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:
Developing an Evaluation Framework for Digital Watermarking Technologies

The work will entail:
This project focuses on contributing to the development of a study on digital watermarking technologies. The student will explore how watermarking techniques are used for protecting digital content and the challenges involved in evaluating their robustness, imperceptibility, and effectiveness. The project aims to build foundational understanding and draft an initial evaluation strategy, supporting broader work at NIST in digital content integrity.

U.S. Citizen Preferred

Key responsibilities will include but are not limited to:

- Conduct a literature survey on state-of-the-art watermarking techniques (image, video, audio, and document-based).
- Familiarize with existing watermarking tools and open-source implementations.
- Understand NIST's role and ongoing efforts in digital content protection and cryptographic standards.
- Propose evaluation metrics, transformation pipelines (stress-testing such as compression, cropping, rotation, noise, etc.), and potential testbeds for watermark robustness testing.
- Draft a preliminary evaluation plan or roadmap that could guide future benchmarking activities.

Deliverables

- Annotated bibliography of key watermarking research.
- Summary report of explored tools and their features.
- Draft evaluation framework document (with proposed metrics and methodology).
- Prototype implementation or scripts for transformation and detection scenarios.

Qualifications

- Background in Computer Science, Electrical Engineering, or related field.
- Education level: Postgraduate individual (above bachelor's degree**)**:
  - At least Master student. May be pursuing or finished with masters, or PhD.
- Strong interest in digital media security, cryptography, or multimedia processing.
- Experience with Python, MATLAB, or image/audio processing tools is preferred.
- Familiarity with scientific reading and technical writing.

- 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.