Online Proceedings

POSTER SESSION 1

Balcony, Easel 105

11:00 AM to 1:00 PM

How Does the Cell Polarity Protein Crumbs Regulate Tube Formation in *D. melanogaster* Egg Chambers?

Sydney Bowker, Senior, Biochemistry
Mary Gates Scholar, UW Honors Program
Mentor: Celeste Berg, Genome Sciences
Mentor: Rachel Dam

During development in most animals, tubes form as precursors to complex organs such as the neural tube, digestive system, and vasculature. To create a tube, cells within a sheet, or epithelium, must coordinate specific shape changes and movements. This coordination requires each cell to establish and maintain directional identity, thereby distinguishing the 'top' of the sheet from the 'bottom'. While extensive research on a group of proteins, called 'polarity proteins', has elucidated how cells establish directional identity, little is known about how they maintain that orientation during the shape changes and rearrangements that occur during tube formation. To address this gap in our understanding, I am studying how these polarity proteins contribute to proper tube morphogenesis during the formation of specialized structures on *Drosophila melanogaster* eggshells called dorsal appendages (DAs). These appendages, which provide the developing embryo with oxygen, are formed from an epithelium that wraps into a tube, elongates, and then fills with eggshell protein. The epithelium sloughs off when the egg is laid, leaving the appendages as a visualization of the earlier tube formation. I used RNA interference (RNAi) to assess the role of 24 candidate proteins in DA formation. My initial results led me to hypothesize that one protein, Crumbs (crb), regulates the tube's directional elongation. To explore this role, I am studying crb protein localization during tube elongation, assaying DA defects after knocking down expression using RNAi in subsets of cells, and analyzing the distribution of adhesion, motor, and other polarity proteins when crb is completely absent in null clones. These analyses will add to our understanding of the role of polarity proteins in the conserved development of epithelial sheets into tubes.

POSTER SESSION 1

Balcony, Easel 97

11:00 AM to 1:00 PM

Molecular Superheroes: Insights into the Mechanism of Action of the Small Heat Shock Protein, HSPB5

Miriam Al Saedy, Senior, Biochemistry
Mentor: Rachel Klevit, Biochemistry
Mentor: Maria Janowska, Biochemistry

Small Heat Shock Proteins (sHSPs) play crucial roles in protein homeostasis, the state of maintaining steady internal cellular conditions, despite changes to the cellular environment. As the "molecular life rafts" of the cell, sHSPs target partially misfolded proteins during stress measured as chaperone activity, and without consuming energy, prevent toxic aggregation. Mutations or malfunctioning of the sHSP, HSPB5 (B5), in humans are associated with neurodegenerative diseases such as Alzheimer's and Alexander's disease, as well as cancers, myopathies, and cataracts. As one of the ten sHSPs encoded in the human genome, B5 contains structural elements (the building block) common to all sHSPs: a highly conserved alpha-crystallin domain (ACD), that is flanked by variable, less conserved, N- and C-terminal regions (NTR and CTR, respectively). Previous studies determined that interactions between building blocks occur between a three amino acid region known as the I-X-I motif (a "knob") in the CTR, and a hydrophobic groove ("hole") in the neighboring block, similar to how two pieces of Lego come together to build a larger structure. Interestingly, in B5, there is an additional I-X-I motif in the unfolded NTR, but its role and structure are unknown. I hypothesize that the CTR and NTR motifs compete for binding into the hydrophobic groove, indicating the "knob" into "hole" interaction is loose, where the other "knob" can bind the "hole" when one leaves. To test this hypothesis, I prepared mutants containing CTR, NTR, and double motif deletions. I aim to uncover the effects of these mutations on chaperone activity and oligomeric size, by optimizing protein purification and using a combination of *in vitro* biochemical assays, and native (non-denaturing) gel electrophoresis on purified B5 mutants. These results will assist in demystifying the role of the NTR, direct future sHSP studies, and provide important insight for development of future therapeutic strategies.

BRIDGING IDENTITIES: PERFORMING ARTS RESEARCH INTERVENTIONS

Session Moderator: Juliet McMains, Dance
MGH 389
12:30 PM to 2:00 PM
* Note: Titles in order of presentation.

