

Potential Project for LM MES Internship Program

The purpose of this form is to provide a potential STEM project that can be advertised through the DOE LM Mentorship for Environmental Scholars (MES) Program (see attached MES flyer). Each scientist may submit more than one project (submit one form/project). Two to three undergraduate students who meet the following eligibility requirements (per the flyer) will be selected for the MES Program each year:

- All must be U.S. citizens (including residents of Puerto Rico, the Virgin Islands, and other U.S. territories).
- Applicants must be undergraduates attending an accredited MSI, as recognized by the U.S. Department of Education, and be members of an underrepresented group, including ethnic and racial minorities and persons with disabilities.
- Applicants must be pursuing a degree in science, technology, engineering, or math (STEM); or STEM-related field (e.g., chemistry, computer science, environmental science, biology).

Selected interns will be supported by DOE LM and will be based in Grand Junction. Field, lab (e.g., ESL), and office-based research projects/activities are welcome. If an intern is matched with a project, the scientist leading the project will be supported by the AS&T Educational Collaboration Initiative to mentor, oversee, and guide the selectee for the duration of the internship, which typically spans June-August of each year. The LMS scientist will be expected to commit up to about 4 hrs/week for 12 weeks per intern. Meetings involving LM, the prospective intern(s), and LMS scientist(s) will also be held prior to the internship, likely starting in the spring. The intern will be expected to write a technical report and present her/his work at the end of the internship.

LMS Scientist Name:

Peter Schillig

Project Title:

Quantifying the Variability in Hydraulic Conductivity at a Uranium Disposal Site on the Navajo Reservation.

Project Description:

Understanding the variability in hydraulic conductivity is an essential and identified data gap for both the Shiprock, New Mexico and Tuba City, Arizona Disposal Sites for the revision of their groundwater compliance strategies. The primary location for this internship will be the Shiprock Site with the Tuba City Site as an alternate. At the Shiprock Site, we will be examining the hydraulic conductivity - a measure of permeability in an aquifer or aquitard - by slug testing wells completed within alluvial deposits and underlying Mancos Shale bedrock. Results from this project will directly support (1) groundwater flow and contaminant transport models for the site, (2) empirical data for interpreting the results of a scoped geophysical investigation, and (3) providing critical data to support remedial design.

Tasks to be Performed by Intern:

The intern will join Legacy Management Support contractors in the field at the Shiprock Site for a period of approximately one week performing slug tests at a number of existing monitoring wells. The slug test occurs when the groundwater level within a control well rapidly changes either through physical displacement or removal, and the subsequent groundwater level response is monitored over time as it returns to pre-test conditions. The processing of the collected data yields an estimate of hydraulic conductivity. Field data collection at each well will include:

- Collecting groundwater levels, and programming and deploying pressure transducers.
- Creating a displacement of groundwater level within the well by either lowering a solid slug into the well or installing a pneumatic assembly.
- Monitoring the progression of the test as groundwater levels recover following the initial displacement.
- Detailed recording relevant field data and organizing the pressure transducer data for processing.

Once the field data has been collected, the intern will work from their office/home using the AQTESOLV Pro software to fit the observed data with the appropriate analytical solution. Following a review of the interpreted data by the LMS Scientist, the intern will then compile the results into a Calculation Set that can be referenced by subsequent documents that will rely on that data.

Project/Tasks Include (select all that apply)

Field work

List site(s): Shiprock, New Mexico, Disposal Site. Alternate location is the Tuba City, Arizona, Disposal Site

Lab work (ESL)

Office (computer) work

Preferred or required skills/experience (include any field, lab, software, or analytical skills/experience and indicate if these are preferred vs. required). Note that required skills may significantly reduce the likelihood of matching an intern with a project:

Preferred Skills/Experience:

- Experiences related to slug testing, aquifer testing, or groundwater monitoring
- Programming pressure transducers/dataloggers, downloading data from scientific instruments, and/or collecting water level measurements
- Collecting field data related to hydrogeology or geochemistry
- AQTESOLV Pro Software
- Relevant course work related to Hydrogeology, Hydrology, Geochemistry, Environmental/Civil Engineering, Environmental Science/Geology, or Geophysics
- Course work demonstrating a strong quantitative background (e.g., calculus, computer programming language, statistics, etc.)

Required Skills/Experience:

- Demonstrated interest in Hydrogeology, Environmental/Civil Engineering, Geophysics, or Geochemistry
- Experience with manipulating data in Microsoft Excel