

IEH Undergraduate Intern Mentoring Opportunity

Deadline: **February 22, 2013**

Selections Announced: **mid-March, 2013**

Name/Title/Institution(s) of senior mentor(s): Paul G. Tratnyek, Professor, OHSU

Name/Title/Institution(s) of frontline mentor(s): Dimin Fan, Ph.D. Student, OHSU

Project Title: Molecular Probes for Characterizing Sediment Redox Properties

Context for Project:

Almost all aspects of biogeochemistry involve redox reactions, and many water quality assessment criteria represent redox conditions. However, the existing redox-based assessment criteria are not adequate to fully characterize the biogeochemical conditions in sediments or surface waters. We have been working on a variety of alternative approaches (both conceptual and experimental) to providing more complete, efficient, and useful redox assessment methods.

Brief Description:

The methods to be developed are of three general types: thermodynamic, kinetic, and capacity. This summer, we propose to focus on “chemical probes” of all three types. One of the most promising types of probes is based on 2-chloroacetophenone (2-CAP), and was developed for use in sediments by Tratnyek et al. in the 1990s. This summer, we will revisit the use of 2-CAP and compare it to alternative family of chemical probes that are tetrazolium compounds. The intern will measure the redox reactions involving these probes in sediments obtained from the Oregon Coast, Columbia River, and Portland Harbor. The measurements will involve both spectrometry and chromatography.

Proposed Outcomes/Broader Impact:

The methods to be developed through this work could be applied to any aspect of water quality assessment (e.g., managing water treatment processes or eutrophication of rivers).

Proposed timeline (within a 10 week span):

<i>Week</i>	<i>Activities</i>	<i>Deliverables</i>
1	Basic training on safety, lab protocols, analytical methods.	
2	Develop and validate analytical methods.	
3	Preliminary application of probe methods on sediments.	
4	Refine methods based on preliminary results.	
5	Synthesize and present interim results.	Presentation
6-9	Further application and refinement of the methodology.	
10	Synthesize and present final results.	Report

Intern academic experience and skill set should include:

Applicants should be majoring in chemistry, marine chemistry, or geochemistry. Strong math and computer skills are also required.