

Opportunity Title: Technetium and Low Activity Waste
Opportunity Reference Code: DOE-MSIPP-18-1-PNNL

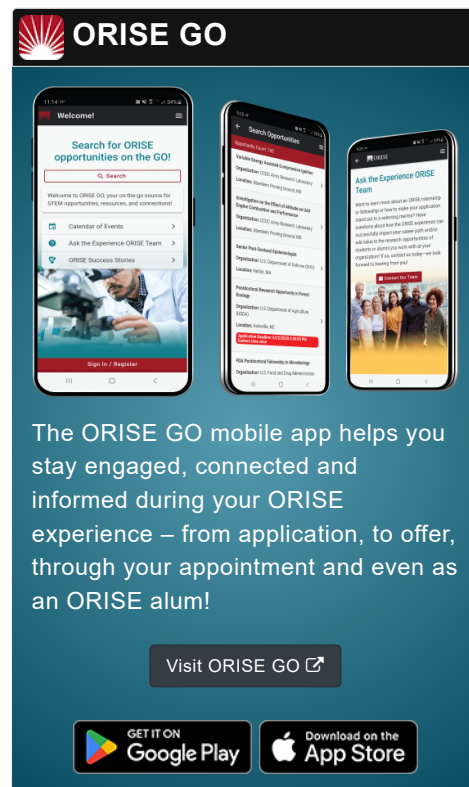
Organization	U.S. Department of Energy (DOE)
Reference Code	DOE-MSIPP-18-1-PNNL
How to Apply	<p>A complete application must include the following to be considered:</p> <ul style="list-style-type: none"> • Completion of all required fields in the application and successful application submission • Undergraduate or graduate transcripts as appropriate • Two recommendations <p>If you have questions, send an email to Kerri Fomby at kerri.fomby@ornl.org. Please include the reference code for this opportunity in your email.</p> <p>For Technical information, contact Sabrina Hoyle at sabrina.hoyle@pnnl.gov.</p>
Application Deadline	1/12/2018 11:59:00 PM Eastern Time Zone
Description	<p>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.</p>

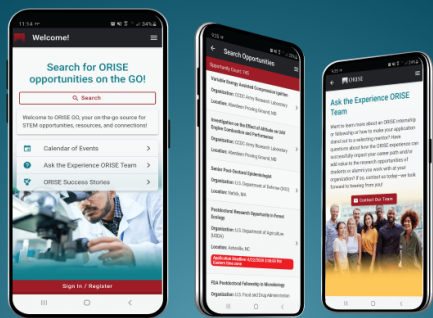
MSIPP Interns will be given the opportunity to complete Summer Internships aligned with ongoing U.S. Department of Energy Office of Environmental Management (DOE-EM) research under the direction of a host national laboratory. The internship will be performed at the host national laboratory, utilizing 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.

Technetium is the main risk driver in the permanent disposal of low activity waste (LAW) by vitrification at the Hanford site due to its high volatility and only fractional incorporation to the borosilicate glass waste. The major fraction of the volatilized Tc is captured by the off-gas treatment system as a condensate and necessitates its recycling back to the LAW glass melter feed. Off-gas recycle is effective at increasing Tc loading in the LAW glass, but it also disproportionately increases concentrations of sulfate, halides, and other problematic materials impeding overall LAW processing. This proposal offers an alternative









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disposal route to continuous off-gas recycling back to the vitrification plant, which may result in a significant reduction in the aqueous volumes of LAW waste to be immobilized in the glass waste form and subsequent cost savings.

Project: The project objective is to determine the suitability of zero valent iron (ZVI) as a separation technology to remove Tc from the off-gas condensate stream to minimize its recycle. While ZVI has been proposed for the remediation applications, it has not been studied for suitability to remove Tc from the LAW off-gas condensate, and many fundamental questions remain. It is expected that Tc will be reduced to Tc(IV) species and incorporated into the iron matrix. The molecular mechanisms of these processes are not well understood and will be probed in by various spectroscopic and microscopy techniques as a function of off-gas stream composition, pH, presence of the competing redox active constituents, and others. To develop a separation process, we will examine Tc removal and incorporation into iron phases via batch and column experiments under relevant conditions for the off-gas condensate to determine the optimum conditions and configuration for treatment. Solids characterization studies will provide insights to the mechanisms of Tc incorporation into iron phases.

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.ornl.gov/msipp/documents/approved-msi-school-list.pdf>,
- Working toward a science, technology, engineering, or mathematics (STEM) degree,

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- 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 chemistry, chemical engineering, or related field.

Desired Knowledge, Skills, Work Experience, and Education

It is desirable for the candidate to have:

- Basic computer skill including familiarity with Word, Excel, and PowerPoint. Some experience working at a chemistry laboratory is desirable.

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 )

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).