p-LIMK and GAPDH. Cells will be treated with phenylephrine (a partial RhoA activator), sodium nitroprusside (which produces NO), phenylephrine **and** sodium nitroprusside as well as no treatment. The above experiments will be repeated in the presence of methyl-beta-cyclodextrin (a cholesterol depleting agent) +/- cholesterol (to impair the cyclodextrin's depleting effect). Preliminary results suggest a significant instability in the model system. Analyzing under some degree of suspicion it appears that the cyclodextrin is impairing the extent to which phenylephrine and SNP produce their downstream response and this affect is somewhat reversed with co-treatment with cholesterol.

## **PANEL #7 – Aquatic Life - Rm. 461**

### **The Antimicrobial Triclosan Can Affect Aquatic Food Webs Through Its Impact on Decomposer Microbes and Animals That Consume Them**

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**Presenter:** Carita Chan, Environmental Sciences

**Faculty Sponsor:** John Richardson, Forest Sciences and Zoology

The compound triclosan is found in a wide array of domestic products and eventually finds its way into water treatment plants and then the environment. In aquatic ecosystems a large amount of the energy flow is through algae or from organic matter processed into microbial biomass that is consumed by animals. Triclosan is known to have strongly negative effects on algae and other microbes. We used an experimental gradient of triclosan concentrations in laboratory mesocosms to determine the dose-dependent effects on algae, bacteria, leaf litter decomposition and growth of a

model invertebrate, the caddisfly *Lepidostoma unicolor*. We predicted that with increasing doses of triclosan that microbial populations will decrease (respiration, biomass), leaf decomposition will decrease and caddisfly growth will decrease or show increased mortality rates.

## **Lunging for a Living: Feeding Mechanics of the Largest Animals That Ever Lived**

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**Presenter:** Daniel J. Field, Zoology

**Faculty Sponsor:** Robert Shadwick, Zoology

Rorquals are a family of whales that include fin whales, humpback whales, and blue whales--the largest animals to have ever existed. These whales exhibit a unique method of prey capture, known as lunge feeding. This feeding mechanism involves the whales engulfing huge volumes of prey-laden water, and swallowing enormous quantities of zooplankton or small fish in one go. Rorquals exhibit numerous morphological specializations for lunge feeding, which include baleen and extensible ventral groove blubber. However, the existence of mechanical specializations of rorqual mandibles (lower jaws) that enable lunge feeding has never been investigated. These bones are responsible for supporting the floor of the mouth during a lunge, and are exposed to enormous drag forces. Here, I test the hypothesis that the patterns of flexural rigidity throughout rorqual mandibles are optimized to resist the bending forces encountered during lunge feeding. Several mechanical parameters throughout humpback whale mandibles were investigated using quantitative computed tomography (QCT). My analysis yielded a clear trend of increasing flexural rigidity from the rostral to the caudal ends of the mandibles, supporting my hypothesis. This study demonstrates that the trends in flexural rigidity throughout rorqual mandibles are different than those of other mammals (like humans and right whales), and suggests that adaptive bone remodeling is a significant contributing factor in establishing mandibular bone density distributions in cetaceans. My research shows that mechanically specialized jawbones enable the unique lunge feeding behaviour of rorquals.

## **Distribution and Abundance of Invasive Red-Eared Slider Turtles in the South Okanagan**

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**Presenter:** Natasha Lukey, Biology, UBC-O

**Faculty Sponsor:** Karen Hodges, Biology, UBC-O

Red-eared sliders (*Trachemys scripta elegans*) are one of the top 100 most invasive species globally, with introductions through the pet trade. Once established in a new area, red-eared sliders have the potential to out-compete native freshwater turtles, and declines in native turtle populations have been experienced in areas where the native turtles and red-eared sliders co-occur. In the South Okanagan region of BC, there is only one native turtle species, the western painted turtle (*Chrysemys picta bellii*), which is provincially blue-listed as being of special concern. The goal of this study was to determine the distribution and abundance of red-eared slider turtles within the South Okanagan, as they may be a threat to western painted turtles. Population estimates were obtained through live-trapping and visual observation of basking turtles. We found red-eared slider populations at 6 sites extending north from Kelowna, BC, south to Penticton, BC. The abundance of these turtles was low within sites, however males, females, and juveniles were detected at 2 of the 3 sites trapped. Only females were detected at the 3 sites where visual observation was used, suggesting that live trapping of red-eared sliders may be a better means of population estimation. These results suggest that the capacity for red-eared sliders to reproduce in the Okanagan exists. It is important that the populations detected in this study be monitored to ensure red-eared sliders do not further encroach upon western painted turtle habitat.

## **Cross-Country Crawling: The Effect of Substrate Resistance and Habitat Preference on Dispersal in the Long Toed Salamander (*Ambystoma macrodactylum*)**

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**Presenter:** Talia Sechley, Zoology

**Faculty Sponsor:** Darren Irwin, Zoology

Habitat fragmentation affects the ability of amphibians to disperse between breeding ponds, which can potentially cause effective isolation of populations. Additionally, differences in resistance between landscape types can influence the range of certain species, as some matrices offer an easier dispersal route than others. In order to quantify the resistance of various landscapes to long toed salamander (*Ambystoma macrodactylum*) dispersal, we tested the mobility of juveniles through five distinct substrate types, representing the major eco-regions in which this species is found: deciduous litter, grass, moss, coniferous litter and sand. Based on a multivariate result involving distance, time and number of stops within the arena, we determined that salamanders moved with significantly increased ease through the moss and sand substrates. This result contradicts the theory that dry, open substrates deter salamander dispersal because of the negative effects of desiccation and increased predatory threat and suggests instead that these landscapes present a decreased physical barrier to movement. As landscape resistance in nature may reflect habitat choice in addition to the physical resistance of the substrate to movement, we also conducted a substrate choice experiment whereby salamanders were placed in a multi-substrate arena (containing five patches of each of the five substrates) and allowed to pick their resting substrate. The salamanders showed a highly significant preference for the moss substrate, selecting it as their resting patch 18 out of 24 times. When considered in combination with the substrate resistance result, this finding suggests that mossy substrates constitute the least resistant landscape overall.



## **Concurrent Session III. > 3:40 – 4:40pm**

### **PANEL #1 – Emotions, Learning & the Brain – Rm. 156**

#### **The Influences of Representation and Processing of Visuospatial Information**

**Presenter:** Anthony Han, Psychology

**Faculty Sponsor:** Todd Handy, Psychology

Does perspective of representation of a visuospatial information effect how we effectively learn and retain the skill? This project tackles this question by looking at how the perspective of the teaching medium (such as a video) affect the learner's ability to quickly obtain the information and to retain it through distractions. In the past, we have tried to teach participants to perform different tasks (such as tying knots and playing instruments) with videos. For all the tasks the two conditions were either a first person or a third person perspective video. Currently, by measuring the time it takes to learn the skill and seeing how well participants can recall the skill after distractions, we have found that a first person perspective is favourable to third person perspective videos. Different variations of tasks and lengths of skills are being tested in order to see the limitations of the effect.

#### **Hemispheric Asymmetry and Processing of Emotion**

**Presenter:** Andrew Hughes, Psychology, UBC-O

**Faculty Sponsor:** Barbara Rutherford, Psychology

This study examines the roles of the hemispheres of the brain in comprehending and processing emotional qualities of visually presented stimuli. Two hypotheses regarding the laterality of emotion are investigated using techniques developed to test hemispheric competence and interaction. The emotional valence hypothesis (Hellige, 1995) proposes that the right hemisphere is dominant in processing negative emotions while the left hemisphere is dominant for positive emotions. In contrast, the right hemisphere hypothesis (Hellige, 1995) suggests that the right hemisphere is dominant in processing all emotions. This study investigated the emotional valence and hemisphere hypotheses by comparing the hemispheres relative efficiencies in processing emotional images. The results of this study indicate that while the hemispheres do have valence specific advantages, there is also an overall effect of hemispheric interaction.

#### **Interhemispheric Communication: How Do First and Second Languages Interact?**

**Presenter:** Rylie Moore, Psychology, UBC-O

**Faculty Sponsor:** Barbara Rutherford, Psychology

How is it that a bilingual individual can easily use each of their two languages without much confusion or mishaps? This question has been widely studied by psychologists that are keen to better understand multilanguage control. The present study seeks to shed light on the controversy between two opposing models of dual language control. The inhibitory control model (Green, 1998) predicts that activation of a word in one language inhibits activation of words in the other language. The level of activation model (Grosjean, 1997) proposes that activation of the language in use is increased over the other. Monolingual and bilingual (English-French) participants decided if a string of letters presented in the middle of a computer monitor was an English word or not. At the same time, a distractor word was presented to either the left or right of the letter string, and it was English or French and related in meaning or not. The data from this study are consistent with predictions of the inhibitory control model.

