**Project 3**

**Zuber lab**

**Using fluorescent in situ hybridization to study nuclear dynamics and differentiation in the bloom-forming ciliate, *Mesodinium CRE*.**

Every year in late summer the Columbia River estuary is visited by a phototrophic ciliate of the genus *Mesodinium*, which forms expansive red water blooms. The red coloration is due to the production of the photosynthetic pigment, phycoerythrin in the ciliate chloroplasts, which are acquired by ingestion of a cryptophyte alga. It is hypothesized that the bloom, which is characterized by rapid ciliate growth and high cell density, creates opportunities for genetic exchange. The resulting zygotic micronuclei undergo differentiation to form new somatic macronuclei. To detect these changes in the differentiated states of the ciliate nuclei, fluorescently labeled oligonucleotide probes specific for telomeric and rRNA sequences were designed and used to initiate a project to conduct FISH analysis on red water samples in hopes of uncovering evidence of meiotic events within the ciliate population. Analysis will utilize laser-scanning confocal microscopy to detect fluorescent hybridization signals. Similar analysis of a cultured *Mesodinium rubrum* will be conducted to determine if changes in nuclear dynamics are specific or the bloom population.