

PREP Research Associate

This position is part of the National Institute of Standards and Technology (NIST) Professional Research Experience (PREP) program. NIST recognizes that its research staff may wish to collaborate with researchers at academic institutions on specific projects of mutual interest, thus requires that such institutions must be the recipient of a PREP award. The PREP program requires staff from a wide range of backgrounds to work on scientific research in many areas. Employees in this position will perform technical work that underpins the scientific research of the collaboration.

Research Title:

Researcher in Optical Properties of Materials

The work will entail:

The Sensor Science Division at the National Institute of Standards and Technology (NIST) is seeking a researcher to advance the understanding and measurement of optical properties of materials. This role emphasizes developing innovative, high-accuracy methods to characterize how materials interact with light—through reflectance, transmittance, and bidirectional reflectance distribution function (BRDF)—across the ultraviolet, visible, and short-wave infrared spectral regions. The researcher will work to reduce measurement uncertainties while exploring new approaches that enable more precise and reliable material characterization. In collaboration with experts at NIST, this work will address real-world challenges such as improving the efficiency of solar energy materials, enabling more accurate remote sensing for climate monitoring, enhancing optical coatings for advanced imaging and defense systems, supporting semiconductor and advanced manufacturing processes, and improving material identification in fields ranging from biomedical diagnostics to cultural heritage preservation.

Key responsibilities will include but are not limited to:

- Develop and improve high-accuracy measurement methods for determining optical properties of materials, including reflectance, transmittance, and bidirectional reflectance distribution function (BRDF) across UV, visible, and short-wave infrared spectral regions.
- Reduce measurement uncertainties and advance the reliability and traceability of optical property data.
- Design, build, and refine experimental systems and instrumentation for optical metrology.
- Apply optical property measurements to real-world challenges, including energy materials, remote sensing, advanced manufacturing, and optical coatings.
- Analyze and interpret complex datasets, including uncertainty analysis and model development.
- Publish research findings in peer-reviewed journals and present results at scientific conferences.

- Develop and sustain an independent, forward-looking research program that expands the impact of optical material measurements across industry, government, and academia.

Qualifications

- Ph.D. in Physics, Optics, Engineering, Chemistry, or a closely related field.
- Hands-on experience in design and construction of optical instruments.
- Demonstrated experience with laser technologies.
- Familiarity or direct experience with optical modeling.
- Programming proficiency with Python, MATLAB, or LabView for instrument control and data analysis.
- Evidence of independent research experience and a strong enthusiasm for learning new theoretical, computational, and experimental techniques.
- U.S. Citizen strongly preferred.

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.