



Undergraduate Research Symposium May 17, 2019 Mary Gates Hall

Online Proceedings

POSTER SESSION 1

Commons East, Easel 52

11:00 AM to 1:00 PM

Graduating Green: Guidelines for and Steps towards the Implementation of a Sustainability Graduation Requirement at the University of Washington

Jasmine Claire Leung, Senior, Community, Environment, & Planning

Mentor: Megan Herzog, Urban Design & Planning, Community, Environment & Planning

In recent years, the University of Washington has promoted itself as a leader in sustainability and has made significant strides towards increasing sustainability efforts on campus. One area in which the University has not focused heavily in sustainability is in the curriculum. To address this gap, I am developing a framework for what measures can be taken to implement a sustainability requirement at the University of Washington. In developing this framework, I am researching sustainability requirement policies at other institutions and sustainability policies and initiatives at the University of Washington. My research shows that a sustainability requirement has been implemented at several universities around the nation, some of which are scale-comparable or peers institutions to the University of Washington. Furthermore, a sustainability requirement would support several of the University's goals and initiatives. Using this research and the UW Diversity Credit as a case study, I am developing a report detailing recommendations and an action outline to details next steps to implement a sustainability graduation requirement. In addition, I am forming a student coalition to gain campus support and work with administration to pass the policy through the appropriate channels. If a sustainability graduation requirement can be implemented, it will not only help the University of Washington emerge as true leader in higher education sustainability, but it will also help develop future generations of graduates who understand sustainability; its applicability to their lives, decisions, future careers, and fields of study; and enable them to tackle the emerging global challenges.

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.

Making Nothing Something: The Creation of a Solo Circus Act

Whisper St Christopher, Senior, Community, Environment, & Planning

Mentor: Megan Herzog, Urban Design & Planning, Community, Environment & Planning

There is a common thread among contemporary circus art disciplines that is unique in the performance world. It is a blend of theater, dance, and acrobatic skill that can produce amazingly complex and captivating works. When comparing the choreographic processes of these performance mediums with the creative practices of solo contemporary circus artists, do new choreographic themes exclusive to circus arts become visible? Or does the essence of contemporary circus lie in the combination of standard techniques adopted from theater, dance, and acrobatics? An analysis of well-known work provides viewable examples of contemporary circus choreography, while local artist interviews provided seasoned, close-to-home examples of solo circus act creation on a professional level. In summary of my findings, I discuss the implications of choreographic methods in contemporary circus from the viewpoint of a solo artist and choreographer.

POSTER SESSION 1

Commons East, Easel 80

11:00 AM to 1:00 PM

Self-Disclosure and Physiological Responses among Adults who Stutter

Sulema Rodriguez, Senior, Speech and Hearing Sciences, General Science, Portland State University

McNair Scholar

Mentor: Megann McGill, Department of Speech and Hearing Sciences, Portland State University

Stuttering is a fluency disorder which is characterized by prolongations, repetitions, and blocks, which disrupt the flow of speech (Guitar, 2014). There are multiple factors affecting stuttering, including physiological, psychological, environmental, and linguistic (Guitar 2006; 2016; Kang et.al, 2010; Sitek et.al; Smith & Weber, 2017). Self-disclosure has been shown to improve listeners' perceptions and attitudes towards people who stutter in a positive manner (e.g., Byrd, McGill, Gkalitsiou, & Cappellini, 2017; Byrd, Gkalitsiou, McGill, Kelly & Reed, 2016; Lincoln, Brinker-Katz, 2017). Yet, limited research has explored the physiological and affective changes that speakers who stutter experience when they self-disclose (or do not self-disclose) their stuttering. Bowers and colleagues (2012) examined the relationship between anticipatory autonomic arousal and stuttering during reading tasks. They found that people who stutter presented with decreased skin conductance when stuttering was eliminated. They also reported that people who stutter exhibited increased final heart rate deceleration when a skin conductance response occurred. Bowers et al. (2012) concluded that physiological responses were best determined by the anticipation/possibility of stuttering, rather than speech outcome (fluent or stuttered). These results suggest the importance of further exploring the anticipation of stuttering and its effects on the speaker who stutters in a variety of contexts (other than reading). In the proposed study, we will ask participants to report speaking situations in which they feel least to most comfortable and we will monitor their physiological and affective responses within those situations. Participant self-report of speaking situations will enable ecological validity and inform our clinical practice. We hypothesize that speaking situations participants rate as "least comfortable" will elicit increased heart rate deceleration during a stuttering moment and decreased skin conductance when stuttering moment is finished.

