

Opportunity Title: Data Driven Approaches to Understand Well Integrity

Opportunity Reference Code: NETL-PGRP-2023-Lackey

Organization National Energy Technology Laboratory (NETL)

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How to Apply A complete application consists of:

- An application, including academic history, work history experiences, and honors/awards
- Description of your goals, related experience, and related skills – refer to NETL's Core Competencies and ongoing projects when applicable
- Transcripts – [Click here for detailed information about acceptable transcripts](#)
- A current resume/CV, including academic history, employment history, relevant experiences, and publication list
- Two educational or professional recommendations
You must provide contact information for at least two recommenders in your application. The first two recommendations received will be attached to your application for review by NETL. You may click the "send" (paper airplane) button to send the recommendation request email immediately after entering their information prior to submitting your application; if not, a request will automatically be sent when you submit your application. Your recommenders will receive an email with a subject line of "[Your Name] - ORISE Recommendation Request - [your email]", from Zintellect@orau.org. This email will include information on the opportunity to which you have applied, as well as a secure link to submit a recommendation for you for this application. If you ask the same person to submit a recommendation for you for multiple applications in Zintellect, they must click the unique link in each email request, but will be given the opportunity to copy over what they had previously submitted.

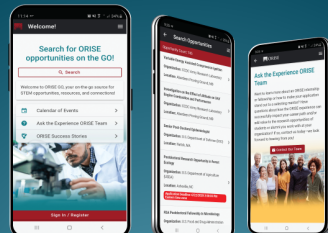
All documents must be in English or include an official English translation.

If you have questions about the application process, contact NETLinfo@orau.org.

After you have submitted an application in Zintellect, you may reach out to internship.program@netl.doe.gov to request to talk with the hosting researcher if you would like additional information on the project or to express particular interest. You must have a completed application in Zintellect to receive a response.


Application Tips


NETL values a combination of academic success, experience, and leadership potential as demonstrated in all aspects of your application. NETL's goal is to create, maintain, and support a [diverse environment](#) that encourages creative ideas and leadership. In the words of [Lab Director Brian Anderson](#), "our differences make us stronger and we're united in fostering inclusivity in all aspects of our research to drive innovation and deliver solutions for an environmentally sustainable and prosperous energy future." In your application, show us




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who you are!

To increase your chances of being selected for an appointment, we recommend:

1. Tailoring your responses to align with the project. What parts of the project are most interesting to you?
2. Spending sufficient time on your essay responses and your resume. Give yourself time to review your writing!
3. Ensuring that everything you submit is grammatically correct and clearly expressed.
 - Consider using a word processor to draft your answers and then copy and paste into the application.
 - Review and edit repeatedly until you have a strong response.
 - Ask someone whose judgement you trust to proofread it and make suggestions for improvement.
 - Efficient writing is valued over quantity of writing.
4. Submitting the application -- we can't select you if you don't submit an application!
 - To be considered for this opportunity, you must hit the "Save & Next" button after providing email addresses for your recommenders, then review the information on the Submit page. Mark if you agree to the listed terms, then click the final "Submit" button. You will receive an e-mail once the application is submitted, and the application will show it has a "Submitted" status on your Zintellect dashboard under "My Applications".
 - Your application will not be considered complete until the required recommendations have been received. You can check the status of your recommendations on your Zintellect dashboard under "My Applications". You may "Manage" your recommendations to verify or update contact information, add another recommender, and resend the recommendation request email, as needed.

Selection Decisions

Selection decisions are made directly by NETL researchers and staff looking to host an internship. Your application will be available to the hosting mentor(s) for up to 12 months after you apply. You may withdraw your application at any time. Applications may be reviewed and selected on a rolling basis or the hosting mentor(s) may choose to wait until after the application deadline before reviewing all applications simultaneously. A final decision of non-selection may not be confirmed for several months after the listed application deadline.

Application Deadline 3/1/2024 3:00:00 PM Eastern Time Zone

Description The National Energy Technology Laboratory's (NETL's) record of success has been built on understanding the future of energy and the technologies required to make that future possible. We've long touted our success in developing the technologies that took on acid rain in the 1970s and mercury in the early 2000s. More recently, NETL has a leading role in

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President Biden's ambitious climate goals, including a carbon emission-free power sector by 2035 and a net-zero economy by 2050.

Program Goals

The NETL Postgraduate Research Program (PGRP) is a high-intensity program designed to identify recent Master's and Doctoral graduates of high promise and to foster advanced skill development. It allows the postgraduate to systematically outline career goals and helps provide the means of achieving these goals. NETL principal investigators and leads serve as mentors to PGRP participants during the program. This interaction affords the postgraduate a unique opportunity to develop critical skills needed to become an independent professional.

The program goals include providing the opportunity to participants to:

- Develop skills and knowledge in their field of study
- Engage with new areas of basic and applied research
- Network with world-class scientists
- Exchange ideas and skills with the Laboratory community
- Use state-of-the-art equipment
- Contribute to answers for today's pressing scientific questions
- Collaborate with the broader scientific and technical communities

Project Details

Through the Oak Ridge Institute for Science and Education (ORISE), this posting seeks a post-Doctoral or post-Master's researcher to engage in projects with the Research Innovation Center (RIC) at the National Energy Technology Laboratory (NETL) in the area of seismicity under the mentorship of Greg Lackey. This project will be hosted at the NETL [Pittsburgh, PA](#) campuses.

