Summer Research 2016

A glimpse of fun to come!

If you are participating in the SRP:
- complete the CITI training!
- remember to check your email and campus box to stay up-to-date with the program!
- alert the campus post office if you’ll be on campus this summer!

SRP dates:
Move in day: May 29
First day: May 30
2016 ASP Researchers!

Undergraduate Research Center

Parallel Processing with Beowulf Cluster
Thao Nguyen is a senior, Mathematics Major. This semester Thao worked with Professors Jeffrey Miller and Chuck Oravec from the Computer Science Department. In the past, supercomputers could only be afforded by large corporations such as IBM, AT&T or the NSA. However, in 1994 the Beowulf cluster was developed at the Center of Excellence in Space Data and Information Sciences. Beowulf cluster is a supercomputer made from multiple processors, or smaller computers, such as Raspberry Pi, a credit card sized computer. Since its components are much cheaper than building a traditional supercomputer, it enables the academic department and small research group to obtain robust computational power using parallel processing. This project will create a Beowulf cluster from ten mini computers called Raspberry Pi. The parallel work pattern Thao will use consists of one master processor or node that communicates and assigns tasks to the other nine worker nodes.

Analyzing Chaotic Plasma Particle Motion
Kayla Currier is a junior, double majoring in Math and Physics, and recently won a Goldwater Scholarship for her research! Working with Professor Eggleston, her research will focus on analyzing the way in which plasma particles move. Last summer, Professor Eggleston’s lab conducted a simulation of single particle in a Malmberg Penning trap to analyze non-neutral plasma particle motion in standing wave symmetry with periodic boundary conditions. While an understanding of regular motion is fairly strong, Currier writes, the characteristics of chaotic motion need to be further analyzed. To bypass the issue of fully visualizing the motion of the particles using two-dimensional graphs in Microsoft Excel, Currier will work to create a new program in Mathematica, which will incorporate various graphs (including three-dimensional) in the simulation. Once the code is complete, new data will offer a more complete understanding of particle motion, and will lead to a more accurate analysis of transport in plasma.

Prevalence of Sulfur-Oxidizing Bacteria in Intertidal Habitats
Matthew Weiser is a Sophomore, undeclared but likely a Biology Major, working with Professor Beth Braker, studying the interaction of the bacterium Beggiatoa and the surrounding invertebrates in exposed intertidal habitats. Matthew will travel to White Point four times throughout the semester to observe invertebrates’ consumption of the bacteria. His research is centralized around the question: Does the presence of Beggiatoa have an effect on the invertebrate biodiversity in the cracks of the lower intertidal zone at White Point, San Pedro? He hypothesizes, “If there is a statistical significance between the presence of Beggiatoa and biodiversity of invertebrates in the lower intertidal cracts, then the bacteria will have an adverse effect on the invertebrate population.

Loneliness in Emerging Adulthood on College Campuses
A team of five Psychology majors are working this semester with Professor Andrea Hopmeyer to determine how college students, as emerging adults, experience loneliness. Their research is part of an ongoing project examining emerging adults’ socio-emotional adjustment to college. This particular project’s objectives are to determine which students experience loneliness on college campuses, what areas may be the most lonely, and what strategies lonely students employ to reduce their feelings of loneliness. Students in the study will take an on-line survey posted in Qualtrics. The first part of the survey will use the NYU Loneliness Scale to measure general loneliness in students. The second set of questions will deal with various reasons that students may feel lonely. Thirdly, the survey will ask participants to rate how lonely certain places on campus make them feel. Finally, it will ask students which coping strategies they rely on to reduce feelings of loneliness. To evaluate the data, they will run analyses of variance comparing lonely and non-lonely individuals’ reasons for loneliness, lonely places and coping strategies.
ASPs (Academic Student Projects) are small grants up to $300 that support the purchase or supplies or local travel. On these pages, we describe some of the student work undertaken with ASP support during the spring 2016 semester. To apply for a fall ASP grant, visit our website!

