

The **Swiss Institute of Allergy and Asthma Research (SIAF)** in Davos, Switzerland, is an academic institute with a long track of discoveries in clinical and basic immunology and allergy. Our institute, associated with the University of Zurich, is dedicated to basic and translational research in the fields of immunology, allergy and asthma. SIAF participates in the Microbiology and Immunology (MIM) and Systems Biology PhD Programs of the Life Sciences Zurich Graduate School.

The Molecular Allergology Group is looking for a highly motivated

## PhD Student

for the project *Identification of specific indicators in complex biomedical datasets using modern computational approaches*.

Typical biomedical datasets consist of sequencing data (genome sequencing, RNA sequencing or ribosome footprint sequencing), proteomics measurements, cytokine measurements, FACS data and patient information in various combinations. The task in data analysis usually first comprises a statistical analysis of the individual datasets. In the next step, the various data types need to be combined to allow for finding specific indicators for the respective scientific question in the complex combined dataset. In this project we will aim at identifying specific features and indicators with the use of Artificial Intelligence (AI) methods, namely Machine Learning (ML). Due to the current high interest in modern computational methods relying on ML, a variety of novel algorithms are developed and applied on a broad range of different data types, and various methods of how to combine different types of features are implemented with different datasets. In this project, the suitability of these methods for the analysis of this type of data needs to be tested, mainly with regard to the application of deep learning methods. Appropriate methods will need to be applied and, if necessary, to be developed further to fulfil the task of identifying specific features in the respective dataset. For each dataset, the suitability of the methods will be assessed with a relevant biomedical readout, which can also be used to further improve the algorithms and broaden their applicability. As a new mass spectrometer is currently installed in the Swiss Institute of Allergy and Asthma Research (SIAF), bioinformatics tasks related to the analysis, interpretation and visualization of proteomics data will also constitute an integral part of the project.

This project is located in the Swiss Institute of Allergy and Asthma Research (SIAF) in Davos in the Molecular Allergology group, and will be part of the DAViS Center (Center for Data Analytics, Visualization and Simulation). The DAViS center is currently established by HTW Chur as leading house and SIAF as main partner to support science, teaching and business in canton Graubünden. The projects on life science data that are to be analysed in this PhD will be from projects submitted to DAViS by the different research institutes SIAF, AO Research Institute Davos (ARI), Kanstonsspital Graubünden (KSGR) and Hochgebirgsklinik Davos (HGK).

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