

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:

Numerical modeling for nano-to-microscale thermo-mechanical measurements (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 finite element analysis and simulations related to nanoscale and microscale material property measurements based on atomic force microscopy and instrumented indentation. This work will focus primarily on numerical modeling of nanoscale and microscale thermomechanical tests on materials and heterogeneous structures used in advanced packaging of microelectronics.

Key responsibilities will include but are not limited to:

- Perform finite element analyses to model the thermo-mechanical behavior of materials and structures at the micro- and nano-scale
- Research and develop theoretical models for the analysis of temperature-dependent micro/nanomechanical behavior of materials and heterogeneous structures at elevated temperatures. As needed, refine these models based on data from AFM and nanoindentation experiments.
- Publish results in peer reviewed scientific journals and present results at scientific conferences.

Required Skills, Expertise and Qualifications:

- PhD in Materials Science or related field.
- Advanced knowledge and experience with finite element methods/multiscale modelling, particularly related to nano/microscale contact mechanics. Experience writing software and/or using python scripting to speed up/automate simulation workflows.
- Experience with computational materials research, particularly in the validation of experimental results or extraction of materials properties from complex experimental data.
- Knowledge of AFM and/or nanoindentation experiments. Hands on experience preferred.

- Knowledge of materials commonly used in BEOL layers and interconnects of microelectronic devices, particularly those used in hybrid bonding processes.
- Strong written and oral communication skills; ability to work independently and as part of a team.

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.