Oak Ridge National Laboratory (ORNL)
STS Instrument Systems Neutron Optics and Modeling Scientist

Requisition Id 3162

Overview:
Oak Ridge National Laboratory (ORNL) is seeking an Instrument Systems Neutron Optics and Modeling Scientist for the Second Target Station (STS) project. The STS is a >$1Billion, Department of Energy project to be constructed at the ORNL Spallation Neutron Source (SNS). The STS will provide entirely new capabilities for the study of a broad range of materials with neutron scattering and support thousands of users from the physical, materials, and applied sciences and industry. The science capabilities provided by the instrument suite at the STS will complement those of the two existing DOE Office of Science neutron scattering user facilities at ORNL, the First Target Station (FTS) of the SNS and the High Flux Isotope Reactor (HFIR). The STS will deliver the highest peak brightness of cold neutrons in the world, which together with advances in neutron optics, instrumentation, and detectors, will ensure US leadership in neutron scattering for decades to come. The goal of the STS instrument systems group is to construct an initial suite of STS neutron instruments with transformative new science capabilities.

Purpose:
The STS Instrument Systems Neutron Optics and Modeling Scientist will support development of neutron instrument concepts and designs through application and development of advanced simulation tools capable of modeling fine details of representative real world samples. These tools will be used not only to optimize instrument concepts but are anticipated to become an integrated part of the routine experiment planning tools for STS instrument scientists and users and a foundation for advanced analysis methods. This position will also advance state-of-the-art in automation of neutron instrument operation and efficient data collection/reduction by applying and developing new methods using artificial intelligence and machine learning-based approaches. Working with STS Instrument Scientists, this position will ensure that instrument designs support the use of these technologies.

This position works closely with STS Instrument Scientists and other project technical groups to ensure that the scientific requirements for the instruments are enabled through optimal physics design and that instrument designs and technologies (e.g., “smart detectors”) support evolving use of AI/ML approaches for efficient data collection/reduction. Engagement in individual and collaborative scientific research focusing on the neutron scattering capabilities in combination with other unique resources ORNL has to offer is encouraged and publication of results is expected.

Major Duties and Responsibilities:
Collaborates with instrument scientists providing modeling capabilities to improve and demonstrate instrument performance through simulation of realistic samples and to ensure that instrument designs support use of AI/ML approaches.

- Contribute to the development of instrument concepts and designs at STS by providing technical expertise and support in instrument simulation methods
- Develop and expand tools used to model neutron instrument performance with particular emphasis on simulating realistic samples in realistic environments, verify predictive capability through testing on existing ORNL neutron instruments
- Working with Instrument Scientists and other STS technical groups, ensure that instrument designs support and enable use of advanced technologies including AI/ML for automation of instrument operation and efficient data collection/reduction
- Collaborate with internal ORNL programs and external institutions to improve methodologies for instrument design and develop relevant technologies
- Publish results in scientific journals, conference proceedings and ORNL technical reports as appropriate
- As a member of the ORNL scientific community, you will be expected to commit to ORNL’s Research Code of Conduct. Our full code of conduct, and a statement by the Lab Director’s office can
be found here: https://www.ornl.gov/content/research-integrity

Basic Qualifications:
- PhD in science or engineering with at least 5 years neutron scattering science experience
- Expert level understanding of Monte Carlo/ray-tracing methods to model the performance of neutron scattering instruments
- Experience in developing neutron instrument, experiment and data modeling software
- Excellent written and oral communication skills
- A strong record of scientific publication
- Must be available for some domestic and international travel

Preferred Qualifications:
- Experience in design and/or major upgrade of instruments at a spallation neutron source using Monte Carlo/ray-tracing methods for instrument optimization
- Experience in the use of neutron scattering instruments as demonstrated by peer-reviewed publications
- Familiarity with US Department of Energy expectations for the management of construction projects
- Demonstrated use of modern software development practice (version control, automated testing, continuous integration, etc.)

Work Direction and Interface:
Position reports to the STS Instrument Systems Group Leader. Works closely with scientists, engineers and technical staff within the STS project. Collaborates with scientists in other ORNL divisions and relevant external institutions.

Measures of Effectiveness:
- Timely completion of neutron instrument simulations demonstrating expected performance
- Publications in peer-reviewed journals
- Invited talks at national and international conferences and workshops
- Successfully represents STS at reviews and other project meetings and workshops

Relocation: Moving can be overwhelming and expensive. UT-Battelle offers a generous relocation package to ease the transition process. Domestic and international relocation assistance is available for certain positions. If invited to interview, be sure to ask your Recruiter (Talent Acquisition Partner) for details.

For more information about our benefits, working here, and living here, visit the “About” tab at jobs.ornl.gov.

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), Adobe (unsecured .pdf), Rich Text Format (.rtf), and HTML (.htm, .html) up to 5MB 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 ORNL.Recruiting@ornl.gov.

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.