

Opportunity Title: Low Viscosity Composite Fluids for Fuel Efficiency

Opportunity Reference Code: DOE-MSIPP-16-11-ANL

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
- Undergraduate transcripts
- One Recommendation (minimum)

If you have questions, send an email to Elizabeth Nelson at Elizabeth.Nelson@orau.org . Please include the reference code for this opportunity in your email.

Application Deadline 3/16/2016 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.

The use of low viscosity oil will result in lower friction in the hydrodynamic and elastohydrodynamic (EHD) lubrication regimes. This will translate into less energy losses and hence better fuel economy and efficiency of vehicles. However, oil viscosity reduction is also accompanied by increase in friction and wear and expands the boundary lubrication regime, which ultimately can increase surface damage and reduce durability and reliability of components. The development and use of composite synthetic low viscosity base oil provides a pathway for practical and commercially viable development of low-viscosity transportation vehicle lubricant that ensure reliability and durability without excessive additives.

Tribology is the branch of engineering that deals with friction and




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wear of materials. The candidate will work with members of the Tribology Section in an experimental setting to investigate the tribological properties of materials, coatings, and lubricants. Topics include: reduction in parasitic losses in engines, gears for wind turbines, studies of chemical boundary films, nanoparticles for lubrication enhancement, and use of hard coating for wear protection. The work will likely consist of operating one of several test machines to acquire data on friction (ball-on-disk, reciprocating, block-on-ring). The candidate will also set up and run computer data acquisition. The candidate 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 micrograph. Specimen preparation (grinding, polishing, and etching of metals or ceramics) may be required beforehand. The candidate will attach test specimens, operate instruments, set up for data acquisition, run an interferometer, exchange data files, graph data, and put results into scientific reports.

Qualifications The successful candidate will need a science background, if possible in engineering, material science, physics or chemistry. Best match will be mechanical or materials engineering. Any laboratory or research experience will be a valuable skill. The student should know the basics of how to operate office: word, power point and excel. Additional skills in the materials characterization (microscopes and profilometers/ topography) and previous skills in operating laboratory equipments will be preferred.

Eligibility Requirements:

1. Be currently enrolled as a full-time undergraduate or graduate student at an accredited Minority Serving Institution *see criteria for Minority Serving Institutions here <http://srnl.doe.gov/msipp/internships.htm>
2. Be working towards a science, technology, engineering, or mathematics (STEM) degree
3. Have an undergraduate cumulative minimum Grade Point Average (GPA) of 3.0 on a 4.0 scale
4. Be a United States citizen
5. 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.
6. Reference must be received by March 6, 2016 at 11:59 PM ET









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For more information about The Minority Serving Institutions Partnership Program (MSIPP) Internships, please visit <http://srnl.doe.gov/msipp/internships.htm>

To see all MSIPP position postings visit: www.orise.orau.gov/MSIPP

**Eligibility
Requirements**

- **Citizenship:** U.S. Citizen Only
- **Degree:** Bachelor's Degree or Master's Degree.
- **Overall GPA:** 3.00
- **Discipline(s):**
 - **Chemistry and Materials Sciences** (12 )
 - **Computer, Information, and Data Sciences** (16 )
 - **Earth and Geosciences** (21 )
 - **Engineering** (27 )
 - **Environmental and Marine Sciences** (14 )
 - **Life Health and Medical Sciences** (45 )
 - **Mathematics and Statistics** (10 )
 - **Physics** (16 )
 - **Science & Engineering-related** (1 )

Affirmation

I certify that I am pursuing or have completed coursework towards a degree in science, technology, engineering, mathematics, or a related field.