**POSTER SESSION 1**

**Commons East, Easel 43**  
12:00 PM to 1:00 PM

**Assessing Growth and Germination Characteristics of the Toxigenic Dinoflagellate *Alexandrium catenella* in Puget Sound Waters**  
Jennifer Emenegger, Senior, Biology (Ecology, Evolution & Conservation)  
Mentor: Stephanie Moore, National Oceanic and Atmospheric Administration, Northwest Fisheries Science Center  
Mentor: Brian Bill, NOAA Fisheries

*Alexandrium catenella* is a coastal dinoflagellate regularly detected throughout Puget Sound. *A. catenella* produces a suite of neurotoxins that can accumulate in shellfish and cause the human syndrome paralytic shellfish poisoning. The severity of toxic events due to blooms of *A. catenella* varies spatially and interannually within Puget Sound; efforts are currently underway to provide early warning of these events. *A. catenella* are a persistent problem and form a dormant cyst stage that overwinters in seafloor sediments. Germination into the vegetative motile stage takes place the following summer when conditions are favorable. *A. catenella* vegetative cells collected in October 2010 from Quartermaster Harbor (QH) demonstrated growth rates of 0.30 and 0.28 day\(^{-1}\) during exponential growth. The germination cue for cysts could be either environmental (e.g. oxygen, light, temperature) or another mechanism, such as an endogenous clock. Whether Puget Sound *A. catenella* cysts possess an endogenous clock that controls germination is under debate; answering this question would yield important understanding of when and why *A. catenella* germinate and cause blooms in Puget Sound. Cyst-containing sediment, collected from QH in February 2011, is being used in germination studies to determine whether these cyst populations have an endogenous clock. If an endogenous clock is present, germination will occur only at specific times of the year, despite incubator conditions being constantly favorable for germination. Results from the study will inform a predictive model of *A. catenella* bloom dynamics to mitigate the effects of future harmful algal blooms. The model will benefit the Department of Health and regional shellfish growers in protecting consumers. This poster will present growth rates and toxicity of *A. catenella* collected from Puget Sound waters in the summer of 2010, methods of cyst isolation and enumeration, and concentrations of cysts in sediment from QH to be used for endogenous clock experiments.

**POSTER SESSION 1**  
MGH 241, Easel 162  
12:00 PM to 1:00 PM

**A Comparison of Wing-generated Acoustic Mate Attraction Signals in Two Closely Related Bird Species**  
Daniel (Dan) Fuller, Senior, Biology (General)  
Mentor: Tim Billo, Program on the Environment  
Mentor: Michael Beecher, Psychology, Biology

Animals use signals to recognize members of their own species. Signals are expected to be species specific in order to facilitate interactions, including mating, with their own species. In allopatric populations of closely related species, signals can differentiate based on a variety of mechanisms: 1) genetic drift, 2) founder effects in the signals themselves, or in the vagaries of female choice, 3) adaptive change, or 4) as a byproduct of morphological differentiation. We studied the unusual wing-generated acoustic mate attraction signals of males of two bird species, the golden-collared manakin (*Manacus vitellinus*) and the white-collared manakin (*Manacus candei*). Both species differ in plumage and vocal signals, and have wings of slightly different sizes. Therefore, we predicted that signals produced by the wings should also differ between species. We used bio-acoustic analysis software to measure the average number of “snaps” and average inter-snap interval in these wing-generated acoustic signals. Contrary to expectation, our preliminary data suggest there is strong overlap in the wing-produced signals of these two species, suggesting that this particular signal type is highly conserved within this genus.

