

Undergraduate Research Symposium May 19, 2017 Mary Gates Hall

Online Proceedings

SESSION 1B

TECHNIQUES FOR IMPROVING QUALITY OF MEDICAL CARE

*Session Moderator: Eric Seibel, Mechanical Engineering
MGH 228*

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Clinical Characteristics of Primary Bocavirus in Infants in Rural Nepal

Micaela S (Micaela) Haglund, Senior, Psychology

Mentor: Helen Chu, Allergy & Infectious Diseases

Pneumonia is a leading cause of infant mortality worldwide, with a disproportionate burden of disease in resource-limited settings. Bocavirus is a newly described respiratory virus that may be associated with pneumonia in infants. We aim to define the risk factors and burden of disease associated with bocavirus infection in infants in rural Nepal. Identifying risk-factors could direct us in future research and help improve our current prevention methods in resource-limited settings. Currently, with unknown risk factors, prevention techniques may not be effective leading to unnecessary cases of bocavirus infection. In a home-based active weekly surveillance study of acute respiratory infections in infants up to six months of age, we find that 292/3646 had a symptomatic illness due to bocavirus. We aim to identify the risk factors, including low birthweight, preterm birth, and household crowding that may be associated with increased risk of bocavirus, as well as to describe the clinical and virologic characteristics of primary infection in infants in a resource-limited setting.

POSTER SESSION 2

Commons East, Easel 78

1:00 PM to 2:30 PM

Ice Flow over a Subglacial Lake in West Antarctica

*Ethan Daniel (Ethan) Guzek, Senior, Earth & Space
Sciences (Physics)*

UW Honors Program

Mentor: Knut Christianson, Earth and Space Sciences

Mentor: Nicholas Holschuh, Earth and Space Sciences

Airborne and satellite remote-sensing surveys of Antarctica have revealed over 400 subglacial lakes beneath the ice sheet. These lakes are one component of a subglacial hydrology network that also includes drainage channels, swamps, and estuaries. The influence of this subglacial hydrology network on ice-sheet dynamics is unclear. Water under ice sheets can reduce friction at the ice-sheet base, and thereby increase ice velocity. Alternatively, partitioning of water into lakes or channels, can also limit the area lubricated by water, and thereby decrease ice velocity. Ice-penetrating radar can map the presence of subglacial water due to the differing electrical properties of an ice/water vs. ice/sediment (or rock) interface at the ice sheet bed. The radar surveys also map constant time (isochronal) layers within the ice sheet that are formed due to chemical (and thus also electrical) differences in the snow deposited at the ice-sheet surface, which is eventually compressed into ice. Burial by subsequent snowfall and ice flow deforms these layers, which were originally surface parallel. Thus mapping these layers reveals the internal stress state and flow history of the ice. Here we report on the internal architecture of the ice sheet in the vicinity of Subglacial Lake Whillans, West Antarctica, as imaged by ice-penetrating radar. In the 2010-2011 austral summer, 500 line kilometers of ice-penetrating radar data were collected over Subglacial Lake Whillans in support of subglacial lake access drilling. In radar profiles (2-dimensional cross sections through the ice), we trace isochronal, internal layers imaged by the radar. Compared to nearby grounded areas, layers in the ice over the lake are highly deformed, suggesting ice-flow disruption over the lake. This interpretation is consistent with the active nature of the lake, which fills and drains every few years, causing changes in friction at the ice-sheet base, and thus non-steady ice flow.

POSTER SESSION 2

Balcony, Easel 94

1:00 PM to 2:30 PM

Are Women Less Likely to Show Interest in Engineering Career When Advised to Follow Your Passion than Men?

Jennifer Bohyun Ko, Senior, Psychology

Mentor: Sapna Cheryan, Psychology

Mentor: Helena Rabasco, Psychology

Gender differences exist in science, technology, engineering, and mathematics (STEM) fields, as women are underrepre-

sented in some STEM fields than others and continue to face discrimination even in fields in which women are better represented (Cheryan, 2016). Will using different American ideologies help to explain gender disparities in interest in STEM fields in the U.S.? This study examined this question by exploring differences in expressing interest in engineering careers between men and women. Specifically, we designed a study to investigate whether women are deterred from engineering when advised to “follow their passions.” Eighty undergraduate students completed a questionnaire, in which they are asked how interested they would be in pursuing a career in engineering based on listening to the advice to follow their passions or based on following the advice to do what is practical. We hypothesized that women will report less interest in engineering career when asked to base their decision on the advice of following their passions versus when asked to base their decision on the advice of doing what is practical; the difference for men will be weaker. This study explores how popular American ideologies may contribute to gender gaps in STEM.

