IEH Undergraduate Intern Mentoring Opportunity

Deadline: **February 22, 2013**
Selections Announced: **mid-March, 2013**

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

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

Project Title: Understanding the interactions of dissolved and particulate phase manganese in Cathlamet Bay – Columbia River estuary.

Context for Project: Manganese reduction and oxidation occurs through two one step electron transfers, with Mn(III) as the intermediary, how long does Mn(III) survive in the environment? Laboratory studies show that bacterial induced oxidation and reduction occurs utilizing these two one electron transfers. In anoxic environments, sediment pore waters and stratified water columns Mn(III) has been measured, are there then physiochemical processes that may promote the presence of Mn(III) in oxic environments: light, presence of organic or inorganic ligands, temperature or presence of a bacterial population. By shedding light on abiotic controls we may then infer bacterial presence through excess Mn(III) concentrations.

Brief Description.

CMOP: This work fits directly into CMOP initiative III, assessing biogeochemical and microbial contributions and controls of lateral bays on the estuarine environment. The student will directly measure manganese II, III and IV in dissolved and particulate phases using colorimetric techniques. Changes in concentration between each species will be compared to the known physiochemico circumstances at the sample site.

Proposed Outcomes/Broader Impact: This work will improve our understanding of Mn(III), directly contributing to the ability to track and measure microbial populations through manganese as a metabolic electron acceptor.

Proposed timeline (within a 10 week span): Week one and two, training on the analytical systems and background reading. Weeks three and four, measure total particulate manganese and $Mn(IV)O_2$. Week five and six, measure total dissolved manganese, and dissolved Mn(II). Week seven measure, Mn(III) in the dissolved phase. Week eight and nine, collate results and compare to physiochemical parameters. Week 10 develop a model manganese cycle and present.

Intern academic experience and skill set should include: I have a preference for physical geography or oceanographic or environmental science majors, however a chemist (analytical) or biologist

(microbiology) would be okay. I would prefer a junior or senior year student as I may be on a research cruise for up to three weeks in total during the initial stages of the project.