Benedikt Seiter

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Education

ETH Zürich Zurich, Switzerland

M.Sc. in Applied Mathematics, focus area: Machine Learning Sep 2026–Spring 2028 (expected)

Current courses: Probabilistic Artificial Intelligence; Natural Language Processing; Advanced Machine Learning.

B.Sc. in Mathematics Sep 2023–Aug 2026

GPA: 5.6/6.0

Thesis: *Anchor PCA* (6.0/6.0), advised by Prof. Jonas Peters.

Key courses: Mathematical Statistics; High-Dimensional Statistics; Computational Statistics; Machine Learning.

Research interests

Domain generalization; foundation models; causality; mechanistic interpretability; LLM evaluation; post-training.

Publications

B. Seiter, A. Fries, J. von Kügelgen, and J. Peters. *Anchor PCA*. NeurIPS 2026 (accepted). arXiv:2606.06233.

Research & projects

Anchor PCA Apr 2026–present

ETH Zürich, Seminar for Statistics PDF GitHub

- Developed Anchor PCA for multi-domain dimensionality reduction, balancing explained variance with stability under domain shift; implemented estimators in Python with NumPy and SciPy.
- Benchmarked against pooled and worst-case PCA in an end-to-end pipeline; improved out-of-domain explained variance on financial and gas sensor data.
- Established recovery of a maximal invariant subspace and proved minimax robustness guarantees.

LLM Interpretability and Experimentation Ongoing

Studying transformer interpretability, RL post-training, and LLM evaluations through ARENA; implementing activation interventions, linear probes, and sparse autoencoders in PyTorch.

Benchmarking Invariant Risk Minimization for Financial Time Series Sep 2025–Jan 2026

ETH Zürich, Supervised Research Project

Reproduced and extended InvariantStock, an IRM-based VAE for regime-robust equity prediction, in PyTorch; rebuilt its pipeline and benchmarked VIX-based environments and loss variants.

Seminar on Representation Learning Sep 2025–Jan 2026

ETH Zürich

Analyzed and presented papers on deep learning, autoencoders, ICA, contrastive and self-supervised learning, causality, and single-cell biology applications.

Teaching

Teaching Assistant Sep 2025–present

ETH Zürich

Lead weekly problem-solving sessions in Theoretical Computer Science and Probability & Statistics.

Awards

First Prize, Bundeswettbewerb Mathematik 2023

Top 2.5% in Germany's national mathematics competition; invited to the German IMO team selection examinations.

DPG-Abitur- und Buchpreis (Physics) 2023

Dr. Hans Riegel-Fachpreis (Mathematics) 2022

Skills

Programming: Python, C++, R, MATLAB **Libraries:** PyTorch, NumPy, SciPy, scikit-learn, pandas

Tools: Git, LaTeX **Languages:** German (native), English (C2, IELTS 8.5)