Opportunity Title: Postdoctoral Opportunity at DOE Office of Fossil Energy
Opportunity Reference Code: DOE-STP-FE-2018-02

Organization U.S. Department of Energy (DOE)

Reference Code DOE-STP-FE-2018-02

How to Apply A complete application consists of:

- An application
- Transcript(s) - For this opportunity, an unofficial transcript or copy of the student academic records printed by the applicant or by academic advisors from internal institution systems may be submitted. Selected candidate may be required to provide proof of completion of the degree before the appointment can start.
- A current resume/CV

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

If you have questions, please send an email to DOE-RPP@orau.org. Please list the reference code for this opportunity in the subject line of your email.

Description The U.S. Department of Energy (DOE) Science, Technology and Policy Program is designed to provide opportunities to participate in programs, projects, and activities at the Office of Fossil Energy (FE).

These opportunities offer graduate exposure to a broad spectrum of Advanced Power Generation technologies to include: Rare Earth Elements, Advanced Combustion, Crosscutting Research, or Carbon Capture, Utilization and Storage. Participants will engage and learn about projects related to the oversight and day to day direction of Headquarters level program.

1. **Extreme Environment Materials:** This opportunity will include professional engineering and scientific tasks to: determine and advise on a material's essential composition, atomic and molecular configuration, and processing; relate the material's essential composition to its properties, end use, and performance in engineering, architecture, and scientific applications and programs; examine the interaction of materials in their processes and applications, taking into account the associated equipment, systems, components, and their fabrication, design, or use; develop, maintain, and apply materials and material solutions to meet certain mechanical, electrical, environmental, and chemical requirements.
2. **Rare Earth Element and Advanced Coal Processing:** This opportunity will include professional engineering and scientific tasks to: determine and advise on a metallurgical extraction, concentration and processing of rare earth materials from coal and coal by-products and taking into

account the associated equipment, systems, components to produce salable products and apply metallurgical solutions.

3. **Advance Combustion Systems:** The participant will engage in projects related to the development of oxy-combustion, and chemical looping technologies. The candidate will be part of projects lead by HQ Program Manager related to program decisions consistent with the overall clean energy research goals and objectives. Program decisions include the content of program plans, external and internal outreach strategy, program guidance and formulation with the field Technology Manager.
4. **Carbon Capture Technologies:** This opportunity will include engineering and scientific tasks to: determine and advise on advanced carbon capture technologies and systems. This includes understanding the chemical and physical properties of solvents, sorbents, and membrane systems, and the corresponding equipment used in separating carbon dioxide from mixed gas streams.
5. **Carbon Utilization Technologies:** This opportunity will include engineering and scientific tasks to: determine and advise on advanced carbon utilization technologies and systems. This includes understanding the biological, chemical, and physical properties of different technologies that can utilize and/or convert carbon-containing molecules derived (e.g., carbon dioxide, carbon monoxide, methane, etc.) from coal or fossil fuel-derived mixed gas streams.
6. **Carbon Storage Technologies:** This opportunity will include engineering and scientific tasks to: determine and advise on advanced carbon storage technologies and systems. This includes understanding the geological, chemical and physical properties of subsurface systems. Additionally, the candidate will perform studies and analysis of modeling and simulation of carbon storage in the subsurface and related issues such as geomechanics, geochemistry, and fluid flow.
7. **Computer Scientist:** This opportunity will include engineering and scientific tasks to: determine and advise on the application of artificial intelligence, machine learning, and robotics to fossil energy systems. The candidate will perform studies and analysis of the application of these techniques and tools to improve the efficiency and performance of fossil energy systems, including carbon capture, utilization and storage technologies.

For more information about the Office of Fossil Energy visit: https://www.energy.gov/fe/office-fossil-energy

Participant Benefits

Participants will receive a stipend to be determined by the Office of Fossil Energy (FE). Stipends are typically based on the participant's academic standing, discipline, experience, and

research facility location. FE may authorize a stipend increase to offset the costs of health insurance. Participants are eligible to purchase health insurance offered through ORISE. A relocation allowance may be provided for participants relocating to the hosting facility. Participants may receive an allowance for education and/or scientific activities as approved by FE.

