

Opportunity Title: CFD for Advanced Reactor Design: An exploration of machine

learning methods

Opportunity Reference Code: NETL-PGRP-2022-Clarke

Organization National Energy Technology Laboratory (NETL)

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- **How to Apply** To be considered for this opportunity, the following must be received within Zintellect:
  - An application
  - Up-to-date transcript(s) <u>Click here for detailed information about</u> <u>acceptable transcripts</u>
  - A current resume/CV, including academic history, employment history, relevant experiences, and publication list
  - Two educational or professional recommendations

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

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

Applications may be reviewed and selected on a rolling basis.

Application Deadline 8/31/2023 12:00:00 AM Eastern Time Zone

DescriptionThrough the Oak Ridge Institute for Science and Education (ORISE), this<br/>posting seeks a post-Master's or post-doctoral researcher to engage in<br/>projects with the Research Innovation Center (RIC) at the National Energy<br/>Technology Laboratory (NETL) in the area of CFD for Advanced Reactor<br/>Design, under the mentorship of Mary Ann Clarke. This project will be<br/>hosted at the NETL Morgantown, WV campus.

The participant will learn to navigate and incorporate new calculation methods into the Multiphase Flow with Interphase eXchanges (MFiX) code, used for the simulation of multiphase flow. This code is often applied to advance development and understanding of novel energy reactors. Participant will examine current machine-learning methods appropriate for multiphase flow software and determine best practices for its incorporation into MFiX. Ideally, participant will demonstrate research success through the incorporation of a machine-learning methodology into MFiX. All research will be non-proprietary. Any code developed will be open source. The participant may publish in open literature.

The participant will learn to read, alter and compile MFiX, perform code verification exercises, and acquire expertise related to incorporating machine-learning methods into an existing CFD code. The participant will benefit from NETL expertise in code development, verification and validation methods, and software management.

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

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

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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, you must have received a Master's degree within the last three years or a doctoral degree within the last five years; or be planning to receive a Master's degree or doctoral degree prior to the appointment start date.

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

- Strong background in applied math, engineering principles, and computational science, in the context of scientific code development
- Coding experience in Fortran (or other GL)
- Background in machine learning as it applies to computational fluid dynamics (CFD)
- Knowledge of GPU programming
- Scientific code development skills
- Eligibility Degree: Master's Degree or Doctoral Degree.

## Requirements • Discipline(s):

- Chemistry and Materials Sciences (<u>12</u>)
- Communications and Graphics Design (2. •)
- Computer, Information, and Data Sciences (17. •)
- Earth and Geosciences (21 (2))
- Engineering (<u>27</u> <sup>(©)</sup>)
- Environmental and Marine Sciences (14 (1)
- Life Health and Medical Sciences (48 )
- Mathematics and Statistics (11. )
- Physics (<u>16</u>)
- 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 date of application.

OR

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