Postdoctoral Research Associate (PREP)

Scanning SQUID Metrology for Superconducting Electronics

This **Postdoctoral Research Associate** position is part of the **National Institute of Standards and Technology (NIST) Professional Research Experience Program (PREP)**, which supports collaborative research between NIST scientists and researchers at PREP-affiliated academic institutions. The position is ideal for early-career researchers seeking to build an independent research profile while working at the forefront of superconducting electronics and quantum-enabled metrology.

Research Opportunity

Advancing Scanning SQUID Metrology for High-Speed Superconducting Circuits

The postdoctoral associate will conduct original research focused on developing advanced scanning superconducting quantum interference device (SQUID) magnetometry to study superconducting electronic systems. Core research directions include improving SQUID sensor performance, imaging and understanding flux trapping, and evaluating mitigation strategies in high-speed superconducting circuits.

The successful candidate will have the opportunity to **lead and shape research directions**, contribute to the design and construction of next-generation scanning SQUID instrumentation, and apply these tools to cutting-edge superconducting devices. Our group has deep expertise in microwave metrology, nanoscale device characterization, and superconducting circuit design, fabrication, and measurement.

Key Responsibilities and Opportunities

The postdoctoral associate will have the opportunity to:

- Lead scanning SQUID imaging studies of trapped flux, superconducting circuits, and novel devices
- Develop and optimize SQUID sensors and measurement techniques
- Design and perform high-speed electronic measurements (>10 GHz)
- Design and fabricate novel superconducting circuits and/or sensors using NIST's advanced cleanroom facilities
- Develop rigorous data analysis pipelines with appropriate statistical validation
- Publish results in high-impact, peer-reviewed journals and present findings at major scientific conferences
- Collaborate closely with NIST scientists while maintaining scientific independence and ownership of research outcomes
- Contribute to documentation, software, and data archiving to support long-term impact of the work

Mentorship and Professional Development

This position provides strong mentorship from NIST staff scientists and is structured to support:

- Development of an independent research program
- A strong publication record
- Visibility within the superconducting electronics and quantum metrology communities
- Preparation for academic, national laboratory, or industry research careers

Qualifications

Required qualifications:

- PhD in Physics, Electrical Engineering, or a closely related field (completed or near completion)
- Strong written and oral communication skills
- Evidence of scientific productivity through peer-reviewed publications
- Demonstration of hands-on experimental research experience with publication(s), e.g. description of experiments constructed, devices fabricated, etc.

Desired qualifications:

- Experience with cryogenic measurements
- Experience with scanning SQUID imaging
- Proficiency in Python or similar scripting languages for data analysis and experiment control
- U.S. citizen preferred

COLORADO O*NET WAGE CATEGORIES FOR PREP POST POSITIONS ONLY!

- **17-2071.00 Electrical Engineers**
- Level of Appointment: Postdoc

Privacy Act Statement

Authority: 15 U.S.C. § 278g-1(e)(1) and (e)(3) and 15 U.S.C. § 272(b) and (c)
Purpose: The National Institute for Standards and Technology (NIST) hosts the Professional Research Experience Program (PREP) which is designed to provide valuable laboratory experience and financial assistance to undergraduates, post-bachelor's degree holders, graduate students, master's degree holders, postdocs, and faculty.
PREP is a 5-year cooperative agreement between NIST laboratories and participating PREP Universities to establish a collaborative research relationship between NIST and U.S. institutions of higher education in the following disciplines including (but may not be limited to) biochemistry, biological sciences, chemistry, computer science, engineering, electronics, materials science, mathematics, nanoscale science, neutron science, physical science, physics, and statistics. This collection of information is needed to facilitate administrative functions of the PREP Program.
Routine Uses: NIST will use the information collected to perform the requisite reviews of the applications to determine eligibility, and to meet programmatic requirements. Disclosure of this information is also subject to all the published routine uses as identified in the Privacy Act System of Records Notices: NIST-1: NIST Associates.
Disclosure: Furnishing this information is voluntary. When you submit the form, you are indicating your voluntary consent for NIST to use of the information you submit for the purpose stated.