Introduction:

Snapping shrimp (Decapoda: Alpheidae) are marine crustaceans where some species inhabit environments with fluctuating life regimes. Such changes in light availability in the environment can affect the visual systems in animals resulting in changes to eye morphology, physiology, and gene expression in genes related to phototransduction. The big claw snapping shrimp, *Alpheus heterochaelis*, inhabits coastal oyster reefs where light availability oscillates with the tides. Here, we propose *A. heterochaelis* as a model to investigate differential gene expression in a visual system that is constantly adapting to changing light environments. **To address this question, I will analyze eye transcriptomics of light and dark adapted *A. heterochaelis*. Specifically, I will identify both consistently and differentially expressed genes related to phototransduction in light and dark adapted *A. heterochaelis*.**

Methods:

I will create a de novo assembly from the eye transcriptomes of both dark and light adapted *A. heterochaelis*. From these de novo assemblies, I will identify genes from gene families related to phototransduction (such as rhodopsin, opsins, phospholipases, and TRP channel genes). From these identified genes, I will describe what genes are differentially expressed between light adaptations and what genes are consistently expressed in both light conditions.

Expected outcomes:

I expect to find that most genes related to phototransduction will be differentially expressed between the light conditions. Specifically, I expect that Rhodopsin will be differentially expressed along with various opsin genes. As this is work I have never done before, my expected outcomes are limited but I will expand on these as we progress through this course.