## **PANEL #2 – Biases, Beliefs & Wandering Minds – Rm. 157**

### **False of Familiarity - The Underlying Mechanism of "The Curse of Knowledge"**

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**Presenter:** Ka Wai (Alice) Wong, Psychology

**Faculty Sponsor:** Susan Birch, Psychology

This study looks at the underlying mechanism of "The Curse of Knowledge". Coined by Elizabeth Newton, this is a form of cognitive bias that when people are given prior knowledge, it affects their estimations and judgment about a third person's viewpoint. For example, when children are primed with the information of where the hidden toy is, they are more likely to overestimate a novel's ability to locate the toy (Birch & Bloom 2005). Thus, this prior knowledge enervates the accuracy of one's ability to understand another's perspective. Although this is not a new phenomenon, scholars still argue about what contributes to these differences in perception. One line of research suggests that the curse of knowledge comes from our inability to inhibit our knowledge (Hardt & Pohl 2003). Knowing the content obscures us from adapting a naive perspective. However, some scholars suggest that it is the feeling of familiarity (ex. our processing speed) associated with the content that leads to the curse of knowledge (Bernstein & Harley 2007). These researchers stress that this misattribution of fluency makes it difficult for us to think in a novel state. Using an online survey, we employed a study to find out whether knowledge bias comes from i) knowing the content alone or ii) being familiar with the content alone or iii) the interactions of these two mechanisms. In part one of the study, we asked the participants to learn answers for some trivia questions ("knowledge" condition) and we also asked the participants to answer other trivia questions but were not given the answers ("familiar" condition). In part two, participants are asked to make estimations for the first two conditions and for trivia questions they have not seen previously ("new" condition). The differences between estimations tell us which mechanism(s) contributes to this knowledge bias.

### **How Attributions of Ostracism Affect its Outcomes**

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**Presenter:** Faraha Rahman, Business

**Faculty Sponsor:** Sandra Robinson, Business

I am conducting research in the Sauder School of Business on how employees experience, and are impacted by, ostracism and exclusion at work. In my study I will show how often employees perceive they are ostracized at work and how ostracism creates emotional distress and reduced work contributions. I am particularly interested in looking at employees' attributions for ostracism; that is, the reasons why they think they are ostracized and whether those beliefs influence the impact of ostracism. I hypothesize that ostracism will be more detrimental when employees believe that the reasons for their ostracism is something about themselves, is something permanent, and something under the control of others. For another part of my study, I will be looking at how self-esteem affects the outcomes of ostracism that stems from something internal, versus external. For instance, I hypothesize that having a lower level of self-esteem leads to higher levels of emotional distress that can be caused by ostracism and the effect is more profound when the cause of ostracism is something about the person himself/herself.

## Attention and Mind-Wandering

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**Presenter:** Maria Stanciulesca, Psychology

**Faculty Sponsor:** Julia Kam, Cognitive Psychology

When our thoughts drift off task without any conscious intent to do so, this is considered mind-wandering. It has been shown that during this off-task state, we are more prone to making errors, and we tend to spend less time evaluating external visual and auditory stimuli. Although many studies have dealt with how we evaluate this sensory information, few studies have examined how task-related attention changes during exposure to a deviant, unexpected, or new stimulus. Our goal was to determine which neural networks were involved in the initial cortical processing of these deviant stimuli. We hypothesize that when we are on-task, (or attentive to the task at hand), we are better able to attend to incoming deviant sensory stimuli. We will measure participant's brain waves, as well as their self-reports of being either "on-task" or "mind-wandering". Participants will be assigned two tasks: a computer task, in which subjects are exposed to intermittent visual stimuli, and a reading task, during which subjects are exposed to intermittent auditory tones. We plan to examine the relationships between subject reports of attention during the two tasks, and the corresponding brain wave patterns associated with perceiving the deviant auditory and visual stimuli. Overall, we predict the subjects will show signs that the brain is less active when exposed to deviant sensory stimuli during "mind-wandering" versus being "on-task".

## PANEL #3 – Coefficients and Balloons! - Rm. 355

### Two Interconnected Rubber Balloons: Restrictions of the Model Showing the Effect of Surface Tension

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**Presenter:** Chieh Shan (Jason) Chen, General Science

**Faculty Sponsor:** Eric Cytrynbaum, Mathematics

The two interconnected rubber balloons system is a model widely used to demonstrate the effect of surface tension on liquid-formed bubbles. According to Young-Laplace equation, the larger the radius of an ideal bubble the smaller the pressure difference across the surface. The above effect can be shown with the model by setting a closed valve between two interconnected balloons at different sizes. If the balloons perform perfectly like liquid formed bubbles, the air would flow from the small balloon to the large balloon. This demonstration is limited by the nature of the rubber skin and sizes of the balloons. The shape, density and surface tension of rubber changes as the balloons grow or shrink, while these factors remain constant in liquid formed bubbles. Studies[1][2] in the past mostly focused on soap bubbles and spherical balloons instead of non-spherical balloons that are actually used in the model, and nor did they analyze the system in terms of surface tension. It is important to understand the restrictions of the two interconnected balloons model and explain the differences between surface tension of rubber balloons and bubbles while doing demonstrations with the model. By studying how surface tension of rubber changes, we can understand in depth how each balloon expands and shrinks in the two-balloon system. In this research, curvature of balloons can be estimated from the shape and circumference at the maximum width. The pressure across surface of balloons can be measured using a U-shape water manometer. Through the application of Laplace-Young equation, the surface tension can be calculated from curvature and pressure. By looking at when the surface tension remains constant as the size changes, we can find out a size range of rubber balloons performing most similarly to liquid-formed bubbles.

## **ASSESS: Abstractive Summarization Systems for Evaluative Statement Summarization**

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**Presenter:** Nicholas FitzGerald, Cognitive Systems

**Faculty Sponsor:** Giuseppe Carenini, Computer Science

One benefit of the Internet is that large volumes of text are available on almost any topic – whether through web pages, blogs, or online databases of print resources. As this volume continues to increase, it has become impossible for any one person to read everything that is available. Specifically, many opinions are expressed through user reviews of consumer products, blogs, and forum discussions. Systems which could automatically summarize these opinions would be immensely useful to those wishing to use this information to make decisions. Most past work in automatic summarization has focused on extractive summarization, in which key sentences from the source text are identified and extracted to form the output. The resulting summaries, while often informative, lack coherence and grammaticality. An alternative framework is abstractive summarization. Information from the source text is first extracted into the form of abstract data which is then processed, and from which the most important messages are inferred. These are then expressed via a Natural Language Generation system which produces coherent, grammatical text. These systems have been shown to produce summaries which are preferred by human evaluators over those produced by extractive methods. My USRA research built upon the work of [Carenini et al. 06a] to create a completely automatic system which could produce abstractive summaries from a plain text corpus of product reviews without the need for any prior manual annotation. My work produced the information extraction system to complement the existing NLG component. This task involved various techniques from Artificial Intelligence and Computational Linguistics which allowed us to infer the topics and opinions expressed within the reviews. As an additional contribution, I also devised an improvement for a crucial step of the summarization process. To the best of our knowledge, this is the first complete system which effectively performs this task.

## **Diffusion With a State Dependent Diffusion Coefficient**

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**Presenter:** Nicole Jinn, Mathematics and Computer Science

**Faculty Sponsor:** Ian Mitchell, Computer Science; Paul Tupper, Mathematics, SFU

Diffusion is a time-dependent process, constituted by random motion of atoms or particles causing them to spread in space. Diffusion arises from deterministic paths of moving objects appearing to be random. For example, in cell biology, diffusion is a main form of transport for necessary materials such as amino acids within cells. I will model particle diffusion at the atomic level using two different approaches, and the approaches available are theoretical predictions of the motion of the particle experiencing diffusion. The first approach would observe that the particle spends half as much time on the side with the higher diffusion constant, because it will exit out of that region (with the higher diffusion coefficient) much quicker, so it is a dynamical approach (A.A. Markov, 1906). The second approach is from statistical mechanics, which predicts that the particle should spend the same amount of time on each side (A.W.C. Lau and T.C. Lubensky, 2007). At this point, we do not know which prediction is correct. To study the motion of the moving particle, a molecular dynamics simulation will be used. This kind of simulation is frequently used in the study of proteins and materials science. The portion of time a particle spends in each half will decide which, if any, of the theoretical approaches is correct because one approach predicts equal time in both halves whereas the other approach predicts that the diffusion coefficient influences the amount of time spent in that region. A numerical simulation will be conducted to validate one of the two predictions.

