

## Undergraduate Research Symposium May 20, 2016 Mary Gates Hall

### Online Proceedings

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#### SESSION 2G

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### POWER, POVERTY, PRIVILEGE, AND THE MAKING OF URBAN GEOGRAPHIES

*Session Moderator: Sarah Elwood, Geography*

**MGH 251**

*3:30 PM to 5:15 PM*

\* Note: Titles in order of presentation.

#### **The Analysis and Application of Therapeutic Gardens**

*Jianghezi (Alexis) Zheng, ,*

*Mary Gates Scholar*

*Mentor: Daniel Winterbottom, landscape architecture*

Therapeutic gardens are a specific type of landscape designed to promote physical and psychological human health within a natural environment. Designs of therapeutic gardens vary depending on the user populations and the goal of my project is to understand the healing components of therapeutic gardens and apply them to specific circumstances. In this project, I will conduct a post evaluation on the Ichi-Go Ichi-E Garden, used primarily by Japanese American senior residents of a senior residential community, Nikkei Manor, and analyze the use patterns of residents and staff using observation, mapping, surveys and interviews. By analyzing the success of the project, I hope to answer the question of how therapeutic gardens can be effectively designed for specific users, site conditions and programs. These findings and knowledge will be integrated into the design for a new project: a capstone design & build project led by Professor Daniel Winterbottom for the Puget Sound Veteran's Affairs Hospital. The garden will serve veterans suffering from post-traumatic stress disorder (PTSD) and other stress-related illnesses. Finally, after gaining feedback from clients and presenting the final design, my classmates and I will build the project by June 2016 when the garden will be dedicated.

#### POSTER SESSION 3

**Commons West, Easel 39**

*2:30 PM to 4:00 PM*

#### **Heavy Metal Concentrations in Possession Sound**

*Kyla Pritzl, Junior, Civil/Environmental Engineering, Landscape Architecture, Everett Community College*

*Maija Diamond, Freshman, Undecided, Everett Community College*

*Caitlin McKay, Junior, Wildlife Biology, Fine Arts , Creative Writing, Everett Community College*

*Jessaca La Boda, Freshman, Associated arts , Everett Community College*

*Mentor: Robin Araniva, Life Sciences, Everett Community College*

*Mentor: Ardi Kveven, Ocean Research College Academy, Everett Community College*

Sources of heavy metals in the Snohomish River estuary system are influenced by both point and nonpoint sources; therefore, areas near the Snohomish River estuary are expected to have higher concentrations of heavy metals in the sediment during periods of high river discharge. At the Ocean Research College Academy, students develop research based studies through hands-on data collection in Possession Sound (P.S.). Our study focused on the effects of non-point sources on heavy metal deposits in P.S., both spatially and temporally. In consideration of the recent removal of the oil dock at Mukilteo, we hypothesized that higher levels of mercury and copper would be present at Mount Baker Terminal (MBT). Collection of arsenic and copper data involved in our group's research were taken by previous cohorts at three sites in P.S.: Buoy, located closest to the mouth of the Snohomish River; Dolphin 1 (DOL), farther from shore near Hat Island and MBT, adjacent to Mukilteo. A Ponar type sediment grab was used to retrieve sediment from the various locations to be analyzed for heavy metal concentration at the Everett Environmental Laboratory. From 2012-2015, Buoy had higher heavy metal content than the other two stations; an average of 5.5 mg/L arsenic and 15.5 mg/L copper. Furthermore, Buoy showed the strongest seasonal correlations in 2014; DOL and MBT did not. The highest concentrations of heavy metals occurred during winter; an average of 6.5 mg/L arsenic and 16.1 mg/L copper. Buoy is nearest to the mouth of the Snohomish River; therefore, it is possible that river runoff heavily influenced arsenic and copper deposits at this station. Increased levels of heavy metals can be toxic for marine life and humans, which poses health concerns in environments with high concentrations. For future studies, the effects of heavy metal contamination on marine plants will be investigated.