Opportunity Title: Computational Methods for Quantitative Risk Assessment at Geologic Carbon Storage Sites
Opportunity Reference Code: NETL-2021-PGRP-Dilmore

Organization National Energy Technology Laboratory (NETL)

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How to Apply Applicants should apply through the Oak Ridge Institute for Science and Education (ORISE) program on Zintellect. After you have applied in Zintellect, please send a CV to Robert Dilmore at Robert.Dilmore@netl.doe.gov.

A complete application in Zintellect consists of:

- An application
- 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 references

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

If you have questions, send an email to NETLinfo@orau.org. Please include the reference code for this opportunity in your email.

Application Deadline 7/14/2021 6:00:00 PM Eastern Time Zone

Description The National Energy Technology Laboratory currently has an educational opportunity for a postgraduate researcher to explore computational and data-driven methods and tools for quantitative risk assessment at geologic carbon storage sites.

The U.S. DOE of Fossil Energy's NRAP is a multi-year, collaborative research effort that focused on developing the scientific basis, computational tools, and methods for risk management and uncertainty reduction at GCS sites, undertaken by Lawrence Berkeley National Laboratory (LBNL), Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (LANL), National Energy Technology Laboratory (NETL), and Pacific Northwest National Laboratory (PNNL). NRAP's approach to quantifying GCS subsurface environmental risk relies on stochastic modeling to forecast full system behavior of GCS sites, while considering site-specific uncertainty and variability. This full system considers not only the primary storage reservoir but also potential unintended migration pathways (wells, boreholes, faults, fractures) and receptors of concern (groundwater aquifers and the atmosphere). Various computational approaches are used to enable rapid and credible characterization of important system attributes and behavior over time. These approaches are used to describe performance and assess subsurface environmental risk in the context of important

system uncertainty and natural variability; they can be applied to constrain critical uncertainties, to improve understanding of likely site behavior, and support decision-making. More details about the NRAP project and research products (computational tools, recommended practices, community datasets, and application case studies) can be found on the NRAP project website: https://edx.netl.doe.gov/nrap/

The learning objectives and goals for this opportunity include

- Improving technical writing and oral presentation skills
- Gaining experience in collaborative research with large, multi-organization, interdisciplinary collaboration teams
- Gaining perspective on career opportunities in energy and environmental science/engineering, with particular exposure to geologic and environmental -related fields
- Learning state-of-art methods and approaches for various aspects of quantitative risk assessment/risk management for engineered geologic systems, methods and approaches for team-based research code development
- Gaining perspective on geologic carbon storage technology research front, key challenges, and stakeholder perspectives

Peer-reviewed publication is strongly encouraged and will be supported by the mentor and other collaborators, as it as seen as 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.

Qualifications

To be eligible, you must have received a Master's degree within the last three years or a doctoral degree within the last five years.

Prospective research associates who will benefit most from this research opportunity will have some formalized training, practical knowledge, and/or experience in some of the following areas:

- Strong affinity for multi-disciplinary collaboration on complex research topics in the area of geologic and environmental systems
- General understanding of the key features, events, and processes that impact technical performance and environmental risks of complex engineered geologic systems (e.g., geologic carbon storage, oil and gas production, well integrity, groundwater system response to perturbation, fracture and fault dynamics, etc.)
- Some knowledge of concepts an computational tools/approaches for numerical simulation of fluid flow in porous and fractured media
- skills with research code development and application

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- Familiarity with concepts and practical application of direct and indirect (geophysical) monitoring technologies and interpretation/inversion approaches
- Knowledge of methods for quantitative risk assessment, Monte-Carlo-type simulation, uncertainty quantification and reduction
- Familiarity or specialized knowledge and experience with reduced order model development, machine learning/data analytics

It is recognized that not all applicants will have knowledge and experience in all of these areas. This fellowship will provide opportunity for exposure to/interaction with technical experts in several of these areas.

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Master's Degree or Doctoral Degree.
- **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** (46 👁)
  - **Mathematics and Statistics** (10 👁)
  - **Physics** (16 👁)
  - **Science & Engineering-related** (1 👁)
  - **Social and Behavioral Sciences** (28 👁)

Affirmation

I certify that I:

- Have an earned or will receive a doctoral or master's degree by appointment start date.

AND

- Have received the degree no more than three years before the date of application (postmasters' applicants).

  OR

- Have received the degree no more than five years before the date of application (postdoctoral applicants).