

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: Modelica Modeling in Support of a Building Digital Twin

The work will entail:

NIST has several projects related to digital twins in the built environment. These projects are developing the infrastructure needed to ease the development and deployment of digital twins and inform existing and future standards. The Intelligent Building Agents Laboratory ([IBAL](#)) is being used in these efforts. A Modelica model was developed for the IBAL, but this model needs to be improved and updated so that it can be used to demonstrate the full physical-digital twin workflow. Guideline 36 controllers need to be added to the model, and the parameters that will be tuned to align the digital twin with the physical twin need to be identified. Some of these parameters are not tunable when the model is converted to an FMU for co-simulation, so some models will need to be modified or developed to make those parameters available after the FMU has been compiled.

U.S. Citizen Preferred

Key responsibilities will include but are not limited to:

- Reviewing and understanding the existing models.
- Identifying the parameters that need to be tuned.
- Modifying and developing new models as needed.
- Adding Guideline 36 controllers to the model.
- 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- Ensuring that results, protocols, software, and documentation have been archived or otherwise transmitted to the larger organization.

Qualifications

- An undergraduate degree in Computer Science or Engineering.
- Experience with Modelica modeling using the Buildings library.
- Preferred experience with Modelica modeling in OpenModelica.
- Preferred experience with FMUs and co-simulation in Python.

- Strong oral and written communication skills.

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.