FLORIAN BARKMANN

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EDUCATION

PhD Student at Boeva Lab, ETH Zürich — Aug. 2022 –
Data Science (M.Sc.), ETH Zürich — Oct. 2020 – July 2022
Mathematics (B.Sc.), Eberhard Karls University Tübingen — Oct. 2015 – Oct. 2019
International Economics (B.Sc.), Eberhard Karls University Tübingen — Oct. 2014 – Oct. 2018

EXPERIENCE

Cradle — Sep. 2025 – Jan. 2025
Machine learning research intern — *Zürich, Switzerland*

German Cancer Research Center — Feb. 2020 – July 2020
Research intern hosted by Niklas Wahl — *Heidelberg, Germany*

- Implemented and tested an optimizer for high dimensional, constrained optimization problems with applications in radiation therapy.

German Climate Computing Center — Oct. 2019 – Feb. 2020
Intern — *Hamburg, Germany*

- Developed a local testing environment for the cluster using Docker.
- Implemented a tool to automate visualizations of climate simulations with ParaView and Python.

PUBLICATIONS

Proceedings

2025 **scSSL-Bench: Benchmarking Self-Supervised Learning for Single-Cell Data**
O. Ovcharenko*, **F. Barkmann***, P. Toma*, I. Daunhawer, J. E. Vogt, S. Schelter, and V. Boeva
Spotlight at *ICML (2025)*

Journal articles

2026 **Representation learning of single-cell RNA-seq data**
C. Ahlmann-Eltze*, **F. Barkmann***, J. Lause*, V. Boeva, and D. Kobak
RNA

2025 **CanSig Benchmarks Methods for Reproducible Cancer Cell State Discovery from Single-Cell Transcriptomic Data**
F. Barkmann*, J. Yates*, P. Czyż, A. Kraft, M. Glettig, N. Beerenwinkel, and V. Boeva
Cancer Research

2023 **scROSHI: robust supervised hierarchical identification of single cells**
M. Prummer, A. Bertolini, L. Bosshard, **F. Barkmann**, J. Yates, V. Boeva, D. Stekhoven, and F. Singer
NAR Genomics and Bioinformatics

2023 **Superiorization of projection algorithms for linearly constrained inverse radiotherapy treatment planning**
F. Barkmann, Y. Censor, and N. Wahl
Frontiers in Oncology

Peer-reviewed workshop papers

2024 **CancerFoundation: A single-cell RNA sequencing foundation model to decipher drug resistance in cancer**
A. Theus*, **F. Barkmann***, D. Wissel, and V. Boeva
AIDrugX workshop at NeurIPS (2024)

2024 **scTree: Discovering Cellular Hierarchies in the Presence of Batch Effects in scRNA-seq Data**
M. Vandenhirtz*, **F. Barkmann***, L. Manduchi, J. E. Vogt, and V. Boeva
Spotlight at *AccMLBio workshop at ICML (2024) & SPIGM workshop at ICML (2024)*

Preprints

2025 **Sparse Autoencoders Reveal Interpretable Features in Single-Cell Foundation Models**
F. Pedrocchi*, **F. Barkmann***, A. Joudaki, and V. Boeva
bioRxiv

2025 **CDState: an unsupervised approach to predict malignant cell heterogeneity in tumor bulk RNA-sequencing data**
A. Kraft, J. Yates, **F. Barkmann**, and V. Boeva
bioRxiv

2023 **ANS: Adjusted Neighborhood Scoring to improve assessment of gene signatures in single-cell RNA-seq data**
L. Ciernik, A. Kraft, **F. Barkmann**, J. Yates, and V. Boeva
bioRxiv

* denotes shared first authorship.

CONFERENCE CONTRIBUTIONS

2024 AccMLBio workshop at ICML, Vienna, **Spotlight talk**

2023 Single cell, systems biology and data analytics approaches to understand cellular mechanisms in development and disease, Freiburg, **Contributed talk**

2023 Basel Computational Biology Conference (BC2), Basel, **Contributed talk**

2022 Single Cell Genomics meets Data Science, Munich, **Contributed talk**, **best poster award**

2021 7th Annual Loma Linda workshop on Particle Imaging and Radiation Treatment Planning, Loma Linda, **Contributed talk**

TEACHING RESPONSIBILITIES

Computational Intelligence Lab **(Head TA)**, ETH Zürich	Feb. 2025 – Oct. 2025
Advanced Machine Learning, ETH Zürich	Oct. 2024 – Feb. 2025
Computational Intelligence Lab **(Head TA)**, ETH Zürich	Feb. 2024 – Oct. 2024
Advanced Machine Learning, ETH Zürich	Oct. 2023 – Feb. 2024
Computational Intelligence Lab, ETH Zürich	Feb. 2023 – Oct. 2023
Deep Learning, ETH Zürich	Oct. 2022 – Feb. 2023
Machine Perception, ETH Zürich	Feb. 2022 – Oct. 2022

SUPERVISION

2025 Flavia Pedrocchi, Master Thesis, *Interpretable Features in Single-Cell Foundation Models via Sparse Autoencoders* (current)

2025 Katya Tubis, Research intern, *Delta Tuning Methods for parameter efficient fine-tuning of Single-Cell Foundation Models* (current)

2024 Alexander Theus, Master Thesis, *scCancerGPT: Understanding intratumor heterogeneity through scRNA-seq foundation models*, **Paper accepted** at NeurIPS 2024 Workshop: AIDrugX 2024

2024 Marco Baumann, Bachelor Thesis, *scDIVA: Towards domain invariant reference-query mapping*, **Poster presentation** at scverse conference 2024

2024 Fiona Muntwyler joint supervision with Imant Daunhawer, Master Thesis, *Multi-modality integration using VAEs*

2024 Olga Ovcharenko joint supervision with Imant Daunhawer, Master Thesis, *Self-Supervised contrastive Learning for spatial transcriptomics data*, **Paper accepted** to NeurIPS 2024 Workshop: Self-Supervised Learning 2024

2023 Philip Toma, Master Thesis, *Regularized Self-Supervised Learning from Nearest Neighbors to Integrate scRNA-seq Experiments*, **Paper accepted** to NeurIPS 2024 Workshop: Self-Supervised Learning 2024

2023 Leander Diaz-Bone, Bachelor Thesis, *VAEs with Learnable Priors for Learning a Robust Latent Space Representation of Single-Cell RNA Sequencing Data*, **Poster presentation** at Single cell, systems biology and data analytics conference in Freiburg 2023

OTHER ACTIVITIES

Reviewer for *ICLR* (2026), *SIMBIOCHEM@EurIPS* (2025),*MMRL4H@EurIPS* (2025), *GenBio@ICML* (2025), *ML-GenX@ICLR* (2025), *Cancer Discovery* (2024), *AIDrugX @NeurIPS* (2024), *Bioinformatics*(2022)

Co-organizer of quarterly meetings for all bioinformatics groups from ETH Zürich and the University of Zürich — Oct. 2022 – Oct. 2023

Semester abroad at the University of Hong Kong — Oct. 2016 – Dec. 2016

Volunteering at a school in San José, Costa Rica — Aug. 2013 – Aug. 2014