

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:

Analysis and Modeling of Wireless Channels for Wearables and Implants

The work will entail:

Developing accurate computational models and phantoms that can be used to emulate tissues and human body organs, although quite challenging, is often needed to assess the reliability of the communication channel used to transfer biological data. These models are not only needed to advance biotech research, but they can also be used to provide channel assessment information to ongoing and future standardization efforts. The project will develop methodologies, computational models, and programming modules to assess wireless channel characteristics for human lung monitoring and brain-computer interface applications.

U.S. Citizen Preferred

Key responsibilities will include but are not limited to:

- Collaborate with domain experts to design appropriate parametric framework to study the scientific problem
- Develop computational models to investigate the performance of a wearable AI system for detecting pulmonary edema.
- Perform sensitivity analysis of the wireless channel with respect to antenna placement.
- Investigate feasibility of antenna arrays and assess viability of in-body beamforming by conducting simulations and analysis.
- Investigate the impact of creeping waves using Poynting vector data
- Communicate results via technical publications at select conferences and journals.

Qualifications

- A PhD in Electrical and Computer Engineering, or a related field.
- Familiarity with Body Area Networks, IEEE 802.15.6 and IEEE802.15 TG6ma, wearable and implant antenna design, computational modeling of human tissues and organs, Maxwell-Garnet model, RF propagation channel modeling.
- Experience in coding or using ANSYS HFSS, SCAN IP, XCAT, Python, MATLAB.
- Ability to develop matching computational models for liquid and solid phantoms used in experiments.
- 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.