## **PANEL #4 – Asteroids and Aerobic Fitness! – Dodson Room**

### **The Effects of Aerobic Fitness and Pulmonary Function on Expiratory Flow Limitation During Exercise in Young Healthy Women**

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**Presenter:** Paolo Dominelli, School of Human Kinetics

**Faculty Sponsor:** Bill Sheel, School of Human Kinetics

Females with a higher maximal aerobic capacity ( $\text{VO}_{2\text{max}}$ ) have higher ventilatory requirements during exercise relative to their untrained counterparts. The higher ventilatory loads in trained females might make them more susceptible to developing expiratory flow limitation (EFL) during exercise. However, the interrelationship between aerobic fitness, resting pulmonary function and EFL has not been well characterized in women. **PURPOSE:** To determine the effect of  $\text{VO}_{2\text{max}}$  and maximal expiratory flow-volume (MEFV) curve characteristics on EFL in healthy women. **METHODS:** A progressive stepwise cycle test to exhaustion was completed by 22 healthy females. A MEFV curve was generated by having subjects perform several expirations from total lung capacity to residual volume at different efforts before and after exercise. Tidal breaths at each exercise stage were superimposed within the MEFV curve by having subjects perform inspiratory capacity maneuvers. The magnitude of EFL was calculated as the percent of the tidal breath that met or exceeded the outer boundary of the MEFV curve. Subjects were partitioned into those with EFL and those with no EFL. **RESULTS:** There was no difference in  $\text{VO}_{2\text{max}}$  between the EFL group and the NEFL group. There was no relationship between the degree of EFL and  $\text{VO}_{2\text{max}}$  ( $r=0.18$ ). Absolute values were different between the EFL and NEFL groups for: peak expiratory flow (PEF, and for forced expiratory flows at 75% of vital capacity (FEF75%), 50% of vital capacity (FEF50) and 25% of vital capacity (FEF25%) The forced vital capacity was significantly larger in the NEFL group compared to the EFL group. When expressed as a percentage of PEF, FEF75% was not different between groups while FEF50% and FEF25% were different. **CONCLUSION:** The degree of EFL experienced by women appears to be more associated with lung size and the characteristics of their MEFV curve rather than aerobic fitness.

### **Finding Near Earth Asteroids with NEOSSat**

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**Presenter:** Henry Ngo, Physics and Astronomy

**Faculty Sponsor:** Brett Gladman, Physics and Astronomy

The study of Near Earth Objects (NEOs) is important for understanding the history of our Solar System. NEOs are as old as the Solar System and are close enough to reach with space probes. In addition, the possibility of collision with Earth poses a potential threat. Therefore, it is useful to find, catalogue, and compute orbits for NEOs. Current catalogues come from ground-based telescopes, which cannot look in the direction of the Sun, so an entire population of near-earth objects are unobserved. However, with the launch of the Canadian space telescope, the Near-Earth Object Surveillance Satellite (NEOSSat) in 2011, we will be able to observe NEOs more efficiently. In particular, NEOSSat uses a sun-blocking device called a baffle to observe objects that are interior to the Earth's orbit. Furthermore, NEOSSat is able to observe 24-hours a day rather than only at night. The goal of this project is to develop an optimal observing strategy for NEOSSat. This is achieved using a survey simulator to emulate NEOSSat's behaviour. NEOSSat surveys the sky to find NEOs. This project will optimize which regions of the sky, relative to the Sun, are best to search. This is complicated by the motion of the Earth around the Sun, causing asteroids to move in and out of the field of view. NEOSSat also tracks previously-found asteroids in order to get follow up data. Further data allows for better constraints on the object's orbital properties. A desired strategy would ensure all found objects are followed up to avoid losing track of any of them. Finally, this strategy would also optimize the ratio of time spent scanning and time spent tracking specific objects as well as

consider other factors such as the shared mission time with Defense Research and Development Canada.

## **PANEL #5 – Critical Analysis: Gender Identity & Social Justice – Lillooet Room**

### **Would You Like “Guys” With That? The Construction of Gay Masculinity -- Reclaiming Male Privilege.**

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**Presenter:** Hazel Hollingdale, Sociology

**Faculty Sponsor:** Carrie Yodanis, Sociology

Issues of sexual equality are often conceptualized as separate from those of gendered equality. However, the performance of one's gender is often conflated with one's sexuality, and as such, they intersect in complex ways. In this honour's thesis project I explore how homosexual men can bolster their performance of masculinity through reinforcing the subjugation of females. My fieldwork uses observational research of a franchised restaurant in Vancouver. I focus on the comparison of one location in the heart of a gay-oriented neighbourhood in contrast to another location that is situated in a middle-class, heterosexual area of the city. Although both locations reinforce a gendered divide of labour and self-presentation, and recreate particular sexualities within each space, this is not done comparably. Female and male genders are performed in their traditional manner at both locations, however, I have found that male staff's masculinity is over-emphasized to a much greater extent at the gay-oriented location. This overemphasization is reinforced in both the actions and presentation of gender, but also through the subjugation of their female counterparts. I will argue that males lose privilege from their gendered status by presenting as homosexual. In this position, I have found that this status can be reclaimed by re-emphasizing both the gendered and sexual oppression of women. If the gains made for male sexual expression comes at the expense of women's equality, the question begs to be asked, is this progress?

### **Pinay-isms, Pinay-Schisms: Gender Construction, Agency and Transnational Ideologies of Womanhood**

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**Presenter:** Lara Maestro, Sociology

**Faculty Sponsor:** Jacqueline Schoemaker Holmes, Sociology

Recent studies have resulted in new knowledge about immigrant communities that is becoming increasingly important in a globalizing world. Transnationalism, which studies the movements of people, things, ideas, and ideologies across national borders, becomes an important concept when those ideologies differ between cultures and cause strain for people experiencing both cultures, as is the case of women negotiating cultural ideas of “womanhood”. This strain may be exacerbated for immigrant women whose gender identities are also affected by their race or ethnicity, such as the case of young Filipino immigrant women in Canada. Most research about Filipino migrant women has concentrated on first generation migrants themselves. A distinction has been made in the early literature between labour migrants and marriage migrants, while later research has attempted to complicate the binary between “labour” and “love”. Most research also focuses on the gendered stereotypes that encourage or limit Filipino women's success as migrants, and how they then socialize, or pass on these ideas of gender, to the next generation. However, little research has been done on the lives of the “new second generation” of young Filipino Canadian women (those born in the Philippines and who migrated at a young age and those who were born in Canada to at least one Filipino immigrant parent), and how they in turn react to their parents' socialization in a new

environment that may have very different ideas of gender. My research aims to document how transnational ideologies of womanhood affect young Filipino Canadian women's capacity to exert power (in other words, agency) over their own gender identities. I will conduct interviews with young women in the Filipino community at the University of British Columbia in order to qualitatively describe how they actively negotiate between different transnational ideologies of womanhood in the creation of their own gender identities.

### **The Root Cause**

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**Presenter:** Devon Wong, Sociology and Women's and Gender Studies

**Faculty Sponsor:** Nora Angeles, Center for Women's and Gender Studies

Food security has gathered more global attention in social justice projects relating to developing nations. My project's intention was to explore food security issues on the home front after learning some alarming statistics relating to urban poverty in the City of Richmond. The Root Cause is an investigative documentary that explores food security issues in Richmond. Through my film, I reveal an overwhelming public unawareness, increasing institutional concern and a strong grassroots movement to address food insecurity within the community.

### **PANEL #6 – Textual Analysis: Turtles, Clothing & Irony – Rm. 460**

#### **Kierkegaard the Ironist**

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**Presenter:** Evan Craig Pagens, Philosophy and English

**Faculty Sponsor:** Leslie Arnovick, English

Typically when one discusses the relationship between Soren Kierkegaard and irony those who are familiar with his works will focus of his dissertation thesis, "The Concept of Irony with continual reference to Socrates". Yet, others have argued that there is a stronger connection between the great author and irony implying that Kierkegaard was himself an ironist. Kierkegaardian scholars, such as Joaquim Garff and Brian Soderquist, have made the case that factors such as the use of humor, indirect communication, as well as the opinions of Kierkegaard's contemporaries cumulatively make a strong case for Kierkegaard as an ironist. Whereas Garff used Kierkegaard's style and hearsay in order to make his point this paper will focus upon two aspects of Kierkegaard's thesis that have never been discussed together. My argument will be made by analyzing the major points in Part One of Kierkegaard's thesis in conjunction with the language that Kierkegaard uses while describing the force of his arguments. As will be shown, there is a vast discrepancy between the content and language. Irony is a concept that requires there to be a disparity between what is said and what is meant; Kierkegaard describes this as a discrepancy between the inner and the outer. Therefore if there is found to be an obvious variance between the actual force of his arguments and the proposed force then this would point to irony. Given that Kierkegaard is a prominent figure in the fields of philosophy and theology there has been a resistance towards an ironic interpretation of Kierkegaard's "On the Concept of Irony" as it creates uncertainty surrounding his other works as well. Even though scholars such as Peter Tudvad have argued against an ironic interpretation of Kierkegaard this research shows that there is much merit in an ironic interpretation.

## **Unpacking the Western Pond Turtle: Taking a New Look at Habitat Relationships in the Pacific Northwest**

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**Presenter:** Erin Samuda, English Literature

**Faculty Sponsor:** Laurie Ricou, English Literature

In the field of eco-criticism and habitat studies, the approach in using the subject matter of the western pond turtle as a tool by which to discover and illustrate habitat relationships has never before been closely examined. The way in which the western pond turtle appears (or does not appear) in its real-life habitat as well as its political, poetic, and mythological presence serves to shed new light on such issues as the commoditization of nature and the general disconnection with the natural world that plagues modern society. Starting with the research of Frank and Kate Slavens, pioneers in the research and conservation of the western pond turtle, I compared and contrasted the current scientific and ecological research with the imagery of turtles that exist in an array of current literary sources. Such examples are contemporary poetry by John Updike, Gary Snyder, and Henry David Thoreau, as well as First Nations mythology. Using the combination of the turtle's ecology, natural habitat, and literary symbolism, I show how the western pond turtle serves as a barometer and grand metaphor for the culturally based relationships humans forge with the natural environment around them.