There are estimated to be more than 6 million wells in the continental United States, of which, approximately 1.16 million are abandoned. Site developers and operators of geologic storage sites are responsible for characterizing the hazard represented by legacy wells within the area of influence of their projects. Managing the risks of potential leakage from those wells during and after injection represents a technical challenge—particularly since robust methods to predict which wells present the greatest leakage risk are lacking. Developing and applying new, data-driven methods to help prioritize well remediation, plugging, and monitoring efforts has the potential benefit of efficiently and effectively managing risk.

Gaining insights into the safety and security of geologic storage requires a combination of field and laboratory experimentation, numerical simulation of system behavior, practical perspective from analogous industrial experience, and insights drawn from data. Under this project, researchers will apply artificial intelligence/machine learning (AI/ML) techniques to national-scale well characterization and integrity test datasets to yield new insights into leakage potential. It is intended that these insights will inform stakeholders' decision making on risk management and help to ensure

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efficient and effective well inspection and plugging efforts. (More details about NETL's Geologic and Environmental Systems Directorate can be found here: <https://netl.doe.gov/onsite-research/geological>. More details about NETL's Advanced Carbon Storage Research and Development portfolio can be found here: <https://netl.doe.gov/carbon-management/carbon-storage/advanced-storage>)

The participant will: (1) learn and apply state-of-the-art methods and approaches for well characterization and integrity assessment, well log analysis, and machine learning model development to address industry-relevant applied geoengineering problems; (2) gain perspective on geologic carbon storage technology research front, key challenges, and stakeholder perspectives; (3) gain exposure to career opportunities in energy and environmental science/engineering, with particular exposure to geologic and environmental-related fields; (4) gain experience in collaborative research with interdisciplinary collaboration teams; and (5) improve technical writing and oral presentation skills.

Peer-reviewed publication is strongly encouraged and will be supported by the mentor and other collaborators, as it an important step for emerging researchers to establish themselves and contribute to the advancement of the state-of-understanding in their field of endeavor. It is not, however, a requirement for this opportunity.

Stipend: The selected participant will receive a monthly stipend commensurate with educational level and experience.

- Post-Master's stipends start at \$3,720 per month.
- Post-Doctoral stipends start at \$5,518 per month.

Actual stipend rate offered may be increased based on experience.

Deliverables: To document the effectiveness of the program, participants are required to submit a pre-appointment and post-appointment survey, as well as a reflection on their appointment experience when they renew or end their appointment. The reflection should summarize their project(s), additional activities, and overall experience. Details are provided as the appointment end date approaches.

Participants may also have the opportunity to contribute to manuscripts, journal articles, book chapters, conference presentations, posters, patents, and other publications as a part of their appointment. Such achievements should also be reported to ORISE; additional details are provided after an offer has been accepted.

The National Energy Technology Laboratory (NETL), part of the U.S. Department of Energy (DOE) national laboratory system, is owned and operated by the DOE. NETL supports the DOE mission to advance the energy security of the United States. This is an educational opportunity offered by NETL and administered by the Oak Ridge Institute for Science and Education. Participants in the program are not considered employees of NETL, DOE, the program administrator, or any other office or agency.

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Qualifications To be eligible, you must either:

- have received a Doctoral degree within the last five years *or* be currently enrolled in a Doctoral degree program and complete the degree prior to the appointment start date.
- have received a Master's degree within the last three years *or* are currently enrolled in a Master's degree program and complete the degree prior to the appointment start date.

The ideal candidate would have some, but not necessarily all, of the following:

- Advanced degree (M.S. or Ph.D.) in engineering (Petroleum, Environmental, or Civil) or geology
- Previous research experience and record of peer-reviewed publications associated with subsurface energy operations such as geologic carbon storage, oil and gas development, or natural gas storage
- High proficiency with statistical data analysis using the Python programming language
- Previous experience with machine learning and web data mining
- Exposure to subsurface reservoir modeling
- Strong affinity for team-based, interdisciplinary collaboration on complex research topics in the area of geologic and environmental systems

Eligibility Requirements

- **Degree:** Master's Degree or Doctoral Degree received within the last 60 months or currently pursuing.
- **Discipline(s):**
 - **Chemistry and Materials Sciences** ([12](#))
 - **Communications and Graphics Design** ([2](#))
 - **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](#))
 - **Science & Engineering-related** ([2](#))
 - **Social and Behavioral Sciences** ([28](#))
- **Age:** Must be 18 years of age

Affirmation I certify that I attend or attended a regionally accredited college or university and:

- Have an earned a Doctoral degree no more than five years before the date of application.

OR

- Have earned a Master's degree no more than three years before the

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date of application.

OR

- Will receive a Doctoral or Master's degree by the appointment start date