PREP Research Associate

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, thus requires that such institutions must be the recipient 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.

Research Title:
Research Scientist – Experimental Flow Measurement and Instrumentation with Automated Data Acquisition

U.S. Citizen is Preferred

The work will entail:
The NIST Fluid Metrology Group seeks a motivated Batchelor-level or graduate-level researcher to support the design, development, and calibration of advanced experimental flow measurement systems. This position offers hands-on experience with high-precision flow meters, anemometers, and sensor instrumentation, including experimental setup, automation, and data acquisition. The successful candidate will assist in developing and implementing calibration protocols, as well as in designing, building, and carrying out flow-related experiments, ensuring traceability to national standards.

The researcher will work closely with a multidisciplinary team of scientists and engineers to design, operate, and maintain experimental flow facilities. Responsibilities include integrating instrumentation, automating measurement systems, conducting computational fluid dynamics (CFD) simulations, fabricating custom components, maintaining quality assurance and documentation, and contributing to the development of experimental software for acquiring data and for controlling pumps, valves, and sensors.

This position is ideal for candidates with strong analytical and technical skills, experience in data acquisition and coding, and an interest in precision measurement and experimental fluid mechanics. A **Bachelor's degree is required**, and a Master's degree is preferred. The researcher will gain professional laboratory experience and opportunities to contribute to publications, presentations, and the broader metrology and fluid mechanics community. **U.S. citizenship is preferred** for this position.

Key responsibilities will include but are not limited to:
- Design and Build Experimental Flow Systems **–** Collaborate with scientists and engineers to create, upgrade, and automate flow measurement setups.
- Calibrate Flow Instruments **–** Use national standards (e.g., NIST) to calibrate flow meters and anemometers, ensuring high precision and traceability.
- Develop and Execute Protocols **–** Plan and implement experiments, including setup, data acquisition, analysis, and uncertainty evaluation.

- Instrumentation Integration – Configure, calibrate, and troubleshoot sensors and flow devices (pressure transducers, thermocouples, RTDs, humidity sensors, anemometers, flow meters).
- Automate Data Acquisition – Maintain existing LabVIEW software for controlling experiments and collecting data, and develop new Python programs for future automation, measurement, and data analysis tasks.
- Fabricate Experimental Components – Design and produce custom parts in CAD for machining, 3D printing, or other fabrication methods.
- Run Computational Simulations – Use CFD or other computational tools to support experimental design and optimize flow systems.
- Apply Fluid Mechanics Principles – Support experimental design, planning, and troubleshooting of flow measurement systems using engineering fundamentals; analyze experimental data and assist in optimizing system performance.
- Present and Communicate Results – Prepare reports, papers, and presentations to share findings and contribute to measurement programs.

Qualifications

- Bachelor's degree required in Mechanical Engineering, Aerospace Engineering, Physics, or a related field; Master's degree preferred.
- Experience or coursework in experimental fluid mechanics, flow measurement, or sensor instrumentation.
- Proficiency with data acquisition and experimental software (e.g., LabVIEW, Python, MATLAB).
- Familiarity with CAD software and basic fabrication for experimental setups.
- Knowledge of CFD simulations is a plus.
- Understanding of measurement uncertainty, calibration, and traceability to standards is a plus.
- Strong problem-solving, teamwork, and communication skills.
- U.S. citizenship is preferred for this position.

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.