## **19th Century Voices Speaking of the Body: Indigeneity and Colonialism Written in Clothing**

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**Presenter:** Zachary Schoenberger, History

**Faculty Sponsor:** Coll Thrush, History

The majority of 20<sup>th</sup> century Western historical inquiry has interpreted colonialism from an euro-centric perspective, describing United States expansionism according to a “frontier” model: American settlers continually advanced westward, “improving” the land and “civilizing” the native population. Recently, however, the loss of Indigenous life and culture has become a focus and, rather than depicting Indigenous people as passive victims and their cultures as being in constant decline, significant examples of resistance are being identified – both violent and otherwise – as having occurred throughout the colonial period. In addition, contemporary scholars have recently recognized the body as a site where Indigenous identity is constructed and maintained, especially within the colonial or neocolonial context (Valdivia 535). A demand exists for the development of a historical basis from which to understand this phenomenon. The many attributes associated with the body contained codified meaning for both Native and American cultures. The voices of a Cheyenne woman named Iron Teeth, of American boarding school students, Lone Wolf, Luther Standing Bear, and Sun Elk, of a Spanish mission student, Pablo Tac, and of others, indicate that, during this period of colonization and throughout the United States and its territories, clothing determined perceived identities, and bodily violence enforced conformity, while both – through the introduction of gendered European clothing – manipulated and determined gender performance and gender perceptions. The body was a site for the Indigenous person to maintain his or her indigeneity, for the colonist to successfully enforce colonization, for the Indigenous person to outwardly and actively assume the role of the American and, for some Indigenous people, it was a site for accommodating both. This analysis offers a unique perspective that honors the body as a site of both Indigenous resistance and of accommodation, rather than a traditional perspective that largely ignores resistance and especially the role of the body in the colonial process. I will elaborate on these themes and their manifestations in 19<sup>th</sup> century North America in an effort to fortify a historical basis from which to better appreciate the significance the body as part of the colonial process.



## **PANEL #7 – Reducing Animal Distress - Rm. 461**

### **Reducing Feline Upper Respiratory Infections Through Behavioural Interventions**

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**Presenter:** Alex Chiu, Animal Science, Land and Food Systems

**Faculty Sponsor:** Dan Weary, Animal Science, Land and Food Systems

Upper respiratory infections (URI) affect over 50% of cats entering animal shelters. Viral reactivations are more prevalent in cats exposed to psychological stressors which lead to compromised immune competence, and can be a predisposition to URIs. The results of the initial study showed that emotional states affect immune competence through changes in secretory immunoglobulin A (S-IgA) levels. The current study aims to examine the effectiveness of using behavioural interventions to increase positive emotions as a way to increase S-IgA levels. Upon admittance to the Vancouver Society for the Prevention of Cruelty to Animals, those who show anxiety related behaviours are chosen for the study. Half of the cats will be assigned to a gentling treatment group while the other half will be placed in the control group. The gentling treatment administered involves face rubbing which is known to relax cats that perform anxious behaviours. The behaviours of cats in the study are being recorded and analyzed to examine changes in emotional states. Immune competence is being evaluated through S-IgA levels extracted from faecal samples which will be collected twice daily. Throat cultures and tear samples are also collected on days 1, 4, 7, and 10 to test the occurrence of viral reactivation. Preliminary results show that cats given the gentling treatments perform anxious behaviours less often and for shorter durations along an increase in self maintenance activities such as eating and cleaning themselves. We hypothesize that the witnessed behavioural changes in associated with the gentling treatment will lead to an increase in S-IgA, in turn increasing immune competence and reducing viral reactivation. We anticipate showing that by improving effectiveness of behavioural interventions in animal shelters, the frequency of feline URIs can be reduced.

### **Using Carbon Dioxide and an Automated Box to Euthanize Mice**

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**Presenter:** Carly Moody, Land and Food Systems

**Faculty Sponsor:** Bev Chua, UBC Animal Care Centre

The most commonly euthanized laboratory animals are mice and rats. The accepted method gradually fills a chamber with carbon dioxide (CO<sub>2</sub>) gas to euthanize rodents. However, growing scientific evidence demonstrates this method is associated with physiological and behavioral distress. Accepted flow rates range between 14-30% CO<sub>2</sub>, although it is unclear which rates cause the least amount of distress. This study uses an automated euthanasia box (Ehret, Germany) to control specific flow rates of CO<sub>2</sub>, and will address two objectives: 1) to determine if this box is an acceptable replacement for imprecise manual flow rates, and 2) which flow rates minimize distress in mice subjected to the gradual-fill method of euthanasia.

### **Wound Healing Following Hot-Iron Branding in Steller Sea Lions**

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**Presenter:** Christina Tse, Land and Food Systems

**Faculty Sponsor:** Kristen Walker, Land and Food Systems

Hot-iron branding is an identification tool used in marine mammal research. Branding is known to cause acute pain. Delayed wound healing may cause chronic pain, however wound-healing processes in sea lions are not yet understood. Our study aimed to: 1) develop a clinical wound assessment scale for sea lions using human and porcine burn model parameters, and 2) use this scale to score digital

images of brand wounds. Data were collected from 12 juvenile Steller sea lions for 10 weeks following branding. Wound healing parameters included pigmentation, epidermal coverage, discharge, and duration and degree of inflammation. Preliminary results show the majority of wounds are not fully healed 10 weeks post-branding. These results suggest that alternative marking procedures and chronic pain management strategies should be investigated.

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## ☞ Poster Presentations ☜

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### ***Morning Poster Session > 11:00am – 12:10pm***

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## **Morning Poster Session > 11:00am – 12:10pm**

### *Animals & Plants*

1.

#### **Does Competitive Fitness against a Common Competitor Predict Competition Outcome between Haploids and Diploids in *Saccharomyces cerevisiae*? Development of a Flow Cytometry Protocol to Measure Competition Outcome between Haploid and Diploids**

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**Presenter:** Yukon Chen, Biology

**Faculty Sponsor:** Sarah P. Otto, Zoology

During a long-term evolution experiment with the budding yeast, *Saccharomyces cerevisiae*, previous work discovered that mutant diploids (with every cell containing two copies of each chromosome) took over in replicate haploid lines (with every cell containing one copy of each chromosome) within 2000 generations. This unexpected result warranted additional research into the reasons behind this phenomenon. Specifically, the lab is interested in why diploids are more fit than haploids. Further experiments were first conducted to measure the relative fitness levels of isolated haploid and diploid colonies of *S. cerevisiae* against a common competitor yeast line. The highest and lowest fit haploids and highest and lowest fit diploids were then used to ask whether fitness compared to a common competitor predicts who will "win" (i.e., take over) in direct competition. Here we report the results of this second set of experiments. Haploids and diploids were directly competed against each other through batch culture transfers for 2 weeks (~50 generations). Upon completion of this period, each culture was assayed using flow cytometry to determine the resulting proportion of diploid to haploid individuals. A flow cytometry protocol was developed to measure the competition outcome. Our results from this second set of experiments show complex patterns. Most of the highest fit lines did out-compete the lower-fitness lines, though this was not always the case. Unexpectedly, some high fitness haploids took over high fitness diploids. In other experiments, no significant changes were detected after 2 weeks of competition. Future experiments will be conducted to reconcile these differences. Different florescent techniques can be used to differentially mark pairs of haploids or diploids. Additionally, further direct competition experiments can be conducted using lines of *S. cerevisiae* from different time points of the initial experiment. It remains to be determined why diploid mutants took over in haploid lines.

2.

#### **Stuck in Endocycle Microtubules: Ploidy Regulation and Cell Cycle Genes in Stomatal Development**

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**Presenter:** Yana Eglit, Botany

**Faculty Sponsor:** Fred Sack, Botany

The surface tissue of most land plants is covered by millions of mouth-like structures, stomata, enabling vital gas exchange to occur. A stoma consists of an opening surrounded and regulated by a pair of guard cells. Their optimal functioning requires proper spacing and well-regulated cell development, the genetic basis of which is the focus of our lab. A significant step in the stomatal development pathway is regulation of cell division to ensure it happens only once, yielding exactly two guard cells. While some relevant genes have been identified, the mechanisms of this process remain poorly understood. Cytoskeletal drugs can interfere with cell division, yielding fresh insights into its regulation. Application of these drugs to a stomatal cell division mutant exhibited an

unexpected phenotype: massive single guard cells with high ploidy levels. My project focuses on the relationship between microtubule disruption, genetics and ploidy regulation in stomatal development.

### 3.

#### **Essential Oils as Botanical Insecticides against Larvae of the Cabbage Looper**

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**Presenter:** Carla Fuginski, General Sciences

**Faculty Sponsor:** Yasmin Akhtar & Murray Isman, Land and Food Systems

Botanical insecticides are effective, relatively cheap, and eco-friendly alternatives to using synthetic chemical insecticides. We tested thirteen essential oils for feeding deterrence effects against larvae of the Cabbage Looper. The bioactivity of some essential oils has been tested on the garden pest *Trichoplusia ni* (Akhtar, Yeoung, Isman 2006). The pest, which is commonly known as the Cabbage Looper, is responsible for the destruction of leaves on various types of crop plants. In this experiment, we applied different essential oils to cabbage leaf discs in bioassays to determine if these oils showed feeding deterrence effects. We used methanol as the control. The feeding deterrence was calculated (at 50.0µg concentration) using twenty four repetitions of the bioassays. The oils which showed a feeding deterrence above 50% were then tested at lower concentrations (25.0, 12.5 and 6.25µg), to determine the  $DC_{50}$  values (the concentration causing 50% feeding deterrence compared to the control). The ideal concentrations of the oils are determined by the  $DC_{50}$  values. Further research into the toxicity and growth inhibition can help determine if these oils can effectively be used as botanical insecticides.