SESSION 1H

POLITICS, PARTY, & POWER

Session Moderator: Margaret O'Mara, History
MGH 242

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Disability Inclusion and the United Nations: Leading from Behind?

Shirlee Sophia Helena (Sophie) Watson, Senior, Law, Societies, & Justice

Colin L. Newton, Senior, International Studies

Zu Zinyang Tan, Senior, Sociology

Mentor: Megan McCloskey, School of Law

With the adoption of the 2030 Agenda for Sustainable Development, United Nations Member States committed to en-

sure international development that "leaves no one behind," and pledged to reach "the furthest behind first." Recognizing that globally persons with disabilities as a group are often among those left furthest behind, the Executive Office of the UN Secretary General and the Special Rapporteur on the Rights of Persons with Disabilities are reviewing how UN operations can better integrate and promote the rights of persons with disabilities. To support that review, a study was commissioned to assess the current state of disability inclusion within UN operations at the headquarters and country levels. In December 2018, a research team led by the School for Global Inclusion and Social Development at the University of Massachusetts and supported by undergraduate students at the University of Washington completed a baseline assessment of disability inclusion within the 40 UN agencies, funds and programs which are members of the UN Sustainable Development Group, and 40 UN Country Teams. Although the assessment is not currently public, this presentation discusses the results of our research which focused primarily on evaluating UN entity disability inclusion through public sources alongside staff survey responses.

SESSION 1M

HEALTHCARE

Session Moderator: Geoffrey Gottlieb, School of Medicine
MGH 284

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Customizable Tactile Maps for the Visually-Impaired

Jerry Cao, Sophomore, Computer Science

Mary Gates Scholar, UW Honors Program

Shriya Kurpad, Sophomore, Computer Science

Emily R. Warnock, Junior, Computer Science

Kathryn J. Lum, Junior, Computer Science

Mentor: Jennifer Mankoff, Allen School of Computer Science & Engineering

Mentor: Megan Hofmann, Paul G. Allen School of Computer Science

This presentation seeks to summarize a solution to helping the visually-impaired navigate new areas. While previous solutions have been relatively successful, many lacked two key features that we hope our solution addresses: being affordable and allowing customization towards those with compounding disabilities. Our solution consists of two main parts: (1) a user-interface created for Fusion 360, a popular 3D-modeling application, that is built upon an existing framework detailed in Hofmann (2018) called PARTs (Parameterized Abstractions of Reusable Things), and (2) an optimization algorithm to generate maps that are tailored for its users. Through PARTs, we developed different variations of mod-

ular pieces of map (e.g., roads, buildings, and sidewalks), which increases ease of customization. After the user specifies personal information and preferences through the PARTs UI—such as the width of their finger, their physical limitations, their understanding of braille, and their desired map features—the optimization algorithm will select the best combination of features from the PARTs database for that specific user. At the end of the process, users have a model of a tactile map in Fusion 360 which can be printed out with commercially-available 3D-printers. With 3D-printers becoming more affordable, this solution is significantly less cost prohibitive than other means of generating tactile maps, which required an initial investment upwards of a thousand dollars. Through user studies, we also test how blind users interpret these maps, which helps us guide design improvements in the future. In this presentation, we discuss the efficacy of our solution by comparing it to previous works and detail our plans to improve the system by making the PARTs user-interface more accessible and incorporating user feedback about the map itself.

POSTER SESSION 2

Commons East, Easel 82

1:00 PM to 2:30 PM

Reclaiming Identity through Space: Designing for the Multiracial and Multicultural

Naomi Pepper (Naomi) Saito, Senior, Community, Environment, & Planning

Mentor: Megan Herzog, Urban Design & Planning, Community, Environment & Planning

The population of multiracial and multicultural individuals in the United States has steadily risen, but little to no public spaces have been designed to represent them and express their identities. Individuals in this group can find themselves feeling isolated from spaces because they feel like “imposters” or that they have to choose only one part of their identity to belong. How can we create public spaces that encourage people to express all parts of their multiracial or multicultural identity in a way that is inclusive, educational, and encourages cultural exchange? Through research of existing methods and practices, this project addresses how public spaces can be created to include multiracial and multicultural individuals. I provide methods and practices in the four categories of cultural exchange, cultural education, safety and inclusion, and expression. These methods are compiled into a set of guidelines and best practices to guide designers through the creation of multiracial and multicultural spaces. Since white public spaces have created the standards, these guidelines fill a gap in non-white spaces and spaces where multiracial and multicultural individuals can find belonging in. As a product created for designers, these guidelines bring the multiracial and multicultural identities into conversations and processes

that they would not normally be a part of. This project reflects my own desire to see my multiracial and multicultural identity and others like me reflected in public spaces and serves as an example of why spaces like this are important and why representation matters.

