

Opportunity Title: Multiscale modeling of long-term creep and fatigue behaviors of high temperature alloys

Opportunity Reference Code: NETL-FRP-2026-Gao

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
 - 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@oraui.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 before, during, or after you submit an application, you may reach out to NETLinfo@oraui.org.

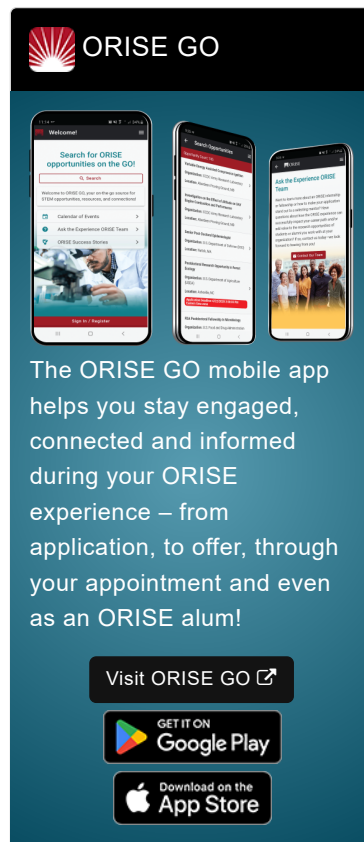
Selection Decisions

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 12/31/2026 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.

Program Goals



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The NETL Faculty Research Program (FRP) offers qualified academic faculty an opportunity to collaborate with NETL principal investigators on research at state-of-the-art NETL facilities. While typical appointments are part-time, some appointments are offered on a full-time basis during the summer or as a sabbatical. Prior to the appointment, the NETL principal investigator and selected applicant will define the scope of research and schedule the appointment period. Appointment periods range from one month to more than one year. Funding varies and is awarded based upon the participant's institutional salary. Faculty members are expected to elevate the collaboration with NETL by supporting connections with students at their home institution, in addition to the research project.

Connecting Students with NETL

The collaboration between the selected faculty member and NETL will include connecting their academic institution and students with NETL. Student connections may be fostered through activities such as, but not limited to, the following:

- Inviting NETL scientists and engineers to present at a departmental seminar
- Joining NETL at institutional career/job fairs to discuss your experiences with NETL
- Speaking about your experiences with NETL at information sessions
- Sharing invitations to NETL information sessions with students
- Partnering with NETL on proposals and other funding opportunities
- Recommending opportunities to NETL scientists and engineers, such as serving as a reviewer or editor, leading a workshop, etc.
- Serving as an ambassador to NETL for students interested in careers in the national lab complex

Research Project

Through the Oak Ridge Institute for Science and Education (ORISE), this posting seeks a faculty collaborator to engage in projects with the Research Innovation Center (RIC) at the National Energy Technology Laboratory (NETL) in the area of Power, Fuels & Chemicals under the mentorship of Michael Gao. This project will be hosted on-site at the NETL [Albany, OR](#) campus.

The National Energy Technology Laboratory's (NETL) Subsurface Simulation Group is seeking a postdoctoral research fellow to engage in collaborative, interdisciplinary research projects within the Oil & Gas Center of Excellence. NETL is the U.S. Department of Energy's Hydrocarbon and Geothermal Laboratory. The Oil & Gas Center of Excellence is located in Pittsburgh, Pennsylvania and focuses on advancing oil and gas technologies that strengthen U.S. energy security and resiliency.

This project aims to provide atomistic understanding of mechanical behavior of high temperature alloys in extreme environments. Microstructure defects such as vacancies, interstitials, stacking faults, twinning, dislocations, grain boundaries, surfaces, and precipitates, are considered.

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The participant will gain experience in multi-scale computational modeling and machine learning of mechanical behavior of high temperature alloys. They will be a part of interdisciplinary team and will engage in multiscale modeling and machine learning to develop reliable, efficient framework for predicting long-term creep and fatigue behaviors of heat-resistant structural alloys considering microstructure evolution. The approaches include but are not limited to continuum, dislocation dynamics, phase field, crystal plasticity finite element method, physics-informed digital twins, and/or data-driven and deep learning-based digital twins.

Stipend: The selected faculty participant will receive a monthly stipend commensurate with their institutional salary.

Program Requirements: 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.

Qualifications To be eligible, applicants must be a full-time regular permanent faculty member at an accredited college/university.

Potential participants should have:

- (1) Ph.D. in Materials Science, Physics, or a closely related discipline.
- (2) Strong research experience in dislocation modeling and simulation.
- (3) Proficiency in machine learning, digital twin technology.
- (4) Record of peer-reviewed quality publications.
- (5) Excellent programming skills.
- (6) Ability to conduct independent research in a multi-disciplinary team.

Point of Contact [Cinnamon](#)

- Eligibility Requirements**
- **Citizenship:** U.S. Citizen Only
 - **Degree:** Master's Degree or Doctoral Degree.
 - **Discipline(s):**
 - **Chemistry and Materials Sciences** ([12](#) )

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- **Communications and Graphics Design** ([2](#) )
- **Computer, Information, and Data Sciences** ([17](#) )
- **Earth and Geosciences** ([21](#) )
- **Engineering** ([29](#) )
- **Environmental and Marine Sciences** ([14](#) )
- **Life Health and Medical Sciences** ([51](#) )
- **Mathematics and Statistics** ([11](#) )
- **Physics** ([16](#) )
- **Science & Engineering-related** ([2](#) )
- **Social and Behavioral Sciences** ([29](#) )
- **Age:** Must be 18 years of age

Affirmation I certify that:

1. To the best of my knowledge all information contained in this application is accurate.
2. I am currently a faculty member at an accredited college/university.
3. I understand that any falsification will render me ineligible for participation and, if found after participation has begun, may require me to reimburse any funds received.