PREP Research Associate
CHIPS Funded Project.

This position is part of the National Institute of Standards and Technology (NIST) Professional Research Experience Program (PREP). NIST recognizes that its research staff may want to collaborate with researchers at academic institutions on specific projects of mutual interest and, therefore, requires those institutions to be recipients of a PREP award. The PREP program involves staff from a wide range of backgrounds conducting scientific research across various fields. Individuals in this position will perform technical work supporting the collaboration's scientific research.

Research Title:
Research scientist: Optical trapping and sensing of nanoparticles (U.S. Citizens preferred)

The work will entail:
The Materials Measurement Laboratory of the National Institute of Standards and Technology (NIST) is seeking qualified persons (U.S. Citizens preferred) to work on a NIST CHIPS R&D Metrology project that aims at developing measurement methodologies for the detection and identification of very low concentration of contaminants in liquid environments. The focus area includes optimizing photonic enhancement techniques for improving the optical scattering of single impurity particles. In this regard, surface engineering methods, theoretical modeling and optical microscopy are employed to design robust sensors for detection of sub-20 nm particles.

U.S. Citizen Preferred

Key responsibilities will include but are not limited to:
- Fabrication of optical cavities in a cleanroom/nanofabrication facility
- Simulation of optical micro- and nano-cavities for optical traps for nanoparticle sensing
- Construct/adapt optical microscopes for optical trapping and dark-field optical microscopy
- Perform single particle detection and spectroscopy in a microfluidic setup
- Perform different microscopies including scanning electron microscopy (SEM), and optical microscopy (OM) equipped with a cryogenic stage for surface analysis
- Develop computer code (e.g. Python) for the development and analysis of optical cavities

<u>Qualifications</u>

- PhD degree in Materials, Electrical Engineering, or a related field
- Skilled in micro-fabrication, optical- and microfluidics, and optical sensing of particles
- Highly experienced in designing nanoparticle trapping techniques using optical methods
- Skilled in modeling electro-optical nano-systems to predict properties and fluid dynamics.
- Highly skilled in multiple scripting languages, including MATLAB, Python, Optiwave (FDTD), COMSOL, Proteus, Lumerical and LaTeX
- Demonstrated ability to develop prototype sensors integrated with optical fibers and detectors needed to detect and analyze the related data

Employment Terms

This opportunity is to be an associate researcher in the NIST Materials Measurement Science Division for a term of 1 year, with options to renew. Associate researchers are NOT Federal Employees, but they work alongside NIST researchers and with NIST's 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.

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 the 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. By applying to a CHIPS-funded PREP opportunity, you also acknowledge that participation in the project requires signing a Non-Disclosure Agreement (NDA) prior to beginning any work.