**Opportunity Title:** Transportation of Radiological Waste Slurries
**Opportunity Reference Code:** DOE-MSIPP-18-3-PNNL

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

**Reference Code** DOE-MSIPP-18-3-PNNL

**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@orau.org. Please include the reference code for this opportunity in your email.

For Technical information, contact Sabrina Hoyle at sabrina.hoyle@pnnl.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 project involves matching interns with national experts in pipeline particle deposition whom would mentor their work. The goal is to benchmark and evaluate recently advanced particle deposition velocity models for use in nuclear and industrial waste and slurry transfer design.

The Oroskar-Turian (OT) correlation is widely-used in slurry handling industries for selecting transfer line design velocities that limit accumulation of solids and pipeline plugging. The OT correlation (Oroskar and Turian, 1980) is a semi-empirical power-law fit of available critical deposition velocity data measured for common industrial suspensions and slurries. Although widely used, application of the OT correlation is effectively limited to the systems from which it derives, that is Newtonian systems with well relatively monodisperse solids (with respect to both particle size and solid-

phase speciation). As such, no formal design methodology or correlation is available to readily assessing deposition in pipelines handling non-Newtonian fluids. Recent work by Poloski et al. (2007) addresses the need for deposition velocity predictions for non-Newtonian fluids, and staff at Pacific Northwest National Laboratory (PNNL) have further refined this method to allow evaluations of poly-disperse solids. While the “Poloski” method performance has been evaluated against a small set of Newtonian and non-Newtonian engineering-scale deposition tests, it has not be validated against the larger body of historical and industrial deposition data. The objective of the current proposed study would to validate the Poloski model against all available deposition data, including recent non-Newtonian slurry deposition assessments and the historic data used to derive the OT correlation. Last summer, the project conducted a major literature survey to collect available deposition data for both Newtonian and non-Newtonian systems. This summer will bench mark the “Poloski” method and a recently advanced "turbulent transition" model's performance in predicting critical deposition velocity in those systems. The bench marking will determine which approach should go forward to publication or be extended to further model enhancement.

**Location:** This internship will be located at Pacific Northwest National Laboratory.

**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:** 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.orau.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

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*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 current junior undergraduate (rising senior) or graduate student pursuing a degree in chemical or mechanical engineering, physics, or related field.

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

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

- Mechanical, chemical or aerospace engineer rising senior student or early graduate school studies with an interest in fluid dynamics. Completion of the introduction to fluid dynamics and airflow dynamic classes is desired.

**Eligibility Requirements**

- **Citizenship:** U.S. Citizen Only
- **Degree:** Currently pursuing a Bachelor's Degree or Master's Degree.
- **Overall GPA:** 3.00
- **Academic Level(s):** Graduate Students, Post-Bachelor's, or Undergraduate Students.
- **Discipline(s):**
  - **Engineering** (27 👁)
  - **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).