



Undergraduate Research Symposium May 17, 2019 Mary Gates Hall

Online Proceedings

POSTER SESSION 2

MGH 241, Easel 135

1:00 PM to 2:30 PM

Detecting Post-Translational Protein Modifications Using Nanopore Sensing Technology

Aerilynn Nha Chi Nguyen, Senior, Biology (Molecular, Cellular & Developmental)

Undergraduate Research Conference Travel Awardee

Mentor: Jeff Nivala, CSE

Mentor: Nicolas Cardozo, Computer Science and Engineering

Nanopore sequencing is a “third-generation” sequencing approach in which a constant electric voltage is applied across a nanoscale pore and the changes in the ionic current flow through the pore are measured as single molecules such as RNA or DNA pass through it. It is our goal to expand and adapt this sensing technology to enable single-molecule proteomics. Specifically, being able to characterize protein post-translational modifications at the single-molecule level is important for quantifying protein complexity and understanding how different protein mod-forms contribute to cellular processes such as differentiation and the progression of disease states like cancer. In this project, we modified a model protein to contain a protein kinase A phosphorylation motif with the purpose of demonstrating the ability to discriminate the modified protein from the unmodified with the Oxford Nanopore MinION, a high-throughput nanopore sequencing device. We hypothesize that the observed ionic current pattern will change upon phosphorylation and enable direct quantification of modified peptides. Ultimately, these analyses will inform us of the general ionic current signature that phosphorylated residues generate, which can then be added to our growing library of nanopore signal signatures that are informative of protein sequence and structure at the single-molecule level.

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 2

Commons West, Easel 37

1:00 PM to 2:30 PM

Wildfire Smoke Risk Communication Symposium: The Importance of Academic Practice Partnerships to Improve Health of Impacted Communities in Washington State

Kim Anh (Kim) Tran, Senior, Public Health-Global Health UW Honors Program

Mentor: Nicole Errett, Environmental and Occupational Health Sciences

Over the past several summers, Washington state has faced high levels of wildfire smoke exposure. Significant research has indicated that wildfire smoke is a public health hazard.

Public health professionals require evidence-based communication and intervention methods for use in exposed communities. It is valuable for researchers to understand current practice-based risk communication and management challenges to inform their research strategy and priorities. In response, the University of Washington's School of Public Health faculty and students convened a wildfire smoke risk communication symposium on October 30th, 2018, to foster academic-practice partnerships among regional stakeholders, identify existing risk reduction and communication challenges, and identify research needs. We conducted pre and post symposium surveys to collect information on participants' goals, demographic characteristics, and symposium satisfaction. Descriptive statistics were calculated and displayed on graphs and tables. The registration survey identified the most common participant goals for the symposium which were to learn about lessons learned from public health practitioners related to wildfire smoke and to identify collaboration opportunities. Participants had a variety of roles related to risk communication and research. The evaluation survey revealed that over half of participants reported knowledge increases on wildfire risk communication, the future of wildfires in the Pacific Northwest, and practice-based responses to wildfire smoke. Over three-quarters of participants reported developing new connections that could lead to new collaborations in the future. Our findings suggest that there is an interest in working collaboratively to improve risk communication during wildfire events to address knowledge gaps and challenges impacted communities may face. We recommend engaging stakeholders and participants to identify the best communication methods and work with multidisciplinary partnerships that will be crucial to prepare for future wildfire seasons.

SESSION 2C

ASSESSING THE SOURCES: WOMEN, IDENTITY, AND PRACTICES OF EMPIRE

Session Moderator: Mira Green, History
MGH 231

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

”White Supremacy, Protection of Womanhood, and Defense of the Flag”: White Women as Active Participants in the 1920’s Ku Klux Klan Movement
Catarina Papagni Terrill, Senior, History: United States History (Tacoma)
Mentor: Julie Nicoletta

