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 Engineer

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 contribute to designing CAD models, running X-ray computed tomography (XCT) simulations, and performing XCT reconstructions to generate datasets. The candidate will develop a Python script or package to automate these processes. Additionally, the candidate will utilize a generative modeling process created by the team to help generate 3D models with seeded defects. The datasets will be used to evaluate defect detection and image segmentation algorithms, including those based on deep learning principles. The candidate may contribute to sample preparation and nondestructive and destructive measurements. 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, communicate with the team, and share the results at conferences and in publications.

U.S. Citizen Preferred

Key responsibilities will include, but are not limited to:

- Design 3D models for simulation, run XCT simulations, carry out XCT reconstruction, and execute image analysis.
- Organize and prepare data sets for publication.
- Prepare samples and make nondestructive and destructive measurements.
- Presenting results at internal meetings and occasional meetings with external stakeholders.
- Publish results in journals and present results at conferences.

<u>Qualifications</u>

- A doctoral degree in physics, engineering, or a related discipline.
- Experience with XCT measurements, reconstruction, and image analysis. Experience with XCT simulation is a plus.

- Experience in writing Python scripts. Familiarity with automating or controlling other software, tools, or processes through APIs, inter-process communication, or similar methods is a plus.
- Experience with sample preparation (mechanical polishing, focused ion beam) or scanning electron microscopy imaging is a plus.
- Experience with implementing deep learning-based image segmentation processes is a plus.
- 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.