### 4.

#### **A Digital Method of Measurement and a Logistic Growth Model for the Blooming Angle of Miniature Rose with Their Application on Cyclamen and Hyacinth**

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**Presenter:** Violet Luo, Microbiology & Immunology

**Faculty Sponsor:** Gordon Bates, Chemistry/Science One

As an individual research project of the Science One Program 08-09, my research investigated the mathematics behind the blooming petals of three house plants. Currently the roughly 260,000 species of angiosperm (flowering plants) known to exist in the world contribute to more than one tenth of the total number of species of living organisms. With this vast variety in the angiosperm group, each species still blooms in its own fashion. In this project, three cultivars of house flowering plants, *Rosa chinensis minima* (miniature rose), *Cyclamen persicum* (cyclamen) and *Hyacinthus orientalis* (hyacinth) were investigated for their blooming angles, with an emphasis on the miniature rose, because compared to the nodding flowers of cyclamen and the undifferentiated tepals of hyacinth, the rose shows many characteristics of a common flower, such as the upright corolla and the well distinguished petals and sepals. The angular positions of several miniature rose petals throughout the course of their bloom were measured with a digital protractor constructed using a function plotting software. The angles were then modeled as functions of time, and an analogy was drawn from the blooming of the petals to the logistic growth of populations. When the method was applied to cyclamen and hyacinth, it was found that instead of the logistic model, the cyclamen petals followed a natural logarithmic model, and the hyacinth tepals indicated a linear blooming trend. A species-specific model for the blooming angle of miniature rose was determined in this project, and the digital method of measurement of angles developed can be applied to a broad range of situations where precise measurements of angles are required: 
$$[\hat{I}_s(t) = J / (1+(J-\hat{I}_o)/\hat{I}_o * e^{(-jt)})]$$

5.

### **Intraspecific and Intraploidy Differences in Gill Morphology of Triploid and Diploid Rainbow Trout (*Oncorhynchus mykiss*)**

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**Presenter:** Jackson Wu, Biology

**Faculty Sponsor:** Christine Verhille, Biology

Triploid (3n), organisms with 3 copies of a chromosomes instead of 2, fish are viable alternative to diploid (2n) fish because they are sterile and thus do not cause genetic impacts on the wild population should they escape the fish farm. Furthermore, 3n invest more energy into somatic growth since they do not develop gonads (Benfey 1999). However, 3n have higher mortality rates, and consequently lower farm yields, than diploid fish (2n) (Galbreath and Thorgaard 1995, Cotter et al. 2000, Cotter et al. 2002). These mortalities may be linked to 3n having a smaller gill surface area than 2n (Flajshans and Piackova 2006). Only two studies have compared the gill morphology of 2n and 3n of a single species (Sadler, Pankhurst and King 2001, Flajshans and Piackova 2006). Gill surface area affects cardiorespiratory capacity because maximum metabolic rate is limited by the amount of oxygen acquired by the exposed gill surface. Bernier et al. found that 3n fish have reduced arterial blood oxygen content compared to 2n conspecifics (2004). This likely contributes to the limited aerobic scope in 3n versus 2n ((Bernier et al. 2004)). Aerobic scope is the difference between the lowest metabolic rate able to support life and the highest achievable metabolic rate. The narrow aerobic scope is detrimental to 3n survival in the wild because it limits the metabolic reserves available to face the challenges a fish experiences in the wild. This study will investigate differences between 3n and 2n gills as well as intraspecific and intraploidy variability in gill morphology in rainbow trout. This will be accomplished by examining interploidy, intraploidy differences of trout gill filaments and lamellae. It is hypothesized that the gill surface area of 3n rainbow trout will be smaller than that of 2n trout, reflecting the lower arterial blood oxygen content found in 3n Chinook salmon relative to their 2n counterparts.

## **Engineering**

6.

### **Building an Autonomous Robot**

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**Presenter:** Shaun Lee, Engineering Physics, Applied Science

**Faculty Sponsor:** John Nakane, Engineering Physics, Applied Science

Building an autonomous robot that meets specific requirements generally involves three stages: design, assembly, and debugging. For the purposes of Physics 253, the specific requirements were being capable of following a given path of electrical tapes, tracking an infrared signal, and fetching the target placed below an obstacle without any human intervention. The biggest decisions during the design stage were as follows: 1) for the platform, a thick sheet of plywood was used due to its stiffness, light weight, and convenient attachment; 2) a claw hanging on a crane arm was the chosen pick-up mechanism because this method seemed much reliable; 3) the robot was moved by two engines each controlling one back-wheel which allowed the robot to turn on the spot. The assembly consisted of building the actual frame including the claw out of sheet metal and plywood using a water-jet cutter, constructing electronic chips that perform functions such as receiving inputs from a microprocessor and moving the engines accordingly or converting physical measurements into digital signals, and finally writing a computer program in C that automates the robot. To complete the required tasks, much debugging had to be done after the assembly; for example, the program had to be re-written several times to take into account of problems discovered during test-runs. However,

the main design decisions proved to be correct and did not require any significant changes. After a total of two months of intense work, my team was able to complete the robot.

## *Pharmaceutical Sciences*

7.

### **The Effect of Exenatide on Pancreatic Beta Cell Survival**

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**Presenter:** Iris Kim & Peter Lin, Pharmaceutical Sciences

**Faculty Sponsor:** Lucy Marzban, Pharmaceutical Sciences

Type 2 diabetes is a disorder characterized by increased blood sugar level associated with progressive insulin unresponsiveness and beta-cell dysfunction. Insulin is the blood sugar lowering hormone secreted from beta cells, a type of cells in pancreas. In type 2 diabetic patients, high blood sugar level leads to increased insulin secretion from beta cells until beta cells cannot meet the body's insulin demand anymore; this leads to beta-cell exhaustion and eventually beta-cell apoptosis (programmed cell death). Exenatide is a new agent that mimics the action of another hormone, incretin. Exenatide is recently approved for treatment of type 2 diabetes. Exenatide has been shown to maintain beta-cell function by decreasing beta-cell death and promoting beta-cell proliferation in the animal models. The effects of Exenatide on survival of beta cells in human islets are less studied. In this study, we examined the potential effects of Exenatide on survival of human islet beta cells. The human islets (group of cells in pancreas) were collected from donors and labelled with radioactive dyes for insulin and TUNEL. Then the number of dying beta cells and non-apoptotic beta cells in islets were compared between Exenatide-treated and control group. The Exenatide-treated human islets had a markedly lower number of apoptotic beta-cells compared to non-treated control islets. We next labelled cells for insulin and glucagon (a hormone that oppose insulin actions) and quantified the number of islet beta-cells and alpha-cells (cells that secrete glucagon) in each condition. The comparison between Exenatide-treated groups and non-treated groups did not show any significant difference between the beta-cell to alpha-cell ratio in those islets, which is likely due to the small sample size in our study. In summary, these data suggest that treatment with Exenatide reduces beta-cell death in human islets, leading to enhanced beta-cell survival.

8.

### **Biodistribution of Amphotericin B into the Liver and Spleen of Non-Infected and Visceral Leishmaniasis Infected Mice**

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**Presenter:** Raymond Li, Pharmaceutical Sciences

**Faculty Sponsor:** Kishor Wasan, Pharmaceutical Sciences

Visceral Leishmaniasis (VL), caused by parasites of the genus *Leishmania*, is a deadly systemic disease that mainly affects the Third World population and targets mostly the liver and spleen. The current front line treatment is AmBisome®, an intravenous liposomal formulation of the antibiotic amphotericin B (AmB). Although effective, AmBisome® is only available as injectables which are expensive and difficult to access in developing countries. Our lab has recently proposed a novel oral lipid-based formulation (iCo-009) which can potentially lower drug costs and enhance patient accessibility. This study investigates the impact that VL has on AmB concentrations in the liver and spleen of mice following administrations of AmBisome® and iCo-009. Non-infected mice were divided into three treatment groups: oral iCo-009 at 10mg/kg and 20mg/kg every 12 hours for 5 days, and intravenous AmBisome® as a 2mg/kg single dose. The animals were sacrificed 7 days



following treatment initiation, and AmB concentrations in their livers and spleens were analyzed by HPLC. The concentrations were then compared to data similarly obtained for VL infected mice. It was found that AmB concentration in the liver and spleen of VL infected mice is significantly lower than in organs of non-infected animals. The differences between infected and non-infected mice in terms of AmB concentrations in liver and spleen are less prominent in the case of oral iCo-009 than for Ambisome®.

## ***Microbiology & Immunology***

9.

