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:
Research Engineering Technician (CHIPS Project: Nondestructive defect detection metrology for advanced semiconductor packaging)

The work will entail:
The candidate will join a multidisciplinary team of scientists working to advance nondestructive defect detection metrology for advanced semiconductor packaging by developing reference artifacts and benchmark datasets. The candidate will also contribute to sample preparation and to making destructive (e.g., FIB/SEM) and nondestructive measurements (e.g., XCT). The candidate will contribute to the development of reference artifacts. The candidate may contribute to designing CAD models, running X-ray computed tomography (XCT) simulations, and performing XCT reconstructions to generate datasets. The candidate will support the development of a Python script or package to automate these processes as needed. The datasets will be used to evaluate defect detection and image segmentation algorithms, including those based on deep learning principles. The incumbent will analyze the resulting measurements, perform image processing, and extract meaningful information to support the research goals outlined in the experiment plan. They will organize the measured and analyzed datasets for publication and communicate with the team.

U.S. Citizen Preferred

Key responsibilities will include but are not limited to:

- Prepare samples for focused ion beam or scanning electron microscopy measurements
- Make X-ray computed tomography or laminography measurements
- Design 3D models for simulation, run XCT simulations, carry out XCT reconstruction, and execute image analysis.
- Organize and prepare data sets for publication.
- Presenting results at internal meetings and occasional meetings with external stakeholders.
- Ensuring that results, protocols, software, and documentation have been archived or otherwise transmitted to the larger organization.

<u>Qualifications</u>

- A bachelor's degree in physics, engineering, or a related discipline.

- At least 5 years of relevant experience.
- Experience with XCT measurements, reconstruction, and image analysis. Experience with XCT simulation is a plus.
- Experience with sample preparation, FIB, and SEM.
- Experience with the image segmentation process using commercial software or an open-source tool.
- Strong oral and written communication skills.
- Able to quickly learn and adapt to new fields or techniques

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.