

22nd Annual Natural Sciences Academic Festival
Geosciences Department
Capstone Presentations
Saturday, 7 May 2016, RCTR 109

8:00 AM - 8:20 AM **Garrett Brown**

A comparative analysis of the tectonic setting in which the extremely rare Lawsonite Eclogite metamorphic rock is found

When oceanic crust is subducted, it becomes metamorphic rock and some of which is a rare type called lawsonite eclogite. This project used a comparative analysis of professionally published constraints of the tectonic settings of the rare exposures of lawsonite eclogite on Earth.

8:20 AM - 8:40 AM **Erik Hogeberg**

Mega-Droughts in the American West: A Geospatial and Proxy Study

A period of mega drought occurred in the American West between 900 and 1300AD. This study investigates how these periods of past drought were identified in the proxy record and analyzes how regional climate trends of recent droughts are linked to climate phenomena of ENSO and PDO.

8:40 AM - 9:00 AM **Isabellah von Trapp**

Clumped Isotope Thermometry Record in Pre-LGM Sediments in the Palouse Loess

This project utilizes conventional stable isotope (d13C, d18O) analysis and clumped isotope thermometry to analyze carbonates that formed during the last glacial period in the Palouse loess. Isotopic information is then used to infer paleoclimate of the region leading up to the Last Glacial Maximum.

9:00 AM - 9:20 AM **Maricel Fee**

Role of Carbonates in the Evolution of Mafic Mineral Assemblages During Subduction

Observation and numerical modeling of calcite in subduction related metamorphic samples show that carbonate fluid can selectively altered a bulk composition to produce the enigmatic layering of eclogite and blue schist.

9:20 AM - 9:40 AM **Christina Gray**

Modeling of the sensitivity of glaciers in the Pacific Northwest and their response to climate change

This study is focused on using a numerical model to determine how physical factors such as width variations, elevation, and bed slope affect how glaciers in the North Cascades and Mount Rainier National Parks respond to climate warming.

9:40 AM - 10:00 AM **Kyle Bennett**

Variations of glacial ice on Mount Rainier, Washington State

This study analyzes the retreat rates and glacial ice volume change for four Mount Rainier glaciers. Using field observations, satellite imagery, and computer-aided mapping, I show that the current glacier retreat rates are the highest in the last 500 years.

10:20 AM - 10:40 AM **Jennifer Tauscher**

Asymmetric earthquake distribution shows non-volcanic addition to crustal spreading rate at the JDFR

Earthquakes are evidence of extension of oceanic crust (strain) that provide additional deciding factors on the spreading rate of tectonic plates, like the Juan de Fuca plate and the Pacific plate. These two plates come together to make the Juan de Fuca Ridge.

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10:40 AM - 11:00 AM **Brandon Northcutt**

A Comparative Study of What Controls $\delta^{18}O$ Values across the Cascade and Sierra Nevada Region

In this study, the distributions of meteoric water oxygen-18 values are mapped across both the Sierra Nevada and Cascade Mountain Ranges to determine which environmental controls (elevation, continentality, etc.) exert dominant controls on oxygen-18 distributions in each region.

11:00 AM - 11:20 AM **Andrew Gunstone**

Soil contamination and relation to groundwater analysis at an outdoor shooting range in Jefferson County, WA

Assessment of a heavily used outdoor shooting range was conducted to find a quantitative number of lead contaminant released into native soils, with a groundwater relationship assessment, in association to a point contaminant source.

11:20 AM - 11:40 AM **Samantha Burleigh**

Saltwater Intrusion and Population Density in Puget Sound

Chloride data from regional wells and census population data indicate that increasing populations in Island County, WA, have not had a measurable effect on the incidence of saltwater intrusion because of mitigation.

11:40 AM - 12:00 PM **Emily Knutsen**

Predicting the locations of new climbing recreational areas based on the distribution of geologic and anthropological factors

Crowding in popular climbing areas has led to people exploring new areas in WA. Understanding the geologic characteristics of these climbing areas may lead to predicting where new areas are to accommodate the increasing popularity of climbing.

12:00 PM - 12:30 PM *Complimentary Pizza Lunch*
Morken Center Atrium

1:00 PM - 1:20 PM **Halley Barnett**

Groundwater Drawdown in Harney County, Oregon

A qualitative temporal and spatial analysis of water table changes in the semiarid region of Harney County, Oregon. Analysis of water level data reveals localized regions of water level declines and long-term downward trends in groundwater throughout the majority of the basin.

1:20 PM - 1:40 PM **John Turner-Frazier**

Establishing a Waterway at Pacific Lutheran University

An investigation of the geologic conditions in Clover Creek's historic channel on PLU's campus. The channel is sufficient for moderate flows which could be provided from Clover Creek or the local aquifer.

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1:40 PM - 2:00 PM **Nicole Combs**

Estimating Climate Change Effects on Water Resources in Eastern Washington

A model is used to estimate water balance components of irrigated farmland in Grant County. Both historical observations and climate change projections are used to characterize hydrologic variability and the effects of climate change on irrigation needs.

2:00 PM - 2:20 PM **Michelle Byrne**

An assessment of Mars as a potential environment that supports biological soil communities

Soil forming factors are applied to Mars to locate areas which may support microbial life. Parent material, climate, and topography are the main contributing factors analyzed.

2:20 PM - 2:40 PM **Adriana Peters**

A climatological comparison of Antarctic glaciomarine sediments

Glaciomarine sediments from relatively similar continental margin environments off of the West Antarctic Peninsula and Prydz Bay in Antarctica exhibit differences in both the Miocene Epoch and Quaternary Period, suggesting climatic differences between East and West Antarctica

3:00 PM - 3:20 PM **Anita Bauer**

Seismic Hazards in Southwest Washington

This study researches seismic hazards that are local to Clark County Washington. For example, the risk of amplification of ground shaking varies greatly between locations due to the different physical properties of the varying geological environments within the County.

3:20 PM - 3:40 PM **Samantha Harrison**

The effects of glacier retreat on the frequency and spatial distribution of debris flows on Mount Rainier, WA

Debris flows are the primary geologic hazard at Mount Rainier National Park. This research analyzes the relationship between glacier retreat, valley characteristics, and debris flow history in the Tahoma Creek and South Puyallup River drainages.

3:40 PM - 4:00 PM **Virginia Allred**

Managing Runoff on the Pacific Lutheran University Campus

Traditional urbanization practices tend to increase storm water runoff from precipitation. Infiltration has been measured at PLU and was used to assess the impact of future land development to see if PLU needs to invest in low impact development strategies to minimize runoff levels on campus.

4:00 PM - 4:20 PM **Kyle Gosnell**

Comparison of Terrestrial and Marine Proxies for Investigating Paleoclimate Change Since the Last Glacial Maximum.

A comparison of stable isotopes used in paleoclimate reconstructions for regions with differing climates during formation. Carbon and oxygen isotopes from soil organics from China and calcium carbonate from the Palouse are analyzed. Terrestrial records are compared to more proven marine records.