This project looks to understand the role of women in the second rise of the Ku Klux Klan in the 1920s to understand why

this manifestation has been categorized as the largest right-wing movement in the history of the United States. I argue that the addition of women as active participants in Klan activity, unlike the first rise during Reconstruction which was a strictly fraternal society, transformed the movement from a domestic terrorist organization into a political club with immense social influence on the white Protestant population in America. Primary sources used to build this argument came from Klan documents such as pamphlets and newsletters as well as local and national newspapers from across the U.S between 1918-1927. Women in this time period were emboldened to participate in politics after their victory with the suffrage movement, and those who employed racist and nativist ideology easily transitioned into the white supremacy of the Klan, who desperately sought to recruit blocs of voters. Using coded language such as “100% American” to describe themselves, the Women’s Ku Klux Klan (WKKK) utilized issues such as poor education, alcoholism, and immigration as a silk screen to vilify their ever-growing list of “enemies” (a tool used to recruit membership from a larger base) among them Catholics, Jews, Bolsheviks, blacks, labor unions in the North, and immigrants. The addition of women allowed the Klan to become an organization that supported nuclear family structure and encouraged all to be involved, including children, which served to develop “Klan culture” to recruit and retain members by building community. While Klanswomen were different from their male counterparts, they worked within social networks that maintained consistent growth, starting chapters in almost every state and amassing political and social influence on a local and national level.

SESSION 2I

EQUITY AND ACCESS IN HIGHER EDUCATION

Session Moderator: Gillian Harkins, English
MGH 254

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

Aligning University Sustainability Planning with Global Development Goals

Christoph Von Strouse, Senior, Community, Environment, & Planning

Mentor: Nico Martinucci, Community, Environment & Planning

Universities are increasingly expected to integrate sustainability practices throughout their mission, strategic planning, operations and academics. Achieving institutional sustainability requires a comprehensive strategic plan which coordinates the efforts and resources of administration, facilities, faculty, and students by making progress toward measurable

goals. How can universities use sustainability benchmarking standards to develop a comprehensive strategic plan that achieves institutional goals, while making progress toward global sustainability reporting standards? This project outlines a model for universities to develop a strategic sustainability plan utilizing the Sustainability Tracking Assessment and Rating System (STARS) as a foundation, to align institutional planning with the Global Reporting Initiative (GRI) and the UN Sustainable Development Goals (UN SDGs). The plan is comprised of seventeen sections or modules that aligns the categories of STARS, the GRI and the UN SDGs into a framework for benchmarking data of key performance indicators (KPIs). The data is visualized using Tableau software to create a campus sustainability map and data dashboard to track annual progress on the KPIs. The goal of this project is the creation of a generalizable and replicable model for aligning a university's strategic sustainability planning with global sustainability metrics. This model facilitates more efficient data driven decision making and resource allocation, while supporting globally focused sustainability research and funding.

POSTER SESSION 3

Commons West, Easel 40

2:30 PM to 4:00 PM

Establishing an Air Monitoring Network in the Methow Valley

Amanda Durkin, Senior, Environmental Health

Mentor: Nicole Errett, Environmental and Occupational Health Sciences

Mentor: Tania Busch Isaksen, DEOHS

The Methow Valley is a community located in Okanogan County, WA that has experienced wildfires in 4 of the past 5 years. The Methow Valley Clean Air Project (MVCAP) is a local volunteer group that promotes air quality awareness through outreach and programming. MVCAP's Purple Air Network was designed to provide access to spatial air quality information to help community members make decisions about protective actions, to identify relatively clean air spaces, and to serve as a public health intervention for wildfire smoke. In collaboration with MVCAP, we worked to install a network of 20 purple air monitors in the summer of 2018. The monitors were placed in homes of "Clean Air Ambassadors" who committed to maintain and promote the monitor. For calibration, each monitor was placed according to federal guidelines and two were collocated with nephelometers maintained by Washington Department of Ecology. During the summer of 2018, two wildfires burned nearby which allowed the monitors to be utilized in a wildfire smoke event. The data from the monitors was downloaded and compared to the nephelometer data using linear regression. I worked to establish a correction factor by analyzing the data and found

that the Purple Air monitor over reported the PM_{2.5} concentration by a factor of 0.53 and even more at high concentrations. The network proved the importance of high spatial concentration monitoring by capturing the air quality variation. In some areas, the air quality was good while in others it was hazardous. Having the network is a tool for individuals to know what the air quality is near their homes and other places in their community. It allowed individuals to access local air quality data and make choices about poor air quality. The next step for MVCAP is designing an online interface that applies the correction factor directly to accurately communicate risk.