**POSTER SESSION 1**  
Commons West, Easel 90  
12:00 PM to 1:00 PM

**The Effect of ADHD on Dropping Out of High School**  
Treasineu McDaniel, Junior, Sociology, University of California, Davis  
McNair Scholar  
Mentor: Bill McCarthy

Undergraduate Research Program  
exp.washington.edu/urp
Most analysis of dropout rates between class and ethnicity examines either the negative effects of one’s environment or individual characteristics. This study analyzes both environmental effects and psychosocial factors, particularly ADHD. Of the 4.5 million children in the U.S between 3 and 17 years of age, 4% of females and 11% of males have been or will be diagnosed with ADHD. Using the National Longitudinal Study of Adolescent Health data, this research examines the relationship between variables thought to have an effect on dropping out such as ADHD, age, ethnicity, prior delinquency, involvement in school related activities, drug and alcohol use, and several others. The study’s principal hypotheses are that there is an independent relationship between ADHD and dropping out of high school, net of all other factors and the effect of ADHD will be exacerbated for children of low income families who have limited access to health care, education, and other resources. The results of this study highlights the extent to which disparities in access to healthcare effect educational outcomes and life chances. It can also be useful in making greater efforts to support and accommodate children who have ADHD in primary school as a preventative step taken to decrease the likelihood of subsequent drop out.

**Poster Session 1**
Commons East, Easel 47
12:00 PM to 1:00 PM

Seattle Ground Motion Using the NetQuakes System
Avery James (Evan) Leon, Freshman, Pre-Engineering
Mentor: Bill Steele, Earth And Space Sciences
Mentor: Michael Cibicki, Earth And Space Sciences

To improve public safety it is necessary to better understand local ground motion variability during an earthquake. The main goal of my research is to discover and verify what influences ground motion in the Seattle area and how the Pacific Northwest Seismic Network’s NetQuakes system will be used in disaster relief and response. Our current knowledge of the geology of the Seattle area gives us a basic understanding of the potential shaking during an earthquake. The NetQuakes program aims to increase the density of strong motion seismometers which will allow for better characterization of ground motions on a more defined scale. Many different variables can amplify or dampen localized ground motion during an earthquake. My project explains these variables along with the NetQuakes system. My project will summarize how the NetQuakes system can yield invaluable insight into the specific effects different variables can have on ground shaking while providing information that can be used immediately to protect structures and direct emergency response in the event of an earthquake. By adding more NetQuakes to PNSN’s array and studying the data, there is a goal to eventually render an even more highly defined susceptibility map for Seattle. As my poster shows, this map is expected to prove useful for engineers building and retrofitting homes as well as emergency response during an earthquake.

**Session 1C**

**Genes and Populations**
Session Moderator: Benjamin Hall, Biology
Mary Gates Hall 228
1:00 PM to 2:30 PM

*Note: Titles in order of presentation.*

Molgulid Ascidians Share a Unique Maternal Gene Complex
Peter Xihua (Peter) Wu, Senior, Biology (General)
Mentor: Billie J. Swalla, Biology

Typical chordate features found in ascidian tadpole larvae have been evolutionarily lost several times independently within the Molgulidae family. While tailed molgulids retain a tail with muscle cells, a notochord, and a dorsal neural tube, these traits have been lost within the tail-less species. Of the ascidians, there are just two extant species with tail-less larvae other than the in the Molgulidae, which are found in the related Styelidae. A locus containing an unusual gene arrangement of the Bobcat gene within the first intron of the Manx gene has been shown to be essential for the development of chordate features in molgulid tadpole larvae. Sequencing and closer examination of ascidian genomes shows that there is a unique gene rearrangement of the NA-14 gene adjacent upstream to Manx and Bobcat within the Molgulidae also not found in styelid and cionid ascidians. Expression of these key genes could be affected by one another’s close proximity, disturbing normal larval development, specifically that of chordate features. We propose that the unique rearrangement that took place in the molgulid ancestor may be responsible for the numerous instances of the evolution of tail-lessness found in the Molgulidae.

