

## **PREP Research Associate**

### **Evaluating the Durability of Additively Constructed Structures**

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.

#### **Overview:**

The Infrastructure Materials Group at the Engineering Laboratory of the National Institute of Standards and Technology (NIST) is seeking qualified persons (U.S. Citizens preferred) to develop test and material standards to assess the durability of Additively Constructed elements through accelerated weathering, multi-scale mechanical testing, and non-destructive testing.

#### **The work will entail:**

This PREP Researcher associate should have knowledge of robotic systems, additive manufacturing and construction, evaluating cementitious materials and concrete structures with expertise in the following areas: concrete/ cement characterization, instrumented mechanical testing for strain evolution, structural health monitoring, and material damage analysis or modeling. The researcher should also have a working knowledge of current building codes and testing standards used in the United States. If selected, you will play a significant role in the development of new test methods and design guidance for additive construction as well as be part of NIST's Additive Construction by Extrusion (ACE) Consortium, which includes working with NIST staff and external partners on planning and executing experimental research. These findings, if warranted, will lead to proposing guidance, codes, and/or standards provisions for improved resilience of additively constructed structures.

#### **Key responsibilities will include but are not limited to:**

- Review literature and test results from previous investigations.
- Perform print operations on 7-axis multi component mortar robot printer.
- Assist in PLC and other system integration of pumps, fixtures, and various sensors associated with printing operations.
- Characterize mechanical performance of cast and printed elements.
- Prepare samples for microscopy investigations.
- Present results in the group and other related meetings, writing protocols, and technical reports.

- Ensure that results, protocols, software, and documentation have been archived.

### **Qualifications**

- **US citizens preferred; currently living in the United States.**
- A master's degree or higher in mechanical, Civil, or Materials Engineering background, or a related science field with an emphasis on multi-scale structural testing.
- Hands-on laboratory experiences on mechanical characterization, nanoindentation, TGA, DSC, FTIR spectroscopy, AFM, optical microscopy
- Experience using analysis software (e.g., Excel, Origin)
- Experience using R or Python for database and data analysis is a plus
- Experience in AutoCAD, RHINO, and Grasshopper
- Experience in Ansys, Abaqus, or other FEM modeling software is a plus
- Ability to work with real-time event data at scale.
- Ability to develop prototypes of tools needed to analyze data.

### **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.