Summer Research Openings

Opportunity with Dr. Jennifer Dionne's laboratory
Lab Mentor: Dr. Dakota McCoy
Project Title: Coral biology and physics
Project Description:
Reef-building corals are natural marvels of engineering. Coral skeletons, made of aragonite, are extremely reflective and act to focus and concentrate light across several orders of magnitude in size. Postdoc Dakota McCoy will advise 1-2 students on a project investigating the biology and physics of reef-building corals; student participation can include methods such as (i) data science, (ii) materials science characterization and modeling, and/or (iii) literature review, among other methods, depending on the student's interests and learning goals.
*Dakota's faculty advisors are Jennifer Dionne and Steve Palumbi. She can be contacted at mccoy6@stanford.edu.

Opportunity with the Druckmann lab
Lab mentor: Dr. Shaul Druckmann
Project title: Understanding multi-regional neural activity
Project description:
Neural activity underlying short-term memory is maintained by interconnected networks of brain regions. It remains unknown how brain regions interact to maintain persistent activity while exhibiting robustness to corrupt information in parts of the network. Several years ago we began exploring the dynamics of a frontal brain area named ALM that had a key role in short term memory and that exhibited a strong interaction across the two hemispheres that allows one hemisphere to restore the activity of the other after its disruption. The main goal is to explore and experience how to think about multi-regional recordings. How do brain areas coordinate their dynamics? How is information transferred between them? There are many potential approaches for such questions but their interpretation is non-trivial and there is no ground truth to guide us for something as high level as the coordination between brain areas.
*Interested students and/or those who would like to learn more information can contact Dr. Druckmann at shauld@stanford.edu.

Opportunity with Dr. Jin Lee’s laboratory
Lab Mentors: Dr. Lee and Dr. Cron
Project Title: Quantification and atlas registration of light sheet microscopy images
Project Description:
The Lee lab at Stanford carries out research on mouse brain circuit anatomy and function, in order to develop novel treatments for neurological and psychiatric disorders. A new and very important tool for this research is light sheet microscopy (LSM), which enables 3D visualization of intact, optically cleared mouse brains. LSM can reveal the distribution of certain types of neurons, as well as the propagation of disease. The lab has been investigating how to analyze LSM images to quantify the density of stained neurons, and how to register the images to a common brain atlas. The Bio-X undergrad summer student will develop a software pipeline for automated brain registration and quantification of LSM images.
*Interested students and/or those who would like to learn more information can contact Dr. Jin Lee at ljinhy@stanford.edu (https://llab.stanford.edu).