POSTER SESSION 2

Commons West, Easel 34

1:00 PM to 2:30 PM

Geological Evolution of Western Anatolia during the Late Cretaceous and Early Paleogene

Gui Guenther Aksit, Fifth Year, Earth and Space Sciences: Geology

Mary Gates Scholar, UW Honors Program

Mentor: Alexis Licht, Earth and Space Sciences

Mentor: Megan Mueller, Earth and Space Sciences

Anatolia, in modern Turkey, is a complex assemblage of micro-continents that collided during the Late Cretaceous and the Paleogene, 80 to 25 million years ago. Despite the large volume of work on the numerous Anatolian terranes and collisions, basic questions regarding the timing of collision, style of post-collisional deformation and development of topography remain enigmatic. In western Anatolia, the timing and mechanisms of these successive collisions are poorly understood and do not conform with current continent-continent collision models. This project reconstructs the evolution of the collision zone in order to reconstruct the tectonic evolution of western Anatolia and refine models of collisional tectonics. Here, we present new data from the 160-40 million year old sedimentary archives preserved in the Central Sakarya Basin, a sedimentary basin that formed adjacent to the collision zone. Two methods for sedimentary analysis are employed in this research: detrital zircon dating and sandstone petrography. Detrital zircon ages attained through Uranium-Lead dating techniques are compared to known ages from surrounding mountain ranges to determine the source of sediment through time and apply age constraints to stratigraphic layers. Sandstone petrographic analysis examines the composition of samples to determine sedimentary provenance. The evolution of sediment sources through time provides a robust timeline of collision, post-collisional deformation and topographic development. The results from zircon dating and sandstone petrography show an evolution of sediment provenance where the oldest, pre-collisional sediments are derived from an adjacent volcanic chain. The onset of collision, around 60 million years ago, is marked by a change in sediment composition as collision creates topography and fault systems exhume older, buried rock. In constructing a progression of sediment source, this research determines a precise chronology for the collision and post-collisional evolution of western Anatolia and contributes to modifying current models on collisional margins.

POSTER SESSION 2

Commons East, Easel 81

1:00 PM to 2:30 PM

Small Steps Toward Social Capital: How Can CPTED and Tactical Urbanism Benefit A Pop-Up Park In Downtown Renton?

Brittany Healani Mendes Gillia, Senior, Community, Environment, & Planning

Mentor: Megan Herzog, Urban Design & Planning, Community, Environment & Planning

Mentor: Nico Martinucci, Community, Environment & Planning

The city of Renton is a developing town located 12 miles south of Seattle. The city is undergoing growth and change and as a result, there are plots of land that are underutilized and dormant in the downtown civic core. The former Big 5 lot is a city owned parcel that is next to Piazza Park and Gateway Park. This is a space that welcomes you into Renton but is currently an empty gravel lot. This site has opportunity for revitalization that could ultimately improve the safety, perception, and activation of this entry way into Downtown Renton. How can civic engagement and design bridge the gaps in the city street? By doing a thorough site analysis, forming community relationships, and involving Renton communities in a design charrette, I hope to find an inclusive design that will incorporate ideas from the people who use this space and understand what they want in their neighborhood. By having this open design charrette, the community can have agency in the changes happening to their neighborhood by forming solutions for their space and connecting with neighbors they may otherwise have never met. This will build a strong foundation for the future developments to come in Downtown Renton.

