

**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 recipients 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:

Metrology of Materials, Surfaces, and Processes for Semiconductor Advanced Packaging

The work will entail:

We are seeking a highly motivated researcher to advance measurement science for next-generation hybrid advanced packaging. This role will contribute to the development of novel surface and materials metrology methods that enable predictive control of bonding processes and heterogeneous integration. The successful candidate will work within the Dynamic Mechanical Metrology Project of the Quantum Measurement Division to help establish the quantitative foundations needed for reliable, high-density microelectronic assembly, supporting national efforts to strengthen U.S. leadership in semiconductor manufacturing and advanced packaging technologies.

The main responsibilities are:

- Design, model, and performance of test methods to evaluate bond quality of bonded chip pairs using different wafer materials and bond methods.
- Design and fabrication of test rigs for bond strength measurement.
- Implement bond strength testing at cryogenic and high temperatures.
- Closely coordinate with teams performing materials characterization, surface and thin film thin film characterization.

Qualifications

Necessary Qualifications:

- PhD in mechanical engineer, physics, electrical engineering, materials science, or a related field.
- Experience with wafer and/or hybrid chip bonding processes.
- Experience with destructive test methods, such as those utilizing materials test machines or related instruments.
- Proficiency in finite element modeling, using tools such as COMSOL or ANSYS
- Proficiency in CAD, using tools such as SolidWorks or Autodesk.
- Proficiency in programming languages, such as Python, Java, or Matlab.
- Excellent communication skills and ability to work effectively in a team.

Desirable Qualifications:

- Experience, including process development, in back-end semiconductor device fabrication, including wafer cleaning and handling.

- Familiarity with silicon electronic and photonic device processing
- Experience with custom infrared microscopy and optical measurement setups.
- US citizenship 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 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.