

IEH Undergraduate Intern Mentoring Opportunity

Deadline: **March 15th, 2016**

Name/Title/Institution(s) of senior mentor(s):

Tawnya Peterson/Assistant Professor/Oregon Health & Science University

Joseph Needoba/Assistant Professor/Oregon Health & Science University

Name/Title/Institution(s) of frontline mentor(s):

Rachel Golda/Graduate Research Assistant/Oregon Health & Science University

Project Title:

Exploring pH dynamics and toxin production in phytoplankton.

Context for Project:

Harmful algal blooms (HABs) are the rapid proliferation of phytoplankton that threaten human health or environmental quality. The impact of HABs on coastal communities can be severe, ranging from serious human and ecological health problems to the negative economic impacts of costly mitigation strategies and lost revenue. The negative impacts of HABs on coastal environments are compounded by the developing problem of ocean acidification, the alteration of the marine carbon cycle due to increased anthropogenic input of CO₂ to the atmosphere. Although ocean acidification is known to have severe negative impacts on shellfish, corals, and certain species of alga, the more intimate effects of pH on phytoplankton are less well known.

Proposed Outcomes/Broader Impact:

This summer project will explore the influence of pH on the population dynamics and toxin production of the toxic marine alga *Alexandrium*. *Alexandrium* is a causative agent of paralytic shellfish poisoning.

This will be a laboratory based study. The student will be assisting me in my research investigating the influences of turbulence, pH and the cell cycle on algal toxin production. In addition to research, the intern will be responsible for maintaining the algal culture collection. The project will include training in algal culture maintenance, (both continuous cultures as well as batch cultures), media preparation and chemostat maintenance. The student will learn sampling techniques and sample processing, including fixing samples for *p*CO₂ work, microscopy and flow cytometry, as well as filtering for nutrients. Training in fluorometry and flow cytometry will be provided as needed.

This research will provide essential information on the effect of pH on the toxin production and physiology of a toxic marine alga. This information can assist ecosystem managers and policy makers on how pH – an environmental variable that is highly responsive to human impact – may effect a toxic organism that has been shown to have severe impacts on estuarine and coastal communities.

Proposed timeline (within a 10 week span):

Week 1: Introduction to project. Introduction to algal culturing and handling. Background reading and literature review. Write-up of summer goals.

Week 2: Introduction to experimental techniques (sampling protocols, pHstat maintenance and operation, SNARF loading techniques).

Week 3: Strengthening of experimental techniques so intern can be autonomous. Begin preparation for multiple long experimental runs.

Week 4-8: Experimental runs, data collection and collation, pHstat maintenance, culture maintenance.

Week 9: Data organization and collation. Begin write-up of summer work.

Week 10: Final write-up, presentation preparation, final presentation.

Intern academic experience and skill set should include:

Preferred Majors: Biology, Microbiology, Ecology, Environmental Science or Engineering, Marine Science or related fields.

Course Background: More experienced candidate preferred (junior or senior); exceptional experience/performance in sophomore also acceptable. One year of general biology and chemistry required; one semester microbiology required. Courses in environmental science, marine science, or riverine science preferred. Good sterile technique a must, excellent written and oral skills required.