

Opportunity Title: ORNL Meteorological Modeling for Nuclear Security

Analysis Post-Master's Research Associate

Opportunity Reference Code: ORNL18-37-NSITD

Organization Oak Ridge National Laboratory (ORNL)

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Description The Nuclear Security Modeling (NSM) Group within the Nuclear Security and Isotope Technology Division (NSITD) at Oak Ridge National Lab (ORNL) seeks applications for a postmaster researcher that will focus on development and application of computational models relevant to a variety of nuclear fuel cycle processes for security and nuclear forensics applications. The Nuclear Security and Isotope Technology Division is a leader in research, development, and deployment of technology that enhances nuclear nonproliferation and safeguards, reduces threats to nuclear material at risk, and expands the national capabilities in radiation detection and nuclear forensics. The NSM Group staff combines expertise in nuclear engineering, nuclear chemistry, applied mathematics, and computational modeling to conduct R&D in nuclear nonproliferation, consequence management, and post-detonation nuclear forensics. Modeling applications include all elements of the nuclear fuel cycle (e.g., enrichment, reactor analysis, and spent fuel safeguards); consequence assessments and forensics related to nuclear detonations; and search and assessment approaches for nuclear and radiological material. The NSM Group collaborates with other groups across the laboratory to develop, implement, and validate enhanced computational methods that support the key mission areas of NSM. The major customers of the work performed in this group are the National Nuclear Security Administration, Department of Defense, Department of Homeland Security, and other government agencies.

The responsibilities of this position include conceptualizing and performing research and development in the assessment of proliferation in every stage of the nuclear fuel cycle and nuclear weapons. Expertise is expected in one or more of the following areas: meteorological modeling analysis, atmospheric science, forecasting, mesoscale modeling, atmospheric transport and dispersion, numerical weather prediction, nuclear fallout modeling, and meteorological data acquisition, processing, and dissemination. The primary focus for this position is to develop and implement methods for simulation of these meteorological and nuclear security processes. The research will focus on developing and validating meteorological modeling methods and integrating these methods into existing modeling and simulation (M&S) tools. The researcher will maintain and develop the codes used for this evaluation, test their performance on different operating systems, and validate results using both numerically generated and actual measured data. Work will usually include a statistical analysis of the uncertainties and correlations in the reconstructed values. Finally, the researcher will maintain a strong understanding of the overall goals of various federal agencies involved in meteorological modeling and nuclear security analysis.

Qualifications The selected candidate will be responsible for interacting with division staff, both within and outside the NSM Group, who work on projects in a team environment. The candidate will be expected to work independently, perform R&D activities, fully document work in technical reports and publications, effectively interface with project sponsors, and participate in the identification and development of research proposals. Candidates for this position must have a master's in meteorology or related field such as atmospheric science and have recent experience in modeling and analysis, with demonstrated accomplishments in the solution of a variety of real-world problems. A firm understanding of the science of atmospheric transport and dispersion, backed by demonstrated recent and relevant research and development in the field, is a fundamental requirement of this position. It is highly desirable for the candidate to have experience with Numerical Weather Prediction (NWP), High Performance Computing (HPC), the Weather Research and Forecast (WRF) model, DTRA's HPAC/SCIPUFF model, NOAA's HYSPLIT model, and/or operational weather models. Excellent verbal, presentation, and writing skills are required to enable effective interaction and communication with technical peers, program managers, and sponsors. The candidate should have considerable programming experience using high-level languages. Additional capabilities, such as programming on parallel processors using the message-passing interface (MPI) are a plus. It is highly desirable for the candidate to have knowledge and experience with national meteorological agencies and/or universities. The ideal candidate would also have diverse experience in many application areas such as nuclear power plant emissions, nuclear accidents, and nuclear weapon fallout.



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Applicants cannot have received the most recent degree more than five years prior to the date of application and must complete all degree requirements before starting their appointment. This position is a temporary, full-time assignment for 12 months with possible extension. This position requires the ability to obtain and maintain a clearance from the Department of Energy. As such, this position is a Workplace Substance Abuse (WSAP) testing designated position. WSAP positions require passing a pre-placement drug test and participation in an ongoing random drug testing program.

The ORNL Postgraduate Research Associates Program is administered by Oak Ridge Associated Universities through its contract with the U.S. Department of Energy to manage the Oak Ridge Institute for Science and Education (ORISE).

**Eligibility
Requirements**

- **Citizenship:** U.S. Citizen Only
- **Degree:** Master's Degree received within the last 60 month(s).
- **Discipline(s):**
 - **Earth and Geosciences** (2 )
 - **Physics** (1 )

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