Opportunity Title: Estimating the Climate Change Impact on Groundwater Resources at Los Alamos National Laboratory
Opportunity Reference Code: DOE-MSIPP-23-1-LANL

Organization U.S. Department of Energy (DOE)

Reference Code DOE-MSIPP-23-1-LANL

How to Apply A complete application consists of the following:

- An online application completed through Zintellect
- Completed references
- Undergraduate and graduate transcripts (uploaded as part of the application)

Application Deadline 12/31/2022 11:59:00 PM Eastern Time Zone

Description

About EM Graduation Fellowship Program

The EM Graduate Fellowship Program (EMGFP), under the Department of Energy Office of Environmental Management's Minority Serving Institutions Partnership Program, is designed to provide science and engineering students and graduates from Minority Serving Institutions (MSIs) an opportunity for training and mentorship in targeted technical areas of interest and needs of the DOE-EM workforce.

Technical Areas of Interest for the fellowship will span across a range of topics, including:

- Environmental Remediation and Stewardship
- Nuclear Materials Processing and Disposition
- Cyber Security
- Advance Manufacturing
- Climate Change
- Deactivation & Decommissioning
- Robotics
- Artificial Intelligence

The desired outcome of the program is to develop exceptional graduate students into future leaders who pursue careers at the DOE, DOE National Laboratories, DOE Contractors, other federal agencies, or STEM related industry.

The year-long, paid fellowship will:

- Offer specialized training, leadership development, and professional networking.
- Provide extensive interaction and collaboration with leading DOE National Laboratory researchers, scientists, and engineers.
- Provide hands-on field research experience that could lead to a potential career opportunity within the DOE Complex.
- Stimulate the potential for an increase of minority students entering STEM careers at the graduate level.

Important Dates

- December 31, 2022 - Application deadline
- June 1, 2023 - Fellowship start date

- May 31, 2024 - Fellowship end date

Fellowship Benefits

- Stipend
  - Master's in Progress - $60,000
  - Post-Master's - $72,000
- Training and associated travel allotment - $10,000/Fellow
- Onboarding incentive - $4,000/Fellow
- Professional trips allotment - $5,000/Fellow
- Comprehensive benefits for limited term employees
- Engagement with DOE-EM
- Professional development and networking opportunities

Important Information

- Telework is not available for this fellowship
- Housing and transportation are not provided

Project Description

Groundwater resources and their sustainability are critical to the mission of Los Alamos National Laboratory (LANL) and the surrounding community. However, sustainability of high-quality groundwater may be at risk due to climate change impacts on temperature and precipitation. Thus, the region has been in a severe drought for the past 20+ years. This drought has changed precipitation patterns (more rain, less snow), leading to challenges in predicting groundwater resources. Moreover, because of unexpected groundwater response, the transport of metalloids (e.g., chromium) in the subsurface is also unknown, leading to questions around water quality. In this opportunity, the EM Fellow will learn about two pressing concerns: (1) how does climate change alter water resource management in the future? (2) how contaminants in the subsurface affect risk (e.g., groundwater quality) over the next 5, 10, 20, and 50 years? To answer these questions, the EM Fellow will learn about (1) the interrelationships between climate and groundwater, (2) the groundwater response due to climate change, and (3) how the climate will impact groundwater resources such as volume and water quality. The EM Fellow will also learn to: (1) use a LANL patented machine learning (ML) code, non-negative matrix factorization with customized k-means clustering (NMFk). NMFk will be used to reconstruct continuous data distributions across missing data. (2) build a ML-enhanced groundwater model based on differential programming to predict groundwater levels over time. (3) quantify uncertainty in the ML model predictions and calibrate/validate model parameters (e.g., porosity, permeability) and responses using the historical groundwater level data. The ML model will be used to examine climate and water balance in the shallow subsurface and deep aquifer responses. (4) use LANL code Chrotran to quantify chromium transportation rate and extent under the current and future climate scenarios to determine if chromium is at risk of transport to the shallow subsurface or deep aquifers.

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Qualifications

Program Eligibility:

- Must be a U.S. citizen
- Must be eligible for a security clearance based on position requirements
- Must have earned or be working towards a STEM degree
- Must have graduated from or be enrolled at a Minority Serving Institution
- Education Requirements:
  - 1) Must be enrolled in a graduate program at the time of application AND have a current cumulative GPA of at least 3.0 on a 4.0 scale.
    OR
  - 2) Must have completed a graduate degree program AND must have a final cumulative GPA of at least 3.0 on a 4.0 scale.

Undergraduate cumulative GPA will be considered for applicants who have not officially started their graduate program.

Successful applicants who are pursuing a graduate degree will be expected to prioritize the GFP work assignment and maintain at least a 3.0 GPA. It is highly encouraged that Master's In Progress Fellows enroll in evening, virtual, and/or weekend courses while participating in the GFP.

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Master's Degree.
- **Overall GPA:** 3.00
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 👁)
  - **Computer, Information, and Data Sciences** (17 👁)
  - **Earth and Geosciences** (21 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (14 👁)
  - **Life Health and Medical Sciences** (48 👁)
  - **Mathematics and Statistics** (11 👁)
  - **Physics** (16 👁)

Affirmation

Certification:

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