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Opportunity Title: Thermal Energy Storage INL Summer Internship
Opportunity Reference Code: DOE-MSIPP-22-1-INL

Organization U.S. Department of Energy (DOE)

Reference Code DOE-MSIPP-22-1-INL

How to Apply

- 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 at MSIPPInternships@orau.org. Please include the reference code for this opportunity in your email.

For Technical information, contact Catherine Riddle at Catherine.Riddle@inl.gov.

Certification:

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

Application Deadline 3/11/2022 11:59:59 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: Thermal energy storage plays an important role in retaining energy overages for utilization during energy demand periods. These types of energy sources, such as solar and wind turbines, are intermittent in nature and benefit from thermal energy storage (TES) as the key to heat recovery and performance. Optimization of these types of thermal conversion systems will only be possible if they can be integrated with thermal energy storage. Although there are many material types that will store and release thermal energy, phase change materials (PCM) and amorphous rock materials have been shown to be the most effective due to their high latent heat of fusion and low thermal conductivity. Nanoparticle additives, nanocomposites used in alkane hydrocarbons and calcium sulphate hemihydrate have the potential to enhance thermal properties of phase change and amorphous rock materials. Smart Rocks is a new technology that offers increased heat storage maximum time (over double current technologies), is composed of non-hazardous materials, and poses no thermal runaway fire or explosive hazards like those associated with lithium-ion thermal storage. Smart Rocks combines metallic nanoparticle technology with non-hazardous paraffin (alkane), calcium sulphate plaster and cementitious materials to produce a non-electric chemical heat storage system. Polymer type waxes

have thermal conductivity much lower than those for metals or ceramic materials, making them good thermal insulators. The outstanding thermal conductivity of Smart Rocks nanoparticle materials makes this a novel candidate for thermal energy storage as well as promoting chemical energy storage advances in portable electronic devices, stationary power systems, and hybrid electric vehicles as a low cost, compact and high-performance energy storage. Smart Rocks have the potential to reduce the size of current thermal storage units and can be linked in tandem making them modular. With the advent of individual modular units, Smart Rocks thermal energy storage units can change as the storage needs changes either by adding or removing units making the overall footprint smaller, easier to manage, and because of its compact size it is amenable to smaller areas and difficult access terrains.

The project intern will work with senior research scientists in a chemistry/engineering lab setting designing and working on experimental associated with the Smart Rocks project. The intern will learn expertise in both the chemistry and engineering for the Smart Rocks TES technology. Duties will include, basic chemistry, analysis, experimental planning and reports preparation.

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.

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, https://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 *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:

- 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.

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Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Currently pursuing a Bachelor's Degree, Master's Degree, or Doctoral Degree.
- **Overall GPA:** 3.00
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (2 👁)
  - **Engineering** (2 👁)

Affirmation

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