



Northwestern
University

Postdoctoral Fellow - Computational Genomics

Note: Applicants for this position must have a PhD and direct experience in computational genomics research.

The Backman Laboratory at Northwestern University's Biomedical Engineering Department is seeking a postdoctoral fellow to join a cutting-edge research team at the crossroads of genomics, biology, physics, engineering and medicine. Our main goal is to investigate fundamental molecular questions and develop novel approaches relevant to the prevention, detection, diagnosis and treatment of cancer and other currently intractable diseases at early, treatable stages. We have developed a platform of pioneering super-resolution and nano-sensing optical microscopy technologies which, combined with genome mapping and other functional genomic approaches, allow us to study the causal relationship between the nanoscale structure of chromatin, global patterns of gene expression, and their alteration in disease. The successful candidate will work under the direction of Prof. Vadim Backman, Director of the Center for Physical Genomics and Engineering, and collaborate closely with Center researchers.

As evidenced by recent publications in *Nature Biomedical Engineering*, *PNAS*, *Cancer Research*, and *Scientific Reports*, our group undertakes systematic approaches to understanding cancer development by integrating molecular dynamics simulations, live cell super-resolution nano-imaging, computational genomics, and genome mapping technologies.

The lab provides a highly collaborative, transdisciplinary environment consisting of researchers with diverse backgrounds: biomedical engineering, molecular biology, mathematics, physics, chemical engineering, etc. Additionally, the Backman Lab has collaborative projects with over 20 physicians, biomedical, and physical sciences investigators both internationally and domestically. Research projects reside within one or more priority areas: cancer biology, biophysics of the genome, or cancer therapeutics.

We are seeking a highly motivated, enthusiastic, and creative candidate with excellent interpersonal skills and the ability to work independently as well as part of a collaborative team. The successful candidate will have the opportunity to conduct cutting-edge research integrating molecular biology, epigenetics, and computational genomics. It is anticipated that he/she will engage in preparation of original manuscripts for conferences and peer-reviewed journals as well as participate in writing grant proposals.

Specifically you will:

- Analyze and integrate large datasets, including genomics and transcriptomics.
- Integrate molecular and physical aspects of genome function.

Qualifications

The lab seeks applicants with a strong background in computational genomics. Successful candidates will have a mixture of the following skills:

1. Degree:

Ph.D. or M.D./Ph.D required, with proven experience in computational genomics research.

2. Prior Experience:
 - a) 3 years' experience in molecular dynamics (LAMMPS, GROMACS, etc.) and Monte Carlo simulations
 - b) Programming experience in Python, R, Bash, C++ and Fortran
 - c) Background in physics required
 - d) Background in chemistry and chromatin biology preferred
 - e) Basic background in statistics preferred
 - f) Experience with bioinformatics analysis (specifically single-cell and bulk RNA-seq) preferred
 - g) Organized and able to work independently
 - h) Works well as part of a collaborative team
3. Proven track record demonstrating critical thinking, problem solving, attention to detail and creativity are essential.
4. Excellent prioritization and project management skills.
5. Strong communication and interpersonal skills and fluency in both spoken and written English.
6. A solid record of quality publications in peer-reviewed journals showing an output commensurate with opportunity.

Qualified candidates should send a CV and cover letter to Benjamin Keane at:

b-keane@northwestern.edu.