VISUAL ARTS & DESIGN SHOWCASE

Odegaard Undergraduate Library

3:00 PM to 4:30 PM

* Note: Titles in order of presentation.

Let the Record Play

Nyles Tavarr Green, Senior, Community, Environment, & Planning

Mentor: Nico Martinucci, Community, Environment & Planning

The Pacific Northwest has always been distinct from other regions because of its diverse environments, histories, and cultures. Seattle is widely regarded for its punk and grunge music scene; however, Seattle's punk and grunge overshadows music from other genres in the region. The purpose of this project is to tell the story of musicians in the Pacific Northwest, specifically black musicians, exploring their successes and struggles during a time when gentrification is rapidly changing the demographic make-up of Seattle at an unprecedented rate. Because music is an auditory experience best expressed and understood through the ears, this story will be told through a series of podcast episodes. Each episode features interviews and discussions about musicians and their craft to create an overarching narrative of Seattle's music scene from the perspective of black musicians and their music to give audiences a greater understanding of Seattle music. Academia from University of Washington's American Ethnic Studies will be incorporated into the research process and preparatory work for the podcast. This podcast aims at preserving the stories of African-American musicians during a time where communities of color are weakened by the effects of gentrification while also highlighting the successes of emerging local musicians. Link to podcast: <http://uwpodcast.com/category/let-the-record-play/>

POSTER SESSION 4

Commons West, Easel 41

4:00 PM to 6:00 PM

Content Needs Assessment and Evaluation of N95 Mask Video-Based Education for Wildfire Smoke Events

Veda Kalliyaan Ting, Senior, Biochemistry, Environmental Health

Mentor: Tania Busch Isaksen, DEOHS

Mentor: Nicole Errett, Environmental and Occupational Health Sciences

Research has shown that wildfire smoke exposure is associated with various respiratory health effects. To help protect the lungs, respirator masks that are labeled as N95 can be worn to filter out fine particulate matter produced from wildfire smoke. Previous studies show that video-based education is effective in increasing knowledge and intervention practices among viewers, and it was hypothesized that an N95 mask instructional video could help educate the lay-public. A video-content needs assessment was conducted using semi-structured key informant interviews. Eight experts knowledgeable in air quality, message communication, N95 respirators, and respiratory and cardiovascular health were interviewed for important content needs. Response themes were identified and used to inform the content and style of the video entitled, *Smoke from Fires: N-95 Respirator Masks*. A Knowledge, Attitude, and Practice (KAP) survey, using a 5-point likert scale, was created to assess the video's knowledge transference, and effect on attitudes and commitment to practice use. The KAP survey was given to undergraduate students before and after viewing the video. The results from our key informant interviews included instruction on proper use, mask limitations, incorrect alternatives, and appropriate use of language, images, and tone. The KAP survey results indicate the video enhanced the participants' knowledge of N95 masks with regards to proper fit, incorrect alternatives, and limitations. Additionally, attitudes of increased ease of use and mask effectiveness were demonstrated. Since this study investigated a video-based intervention, possible future research includes testing the effectiveness of different education methods on N95 mask fit, in addition to knowledge, attitudes, and commitment to practice.

VISUAL ARTS & DESIGN SHOWCASE

Odegaard Undergraduate Library

3:00 PM to 4:30 PM

* Note: Titles in order of presentation.