Nature of Appointment

The participant will not enter into an employee/employer relationship with ORISE, ORAU, DOE, or any other office or agency. Instead, the participant will be affiliated with ORISE for the administration of the appointment through the ORISE appointment letter and Terms of Appointment.

Qualifications

The candidate should have completed a PhD program in Computer Sciences, Engineering or in one of the Physical Science disciplines (e.g., Chemistry, Geology, Geochemistry, Geophysics, etc.) from an accredited institution.

Preferred Skills for each project are listed below:

1. Extreme Environment Materials

- Knowledge of fossil-fueled electric power generation system and extreme environment materials
- Knowledge of the principals, practices, methods, techniques, processes, and procedures related to advanced clean energy systems, particularly in the fields of materials
- Ability to apply new developments and experienced judgment to solve novel problems, extend and modify existing techniques, and develop new approaches in solving a variety of problems related to extreme environments materials areas
- Understanding of nanomaterial’s and there development and limitations
- Demonstrated the ability to model complex material thermodynamics and kinetics phenomena

2. Rare Earth Element and Advanced Coal Processing

- Knowledge of fossil-fueled electric power generation system
- Knowledge of the principals, practices, methods, techniques, processes, and particularly in the fields of rare earth elements recovery from coal and coal by-products
- Ability to apply new developments and experienced judgment to solve novel problems, extend and modify existing techniques, and develop new approaches in solving a variety of problems related to rare earth elements
- Understanding of geology and extractive metallurgy of Rare Earth Elements

3. Advance Combustion Systems

- Be able to provide technical, programmatic and management advice and recommendations to Technology Project Managers, the Director of Advanced Energy Systems and related project groups as requested
- Ability to use technical capability, specialized knowledge relevant to Advanced Combustion program activities, and management skills to make recommendations based on inputs from the technology group comprised of knowledgeable, senior technical staff with often divergent views

4. Carbon Capture Technologies

- Be able to provide technical and management advice and recommendations to Program Manager and related project groups as requested
- Knowledge of the principles, practices, methods, techniques, processes, and procedures related to carbon capture systems
- Ability to review technical work in research, development, design, operational analysis, evaluation, and improvement processes, systems, and subsystems associated with power plants and carbon capture systems, methods, or products

5. Carbon Utilization Technologies

- Be able to provide technical and management advice and recommendations to Program Manager and related project groups as requested
- Knowledge of the principles, practices, methods, techniques, processes, and procedures related to carbon utilization technologies and systems
- Ability to review technical work in research, development, design, operational analysis, evaluation, and improvement processes, systems, and subsystems associated with power plants and carbon utilization systems, methods, or products

6. Carbon Storage Technologies

- Be able to provide technical and management advice and recommendations to Program Manager and related project groups as requested
- Knowledge of geology, geochemistry, geophysics, geoscience, or petroleum engineering and the technologies applied in these fields
- Knowledge of the principles, practices, methods, techniques, processes, and procedures related to carbon storage
- Ability to review technical work in research, development, design, operational analysis, evaluation, and improvement processes, systems, and subsystems of geologic field projects

7. Computer Scientist

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- Be able to provide technical and management advice and recommendations to Program Manager and related project groups as requested
- Knowledge of artificial intelligence, machine learning, and robotics and the technologies applied in these fields
- Knowledge of the principles, practices, methods, techniques, processes, and procedures related to artificial intelligence, machine learning, and robotics
- Ability to review technical work in research, development, design, operational analysis, evaluation, and improvement related to the application of artificial intelligence, machine learning, and robotics to fossil energy systems

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Business** (1 👁)
  - **Chemistry and Materials Sciences** (2 👁)
  - **Communications and Graphics Design** (1 👁)
  - **Computer, Information, and Data Sciences** (2 👁)
  - **Earth and Geosciences** (4 👁)
  - **Engineering** (11 👁)
  - **Environmental and Marine Sciences** (1 👁)
  - **Life Health and Medical Sciences** (3 👁)
  - **Mathematics and Statistics** (4 👁)
  - **Science & Engineering-related** (1 👁)
  - **Social and Behavioral Sciences** (3 👁)