POSTER SESSION 3

Commons West, Easel 39

2:30 PM to 4:00 PM

Plants over Poultry: Recommendations and Guidelines for Replacing Chicken Processing with Plant-Based "Meat"

Hanna Nicole Peterson, Senior, Community, Environment, & Planning

Mentor: Megan Herzog, Urban Design & Planning, Community, Environment & Planning

This project will assess how plant-based meat substitutes can most effectively replace animal-based meat. I will be focusing specifically on chicken, the most widely-produced animal in the meat industry. 8,000,000,000 chickens are killed for meat every year in the United States, dwarfing the number of all other animals used for meat combined. Chicken pro-

duction is a threat to global health, because it contributes to the emissions of greenhouse gases. It is also an environmental justice issue because low-income communities with little political power live near slaughterhouses and experience polluted waterways from the animal waste. The scope of the chicken industry demands that a solution to its problems account for scale of implementation. I am going to be interviewing experts in the fields of plant-based food technology, farm transformation, and poultry industry economics. I plan to discover why poultry is one of the most prominent agricultural industries in the United States, focusing on supply chains and subsidies. I will then compare these factors to corn, wheat, and soy, the most common ingredients in plant-based meat. The current state and levels of production of the meat and animal product industry are financially inefficient, environmentally harmful, and unhealthy for our communities. For plant-based meat to realistically compete with real chicken, it must be widely available, reasonably priced, and equally nutritious. My project aims to explain what this would look like in practice.

POSTER SESSION 3

Commons East, Easel 44

2:30 PM to 4:00 PM

Coming to Agreement: The Promise of Consensus Governance "There was an election, and there was a winner, and a loser." -The Hundred-Foot Journey

Aidan James Carroll, Senior, Community, Environment, & Planning

Mentor: Megan Herzog, Urban Design & Planning, Community, Environment & Planning

This project is about decision-making systems and in particular, the costs and benefits of consensus. Consensus voting is appealing because, among other reasons, it not only protects the right of minority views that would otherwise be consistently overruled, it also has the potential to completely transform organizational culture - which is good since for many organizations nothing at all could get done by consensus under their current culture. The dynamics that consensus creates teaches us how get along with other people, to create camaraderie, and to change the world or at least reduce the disastrous consequences of our conflict-based status quo. I've explored when and why consensus voting does and doesn't work, and have produced proposals for its wider use in one or more specific groups or situations. First, I analyzing three cases where consensus is currently used, including felony trial by jury, and three cases where it could be added or expanded, such including certain urban planning decisions. I also held a simulation to gather feedback from participants. In certain situations, consensus can allow a broader range of people affected by a decision to participate in it, but it can also be seriously impeded by a small group, and the effects

of this depend on whether there is any sort of escape valve or override, as well as the social dynamics of the situation.

POSTER SESSION 4

MGH 241, Easel 125

4:00 PM to 6:00 PM

SIV-ZIKV Coinfection Affects ZIKV Pathogenesis through Increasing Viral Replication *In Vitro*

Brett Knowlton Jones, Senior, Microbiology

Mentor: Megan O'Connor

Mentor: Deborah Fuller, Microbiology

There is a critical lack of knowledge regarding the effects of human immunodeficiency virus (HIV) and zika virus (ZIKV) coinfection in respect to ZIKV pathogenesis, vertical transmission and current vaccine strategies. ZIKV has received global attention because of its clinical complications including congenital malformations during vertical transmission and Guillain-Barré syndrome, a neurocognitive disorder in adults. Recently, ZIKV outbreaks have occurred in tropical and subtropical regions endemic with HIV, therefore it is imperative to understand the impact HIV-ZIKV coinfection may have when moving forward with ZIKV vaccine design. Furthermore, in humans and non-human primates (NHPs) frequencies of blood monocytes increase during HIV and simian immunodeficiency virus (SIV) infection and monocytes are early targets of ZIKV infection. Therefore, we hypothesize that cells from HIV infected individuals have the capacity to harbor increased ZIKV replication and could lead to enhanced ZIKV viremia and pathogenesis. For this study, we use a NHP model to determine the impact of acute SIV infection on ZIKV pathogenesis. We determine ZIKV cellular targets in the blood and preliminary results show an increase in NHP blood monocyte within the first six weeks of SIV infection. We evaluate whether SIV infection increases the susceptibility of cells to ZIKV infection by isolating cells from SIV- and SIV+ animals, infecting them *in vitro* with ZIKV, and assessing viral replication by plaque assay. Our preliminary findings suggest that *in vitro* ZIKV replication may increase in cells from SIV+ NHP blood when compared to SIV-blood. Future studies will look at the impact of SIV infection on *in vivo* ZIKV replication and whether ZIKV replication is enhanced in cells from HIV-infected individuals.