Charité - Department of Infectious Diseases - Research Group "Systems Biology of Infectious Diseases"

Charité – Universitätsmedizin Berlin is one of Europe's largest and most prestigious university hospitals, combining excellent patient care with pioneering biomedical research. At the intersection of medicine, biology, and data science, Charité develops innovative approaches for the precision medicine of tomorrow. This position is embedded in the newly established Einstein Center for Early Disease Interception (EC-EDI), a consortium of leading Berlin institutions including Charité, the Berlin Institute of Health (BIH), Max Delbrück Center, and TU Berlin. The center's mission is to diagnose and intercept diseases at their earliest stages – when only a few cells are affected – using cutting-edge single-cell technologies, advanced AI, and patient-derived disease models. The successful candidate will work jointly with two research groups: The Buchauer Lab ("Systems Biology of Infectious Diseases") at Charité's Department of Infectious Diseases develops computational methods to decode immune responses to infections and vaccines, combining single-cell omics data, mathematical modeling, and machine learning. The Haas Lab ("Systems Hematology, Stem Cells & Precision Medicine") at BIH/Charité/MDC-BIMSB develops and applies multimodal single-cell and spatially resolved technologies to study cancer etiology and immune-cell interactions. The lab has pioneered next-generation precision diagnostic tools based on single-cell multi-omics, recently developing up to 50-plex full-spectrum flow cytometry assays with near single-cell genomics resolution.

PhD student in Machine Learning for Immunology

Develop translational algorithms for early disease interception in Berlin

City: Berlin; Starting date (earliest): At the earliest possible; Duration: 3 years; Remuneration: 65% E13; Closing date: 20/02/26

Working field

As part of the Einstein Center for Early Disease Interception, we are recruiting a PhD student to develop computational methods enabling rapid, data-driven diagnosis of lung diseases.

Our goal is to build an "immune ecotype" framework that transforms single-cell RNA sequencing data from blood samples into interpretable feature vectors, enabling machine learning-based classification of lung diseases including viral and bacterial infections, autoimmune conditions, and lung cancer. We aim to translate these scRNA-seq-derived signatures to ultra-high-plex flow cytometry for clinical deployment.

Your Tasks:

- Developing robust algorithms for batch-corrected integration and summarization of scRNA-seq datasets from >1,000 patients
- Engineering human-interpretable features (cell type proportions, gene expression scores) optimized for cross-dataset stability
- Training and validating machine learning classifiers for multi-class lung disease

diagnosis
- Translating scRNA-seq-derived immune signatures to spectral flow cytometry measurements
  Collaborating with clinical and experimental partners within the EC-EDI consortium

Requirements

Required:

- Master’s degree in a quantitative discipline: physics, mathematics, computer science, statistics, machine learning, data science, or computational biology/bioinformatics
- Strong programming skills (e.g. Python and/or R)
- Experience with machine learning methods
- Independent, structured, and detail-oriented working style
- Proficiency in English

Desirable:

- Experience analyzing high-dimensional biomedical data (e.g., omics, single-cell data)
- Familiarity with batch correction, dimensionality reduction, or multi-dataset integration methods
- Knowledge of software engineering principles (version control, testing, documentation)
- Interest in translational research and clinical application
- We are looking for a curious, self-driven individual who enjoys interdisciplinary collaboration and is motivated to translate computational advances into clinical practice.

Application

Please send your motiviation letter, CV (including contacts of ideally two references) and master’s certificate and/or current transcript to lisa.buchauer@charite.de.

More information at https://stellenticket.de/200422/TUB/
Offer visible until 05/02/26