**Poster Session 2**
Balcony, Easel 104
2:30 PM to 3:30 PM

Investigating Ptychodera flava Hox Gene Organization
Lena Jewelene (Lena) Perry, Junior, Biology (General)
Mentor: Billie J. Swalla, Biology

Deuterostome adult body plans greatly differ between echinoderms, chordates and hemichordates. In order to understand the evolution of deuterostomes and the relationships between species, we may eventually have complete genomic sequences available for comparison, but we do not yet have the genome for Ptychodera flava. This information, along with
gene expression data, gives insight to the similarities in developmental patterns between phyla as well as insight to their evolution. In this project, we are sequencing the genomic organization of the Hox genes in *P. flava*, an indirect developer of the hemichordates, which has larvae that are morphologically similar to echinoderms. Our purpose is to complete the genomic organization *P. flava* Hox genes in order to learn more about deuterostome evolution. We have analyzed a set of clones with Hox sequences inserted into bacterial artificial chromosomes (BACs). These BACs have been sequenced with primers made to individual Hox genes. We are mapping the exons of the genes in the Hox gene complex and the position of the BACs relative to the *P. flava* chromosome. Then, by sequencing the BACs we can piece together overlapping portions of the Hox genes. The overlapping sequences will reveal the order of the *P. flava*Hox genes on the chromosome. We are specifically interested in whether the Hox complex is rearranged, as in echinoderms, or co-linear, as in chordates.

**POSTER SESSION 2**

Commons East, Easel 21  
2:30 PM to 3:30 PM

**Hazards of Cascadia Subduction Zone**  
*Kathleen Nicole (Kathleen) Moore, Sophomore, Pre-Engineering*  
*NASA Space Grant Scholar*  
*Mentor: Bill Steele, Earth And Space Sciences*  
*Mentor: Renate Hartog, Earth And Space Sciences, Pacific Northwest Seismic Network*

Off the coast of Washington, Oregon, and northern California, the oceanic Juan de Fuca plate is being forced under the continental North American plate, a subduction zone. The presence of the subduction zone results in a risk of three types of earthquakes: earthquakes associated with internal deformation of the subduction slab (intraplate earthquakes), earthquakes on the interface between the subducting plate and the overriding plate (interface earthquakes), and earthquakes in the crust of the overriding plate (crustal earthquakes). Washington has many more small Cascadia intraplate and interface subduction zone earthquakes than Oregon which indicates a difference in the conditions of the subduction zone. One plausible explanation for the difference in background seismicity is a difference in heat flow beneath Washington and Oregon. The PNSN, Pacific Northwest Seismic Network, catalog of earthquakes in Washington and Oregon since 1990 will be used to search for interface and intraplate earthquakes in Oregon. Using the location, depth, and focal mechanics of an earthquake, it can be determined whether or not the earthquake was an intraplate or interface earthquake. A better catalog of interface and intraplate earthquakes beneath Oregon will help to understand what causes the difference in seismicity between Washington and Oregon.

**Regeneration in the Ctenophores Bolinopsis infundibulum and Pleurobrachia bachei**

*Kellen Kane Andrilenas, Senior, Psychology, Biology (General)*

*Howard Hughes Scholar, Mary Gates Scholar*  
*Mentor: Billie J. Swalla, Biology*  
*Mentor: Leonid L. Moroz, Neuroscience, University of Florida*  
*Mentor: Andrea Kohn, Molecular, Genome, University of Florida*  
*Mentor: Mathew Citarella, Biology, University of Florida*

Ctenophores are basal metazoans with potential to contribute to regenerative medicine. Rapid regeneration has been documented in multiple species of ctenophore, across multiple orders. Many of the studies were conducted in the early or late 1900s, some featuring small data sets. The ctenophore species *Bolinopsis infundibulum* and *Pleurobrachia bachei* were collected from the dock at Friday Harbor Laboratories, Friday Harbor, WA and kept at local sea water temperature in sea table aquaria. Aboral regions (including polar fields, statocyst and ciliated furrows) from both species were excised and the progress of regeneration was documented at regular intervals. In *B. infundibulum* statocysts appeared on average 3.9 days after dissection (n=8). Statocysts were fully formed an average of 5.9 days after dissection (n=8) and regeneration of the polar fields continued through the end of the experiment (15 days). *P. bachei* healed the site of injury but did not regenerate aboral organ structures (n = 8). *B. infundibulum* may be a useful model organism for studying regeneration in basal groups.