Performance and Identity in the European Court of Human Rights
Hannah Sophie Probst, Senior, Drama, Law, Societies, & Justice
Mary Gates Scholar, UW Honors Program, Undergraduate Research Conference Travel Awardee
Mentor: Rachel Cichowski, Department of Political Science
Mentor: Catherine Cole, School of Drama

Legal theorists have long maintained that courts operate beyond their primary function of dispute-resolution and have problematized their characterization as "objective" bodies, noting their significance as powerful social and political actors bestowed with constitutive powers of meaning-making. Virtually absent in this scholarship is an analytical angle examining this constitutive power using theory or methods from performance studies. This is surprising, as courtrooms are highly theatrical spaces. My research seeks to fill this gap in scholarship by marrying theories and methods from sociolegal studies and theatre- and performance studies to examine how courts contribute to the construction of cultural meanings pertaining to identity. This essay treats the European Court of Human Rights (Court), the judicial organ of the Council of Europe and one of the most active, powerful international human rights courts in the world. How does the Court construct notions of identity – especially around nationality, European community, gender identity, and religion? More specifically, my project asks: How are these courtroom constructions conceived and legitimized through narrative performance, and how is their sociopolitical influence shaped by the mechanics of performativity? To answer these questions, I conduct an original research project analyzing both written judgments and video recordings of oral hearings held in the Court's Grand Chamber. I form my own criteria to analyze these hearings as performances, and create a scheme to evaluate written judgments for their performativity. I also analyze certain structural characteristics of the Court, and some legacies of its case law, as symbolic and embodied performances, examining how identity narratives are reproduced by the Court's composition as an institution and its behavior over time. In addition to demonstrating what can be gained by critically assessing courts holistically using performance theory and methodology, I hope to illuminate exciting intersections between sociolegal studies and theatre- and performance studies with this work.

SESSION 1S

USING ANTHROPOLOGY TO UNDERSTAND OUR PAST AND PRESENT

Session Moderator: Stephanie Selover, Near Eastern Languages and Civilization
JHN 111
12:30 PM to 2:15 PM
* Note: Titles in order of presentation.

Bursting the Bubble: Transforming White Identities
Kerrie Lynn Agosta, Senior, Anthropology
UW Honors Program
Mentor: Rachel Chapman, Anthropology

What does it take to burst the "bubble" of white privilege...what are the moves? Awaking to one's complicity as a white person who benefits from racist systems of unearned privileges that mark a white supremacy culture can be a difficult experience. This research is the result of one person's willingness to enter the transformative journey of following the auto-ethnographic process of dissolving and reconstituting their understanding of a white-self through the lens of indigenous scholarship and growing relationships with people of color whose voices and stories told of a reality that was unlike her own. In choosing to resist resisting the fear that is bound up in entering conversations about white privilege and racism, and holding space in an uncomfortable process, the researcher turned to her 89.7% predominately white community of Bainbridge Island, Washington to examine the culture of relationships between communities of color and those who identify as white. She asks the question "can, and if so, where, when and how are white identities transformed from positions of White Fragility and white supremacy into identities and relationships with people of color, of solidarity, allyship, accompliceship and race-traitorship in denouncing white privilege in order to create a culture that is equitable and inclusive for all people? Centering the methodology of relationships as sites of knowledge, the researcher engaged in cultivating cross-racial friendships with community members who were actively working in spaces of racial equity, inclusion, and social justice. In documenting the intersection of their lives and stories, valuable knowledge was gained in the accounts of privilege, fragility, oppression, hope, despair, joy, adversity, and triumph that is embodied in their collective experiences. This research contributes to the ongoing discovery and scholarship of the ways in which white identities move through the stages of transformation in relationship with communities of color.

