



## Master Thesis Position

Lab of Prof. Burkhard Becher, Institute of Experimental Immunology, University of Zurich

Start: as soon as possible (negotiable), duration: 9-12 months

Supervisor: Jonas Schmid, MD (PhD student)

## Research Topic: High-dimensional analysis of the human immune response to vaccination

We are studying the circulating human immune system by using high-dimensional spectral flow cytometry and algorithm-guided data analysis. If you are motivated to learn more about human immunology and to perform a master thesis that largely focuses on data analysis, this project represents an interesting opportunity.

Vaccines are one of the main pillars of public health and a promising new avenue for cancer therapy. In large experiments, we have used high-parametric spectral flow cytometry to analyze human peripheral blood mononuclear cells (PBMCs) from over 400 individuals following vaccination with 16 different homologous and heterologous combinations of COVID-19 vaccines. Although we have already published some findings from this study (Nuñez, Schmid, Power et al., Nature Immunology, 2023), a substantial amount of data remains to be analyzed. Our goal is to further characterize the immune response to vaccination and identify specific differences between vaccine regimens, with implications for vaccination strategies beyond COVID-19. This project is conducted in close collaboration with a group at the National University of Córdoba, Argentina.

We provide guidance for the analysis of flow cytometry data, while also giving the student autonomy to pursue their own ideas.

### Aims:

- Characterize the immune response to vaccination by applying dimensionality-reduction and clustering algorithms to flow cytometry data.
- Identify differences in the abundance of immune populations and functional marker expression between different vaccine combinations.
- Integrate additional variables, such as antibody titers and ELISpot assay results.

### We offer:

- The opportunity to join a large, experienced and highly motivated team of researchers.
- Training in cutting-edge technologies (algorithm-guided data analysis, possibility to help with spectral flow cytometry experiments).
- Weekly group meetings, journal flow, scientific seminars.

### Requirements:

- Strong interest in immunology and data analysis.
- Basic knowledge of R programming (more advanced skills are a plus) and statistics.
- Experience with flow cytometry or Python programming is advantageous (but not necessary).

### Application:

Please send your CV and a short description of your motivation to:

[jonas.schmid@immunology.uzh.ch](mailto:jonas.schmid@immunology.uzh.ch)