

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:

Quantitation of AAV genome size

The work will entail:

This position supports a project focused on developing and validating novel measurement methods for adeno-associated virus (AAV) gene therapy vectors. The primary goal is to address the critical quality control issue of accurately characterizing and quantifying "partially full" viral capsids. The PREP associate will work with a unique set of AAV samples engineered with specifically sized DNA genomes to simulate known filling states. The core of the work involves using advanced microscopy and analytical techniques to establish a quantitative relationship between the AAV genome size, the physical filling state of the capsid, and the capsid's surface hydrophobicity. This research directly supports the NIST mission of advancing biomanufacturing by enabling the development of reference materials and more scalable quality control methods for the gene therapy industry.

U.S. Citizen Preferred

Key responsibilities will include but are not limited to:

- Participating in the production and purification of Adeno-Associated Virus (AAV) samples
- Performing characterization of AAV preparations using techniques such as droplet digital PCR (ddPCR), enzyme-linked immunosorbent assay (ELISA), and size exclusion chromatography (SEC).
- Performing cryogenic electron microscopy (CryoEM) analysis on AAV samples
- Conducting atomic force microscopy (AFM) and chemical force microscopy (CFM) experiments
- Analyzing and correlating data from CryoEM, Analytical Ultracentrifugation (AUC), and AFM to establish clear relationships between AAV genome size, filling state, and capsid hydrophobicity.
- Adhering to all biosafety protocols for materials such as AAVs and human cell lines.
- Presenting results at internal meetings and potentially at scientific conferences.
- Publication of results in peer-reviewed journals
- Ensuring that experimental results, protocols, and data analysis are thoroughly documented and archived

Qualifications

- A Ph.D. in Biological Sciences, Biochemistry, Biophysics, or a closely related field.
- Proficiency in standard biochemical and molecular biology assays, such as qPCR, ddPCR, ELISA, and protein/nucleic acid quantification.
- Experience in quantitative data analysis and the ability to correlate results from multiple complex analytical methods.

- Experience in Transmission Electron Microscopy and Atomic Force Microscopy
- Experience in BSL-2 sample handling
- Strong oral and written communication skills, evidenced by a track record of publications and/or scientific presentations.
- Ability to work both independently and collaboratively within a multi-disciplinary team

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.