

PREP Research Associate

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: Machine Vision Engineer for PCB Inspection

The work will entail: NIST is investigating the performance of commercial and custom AI systems (hardware and software) for printed circuit board (PCB) inspection and manufacturing defect detection. The work will focus on conducting experiments, acquiring and analyzing data to understand these systems' performance, and generating data to train AI systems.

U.S. Citizen Preferred

Key responsibilities will include but are not limited to:

- Develop AI/ML based image processing pipelines using Python/Pytorch and other relevant software modules in collaboration with other NIST researchers.
- Develop test rigs to acquire 2D and 3D images of PCBs and defective parts.
- Research the effects of various physical properties of an object and sensor settings on the AI metrics.
- Write reports and develop weekly presentations to discuss the progress of the project.
- Perform a literature review and market research of relevant algorithms, hardware and software.

Qualifications

- Education:
 - Engineering majors with a Ph.D or master's degree (Ex: Computer Science, Computer Engineering, Robotics, Electrical Engineering, and/or Mechanical Engineering)
- PCB design and hardware:
 - Experience with PCB layout and design software such as KiCad, DipTrace
 - Experience with developing and inspecting PCBs
- AI/ML and computer vision:
 - Experience using Python, PyTorch, and Tensorflow for developing AI/ML pipelines.
 - Experience with OpenCV, MVTec HALCON, or Matlab Computer Vision Toolbox.
 - Basic understanding of imaging sensors such as RGB and RGB-D cameras
 - Experience with computer vision algorithms to perform object detection, data augmentation, and 2D/3D pose estimation
 - Point cloud data processing, 2D and 3D imaging
- Experience with physics engines such as Unity, Unreal Engine and MuJoCo.
- Experience developing on both Windows and Linux platforms.

- Experience with CAD software such as SolidWorks and OnShape

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.