

IEH Undergraduate Intern Mentoring Opportunity

Deadline: **March 17th, 2015**

Name/Title/Institution(s) of senior mentor(s): Bradley Tebo, Professor and Division Head, Division of Environmental and Biomolecular Systems, Oregon and Health Sciences University.

Name/Title/Institution(s) of frontline mentor(s): Matthew Jones, post-doctoral researcher. Affiliated to both the Division of Environmental and Biomolecular Systems (EBS) and the Centre for Coastal Margin Observation and Prediction (CMOP), Oregon and Health Sciences University.

Project Title:

Relationship between the growth of a *Roseobacter* Columbia River ETM isolate and its expression of the manganese oxidizing gene, *mopA*.

Context for Project:

This work fits directly into CMOP initiatives, assessing biogeochemical and microbial contributions and controls of lateral bays on the estuarine environment and biogeochemical and microbial contributions in the ETM. The student will grow a known *Roseobacter* Columbia River estuarine turbidity maxima isolate and compare it to three laboratory strains, one *Roseobacter* and two *Pseudomonas*. During growth of the four cultures measurements of hydrogen peroxide and potentially superoxide and manganese II, III and IV will be made in the dissolved and particulate phases. The expression of the *mopA* gene through the growth phase and into the stationary phase of the culture isolate will be compared. Changes in concentration between the manganese and oxygen species combined with expression of *mopA* will allow development of a mini-biogeochemical model to infer occasions of up regulation of manganese oxidizing genes in the cultures and from their extrapolation into the Columbia River.

Proposed Outcomes/Broader Impact:

This work will improve our understanding of manganese cycling in the Columbia River, directly contributing to the ability to track and measure where and when microbial populations become involved in environmental manganese oxidation.

Proposed timeline (within a 10 week span):

Week one and two, laboratory familiarization and training on the four main analytical techniques and some background reading. Weeks three and four, first round of culture experiments and measurement. Week five recap and measure outstanding samples. Week six and seven second round of culture

experiments. Week eight recap and measure outstanding samples. Week nine, if time allows, a final round of culture experiments. Week ten synthesis understanding of experiments through written and oral presentations and complete outstanding sample analysis.

Intern academic experience and skill set should include:

A biologist favoring microbiology or environmental science major would be nice, though any student with a little lab or environmental experience would be fine such as chemists or geographer. The work just requires someone to dive straight in and take themselves out of their comfort zone, organized would be useful too.