SESSION 1S

USING ANTHROPOLOGY TO UNDERSTAND OUR PAST AND PRESENT

Session Moderator: Stephanie Selover, Near Eastern Languages and Civilization

JHN 111

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Collaborating for Continuity: How a Network of Black Women in Seattle Make Sense of and Advocate for the Health, Well-Being, and Safety of Their Communities

Madhavi Bhuvana Kuthanur, Senior, Anthropology: Medical Anth & Global Hlth

UW Honors Program

Mentor: Rachel Chapman, Anthropology

Black womxn in the United States have a long-standing history of creating community-based support networks and utilizing strategies of resilience to thrive in an oppressive society. Black feminist scholars have formulated useful frameworks such as "transformative work" and "intersectionality" to help contextualize long-standing practices of resistance, resilience, and transformation. As a medical anthropology student, the aim of my project is to understand how Black womxn in Seattle make sense of and advocate for the health, well-being, and safety of their communities. In order to answer this question, I collaborated with a diverse network of Black womxn who are initiating conversations about health and social justice in their churches, workplaces, and advocacy groups. Mount Zion Baptist Church, a predominantly African American church in Seattle, functioned as a community center for a network of Black womxn actively working to advance health equity. To learn about the ways that Black womxn in Seattle express, communicate, and act on their personal and political views regarding health, I engaged in participant observation at health-centered church events, advocacy meetings, marches, and health equity committee gatherings. Furthermore, I conducted structured and unstructured interviews to understand how Black womxn in Seattle perceive societal conditions and rely on support networks to radically better their lives. Through the experience of listening to Black womxn's life history narratives, I learned about the vital role that solidarity, collaboration, and faith have in creating positive social change. My ethnographic research process has enlightened me to the importance of listening to and learning from the lived experiences of Black womxn who consistently work to transform their own health and the health of their communities.

SESSION 1S

USING ANTHROPOLOGY TO UNDERSTAND OUR PAST AND PRESENT

Session Moderator: Stephanie Selover, Near Eastern Languages and Civilization

JHN 111

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Disordered Eating and the Politics of Isolation

Ellie Pickering, Senior, Anthropology: Medical Anth & Global Hlth

UW Honors Program

Mentor: Rachel Chapman, Anthropology

Millions of people across the United States struggle with disordered eating. For the proportion of those who have been clinically diagnosed with "eating disorders", many will continue to fall in and out of the grasps of their illness - even after the privilege of receiving comprehensive treatment and therapeutics. The issue of "chronic relapse" amongst individuals who have attended inpatient, partial hospitalization, and/or intensive outpatient care for disordered eating necessitates a thorough questioning of "treatment", "illness", and "recovery". Despite so many years under the "medical gaze" of research in medicine and psychology, as well as in sociology and feminist scholarship, little has been done to make space for the voices of those affected. Therefore, the intent of this project is to strip away hegemonic discourses on disordered eating, and radically listen to those who have traditionally been silenced, isolated, and reduced to statistics in other literature. Drawing from subaltern and feminist theory, I seek to illuminate the lived and embodied experiences of women who have attended and returned to clinical treatment for disordered eating on multiple occasions. A phenomenological, (auto-)ethnographic approach is adopted to explore the liminal period between their treatment cycles. Having personally returned to treatment for disordered eating numerous times, I will use reflections from my own experience to inform my engagement and collaboration with other women who have embarked on a similar journey towards healing to produce a collection of narratives. Deeply listening to these individuals and juxtaposing their narratives may shed light on the ways they resist, negotiate, and perform relationship and identity in the sphere of "recovery". Contextualizing healing trajectories in this way has implications for a new lens through which "relapse" and "recovery" are discussed, and could reveal what may be missed in the realm of current therapeutics for disordered eating.

