

Title: Postdoctoral Associate

Summary statement:

The postdoctoral research associate is responsible for developing novel computational methodology for high-throughput sequence genomics tasks, as well as for building efficient and robust implementations of these methods. The primary focus is on the development of methods for single-cell transcriptomic (RNA-seq) and ATAC-seq data, specifically in the single-cell context, though projects related to long-read RNA-sequencing and to foundational algorithmic and data structural questions is also within scope. The postdoctoral research associate leads their own project, as well as collaborating with other members of the lab. The Patro lab has a strong commitment to open science, and to developing efficient, robust, usable and free and open-source software.

Duties include:

- Designing and developing novel computational methodologies for the processing and analysis of high-throughput sequencing data
- Writing robust and efficient implementations of novel computational methods in a “high-performance” programming language (Rust, C, C++, Zig) and integrating these new tools with existing software developed by the lab
- Preparing, writing, and editing scientific manuscripts
- Collaborating with and co-mentoring PhD students
- Assisting in the writing and preparation of funding proposals (NSF, NIH, and other relevant foundations or opportunities)

Minimum qualifications:

Education: PhD in Computer Science or a closely-related field

Experience: Experience in performing independent research in algorithmic genomics, and communicating scientific results via scientific publications and presentations. Experience with handling and analyzing large genomics datasets, as well as experience in developing software in compiled, statically-typed, garbage-collection-free languages (e.g. Rust, C, C++, Zig).

Other: Strong written and oral communication skills. Strong interpersonal skills.

Physical Demands: Must be capable of maintaining a stationary position for extended periods. Job requires close-up vision for computer

work.

Preferences:

- Experience developing advanced computational methodology for genomics data processing
- Experience with and knowledge of compact and succinct data structures
- Experience with and knowledge of methods for high-dimensional statistical inference (e.g. generative graphical models, maximum likelihood inference, Bayesian inference, etc.)
- Knowledge of or willingness to learn the Rust programming language
- Experience with data analysis and visualization
- Familiarity with common genomics tools, formats and programs
- Experience with standard *-nix command-line tools and idioms
- Familiarity with reproducible scientific workflow systems, such as Nextflow or Snakemake

Job Description

The appointee shall have been trained in research procedures, shall be capable of carrying out individual research or collaborating in group research at the advanced level, and shall have had the experience and specialized training necessary for success in such research projects as may be undertaken. An earned doctorate shall normally be a minimum requirement. Appointments to this rank are typically for one to three years and are renewable, provided the maximum length of consecutive service in this rank does not exceed 6 years. After six years in rank, appointees who have performed satisfactorily should be eligible for appointment to an appropriate faculty position.

Additional Job Description

The Patro lab is part of the University of Maryland Institute for Advanced Computer Studies (UMIACS). UMIACS is a multidisciplinary computing research institute led by distinguished researchers and supported by cutting-edge infrastructure. UMIACS pioneers computational science involving national defense, precision medicine, big data, cybersecurity, language and culture, and more.

Application materials:

1. Personal statement (research vision, accomplishments and approach)
2. CV
3. Research portfolio (2-4 papers or mature pre-prints)
4. Software sample (preferably hosted on GitHub or a similar service)

5. 2 References