Electric Pocket Bike Kit for Adolescent Children

William Clarence Perry, Senior, Community, Environment, & Planning

Mentor: Nico Martinucci, Community, Environment & Planning

Encouraging creativity among children is important, especially during their adolescence. As children age, their interests shift, however, some activities provide consistent excite-

ment throughout their childhood. Learning how to ride a bike has remained a cultural norm in countries across the world for decades, providing children and adults with function and fun alike. Using this concept as a foundation, further research was done to see how biking can become a learning experience on top of the existing purposes. Aimed to spark STEM-based interests within children of the biking community, I have created a kit where adolescent children are able to build their own electric pocket bike. With the frame template made out of high-grade marine plywood and aluminum reinforcements, the kit will instruct the builder how to assemble the product. In addition to the written instructions, illustrations will be provided to assist visual learners. Through hands-on work, these children will have the opportunity to build their own "invention", along with building self-confidence, accomplishment, and improved relationships.

POSTER SESSION 4

Commons West, Easel 38

4:00 PM to 6:00 PM

Assessment of Wildfire Smoke Health-Risk Communication Needs of Organizations that Serve the Public in Clallam County

Rico J. Gonzalez, Senior, Environmental Health

Mentor: Tania Busch Isaksen, DEOHS

Mentor: Nicole Errett, Environmental and Occupational Health Sciences

Clallam County has recently been experiencing concerning air quality conditions due to smoke drift from wildfire events in nearby areas. The objective of this study was to assess the wildfire smoke health-risk communication needs of organizations that serve the public in Clallam County. Communication needs were assessed by surveying 10 organizations that serve sensitive populations. Surveys were conducted in person or over the phone, and summary statistics were calculated. In addition, a low-cost air monitor was installed to track summer time air quality. The low-cost air monitor was installed adjacent to a nephelometer administered by the Olympic Region Clean Air Agency (ORCAA). This was done to determine the accuracy of the low-cost air monitor by comparing air quality values registered from both devices. The majority (60%) of organizations responding to the survey reported that they had not received information about the health risks of wildfire smoke. Nearly all organizations (90%) reported that they have the capacity and are willing to communicate the health-risks of wildfire smoke to the people they serve in Clallam County. Analysis of air quality data shows the low-cost monitor may be a useful device in determining air quality conditions. The correlation coefficient for the daily averages (from July 12 to August 24) between the ORCAA nephelometer and the low-cost air monitor was determined to be 0.98, but closer examination of data for hourly averages

show a correlation coefficient as low as 0.82. Future wildfire smoke events in Clallam County require public health interventions to address health-risk communication needs of sensitive populations. Implementation of a low-cost air monitor network accessible by the public is a promising prospect to protect sensitive populations in Clallam County.

POSTER SESSION 4

Commons West, Easel 40

4:00 PM to 6:00 PM

N95 Mask Distribution Effectiveness in Okanogan County

Katelyn Lorraine (Katie) Kern, Senior, Environmental Health

Mentor: Tania Busch Isaksen, DEOHS

Mentor: Nicole Errett, Environmental and Occupational Health Sciences

Okanogan County, Washington is known for unpredictable and persistent wildfires. In 2014, it had the largest wildfire known in Washington State history. Over the past few years, N95 masks provided by the Public Health Department have been given out to community members at 72 different distribution locations throughout the county in order to protect against some of the harmful airborne contaminants caused by wildfire smoke. In order to determine the effectiveness of the N95 mask distribution system and the public service announcements regarding N95 masks, a survey was given to residents and visitors of the county. Focus areas of this survey were the availability and use of free N95 masks, knowledge of the N95 mask distribution locations, desired information on the N95 masks, and the awareness of public service announcements regarding N95 masks during wildfire smoke events. Results showed that many are still unaware of the free N95 masks in the county and those who picked them up had unresolved questions about them. Of the total 87 respondents, 34.5% were not aware that there were free masks available to them throughout the county. Of those who were aware, 81.3% wanted to know how long the masks could be worn before disposing and 56.3% wanted to know for who the masks were not appropriate for. The survey also found that 40% of people prefer to receive their information through Facebook. In order to combat the issues found, an N95 mask infographic was created for distribution along with the masks.