### **The Effect of Melanotransferrin on Levels of Reactive Oxygen Species**

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**Presenter:** Grace Lim, Biology

**Faculty Sponsor:** Mei Mei Tian, Microbiology & Immunology

Occurring due to natural reactions in the body, reactive oxygen species are molecules containing unpaired electrons. They are reactive with cell structures and according to Crowe and Bartfay, they “induce tau glycation and promote lipid peroxidation, leading to disruption in neural membrane physiology” (2002 p. 285). Furthermore, cells are normally capable of balancing antioxidants however “in cells with diminished natural antioxidant capacity, normal metabolic sources of ROS may overwhelm the redox balance and push cells into a condition of oxidative stress” (Kresja and Schieven p.35). Melanotransferrin (P97) is a secondary transport system for the ROS iron especially in situations of iron overload such as Haemochromatosis. Based on this, I hypothesize the levels of ROS in cells will fluctuate inversely with the levels of expression of P97. Using a chemical called DCF-DA to measure levels of fluorescence and thus presence of ROS of each cell type generating different amounts of the P97 protein, I will determine if there exists such a relationship.

10.

### **Investigating the Connection between FOXO3A and Human Longevity**

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**Presenter:** Ryan Poon, Hilary Leung & Alex Wong, Biochemistry

**Faculty Sponsor:** Joanne Fox, Microbiology & Immunology

Human longevity is determined by a complex interaction of genetic and environmental factors. Research has shown that genetic factors become more significant with age. The human forkhead box O3A (FOXO3A) gene has been implicated to be one of the important factors for longevity. Human FOXO3A is homologous to the daf-16 gene in roundworm, *Caenorhabditis elegans*. The DAF-16 protein is a transcription factor that promotes longevity in *C. elegans* by regulating antimicrobial, antioxidant, and metabolic genes. This longevity model advocates FOXO3A as an ideal candidate for studying human longevity. From previous studies, single nucleotide polymorphisms (SNPs) in FOXO3A have been associated with prolonged survival in centenarians, individuals over the age of 100. We hypothesize that the FOXO3A transcription factor has conserved domains that are essential for its activity, and changes in these regions will disrupt its activity and affect longevity. We will investigate this with two aims using approaches based on bioinformatics. Our first aim is to identify the key conserved domains in FOXO3A across species. Proteins with similar functions are highly conserved across species; therefore, our comparison between species will likely provide information on essential domains in the FOXO3A transcription factor. Our second aim is to identify possible protein alterations based on DNA alterations (SNPs) on the FOXO3A gene. A change in the DNA sequence may affect the protein structures; thus, resulting in an altered protein that cannot interact with other substrates in the cell. With such changes, human longevity may be affected.

11.

### **Peptide Effect on Human Macrophage Differentiation: Analysis of Cell Surface Markers**

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**Presenter:** Disha Raj, Microbiology & Immunology (Biotechnology)

**Faculty Sponsors:** Robert Hancock & Olga Pena, Centre for Microbial Diseases & Immunity Research

Macrophages play a key-role in our immune system providing protection against pathogens and clearing cellular debris. Based on their functions they are normally divided in two types: Classically activated macrophages (M1), which are involved in inflammatory responses, and alternatively activated macrophages (M2), which are involved in the resolution of inflammation. Exaggerated M1 responses can lead to many inflammatory diseases such as Inflammatory Bowel Disease (IBD), Rheumatoid Arthritis (RA) and many others. Thus, there is a need to find methods to inhibit these exaggerated responses. Host defense peptides play a central role in innate immunity by maintaining homeostasis. This process is achieved by regulating different immune functions such as reduction of pro-inflammatory responses, up-regulation of anti-inflammatory mediators, cell chemo-attraction, wound healing, among others. Therefore we proposed that host defense peptides (HDP) and innate defense regulators (synthetic HDP) could act as inducers of M2 polarization in human macrophages and if so, these molecules would be excellent candidates for treating inflammatory diseases such as IBD. We approached this hypothesis by differentiating *in vitro* human blood monocytes into macrophages using a cytokine named Macrophage-Colony Stimulating Factor (M-CSF) evaluating the effect of peptide treatment for 7 days. Subsequently examination of cell surface markers that revealed M1 or M2 polarization was performed by Fluorescent Activated Cell Sorting (FACS), where the markers were labeled with the fluorescent tags. Results of this analysis showed down-regulation in the expression of M1 markers such as CD80 and up-regulation of M2 markers such as CD163, CD200R and CD206. These preliminary data confirm the ability of peptides to promote macrophage differentiation towards an M2 phenotype.

12.

### **Host Resistance to *Salmonella Typhimurium*: Tackling It One Gene at a Time**

---

**Presenter:** Devina Wong, Biology

**Faculty Sponsor:** Winnie Kum, Microbiology & Immunology

Salmonellosis is a gastric disease caused by *Salmonella* species, of which there are 1.3 billion cases of occurrence each year. Symptoms include diarrhea, fever and vomiting. It is known that host resistance plays a role in the susceptibility to infection, but the effect that most genes have on host susceptibility to *Salmonella* infection is still unclear. To study the effects of host genetics to *Salmonella*, we utilized a mouse model that closely simulates *Salmonella Typhimurium* infection in humans. In this study, inbred mice with the Akt2 allele knocked out were chosen as the subject, as the Akt2 proteins are known to play a role in regulating apoptosis, or cell death, in intestinal epithelial cells, where initial *Salmonella* pathogenesis takes place. It was found that *Salmonella* can make use of said proteins to protect its own cells from being apoptosed. With that in mind, we hypothesized that inflammatory response in Akt2 KO mice should be less severe as anti-apoptotic activity is nullified by the deficiency of Akt2. To test such inflammatory response, we infected Akt2 KO mice and wild-type mice with *S. Typhimurium*, and compared bacteria loads found in the spleen, colon and cecum. Myeloperoxidase stained tissue sections were prepared and viewed under immunofluorescent microscopy to detect for the presence of neutrophils.

## **Afternoon Poster Session > 11:00am – 12:10pm**

### *Arts & Social Sciences*

**13.**

#### **Working Class Students at UBC**

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**Presenter:** Mike Kehl, Sociology

**Faculty Sponsor:** Daniyal Zuberi, Sociology

Students from working-class backgrounds often report difficulty “fitting in” at university. They often report difficulties relating to other students as well as problems accepting the general atmosphere of the university. At the same time, many working-class students report that their university attendance serves to create tension between themselves and their families as well as their working-class friends. This study proposes that habitus discontinuity is the primary contributor to these difficulties. Using structured interviews, the goal of this research project is to examine in what ways the discontinuity between the working-class and middle-class habitus is responsible for these difficulties and what strategies these students use to reconcile the two habitus.

**14.**

#### **Happy Guys Finish Last: The Impact of Emotion Expressions on Sexual Attraction**

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**Presenter:** Raya Rhabari, Psychology

**Faculty Sponsor:** Jessica Tracy, Psychology

This research examines the role of emotion expressions in interpersonal attraction. Specifically, the research aimed to find relative sexual attractiveness of individuals showing emotion expressions of happiness, pride and shame. Across two related studies using different images and samples ranging broadly in age, there is a large gender difference that emerged in the sexual attractiveness of happiness displays as well as pride, where women are viewed as most attractive when displaying happiness, while males are found more attractive when displaying pride. Shame displays were relatively attractive in both genders, although the effects did vary based on age as well as gender. This research provides evidence that distinct emotion expressions have divergent effects on sexual attraction, which varies by gender, but is largely consistent across different age groups.

**15.**

#### **Layers of Stigma Among Adolescents: Development of a Comprehensive Measure**

---

**Presenter:** Nardin Roshan Moniri, Science

**Faculty Sponsor:** Jennifer Matthews, Nursing

According to studies done by Link and Phelan (2006) and as it has been referenced in Saewyc et.al (2009), the social, psychological, physical and economic consequences of stigma has become one of the major arising concerns in recent decades. Poverty, low social status, reduced access to housing and health care, poor psychological adjustments and suicide have been greatly associated with stigma (Saewyc et.al., 2009). As stigmatized individuals reach adolescents and adulthood, they normally gain lower social and emotional supports, become vulnerable targets for sexual/physical violence and they show lower degree of attachment to important social structures such as family, school and religious organizations (Saewyc et.al., 2009). Since most of the studies that have been so far conducted were mainly concentrated on a single characteristic of stigma e.g. mental illness; it has become evident that the “layered” stigma (the component effects of stigma from multiple stigmatized

characteristics) requires the immediate attention from the scientific groups. The question that our research team tries to answer is: how scientists can develop a comprehensive technique to measure “layered” stigma among adolescents? By considering four different study methods such as 1) measure/item development, 2) piloting the stigma measure, 3) psychometric properties of the measure’s scores and 4) developing a short form of the stigma we are able to identify layered stigma among adolescents. The goal of this research is to form multiple focus groups with potential stigmatized youth as well as additional individual youth interviewees in order to identify ways of expressing enacted stigma not previously identified in the literature (Saewyce et.al., 2009).

