TITLE: Development of neutron generator-based prompt gamma activation analysis instrument (U.S. Citizens preferred)

Overview

The Material Measurement Laboratory of the National Institute of Standards and Technology is seeking qualified persons (U.S. Citizens preferred) to join an effort in extending the current reactor-dependent prompt gamma activation analysis (PGAA) to one based on laboratory neutron sources. PGAA is a non-destructive nuclear analytical technique based on thermal neutron capture. NIST is a world leader in employing reactor-based neutron beam PGAA for the certification of standard reference materials (SRMs) and in material characterization in support of academic and industrial research and development. This project partially leverages the reactor-based expertise for the development of their neutron generator-based counterparts. The main challenge is to overcome the lower neutron intensity by careful design of the neutron moderator and optimization of the detector shielding and geometry, and by exploiting the pulse nature of the generator for coincidence detection to achieve background reduction. The candidate will be expected to publish findings in peer-reviewed scientific journals and present at relevant meetings and conferences.

Duties

- Design neutron moderator for a DD generator to optimize thermal neutron irradiation
- Set up gamma ray detector and electronics for PGAA measurements and perform spectral analysis
- Investigate coincidence detection scheme to enhance detection limits.

Required Skills, Expertise and Qualifications

- Ph.D. or equivalent experience in nuclear engineering, physics, or related field
- Hands-on ability in design and assembly of neutron moderators for optimal thermal output.
- Understanding of principles of neutron and gamma ray interaction with materials.
- Expertise in nuclear digital and analog electronics
- Expertise in simulation tools for radiation transport
- Good verbal and written communication skills

Other Desirable Qualifications

- Skills in Python or other programming language for custom development of analysis software
- Desire to employ machine learning and artificial intelligence for data processing
- Ability to initiate new technical approaches and research opportunities in measurement science

Employment Terms: This opportunity is to be an associate researcher in the NIST Chemical Sciences Division for a term of 1 year, with options to renew. Associate researchers are NOT Federal Employees, but they work along with NIST researchers and with NIST's often world class instrumentation. Relocation expenses will not be provided. U.S. Citizens hired into associate positions may have the opportunity to seek longer term Federal Employment.

Salary: $90,000 - $100,000 per year.

How to express interest: Persons (U.S. Citizens preferred) who meet all of the required qualifications and who would be interested in taking this position are invited to express their interest by sending an email that briefly describes their qualifications along with a CV to 646assoc@nist.gov. U.S. Citizens should note "U.S. Citizen" and the opportunity title in the email subject line. All others should note "Non-U.S. Citizen" and the opportunity title in the email subject line.