

ORNL Publications

External Publication

Job Posting Title

Postdoctoral Research Associate in Nuclear Security and Nuclear Forensics Modeling / NB50629445

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Purpose

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 postdoctoral 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.

Major Duties/Responsibilities

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 weapon production. Expertise is expected in one or more of the following areas: uranium enrichment, reactor production of plutonium, depletion and activation processes, fuel reprocessing, and forensic evaluations of nuclear materials. The primary focus for this position is to develop and implement calculational methods for simulation of these nuclear fuel-cycle processes and interpreting forensic data. The research will focus on developing and validating mathematical methods, incorporating inverse calculations and statistical models, 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 nonproliferation nuclear forensics missions.

Qualifications Required

The selected candidate will be responsible for interacting with division staff, both within and outside the Nuclear Security Modeling 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 Ph.D. in nuclear engineering or related field and have recent experience in nuclear fuel cycle analysis and nuclear forensics, with demonstrated accomplishments in the solution of a variety of real-world problems. A firm understanding of the physics and chemistry of nuclear fuel-cycle processes, 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 the SCALE code system and with models of various fuel-cycle processes. 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 FORTRAN and/or other 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 numerical analysis and applied mathematics, including optimization, statistics, and solution of inverse problems. The ideal candidate would also have diverse experience in many application areas such as nuclear forensics, neutron and gamma ray detection, and safeguards technologies.

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.

This position will remain open for a minimum of 5 days after which it will close when a qualified candidate is identified and/or hired.

We accept Word(.doc, .docx), Excel(.xls, .xlsx), PowerPoint(.ppt, .pptx), Adobe(.pdf), Rich Text Format(.rtf), HTML(.htm, .html) and text files(.txt) up to 2MB in size. Resumes from third party vendors will not be accepted; these resumes will be deleted and the candidates submitted will not be considered for employment.

If you have trouble applying for a position, please email ORNLRecruiting@ornl.gov.

Notice: If the position requires a Security Clearance, reviews and tests for the absence of any illegal drug as defined in 10 CFR 707.4 will be conducted by the employer and a background investigation by the Federal government may be required to obtain an access authorization prior to employment and subsequent reinvestigations may be required.

If the position is covered by the Counterintelligence Evaluation Program regulations at 10 CFR 709, a counterintelligence evaluation may include a counterintelligence-scope polygraph examination.

ORNL is an equal opportunity employer. All qualified applicants, including individuals with disabilities and protected veterans, are encouraged to apply. UT-Battelle is an E-Verify Employer.