

# Research Associate

## Research Associate in Experimental Nuclear Science – Fission, Equation of State studies

### Position Summary

The [National Superconducting Cyclotron Laboratory \(NSCL\)](#) invites applications from outstanding candidates for a fixed-term research associate (Postdoctoral Researcher) position in the area of experimental nuclear science, who will work in the HiRA research group led by Prof. William Lynch ([Lynch@frib.msu.edu](mailto:Lynch@frib.msu.edu)).

The successful candidate will lead in the development of experimental equipment and data analysis procedures for FRIB science aimed at elucidating fission processes in rare isotopes and on constraining the nuclear equation of state. The candidate is expected to take a leading role planning future experiments in these areas. The candidate will also work on the analysis of existing data on fission and on the nuclear equation of state.

One research focus of the HiRA group concerns the understanding the nuclear equation of state that is relevant to characterize the properties of neutron-rich systems such as the recently observed neutron star merger. The successful candidate is expected to take a leading role in studying the nuclear equation of state including simulations and analysis of heavy ion collision data acquired recently in a long experimental campaign. The candidate is also expected to lead in planning and designing future experiments to measure the fission barriers of exotic nuclei involving the NSCL Active-Target Time-Projection Chamber (AT-TPC) and other devices. The latter series of experiments provides important information on the fission cycling in the r-process. The postdoc is expected to work closely with theorists to understand the data.

NSCL is one of the world's flagship nuclear science research facilities. The Laboratory's research program is broad: fast, stopped, and reaccelerated beams of rare-isotopes are available to address key scientific questions concerning the creation of the elements in the cosmos, the limits of nuclear stability, the properties of nuclei with extreme neutron-to-proton ratios, and the equation of state of neutron-rich nuclear matter as it may exist inside neutron stars. Postdoctoral researchers play an important role in expanding, improving and utilizing the world-class experimental capabilities at the Laboratory. Experimentalists often work closely with theorists in the Laboratory and beyond and projects can involve high-performance computing.

NSCL is part of the [Facility for Rare Isotope Beam \(FRIB\)](#) Laboratory, which aspires to become the world's leading laboratory for education and research in rare isotope science, in accelerator science, and in applications of rare isotopes to meet societal needs. To realize this vision, the FRIB Laboratory builds on the expertise and the achievements of NSCL as it establishes FRIB, which will extend the frontier of nuclear science through unprecedented discovery potential.

Research Associate positions are typically for two years, depending on the availability of funds. Renewal for the second year is based on a performance evaluation. A third year is possible, subject to funding and satisfactory performance evaluations.

Besides the excellent research environment, the FRIB Laboratory offers a strong program for mentoring postdoctoral researchers in preparation for the next steps in their careers. You can read more in the [postdoc mentoring plan](#). Postdoctoral researchers play a role in running the Laboratory, from leading forefront research to serving on important committees. They help supervise students and, for those interested, there are opportunities to engage with teaching and outreach.

NSCL is funded by the National Science Foundation through the Nuclear Physics program of the NSF Physics Division to be a national user facility with a mission to provide beams of rare isotopes for researchers from around the world. Hundreds of users come to Michigan State University each year to take advantage of our facilities and explore the inner workings of atoms and their role in the universe.

The FRIB Laboratory is a major administrative unit within Michigan State University, comprised of NSCL and the FRIB Project. MSU is establishing FRIB as a scientific user facility with financial assistance from the Office of Nuclear Physics in the U.S. Department of Energy Office of Science (DOE-SC).

MSU is one of the largest university campuses in the United States with a beautiful campus of 5,000 tree-filled acres. It has 17 degree-granting colleges and is a center for academic and research activities as well as the arts and athletics.

The campus sits between Lansing (Michigan's capital city) and East Lansing. The Lansing area has a population of 460,000 and offers lovely suburban areas, loft condos and other urban living opportunities as well as easy-to-get-to rural areas. A symphony orchestra, excellent health care, many community and professional theatres, rivers, lakes, outdoor festivals, close access to large cities and Lake Michigan make for a near-perfect living environment.

MSU is an affirmative action, equal opportunity employer and is committed to achieving excellence through cultural diversity. The University actively encourages applications and/or nominations of women, persons of color, veterans and persons with disabilities. Job applicants are considered for employment opportunities and employees are treated without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, disability, or veteran status. The University actively encourages applications of women, persons of color, veterans, and persons with disabilities.

### **Minimum Requirements**

- Ph.D. in Nuclear Physics, Nuclear & Radiochemistry, Nuclear Astrophysics, or related field.
- An ability to carry out independent and original research as demonstrated by published works in refereed journals and/or conference proceedings.
- Demonstrated written and oral communication skills, as evidenced by published works and by presentations at conferences, workshops, scientific outreach, and other professional meetings.
- Strong research interest, demonstrated in the cover letter, in at least one and preferably several of the following areas: nuclear reactions and/or nuclear fission, nuclear equation of state, large-scale data analysis and interpretation, nuclear detector development, digital data acquisition, experiments with radioactive ion beams.
- The ability to handle export-controlled materials.

## Desired Qualifications

- Demonstrable knowledge of experimental principles and techniques pertaining to measurements of fission, nuclear reactions with intermediate energy nuclear beams, Reactions with rare isotope beam.
- Experience with computer programming for the purpose of acquiring and analyzing data and for comparison with model predictions.
- Experience designing, building, and commissioning new experimental equipment.

## Required Application Materials

In the cover letter of their application, applicants must highlight their interest in and experience/expertise related to the open position in the research group of Prof. Lynch. Applicants must provide a Curriculum Vita including a complete list of publications and presentations. Applicants must also arrange for three letters of recommendation to be submitted.

To apply: please visit <http://careers.msu.edu>, search for posting number 675496 and follow the application process.

## Special Instructions

Review of applications will begin immediately and the search will continue until the position is filled. General questions regarding the position may be sent to the Associate Director for Experimental Research, Sean Liddick ([liddick@nscl.msu.edu](mailto:liddick@nscl.msu.edu)); specific research questions about this opportunity should be sent to Prof. William Lynch ([lynch@frib.msu.edu](mailto:lynch@frib.msu.edu)).

## Further information

NSCL Experimental Research, with links to research pages of faculty members:  
<https://www.nscl.msu.edu/researchers/experiments.html>.

Profile of Prof. Lynch: <http://www.nscl.msu.edu/directory/lynch.html>

NSCL: <https://www.nscl.msu.edu/>

FRIB: <https://frib.msu.edu/>