SESSION 2A

POWER MADE VISIBLE: IMAGE, IDENTITY, NARRATIVE ACTIVISM

Session Moderator: Julie Villegas, English

MGH 171

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

Race, Colonialism, and Identity in 20th Century Caribbean Literature

Rebecca Gross, Junior, English

UW Honors Program

Mentor: Louis Chude-Sokei, English

Mentor: Charles LaPorte, English

In “Writing Against Culture,” Lila Abu-Lughod writes, “The process of creating a self through opposition to the other always entails the violence of repressing or ignoring other forms of difference.” This complicated discourse Abu-Lughod describes emerges from 19th century colonialist practices, which oppressed colonized peoples, and therefore rendered their “identities” troubled. As literary modernism gained traction in the 20th century, Caribbean writers such as Frantz Fanon and Jean Rhys responded to the suddenly complicated identity paradigm in which they become marked as the “Other.” How do Fanon and Rhys untangle modernist notion of the self while being deeply entwined with constantly alienating effects of colonialist practices? In this paper, I explore the extent to which “the violence of repressing or ignoring other forms of difference” causes colonized people to react loudly against these forces with their own newly con-

structed identities. Rhys and Fanon reacted loudly in their work, but other colonized people would react loudly through force and violent resistance. Black Power movements in the Caribbean and America, for example, feature the colonized seizing upon new identities in order to break free of colonialism and the identities it imposed. Fanon’s reaction to break free of those shackles are manifested in *Black Skins, White Masks*, which becomes essential for these Black Power movements. Rhys creates *Wide Sargasso Sea* to problematize the racism of 19th Century colonialism itself and highlight the vicious process of identity formation via a famous work of Victorian literature. Through my research, I have ultimately come to the conclusion that colonialist oppression produces identities contrary to it, whether that may be in the form of writing or other violent movements; it is that very narrative process by which colonial power breeds its own undoing.

SESSION 2J

MCNAIR SESSION - THE ART OF LEARNING: FROM ALGEBRA TO PREJUDICE

Session Moderator: Stewart Tolnay, Sociology

MGH 258

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

How Experience with Oppression Influences Diversity Initiative Evaluations

Mi’lexus Nychelle (Mi’Lexus) Milton, Junior, Psychology, Communication

McNair Scholar

Mentor: Helena Rabasco, Psychology

This study will be presenting participants with either an interpersonal or structural initiative for racial progress and examining whether Whites and people of color differ in their support. We will also look at the experiences of oppression and discrimination as a possible predictor. We expect to see people of color have a preference for structural initiatives due to the fact that the oppression they experience structurally has more consequences than interpersonal relationships. However, Whites will prefer interpersonal initiatives, as structural oppression does not affect them to the same degree. The implications of this study would provide insight into what matters most to people of color, making the move towards progress more intersectional in the sense that it will center around the oppressed for a solution instead of equating the oppressed (people of color) and the oppressor (whites), in their need of interpersonal resolve.

POSTER SESSION 3

MGH 241, Easel 146

2:30 PM to 4:00 PM

Clinical Characteristics of Hospitalized Adults with Acute Respiratory Viral Infection in Seattle, WA

Micaela S (Micaela) Haglund, Senior, Psychology
Mentor: Helen Chu, Allergy & Infectious Diseases

Respiratory syncytial virus infection (RSV) is the most common cause of hospitalization in infants in the United States. It has now been increasingly recognized to cause disease in elderly adults and those with chronic lung disease. We aim to identify risk factors associated with hospitalization due to RSV, severity of infection, and the neutralizing antibody response to infection in adults acutely infected with RSV. Patients admitted to Harborview Medical Center (HMC) with RSV are enrolled and given a brief questionnaire about their family and home, health history, and their drug use. In addition, serum samples are collected and tested for neutralizing antibody response to RSV. Analyzing the titers from the neutralizing antibody test identifies patients with a higher antibody response to infection. This can lead to a better understanding of the characteristics associated with more virulent RSV symptoms. With these data we will be able to better understand the immune response to infection as well as other factors that may play a role in disease severity due to RSV.

