

**PREP Research Associate
CHIPS Funded Project**

This position is part of the National Institute of Standards (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, and thus requires that such institutions 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:

Modeling and Mechanical Testing for Heterogenous Structures of Advanced Semiconductor Packaging

The work will entail:

The Infrastructure Materials Group at the National Institute of Standards and Technology seeks a researcher with extensive expertise in finite element analysis and knowledge of one or more of the following technical areas: instrumented mechanical testing, adhesion testing, polymer degradation characterization, and material damage analysis and modeling.

If selected, you will play a significant role in the projects related to modeling and reliability testing of advanced chip packaging and other electronics applications. This includes working with NIST staff and external partners on setting up models to predict the behavior and investigate possible points of failure during the service lifetime of heterogeneous multilayered polymeric, metal, and semiconductor structures, identify crucial material parameters, and plan and execute experimental research to evaluate changes of these material parameters after aging. The results will be used to understand the root causes of the multilayer failures, providing a scientific basis for test method development, material selection, and product quality assurance for the semiconductor industry.

Key responsibilities will include but are not limited to:

- Developing finite element models of thermomechanical behavior of heterogeneous multilayered systems.
- Characterizing the degradation of materials and interfaces before, during, and after exposure to accelerated laboratory aging.
- Developing reliability models for complex advanced packaging systems.
- Providing technical leadership on finite element modeling of failure mechanisms in multilayered polymeric structures.
- Disseminating research results through presentations at conferences, publication of journal papers, and technical reports.

Qualifications

- U.S. citizenship is preferred
- Currently live in the United States
- Ph.D. in Physics / Mechanical Engineering / Electrical Engineering / Materials Science / Chemical Engineering
- Experience in nano- and micro-scale mechanical testing and materials characterization
- Experience in finite element modeling of heterogeneous systems

- Experience in advanced semiconductor packaging is preferred
- Strong oral and written 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 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.