

Postdoctoral Researcher (Computational Biology and Neuroscience)

A Postdoctoral Researcher position is available immediately in the lab of Dr. Gioele La Manno at the École polytechnique fédérale de Lausanne (EPFL) in Switzerland. The research project offered will be focused on developing new computational approaches to integrate single-cell/nuclei RNA-seq and ATAC-seq data generated from archival material. The successful candidate will develop new analysis approaches and apply them to a comprehensive human oligodendroglia dataset. The overarching goal is understanding gene regulation in the specification and maintenance of oligodendrocyte lineage in the human brain.

The candidate will have the possibility to work with a unique single-cell dataset obtained from biopsies and post-mortem brains from different regions, ages, and sexes. The project, funded by CZI, is low-risk and high-impact as ensured by the value of the dataset we have obtained and the importance, for the wider Human Cell Atlas community, of new analysis schemes that we will develop.

About the project

The successful candidate's main project will entail the integration of transcriptional and epigenomics datasets to define a complete landscape of oligodendroglia heterogeneity in the human brain.

Among the project's specific aims:

- Recrafting the RNA velocity methods for the analysis of single nuclei RNA-seq data.
- Designing methods for clustering single-nuclei ATAC-Seq data from archival material.
- Developing approaches for integration of snRNA-seq and snATAC-seq datasets.
- Building a statistical predictor of cellular state transition.

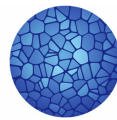
This work will be part of a collaborative effort between the labs of Gonçalo Castelo-Branco (neurobiologist, whose lab at Karolinska Institutet in Sweden focuses on epigenetics, oligodendrocyte biology and multiple sclerosis) and Anna Williams (neurologist, whose research laboratory at the Centre of Regenerative Medicine in Edinburgh, UK, focuses on the pathology of multiple sclerosis). This synergy will allow for production of high-profile research complete with validations and functional experiments.

About us

The Laboratory of Neurodevelopmental Systems Biology is part of the Brain Mind Institute at the Swiss Federal Institute of Technology Lausanne (EPFL). EPFL is one of the top-ranking universities in the world, and its research environment is characterized by its multi-disciplinarity, bridging neuroscience, computation, and engineering.

The long-term goal of the La Manno lab is the description and modeling of the cell fate commitment process taking place during nervous system development. Using the tools of single-cell genomics and systems biology, we aim to answer key questions in developmental biology, neuroscience, and pathology.

We have recently developed RNA velocity, a new analysis framework that allows the inference of lineage relationships from scRNA-seq data (La Manno et al., Nature 2018). RNA velocity makes it possible to measure the dynamic, time-resolved component of gene expression directly and reveals branch points and commitment in mammalian tissues, including humans.



We have been analyzing single-cell genomics data since its early times (Islam et al., Nature Methods 2013). We contributed to the discovery of sympathetic neurons that control goosebumps and nipple erection and their specification (Furlan, La Manno et al., Nature Neuroscience 2016) as well as new radial-glia populations in the human midbrain (La Manno et al., Cell 2016), and we have contributed to cell type atlases (Zeisel et al., Cell 2018).

We are a small team of motivated and ambitious individuals with a highly collaborative spirit. We strive to maintain an international, inclusive, and friendly work environment.

Candidate Qualifications

We are looking for an ambitious candidate with a Ph.D. in computational biology, bioinformatics, or related areas, interested in the development of new analysis frameworks and cutting edge methods for the analysis of single-cell genomics data. Programming skills and the ability to run bioinformatics tools are necessary, but not sufficient, to carry out the proposed project. A certain degree of proficiency in statistical modeling, linear algebra or mathematical optimization is required.

Applications from individuals with a background in Physics, Engineering, Statistics, Data Science, and Computer science are very welcome to apply. However, the candidates should be ready and interested in adventuring into the specifics of the biological systems that will be studied.

Ideally, there will be a track record of peer-reviewed publications. Good written and oral skills and ability to work collaboratively in a team is an important plus.

What we offer

We offer a challenging project and a friendly and constructive work environment. We will provide you with the freedom to be a creative, independent scientist. We strive to ensure a good work/life balance and flexible working hours.

The successful candidate will have the opportunity to interact and participate in the scientific activities of the EPFL School of Life Sciences. The laboratory is located in Lausanne with state-of-the-art facilities, and the vibrant interdisciplinary research community at the School fosters interactions with allied disciplines on campus, including engineering, physics, chemistry, and computer sciences.

EPFL offers an English-speaking work environment and competitive salaries and benefits. The position is fully funded for one year. The candidate is welcome to apply for a fellowship to extend this period to up to 3 years. Remuneration is determined in accordance with the EPFL “Scientific collaborator” directive (a minimum salary of 82k Swiss francs, and adapted depending on years of experience).

EPFL is an equal opportunity employer and a family-friendly university. We strive to increase diversity and strongly encourage minorities to apply.

Application

Please send your request as a single PDF file – including a CV, a complete list of publications, a statement of research interests, and the contact information of at least two reference persons – to nsbl.openings@epfl.ch.

We are looking forward to receiving your application.