Julia DeRogatis is a Biochemistry major, in her sophomore year at Oxy. Working with Professor Goffredi, she will work to uncover whether the mechanism of cellulose digestion used by an undescribed deep-sea Munidopsis crab is bacterial-mediated, or is performed by cellulases of endogenous crab origin. She will determine whether the crabs rely on wood by examining gut contents, and will perform dissections of the crab digestive systems in order to form an understanding of digestion. She'll be able to isolate areas of enzymatic activity, nutrient absorption, and bacterial residence. Finally, she will conduct comparisons of previous gene sequences, based on previous studies, in order to map the similarities of the cellulases and attempt to determine their genetic or environmental/bacterial origins.

A mysterious crab living off a deep sea fallen tree: a scientific inquiry into the cellulose digestion of a Munidopisis deep-sea crab

Sophomore, future Biochemistry Major, Christy Wong participated in research with Professor Aram Nersissian from the Chemistry Department. By embarking on research of the Blue Copper Binding proteins in Early Nodulins, they will gain insight on plant evolutionary relationships. The research on Early Nodulins can further gain understanding on how plants have transformed from nonvascular to vascular and how the Early Nodulins were able to survive this change without binding copper. Through this research, they will see the process of two metal binding domains which differ through a point mutation, and how that has probably changed its function - ultimately creating new genes. Christy will continue her project this summer in the SRP with funding by ISLA (Institute for the Study of LA).

NPF: “This is How the Pacheco Brothers Make their Mama’s Chicken Soup”

Maricela Guardado is a junior, Theater and Latino/a and Latin American Studies double major. As part of the program for the Theater Department’s New Play Festival, 2016, Maricela presented a reading of an original Salvadoran-American one-act full-length play. She wrote the one-act dark comedy, “This is how the Pacheco Brothers Make their Mama’s Chicken Soup” as a project in her independent study under Professor Laural Meade’s advising. She wrote a previous play, “Sin Dolor, Ama/Painless, Mother” that explored the manifestation of intergenerational trauma through anorexia nervosa. In this new piece, she presents an aspect of this trauma, performed through Latino hipster culture, acculturation, as well as Americanization. She will continue her project this summer in the SRP with funding by ISLA (Institute for the Study of LA).

Cross Preferences for Color and Shape

Annemarie Schnedler is a senior, Cognitive Science Major, and worked with Professor Carmel Levitan. Her research question this semester asked, “Does the angulatiry or roundness of an object elicit associations for color?” 150 participants were told that the purpose of the study was to explore the relationship between color and shape and were randomly assigned to each of the three studies (although they were balanced for gender). The order in which the colors were arranged on the computer screen was randomized, as well as the order in which the shapes were presented. Shapes were also presented on a piece of paper with six colors arranged around the shape of a circle. In the third study, a shape was placed under a covered shelf so that it was out of sight, but could still be touched by the participant. In all three studies, participants were asked to select a color that best corresponded to the shape. Annemarie recorded the frequency of colors selected for each shape. ASP funds were used to pay subjects for their participation. This project was for Annemarie’s senior comprehensive project.

Discovering the Bridge between Vascular and Nonvascular plants

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URC Dates to Note

May

6  Spring semester funding final reports due, email to urc@oxy.edu
29  Move in day for Summer Research Program (SRP) Participants!
30  First day of SRP 2016!

August

3  SRP Conference

September

9  First deadline for Fall semester ASP grants!*

CONGRATS!

● to Science Scholars Chelsea Blankenchip, Natalie Dwulet & ASP student Kayla Currier for winning the Goldwater Award!
● to all the Graduating Seniors of 2016!

Contact us!
Email: urc@oxy.edu  Phone: (323)259-1414
Location: Library, 2nd Floor, Old Wing, Room 253A
Website: oxy.edu/undergraduate-research-center

*all applications are due @ 4pm on deadline dates

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