

**Opportunity Title:** Field Characterization of Mercury Transport and Surface Water-Hyporheic Zone Exchange

**Opportunity Reference Code:** DOE-MSIPP-17-3-ORNL



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**Organization** U.S. Department of Energy (DOE)

**Reference Code** DOE-MSIPP-17-3-ORNL

**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](mailto: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](mailto:pierceem@ornl.gov).

**Application Deadline** 3/27/2017 12:00:00 AM 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.

**Objective:** The goal of the proposed work is to quantify water and mercury (Hg) sources and fluxes from contaminated creek hyporheic zone (HZ) sediments to the overlying surface water in the East Fork Poplar Creek (EFPC). Objectives include: (Obj 1) directly measure water and Hg exchange between surface water and pore water in the HZ of the creek bed; (Obj 2) use geophysical techniques to indirectly and non-destructively measure the spatial distribution of the groundwater, surface water, and HZ; (Obj 3) determine location and spatial variability of water and Hg source areas within the creek-bed sediments of

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the HZ; and (Obj 4) translate research/knowledge to communities and students within minority or underrepresented groups.

**Description:** This applied research project will develop a quantitative understanding of water and contaminant transport between the surface water and the HZ. This project aims to address the need to quantify the locations and uncertainty of Hg sources and fluxes into the EFPC stream: (1) installing dedicated streambed piezometers along EFPC that leverage prior and ongoing data collection efforts focused on quantifying key hydrologic variables (e.g., bed hydraulic conductivity) and water quality indicators (e.g., dissolved Hg concentration); (2) conducting tracer tests to quantify water flux between surface water and groundwater; (3) employing geophysical monitoring techniques to indirectly and non-destructively interrogate and characterize large volumes of the surface water – hyporheic water continuum.

**Activities:** Student will participate in field and laboratory scale studies. At the field scale activities will include (1) installing dedicated streambed piezometers that will be used to measure water and mercury exchange between surface water - hyporheic zone (HZ), (2) supporting tracer tests to quantify water and solute exchange between surface water and HZ water, and (3) supporting shallow subsurface electrical resistivity (e.g., vertical electrical profiling) and spatial analysis to characterize the HZ. At the lab scale will include analysis of water quality parameters (dissolved cations, anions, and total dissolved carbon, etc.) and mercury concentration.

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

**Salary:** Selected candidate 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:** March 27, 2017

**Expected Start Date:** May 15, 2017

**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,

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<http://orise.ornl.gov/sepreview/msipp/Approved%20MSI%20School%20List%202017.pdf>,

- Working toward a science, technology, engineering, or mathematics (STEM) degree,
- Have an undergraduate 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 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 rising junior or senior undergraduate student studying microbiology, biochemistry or chemistry.
- Have the ability to complete a scientific literature review on subject of study.
- Have skills and maturity to operate advanced laboratory instruments, perform experiments, analyze data, and maintain records in the environmental biotechnology laboratory.
- Have ability to follow all laboratory safety rules and procedures.

#### **Desired Knowledge, Skills, Work Experience, and Education**

##### **It is desirable for the candidate to have:**

- Be a current undergraduate student in Hydrology, Hydrologic Science, Environmental Engineering, Geophysics, Geochemistry, Environmental Science, Water Resource Science, or related field.

#### **Eligibility Requirements**

- **Citizenship:** U.S. Citizen Only
- **Degree:** Currently pursuing a Bachelor's Degree.
- **Overall GPA:** 3.00
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 👁)
  - **Earth and Geosciences** (21 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (14 👁)

**Affirmation** I certify that I am at least 18 years of age and a US citizen, and

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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).