

**Opportunity Title:** Mechanistic Understanding of Surfaces Interactions in

Tribology

**Opportunity Reference Code:** DOE-MSIPP-18-6-ANL

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

**Reference Code** DOE-MSIPP-18-6-ANL

**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](mailto:kerri.fomby@orau.org). Please include the reference code for this opportunity in your email.

For Technical information, contact Lisa Reed at [lisareed@anl.gov](mailto:lisareed@anl.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:** This project involves Tribology, the branch of engineering that deals with friction and wear of materials. The intern will work with members of the Tribology Section in an experimental setting to investigate the tribological properties of materials, coatings, and lubricants. This project will investigate the nano-mechanical properties (in terms of hardness, elastic modulus and adhesion properties) of some engineering materials, such as thin-film coatings, tribo-chemical surface films, and tribofilms produced from colloidal (nano-particulates) fluids during friction and wear testing. Tribochemical surface films are usually complex layers that control the ultimate tribological behavior and performance of materials and real components, such as internal combustion engines or wind turbines, to name some. The microstructure, phases, chemistry and mechanical properties of these films will have influence in the ultimate properties of the materials. The intern will perform hardness mapping of the surfaces of



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different materials using nano-indentation techniques and will set up and run computer data acquisition. He/she will process and graph the data using Excel or Kaleidagraph. The test specimens will also be characterized by one or more of the following: optical profilometry, microindentation, viscometry, particle size analysis, and optical micrographs. Specimen preparation (grinding, polishing, and etching of metals or ceramics) may be required beforehand. The intern will attach test specimens, operate instruments, set up for data acquisition, exchange data files, graph data, and put results into reports.

**Location:** This internship will be located at Argonne 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.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 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 materials science engineering, mechanical engineering, physics, chemistry, or related field.

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

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

- Previous laboratory experience, data analysis-excel.

- 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](#)👁)
    - **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).