POSTER SESSION 3

MGH 241, Easel 147

2:30 PM to 4:00 PM

Variations in Cytokine Profiles Associated with Small for Gestational Age and Premature Births in Nepal

Nicole Horsley, Junior, Biology (Molecular, Cellular & Developmental)

Mentor: Helen Chu, Allergy & Infectious Diseases

In resource-limited settings, premature and small for gestational age (SGA) births are common and increase risk of infant mortality. During pregnancy, exposure to high pathogen levels and other health risks increases inflammation and may result in premature or SGA infants. Cytokines are small secreted proteins involved in the inflammatory immune response. This experiment examines variations in 25 cytokine levels in sera collected from pregnant women during the second trimester of gestation and again at the time of delivery. Samples selected from women who delivered full term SGA (n=50), preterm SGA (n=50), preterm appropriate for gestational age (AGA) (n=50), and full-term, AGA (n=50) infants were tested using a Luminex 25-Plex Magnetic Assay to compare cytokine level changes in these populations. I plan to conduct and analyze this assay which has not yet been com-

pleted, but preliminary data shows we should expect elevated levels of cytokines in those mothers with preterm and SGA infants. Overall this experiment provides a better understanding of cytokine profiles unique to preterm and SGA infants in resource poor conditions, and could provide novel therapeutic targets for the prevention of infant mortality associated with these conditions.

POSTER SESSION 4

Commons East, Easel 57

4:00 PM to 6:00 PM

Developing Reference Conditions for Forest Landscape Restoration in Response to Mixed-Severity Fires

Eden Rose (Eden) Pollock, Senior, Environmental Science & Resource Management

Mentor: Derek Churchill, School of Environmental and Forest Sciences

Historical forest landscape patterns are necessary to generate landscape level restoration treatments. Though landscape and disturbance patterns due to fires are well understood and recorded on public forest lands east of the Cascade Mountain Range, factors like fire suppression, long fire return intervals of west-side forests, lack of documentation, climatological differences, and extensive timber harvest complicate implementing similar strategies on landscapes west of the Cascades. By examining the distribution of smaller forest patch sizes, in addition to patches that were subjected to low-severity burning as a part of the 2015 Goodell burn for mortality and survival, we can derive and quantify factors necessary for early seral habitat creation (the critical establishment phase in ecological succession; historic proportions of early seral habitat have been approximated, and current levels are comparably lower). By interpreting stereo imagery and burn severity maps of the Goodell burn, and by employing GIS and remote sensing techniques, historically compatible models and landscape-level restoration strategies for both terrestrial and aquatic habitat can be utilized in guiding and monitoring restoration efforts.

POSTER SESSION 4

MGH 241, Easel 146

4:00 PM to 6:00 PM

Impulsivity: An Influencing Factor in Family-Based Behavioral Treatment Weight Reduction Outcomes

Holly Sandborg, Senior, Biology (Molecular, Cellular & Developmental)

Mentor: Ellen Schur, Medicine, Univ Of Washington

The percentage of obese children in the United States has tripled since the 1970's, with one in five school-aged children now categorized as obese. Obesity development and response

to intervention has been found to depend on factors such as impulsivity, though its influence as a major risk factor is unknown. This project seeks to determine if impulsivity affects weight reduction outcomes in family-based behavioral treatment. I hypothesize that increased impulsivity will be associated with increased food intake, increased food reward value and subsequently poorer weight reduction outcomes. Forty-nine obese males and females aged nine to eleven years old were evaluated before and after they participated in a 6-month family-based behavioral treatment intervention to determine the relationship between impulsivity and treatment outcomes. Impulsivity was assessed using a Developmental Neuropsychological Assessment. Each subject's food reward value was measured using interviewer-administered tasks in which participants were questioned on their choice between preferred snack foods vs. an appealing alternative. Calorie intake was measured by providing study participants with a buffet consisting of a wide variety of foods, with which they had access to for thirty minutes. Calorie intake and composition was measured by weighing back uneaten food. Success of obesity treatment was measured in the comparison of adiposity using BMI z-scores, given that a z-score decrease of at least 0.25 improves blood pressure, lipids and insulin sensitivity. Obese children categorized as impulsive are predicted to consume more calories and rate a food reward value compared to non-impulsive obese children, resulting in poorer weight reduction outcomes, indicating that childhood obesity is correlated with impulsivity on the basis of an inability to engage cognitive control of food intake. This research will provide new insights into the neurobiological basis of child obesity, potentially improving the cost-effectively and long-term results of obesity interventions.