## 16.

### **Food and the Feminine: Images of Food in Women's Lifestyle Magazines**

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**Presenter:** Jenniffer Tai, Sociology

**Faculty Sponsor:** Amy Hanser, Sociology

How is the consumption of food related to socially constructed ideas about gender? In particular, how have ideas about what it means to be “feminine” and how women should relate to food been reflected and reproduced through the media? To construct a theoretical framework upon which to address these questions, this project will use feminist theory to link notions of gender, food, and the body, and will overview already existing research regarding gender representation in advertisements and the media as a social influence. This project will focus on a specific form of media: print advertisements directed at women, containing food imagery. This study will consist of a discourse analysis of depictions of food in advertisements in the magazine, *Chatelaine*, within the time period of 2007-2010. This discourse analysis will concentrate on the construction of femininity in the advertisements as related to discourses of discipline and control over the body, the nurturing of others, and indulgence and sin. By engaging this analysis with existing theoretical knowledge, this study aims to critically examine constructions of femininity and the gendered nature of the consumption of food.

## 17.

### **Painting Land Claims in B.C: A Comparative Analysis of Canadian Art**

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**Presenter:** Vivienne Tuttlewski, English Literature & Art History

**Faculty Sponsor:** Sarah Stanners, Art History and Visual Arts

In 1920 the *Group of Seven* (a group of Canadian painters of European descent) was formed to produce and promote Canadian identity through landscape painting. Their paintings imagined Canada as a wild and unoccupied terrain while disregarding pre-existing indigenous communities. At the same time, European settlers were seizing and exploiting Canadian land while devastating indigenous populations. This research project presents a comparative analysis of select paintings, with specific focus on works by the *Group of Seven* and First Nations artist Lawrence Paul Yuxweluptun. Additionally, Yuxweluptun’s decision to paint using elements of First Nations art and European Surrealist techniques creates a hybrid form of art that refuses categorization as either “Native” or “Western,” and instead focuses on the fact that “we all have to live from this land” (qtd. Artist statement, 1995).

18.

### **Assessment of Inhibitory Oligonucleotides (ODNs) in Inhibiting TLR7 and 9 Effects in Diabetes Prone NOD Mice**

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**Presenter:** Ting Ya (Emily) Chang, Pharmacology

**Faculty Sponsor:** Jan Dutz, Dermatology and Skin Science

Type 1 diabetes (T1D) is an organ-specific autoimmune disease in which insulin-producing cells of the pancreas are destroyed by cytotoxic T cells of the body's immune system. Recently, toll-like receptor (TLR) 7 and 9 have been implicated as possible triggers of T1D. TLRs are receptors present on certain immune cells and they recognize conserved patterns on pathogens. When activated, TLRs influence the production of pro-inflammatory cytokines (signaling molecules used by immune cells to communicate with each other) in dendritic cells and macrophages of the immune system. Despite this role, there is evidence suggesting that TLRs can also recognize self-molecules such as the body's own RNA and DNA as foreign. The inappropriate activation of TLRs results in the activation of other immune cells which is thought to activate the cytotoxic T cells that in turn destroy pancreatic cells. Previous research in our lab shows that inhibition of TLR7 and/or 9 signaling in non-obese diabetic (NOD) mouse models (mouse model of human T1D) by inhibitory molecules delays the onset of spontaneous T1D. In order to determine whether the specific blockade of TLR7 or 9, or both are required to delay the onset of spontaneous T1D, we assessed the inhibitory effect of ODN2088 (TLR7 and/or 9 inhibitor) on TLR7 and 9 signaling in NOD mouse. Studies have shown that ODN2088 only inhibits CpG (TLR9 agonist) but our results indicate that ODN2088 also partially inhibits CL097 (TLR7 agonist) and blocks the activation of T cells induced by CL097 *in vivo*. Also, the inhibition of TLR7 signaling with IRS661 (TLR7 inhibitor) delayed the onset of T1D in transgenic 8.3 NOD mice. These findings suggest that inhibition of both TLR7 and 9 delays the onset of T1D and thus indicate their potential roles in the initiation of T1D.

19.

### **Characterizing the Progression of Adipose Tissue Inflammation and Apoptosis in Relation to Cell Size During the Onset of Diet-Induced Obesity**

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**Presenter:** Amy Hung, Cellular & Physiological Sciences

**Faculty Sponsor:** Susanne Clee, Cellular & Physiological Sciences

Obesity, a state characterized by low-grade inflammation of the fat tissue, has become increasingly common, affecting 400 million adults worldwide (World Health Report, 2002). As fat cells grow larger, they can reach maximum capacity and face metabolic stress, limiting access to blood and oxygen (Hosogai et al., 2007). Studies have suggested that as fat cells grow bigger, their properties can change, causing dysregulation of hormones (adipokines) that control appetite and nutrient metabolism (Hotamisligil, 2003). The dysfunction of these large fat cells can subsequently recruit macrophages to induce inflammation and cause cell-programmed deaths, apoptosis, leading to complications such as diabetes and cardiovascular diseases. However, the underlying mechanism remains largely unknown, as few studies have directly characterized the role of large cells in fat tissue inflammation and apoptosis. In the present study, we investigated the physiological changes of reproductive fat tissue in the development of obesity by examining the changes in cell sizes, macrophages, and apoptotic cells. The study looked specifically at C57/BL/6 male mice fed on high-fat diet, over the ages of 6 to 20 weeks. Immunohistochemistry was used to quantify macrophages in the form of crown-like structures (CLS) and to measure the number of apoptotic cells. The results demonstrated increases in the average cell diameter, CLS density and apoptosis density over a period

of 6 to 20 weeks. There were significant increases in all three parameters between 8 and 16-week mice.

**20.**

### **Airway Reactivity: Time Course of the Refractory Period**

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**Presenter:** Jae-Young Kwon, Kinesiology and Health Science

**Faculty Sponsor:** Don McKenzie, Sports Medicine

Due to complex mechanisms underlying exercise-induced asthma (EIA), there is still debate on the time frame required for lung functions to return to baseline condition. Previous studies have shown that for subjects with EIA, bronchoconstriction can occur without proper warm-up exercise. On the other hand, bronchodilation was observed if warm-up intensity was increased to 60% of maximal exercise capacity. Therefore, we investigated the time frame required for pulmonary function to return to baseline after two exercise bouts following proper warm-up in asthmatics. Our result shows that asthmatics maintained and even increased their pulmonary function 5, 10, 15, and 30 minutes after exercise, suggesting that the warm-up helped to dilate the lungs.

**21.**

### **Identify Novel Genes that Control Granule Cells Division**

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**Presenter:** Lee Ling Yang, Biology

**Faculty Sponsor:** Dan Goldowitz, Medical Genetics

Granule cells are the most abundant neurons in the cerebellum, the brain structure that controls movement and balance. The correct quantity of granule cells is determined by complex interactions between cell division regulators. There is much evidence indicating that mutations in these regulators result in abnormal granule cells division. These alternations can lead to Medulloblastoma, the most common malignant brain tumor in children. Current studies have only identified 70% of the genetic mutations which cause Medulloblastoma, suggesting the existence of regulators which have not yet been found. In this study, we identified a potential regulator, Lysl Oxidase Like Protein-1 (Loxl-1). It is highly expressed in the proliferative area of granule cells. Recent findings have also revealed that Loxl-1 is significantly correlated with breast cancer progression. Both of these indicators demonstrate that Loxl-1 performs a vital function in granule cells and its mis-expression may result in tumor formation. Few researchers have studied the role of Loxl-1 in the brain. We are the first to investigate how Loxl-1 affects granule cells division. To validate the function of Loxl-1, we performed an *in vitro* study. In this analysis, we isolated granule cells from the cerebellum of mice. The expression of Loxl-1 was then suppressed in these cells and the effect on granule cells division was examined. The results of this study will identify novel regulators which control granule cells proliferation. In examining the molecular differences between normal granule cells and tumor cells division, we can provide insight into understanding the pathogenesis of Medulloblastoma.

**22.**

### **The Effects of Secondary Degeneration on Size, Shape and Synaptic Input in Neurons in Gracile Fasciculus Following a Complete Spinal Cord Injury**

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**Presenter:** Jenny Lee, Biology

**Faculty Sponsor:** Mario Cruz, iCORD

Secondary degeneration occurs in days and weeks following injury to the spinal cord and is characterized by a gradual deterioration of axons and dendrites on both sides adjacent to the injury.

Due to the close cluster of neurons in the grey matter of the spinal cord, the effect that secondary degeneration has on these cells has not been widely examined. The purpose of this study is to characterize the consequences that secondary degeneration has in a population of neurons residing in the gracile fasciculus (white matter) which being widely spaced allow for individual tracing and measuring. Control (uninjured) neurons will be compared to groups of neurons 1 week and 1 month post-injury, comparing their changes in size, shape and synaptic input. Given their close functional, morphological and neurochemical resemblance to neurons in the III-VI laminae of the dorsal horn, the neurons in the gracile fasciculus make an easily translatable example of the effects that secondary degeneration would have in neurons residing in the grey matter.

