

Opportunity Title: Biomolecular Mechanism of Mercury Transformations in Contaminated Systems (2 Internships)

Opportunity Reference Code: DOE-MSIPP-18-1-ORNL

Organization U.S. Department of Energy (DOE)

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How to Apply A complete application must include the following to be considered:

- Completion of all required fields in the application and successful application submission
- Undergraduate or graduate transcripts as appropriate
- Two recommendations

If you have questions, send an email to Kerri Fomby at kerri.fomby@ornl.gov. Please include the reference code for this opportunity in your email.

For technical questions, please contact Eric Pierce at pierceem@ornl.gov.

Application Deadline 1/12/2018 11:59:00 PM Eastern Time Zone

Description The Minority Serving Institutions Partnership Program (MSIPP) Internships is a new program to promote the education and development of the next generation workforce in critical science, engineering, technology, and math (STEM) related disciplines that complement current and future missions of DOE national laboratories. The MSIPP Internship program is designed to provide an enhanced training environment for next generation scientists and engineers by exposing them to research challenges unique to our industry.

MSIPP Interns will be given the opportunity to complete Summer Internships aligned with ongoing U.S. Department of Energy Office of Environmental Management (DOE-EM) research under the direction of a host national laboratory. The internship will be performed at the host national laboratory, utilizing their facilities and equipment under the guidance of a research staff member.

Minority Serving Institutions are institutions of higher education enrolling populations with significant percentages of undergraduate minority students.

Project: The successful candidates will conduct laboratory scale and meso-scale experiments to evaluate the performance of sorbents to limit the release of mercury from contaminated soils and sediments. Specifically this will involve data collection and analysis, interpretation, and publication of experimental results.

Abstract: Mercury (Hg) is a pervasive global pollutant which, as methylmercury (CH₃Hg⁺), bioaccumulates in the food web and is highly toxic to humans and other organisms. Unlike inorganic forms of mercury, which originate from atmospheric deposition



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and point discharges, CH_3Hg^+ is generated in the environment predominantly by anaerobic microorganisms. Sulfate-reducing bacteria are the main producers of CH_3Hg^+ , although iron-reducing bacteria, firmicutes and archaea can also be involved. We demonstrated that the biosynthesis of methylmercury is linked to *hgcA* and *hgcB*, two genes that are unique to methylating microbes in anaerobic environments suggesting a mercury methylation pathway common to all methylating bacteria and archaea sequenced to date. Additionally, evaluations of the influence anaerobic microbes can have on Hg release from adsorbents will also be evaluated. Research will include the use of techniques to identify proteins including SDS-PAGE, Western blots, immunostaining and mass spectrometry, and experiments that will require measuring total mercury and conducting mercury methylation/demethylation assays.

Location: This internship will be located at Oak Ridge National Laboratory.

Salary: Selected candidates will be compensated by either a stipend or salary, and may include one round trip domestic travel to and from the host laboratory. Stipends and salaries will be commensurate with cost of living at the location of the host laboratory. Housing information will be provided to interns prior to arrival at the host laboratory, and will vary from lab to lab.

Application Deadline: January 12, 2018

Expected Start Date: The program is 10 weeks in duration, starting May 21, 2018. Start date is flexible based on laboratory and candidate availability.

Qualifications

Eligible applicants must:

- Be a citizen of the United States,
- Be at least 18 years of age,
- Currently enrolled as a full-time undergraduate or graduate student at an accredited Minority Serving Institution, <http://orise.ornl.gov/msipp/documents/approved-msi-school-list.pdf>,
- Working toward a science, technology, engineering, or mathematics (STEM) degree,
- Have an undergraduate or graduate cumulative minimum Grade Point Average (GPA) of 3.0 on a 4.0 scale, and
- Pass a drug test upon selection to participate in the MSIPP

*The process and timing for drug testing varies from lab to lab. Use of Marijuana/Cannabis or its derivatives if

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prescribed is legal in some states. However, having these drugs in your system is NOT legal at United States Federal Contractor sites and National Laboratories.

Required Knowledge, Skills, Work Experience, and Education

Successful candidates will:

- Be a current undergraduate or graduate student pursuing a degree in microbiology, biochemistry, biology, biogeochemistry, or related field.

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Currently pursuing a Bachelor's Degree or Master's Degree.
- **Overall GPA:** 3.00
- **Discipline(s):**
 - **Chemistry and Materials Sciences** (12 👁)
 - **Earth and Geosciences** (21 👁)
 - **Environmental and Marine Sciences** (14 👁)
 - **Life Health and Medical Sciences** (45 👁)
 - **Physics** (16 👁)

Affirmation

I certify that I am at least 18 years of age and a US citizen, and am currently enrolled as a student in a degree seeking undergraduate or graduate program in a STEM field at an accredited Minority Serving Institution (MSI).