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:
Understanding failure in novel microelectronics material systems (U.S. Citizens Preferred)

The work will entail:
The Materials Measurement Laboratory of the National Institute of Standards and Technology is seeking qualified persons (U.S. Citizens Preferred) to perform a peridynamic-based analysis for failure that can transition seamlessly between brittle and ductile fracture behavior and between quasi-static and dynamic failure. The work will focus primarily on interface failure caused by loading near or away from the interface. The application of this study is relevant to structures of interest in the semiconductor industry, particularly dielectric/metal interfaces subjected to various loading conditions that mimic potential mechanical stresses during fabrication or operational lifetime.

Key responsibilities will include but are not limited to:

- Peridynamic modeling of elastic and elastoplastic behavior from nanoindentation in a brittle substrate with ductile inclusions near the indentation site.
- Peridynamic modeling of interface failure due to loading near or distant from the interface between brittle and ductile regions.
- Investigation of crack dynamics near material interfaces based on interface strength.
- Publish results in peer-reviewed scientific journals and present results at scientific conferences.

<u>Qualifications</u>

- PhD in Materials Science or another related field
- 10 years of experience with computational materials research
- Skilled in using various computational techniques to analyze the elastoplastic behavior of materials, including peridynamic analysis.
- Familiarity with materials commonly used in microelectronic devices and assemblies.
- Independent worker with strong written and oral communication skills

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.