## **23.**

### **Regulation of Developmental Neurogenesis by the Inhibitory Guidance Cue Semaphorin 5B**

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**Presenter:** Qian Qian (Rachel) Liu, Pathology & Laboratory Medicine

**Faculty Sponsor:** Timothy O'Connor, Cellular & Physiological Sciences

Semaphorins are a family of secreted or membrane bound proteins that act as guidance molecules essential for directing the correct connectivity of the developing nervous system. It has been shown that the class 5 semaphorin, Sema5B, is expressed by progenitors of neurons called radial glia (RG) and not by their neuronal progeny. We knocked-down and over-expressed Sema5B in the mouse fetus brains at embryonic day 14 (E14) and let the brains grow in organotypic slice cultures. Healthy cultures were kept for 2 to 5 days and processed for immuno-fluorescence labeling of RGs, intermediate progenitor cells (IPC), and neurons. Our hypothesis is that the loss of function of Sema5B leads to a loss of RG as they precociously differentiate into neurons with a loss of self-renewing potential, as would a terminally differentiating IPC. We expect to see an initial increase in the number of neurons in the cortical plate (outer region of cortex), with a progressive depletion of the RG population in the ventricular zone (region of the cortex lining the ventricle). The over-expression of Sema5B should have the opposite effect, suppressing RG from exiting the cell cycle. As a result, radial glia would be maintained in the ventricular zone (VZ) as possibly non-neurogenic, self-renewing stem cells, and a decrease in the number of neurons in the cortical plate would be expected, with progressive expansion of the VZ. The preliminary results support the hypothesis and indicate that RG require Sema5B for their maintenance, and without it would lose their self-renewing capabilities.

## **24.**

### **Pediatric Evaluation of Disability Inventory (PEDI) Inter-Rater Reliability**

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**Presenter:** Edmund Tan, Pediatrics

**Faculty Sponsor:** Hal Siden, Pediatrics

The Pediatric Evaluation of Disability Inventory (PEDI) is an instrument designed for assessing function in young children. Three domains: self-care, mobility and social function, are used in the instrument to evaluate the child's functional performance and capability. The PEDI is used as one of the many evaluations by Research Assistants (RA) collecting data for the Charting the Territory study, a longitudinal study of children with life-threatening diseases. Parts II and III of the PEDI, Caregiver Assistance and Modification respectively, consists of 40 questions, 20 in each of the parts. Each part can be further split into three domains: Self-Care, Mobility and Social Function. The Caregiver Assistance part uses a numerical scale: maximal (1), moderate (2), minimal (3), supervision (4) and independent (5). The Modification part is similar: none (1), child (2), rehab (3) and extensive (4). Since many of these choices could be interpreted in multiple ways, large portions of the PEDI are

subjective. To combat this problem, the five RAs involved with this study were trained to complete the PEDI by an occupational therapist. To ensure that all the RAs will be able to administer the PEDI and secure consistency in their rating, inter-rater reliability was completed on the RAs. A sample child case was given to the RAs and they were asked to complete all three domains in both Parts II and III of the PEDI for the sample child. Analysis of the reliability involved calculating the Intra-class Correlation Coefficients (ICC). Excellent correlation among the RAs was found for Part II. (Self-Care: 0.984 Mobility: 0.996 Social Function: 0.950). Part III has an ICC value of 0.919 (Self-Care: 0.876 Mobility: 0.919 Social Function: 0.800). Results show that there is a high correlation with the all three domains in both Parts II and III. Consequently, it is indicative that training by an OT is sufficient to be an assessor for the PEDI.

## 25.

### **Elucidation of the Role of the A600.1 Gene in the Amastigote Stage of *Leishmania***

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**Presenter:** Melanie van Soeren, Microbiology & Immunology

**Faculty Sponsor:** Robert McMaster, Medical Genetics

Leishmaniasis is a neglected tropical disease and thus affects only the poorest and the most marginalized communities. The disease can cause grave disfigurement, and in its more severe forms death. It is caused by several species of obligate intracellular protozoan parasites of the genus *Leishmania* and is spread from human to human by sandflies. As of yet there is no effective vaccine for Leishmaniasis, and all drugs that are currently available have serious downfalls such as severe reactions, some of which can be lethal, and high prices which disqualify many patients from treatment. *Leishmania* has a digenetic life cycle, and alternates between a promastigote and an amastigote stage. The promastigote persists in the sandfly midgut and is released into the skin of a human during a bloodmeal. There, it is phagocytosed by macrophages wherein the promastigote transforms into the tissue stage of the parasite, the amastigote, which actively multiplies in the phagolysosome. The research strategy currently being undertaken is to identify and perform functional analyses of genes that are expressed or upregulated in the amastigote. This will potentially expose novel mechanisms employed by *Leishmania* in the establishment of a persistent infection in humans. The role of the multi-gene A600 locus, whose expression is seven-fold higher in the amastigote stage, is currently being investigated. Using molecular biology techniques, the subcellular localization of the A600.1 protein, a member of the A600 protein family, is being targeted. This will aid in the elucidation of its function in the amastigote. This research could lead to vaccine and drug development targeting genes shown to be of importance in the amastigote stage of the *Leishmania* life cycle which is responsible for chronic infection in humans.

## 26.

### **Expression Analysis of Obesity-Associated Genes in the Hypothalamus with Changes in Diet Conditions**

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**Presenter:** Piriya Yoganathan, Biology

**Faculty Sponsor:** Susan Clee, Cellular & Physiological Sciences

Obesity is referred to as a body mass index of 30 kg/m<sup>2</sup> and above, and is associated with a higher risk of many weight-related diseases, such as diabetes mellitus, cardiovascular disease, and hypertension (Calton and Vaisse, 2009; Hofker and Wijmenga, 2009). The development of obesity involves both environmental and genetic factors (Calton and Vaisse, 2009). Studies have recently identified genes that are implicated in the risk of obesity (Loos et al., 2008; Hofker et al., 2009; Willer et al., 2009; Thorleifsson et al., 2009; Meyre et al., 2009). However, very little is known about these



genes, such as where they are expressed, their function, and how they might actually contribute to the development of obesity. We initially performed literature searches to determine known functions and tissue distributions of these obesity-associated genes. Using molecular biology techniques, we also conducted experiments to verify the tissue distribution of these genes. In order to gain a better understanding of the relationship between these genes and obesity, we assessed the differences in expression levels of the genes between conditions, such as fasting and feeding, and a high fat diet and normal chow diet, in the relevant tissues where the gene is known to be expressed. Our preliminary results suggest that certain genes may be differentially regulated with changes in diet conditions in the hypothalamus. We plan to analyze the expression levels of certain genes in other tissue types, such as the brain, liver, and reproductive fat, to further understand the relationship between these genes and obesity.

## 27.

### **Predicting Glomerular Filtration Rate in Pediatric Renal Transplant Population**

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**Presenter:** Shing Zhan, Pathology & Laboratory Medicine

**Faculty Sponsor:** Andre Mattman, Pathology & Laboratory Medicine

For patients suffering from acute renal disorders, constant monitoring for abrupt and potentially life-threatening changes in kidney function is necessary for timely medical attention. The conventional measure of renal function, nuclear glomerular filtration rate (nGFR), is costly and time-consuming, and may prove unsuitable for cases requiring regular renal function evaluation. The alternative method, the eGFR (estimated GFR) equations, enables quick daily estimation of renal function using measures of certain physical and biological markers. To-date, no eGFR equations with clinically acceptable accuracy, precision, and bias have been derived for the pediatric renal transplant population. We employ statistical modelling techniques to derive a GFR equation for the renal transplant population using patient information obtained from the British Columbia Children's Hospital database. Our formula (BCCH RTx) produces estimates with 81% accuracy for GFR (accurate within 30% of the empirical GFR), high precision, and low bias. Comparison of the performance of the BCCH RTx with previously published models indicates that the BCCH RTx fares reasonably well against two published models. Our study demonstrates that clinically acceptable eGFR equations can be derived for the pediatric renal transplant population. We caution that these equations must be under regular re-evaluation for optimal performance.

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## ☞ Acknowledgements ☞

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We would like to thank all of the hard-working and dedicated people who have helped to make this year's 2010 Multidisciplinary Undergraduate Research Conference a success.

### **Conference Opening**

Office of the Vice President Research & International

### **Roundtable Panel Discussion**

Dr. Santokh Singh  
Dr. Kishor Wasan

Dr. Ingrid Price

Dr. John Richardson

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Ida Molavi

Shayan Shakeraneh  
Gary Yang

Ben Eshref  
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### **Panel Moderators**

Dr. Santokh Singh  
Dr. Ingrid Price  
Dr. Katja Thieme  
Dr. Olga Pena

Dr. Katharine Patterson  
Dr. Anneke van Enke  
Sheryl Adam  
Dr. Joanne Fox

Judy Feng  
Katherine Miller  
Dr. Carrie Yodanis

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Frank Huynh  
Akiff Manji  
Gigi Lau  
York Ng  
Jasna Levi  
Khataeeh Aminoltejari  
Laura Weingarten  
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Stella Lee  
Mike Juan  
Bryan Tennant  
Yenlinh Chung  
Micha Ben-Zvi  
Lyn Grandham

### **AMS Catering**

Tessie Sy and staff - Thanks for always serving such delicious treats!

### **Audio-Visual Needs**

Brian Wright

### **Lunchtime Violin Accompaniment**

Kelsey Zachary & Samuel Tsui

### **UBC Improv Theatre Society of AMS**

## œ NOTES œ