POSTER SESSION 2

Commons West, Easel 8

1:00 PM to 2:30 PM

Analysis of Oral Swabs for Universal Bacterial 16s rDNA to Optimize Diagnostic Application

Divya Naidoo, Senior, Public Health-Global Health
Mentor: Gerard Cangelosi, Environmental and Occupational Health Sciences
Mentor: Rachel Wood, Department of Environmental & Occupational Health Sciences
Mentor: Alaina Olson, Environmental and Occupational Health

Oral swab analysis (OSA) is a possible alternative sample type for tuberculosis diagnostics. It has been observed that tongue swabs contain greater amounts of *Mycobacterium tuberculosis* DNA than cheek swabs ($p<0.0001$) from tuberculosis patients. After determining that oral microbiota follows this same pattern, several factors including time-of-day swabbed and health status were analyzed to understand factors affecting the amount of bacteria on the tongue. This project aims to optimize the oral swab sampling methods in order to facilitate more sensitive diagnostic tests, using universal bacterial 16s rDNA as a proxy for *Mtb* DNA. Previously tested samples from South Africa were further analyzed to investigate amount of oral microbiota by day collected, HIV status, health status, and other demographic factors. To evaluate whether collecting multiple swabs per sample yielded more universal bacterial DNA, tongue swabs were taken from healthy volunteers in Seattle. Each subject provided a 1-swab sample and a 3-swab sample, which was then extracted and analyzed by a previously optimized universal bacterial PCR. Additionally, tongue scrapers are being assessed as an alternative to oral swabs. Swabs collected early in the morning had more bacterial DNA than swabs collected later ($p<0.03$). 3-swab samples yielded an average of 2-fold greater amounts of bacterial DNA than 1-swab samples. Bacterial biomass correlated with *M. tuberculosis* signal in most comparisons. Bacterial biomass may serve as a useful proxy when developing better oral swab sampling strategies for TB diagnosis.

POSTER SESSION 2

MGH 241, Easel 139

1:00 PM to 2:30 PM

Understanding Methylmercury Accumulation in Rice: Experimental Control of Oxygenation and Root Carbon Levels in the Rhizosphere of *Oryza sativa*

Sarah Katherine Larson, Senior, Biology (Plant)
Mary Gates Scholar, NASA Space Grant Scholar
Mentor: Rachel Strickman, Civil and Environmental Engineering
Mentor: Rebecca Neumann, Civil and Environmental Engineering

Methylmercury (MeHg) is a bioaccumulative neurotoxin, dangerous to human health even at trace levels. In inundated soils, MeHg is formed from inorganic mercury by mercury-methylating microorganisms; a process termed methylation. Demethylation, by contrast, converts MeHg into less-dangerous inorganic mercury, and also occurs via microbial activity throughout the aquatic soil profile. Rice grains can be contaminated with MeHg when grown in soils where methylation rates are high; human exposure to MeHg is thus a serious public health concern in places where rice cultivation, high rates of consumption, and soil mercury (Hg) contamination overlap. Our research aims to better understand the soil conditions that favor demethylation over methylation – this information can then be used to reduce rice grain contamination through agricultural practices or rice breeding programs. Specifically, our research focuses on the role of oxygenation and carbon root exudates on the net MeHg accumulation throughout the soil profile. Rice plants grow in flooded, oxygen-free (anoxic) soils, but their roots can leak oxygen (making the rice rhizosphere oxygenated in varying degrees), as well as carbon root exudates. Our project simulated both fully oxic and transiently-oxic (transition) zones, with two different levels of root exudates; we use isotopic tracers to assess respective methylation and demethylation rates in all four treatments in both the vegetated (rhizosphere) and non-vegetated (bulk) soil. Carbon root exudates have been collected from hydroponically-grown rice variety *M-206,* and can be applied to different soil zones via tubules. Oxygenation of the soil can be measured with mm-scale optode imagery, which allows delicate testing of various oxygen-introduction designs. My role in this interdisciplinary project has been to develop, scale-up, automate, and verify the accuracy and dependability of root-oxygenation and root-exudate introduction systems to be used in upcoming experiments.

