

Perception Performance of Robotic Systems

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 conduct scientific research across many areas. Employees in this position will perform technical work that underpins the collaboration's scientific research.

Position Description

The Intelligent Systems Division at NIST is investigating the performance of 3D machine vision systems for various manufacturing applications. The research will focus on conducting experiments and analyzing data to understand these systems' performance and to support the development of standards for measuring their depth error and depth resolution, as well as the performance of robotic systems used for bin-picking applications.

Duties:

The duties will be tailored to fit the applicant's qualifications, and the applicant will be trained in the use of certain systems needed for the following possible duties:

- Conducting experiments in support of the development of performance metrics for various 3D sensors.
- Assisting in recording and analyzing test data and preparing test reports.
- Performing simple preventative maintenance, troubleshooting, adjustment, and repairs of laboratory equipment.
- Assisting in performing market research for purchases required for the laboratories.
- Using CAD software to design parts, end-of-arm tooling, and fixtures.
- Working with NIST and/or external resources to have parts fabricated.
- Recording knowledge and best practices to help improve efficiency and productivity.
- Conducting tests in the laboratory as well as in the field.
- Programming and maintaining robots (arms, etc.).
- Operating and maintaining measurement equipment (e.g., laser trackers, laser scanners, oscilloscopes, etc.).
- Preparing and maintaining laboratories to support experiments and demonstrations.

Qualifications:

Not all the qualifications below are required.

- Pursuing Associate or bachelor's degree in physical sciences, engineering or related field (or a training certificate in robotics, engineering, or automation).
- Experience using gauge blocks and/or micrometers.
- A basic understanding of geometric dimensioning and tolerancing (GD&T).
- Experience in using digital oscilloscopes, multimeters, and environmental monitoring instruments (thermometers, hygrometers, etc.).
- Experience with CAD software such as SolidWorks, OnShape etc.
- Experience in programming robots (using a teach pendant, hand guidance, and a command line interface).
- Experience using basic hand and power tools.
- Experience using fused deposition modeling (FDM) 3D printers.

- Experience in operating in laboratory environments in a safe manner.
- Be able to work without close supervision in a team environment.
- Experience in using software tools such as Python, MATLAB, Excel (or others) to analyze data.

Desired Qualifications:

- US Citizens preferred
- Experience in using dimensional measurement instruments (such as laser trackers, laser scanners, coordinate measurement machines, etc.).
- Experience in using Python, C++, C#, JAVA, etc. for programming/controlling robots.
- Experience in using the robot operating system (ROS) to program robots.
- Experience in using simulation software (e.g., MoveIT, RoboDK, etc.) to program robots.
- Experience with basic machine tools (e.g., drill press, band saw, lathe, etc.).

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.