

Postdoctoral Fellowships in Computational and Systems Biology

I am currently seeking postdoctoral fellows to join a dynamic team exploring the regulatory processes that drive health and disease.

My research involves the use of advanced quantitative, statistical, and machine learning methods to understand complex diseases such as cancer and chronic obstructive pulmonary. My research has grown out of the recognition that individual genes do not act alone, but rather are assembled in complex networks that regulate processes in our cells. My research group and I have developed a number of methods that use complex biomedical data to infer these regulatory processes. These methods, which we refer to as “The Network Zoo” (<https://netzoo.github.io/>) are implemented in the statistical programming language R (as well as python, Matlab, and C) and allow us to understand the cause and effect that preserve the health of our cells or drive their transition into disease states. A particular emphasis of my research work has been the investigation of the gene regulatory processes that drive clinically observed differences between males and females in disease risk, progression, response to treatment, and survival.

Because my postdocs are being actively recruited for faculty positions in the US and Europe, I currently have openings on three projects. The first is project funded by the National Cancer Institute to develop methods to understand the network drivers of cancer. A few years ago, we took the collection of tools in the Network Zoo and applied them to explore network properties that we could link to phenotypes in 38 different tissues and sex differences in 29 tissues, among other applications. We are currently taking a similar approach with data from The Cancer Genome Atlas (TCGA) which is necessitating that we expand our methodological repertoire and tackle some fundamental questions in cancer, including trying to use pseudotime methods to model network trajectories over the course of disease and epigenetic clocks as a quantitative way of assessing tumor severity.

The second is a project, funded by the National Heart Lung and Blood Institute, in which we are exploring the cellular networks that drive chronic obstructive pulmonary disease. Here we are looking to build more comprehensive multi-omic regulatory models and to extend these models to single-cell data. We are currently working on methods that exploit genetics, expression, and methylation with the goal of finding control nodes in networks that can be used to slow disease progression.

The third project involved addressing one of the most significant yet most ignored problems in biology—our failure to account for sex and gender in most biological analyses. With funding from the National Human Genome Research Institute, we are developing sex-aware methods for inferring gene regulatory networks that will allow us to account for the differences in background networks between XX and XY individuals. Surprising as this might be, the X and Y chromosomes are excluded from many analyses, including most GWAS studies, because there are no widely accepted methods to account for these chromosomes. We are making great strides in developing robust, principled ways of accounting for these background differences with the goal of better elucidating the mechanisms that make the same disease in biological males very different from that in biological females—with an eye toward expanding these methods to also account for gender effects.

Information about applying for these positions are attached.

My research group is comprised of a diverse group of individuals from varied backgrounds who work together collaboratively on nearly all of our projects. It also includes many former students and postdocs, and their students and postdocs, as we continue our commitment to developing methods to take us from our current state of examining what is different to addressing why things are different. The environment is very supportive and we actively seen and encourage robust discussion and the expression of differing viewpoints.

Postdoctoral Fellow

Position

Details

Title	Postdoctoral Fellow
School	Harvard T.H. Chan School of Public Health
Department/Area	Department of Biostatistics/Quantitative Cancer Biology and Analysis
Position Description	We are seeking a candidate with expertise in computational and systems biology to work as part of a multidisciplinary team developing methods relevant to the study of genetics, gene regulatory networks, and the use of quantitative imaging data as biomarkers. Our goal is to use these methods to better understand the development, progression, and response to therapy. The successful applicant will work directly with Dr. John Quackenbush, but will be part of a community of researchers consisting of Dr. Quackenbush, Dr. Kimberly Glass, Dr. John Platig, and Dr. Camila Lopes-Ramos, and members of their research teams.
Basic Qualifications	A PhD in computational biology, biostatistics, applied mathematics, physics, biology, or related fields and demonstrated skill in methods and software development and the analysis of biological data are required.
Additional Qualifications	The ability to work as part of a large, integrated research team and strong verbal and written communication skills are essential. Previous work in cancer biology/cancer genomic data analysis is welcome but not required.
Special Instructions	Administrative questions regarding this position can be sent to Nicole Trotman at ntrotman@hsph.harvard.edu . Scientific questions regarding this position can be sent to John Quackenbush at johnq@hsph.harvard.edu .
Contact Information	Nicole Trotman
Contact Email	ntrotman@hsph.harvard.edu
Equal Opportunity Employer	We are an equal opportunity employer and all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability status, protected veteran status, gender identity, sexual orientation, pregnancy and pregnancy-related conditions or any other characteristic protected by law.
Minimum Number of References Required	2
Maximum Number of References Allowed	5
Keywords	

Supplemental Questions

Required fields are indicated with an asterisk (*).

Applicant Documents

Required Documents

1. Curriculum Vitae
2. Cover Letter

Optional Documents