SESSION 2O

ECONOMIC ISSUES

Session Moderator: Michelle Turnovsky, Economics

MGH 389

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

The Impact of the Take Charge Family Planning Initative on Educational Attainment for Hispanic Women in Washington State

Nadya Ekhteraee Sanaee, Senior, Economics
UW Honors Program
Mentor: Rachel Heath, Economics

Take Charge is a statewide family planning initiative that provides men and women in Washington State with free access to family planning services. As one of the most accessible family planning programs in the nation, Take Charge has expanded into school based clinics, allowing adolescents as young as thirteen to receive contraceptives without the knowledge of their parents. Success of family planning initiatives are typically measured by how much they reduce unintended pregnancies among their low income or minority populations, but the effect of these programs on economic indicators such as income and educational attainment are generally less well explored. Thus, the purpose of this research project is to determine the impact of having access to Take Charge on college completion for Hispanic women in Washington State. To address this question, individual level data from the Minnesota Population Center Current Population Survey were used to conduct a variety of difference-in-difference and triple difference tests to measure the effect of having access to Take Charge on college completion. The results depict that having access to this program starting at age 13 significantly increased the likelihood of completing college by 14-18% for Hispanic women. These findings imply that Take Charge can be used as a model program for other states that hope to reduce their number of unintended pregnancies and increase college completion among their low income and minority populations.

POSTER SESSION 4

Commons East, Easel 43

4:00 PM to 6:00 PM

Is Female Genital Circumcision the Problem?

Salma Al Sammary, Senior, Anthropology: Medical Anth & Global Hlth
Mary Gates Scholar
Shukri Hassan, Senior, Public Health-Global Health
Mentor: Rachel Chapman, Anthropology
Mentor: Jihan Rashid, Somali Health Board

Women in the most underserved area of Seattle experience higher rates of pre-term birth, low birthweight rates, and cesarean section surgeries. The focus of this project is to see if female genital circumcision (FGC) correlates with the cause of these issues, but also if there are other factors that have an influence on high reproductive health disparities such as, racism, access to resources, and any other barriers of the community that are driving these issues. This project works with Somali immigrant and refugee residents in the south Seattle area because it is the most under-served, ethnically and economically diverse area. Somalia has the highest rate of women who have undergone the practice of FGM/C with a leading 98% of the female population between the ages of 15-49 years being circumcised. My project works collaboratively with the Mama AMAAN Project which seeks to test out a community-led, integrative services approach to improve perinatal health outcomes in this population. The goal of my project is to understand why these issues are consistently happening amongst women that come from similar backgrounds, more specific amongst East African women. While trying to reach the goal of this project, we seek to answer the following questions; What are the ways that FGC played a part in their perinatal experience and outcomes for Mom and infant? What is their perspective on the practices of FGC in Seattle as relates to themselves, their families, their community? To accomplish the goal of my research I plan on using qualitative methods by conducting written surveys, participant-observation during child birth education sessions. This project is significant because it assesses the reason for the high rates of reproductive health disparity that we are seeing amongst the women of the Somali community and how FGC is related to those problems, if at all.

POSTER SESSION 4

Commons West, Easel 4

4:00 PM to 6:00 PM

Optimizing Oral Swab Analysis for Tuberculosis Diagnosis

Rita Noor Olson, Senior, Microbiology
Mentor: Rachel Wood, Department of Environmental & Occupational Health Sciences
Mentor: Gerard Cangelosi, Environmental and Occupational Health Sciences

Tuberculosis (TB) remains a major international health concern and one of the top 10 causes of death worldwide, according to the World Health Organization. Previous clinical work in our lab demonstrated that oral swab analysis (OSA) can successfully diagnose tuberculosis by detecting *Mycobacterium tuberculosis* DNA in the mouths of infected patients. In order to strengthen OSA against traditional but more invasive methods, such as sputum sampling, improvements to DNA extraction and swab type must be investigated. I am comparing different degrees of automation with MolBio's Trueprep, the AudioLyse, and ThermoFisher's KingFisher against our previously validated manual Qiagen extraction protocol—with the comparison lying in sensitivity and efficiency. In order to increase the versatility and sensitivity of OSA, I am also investigating boil preparations and dissolvable swabs. Boil preparation of swabs is a relatively simple extraction procedure, and early results have demonstrated its comparability against the Qiagen extraction. Mean-

while, dissolvable swabs have a hypothetical 100% yield of sample material. I have successfully dissolved calcium alginate swabs from Puritan in acidic sodium citrate solutions, and Luna swabs were dissolved in chaotropic agents. DNA yields are compared to non-dissolvable, previously validated swabs.