# Lorenz **Vaitl, PhD**

PhD in Machine Learning · Generative AI for Science

*Berlin*

+49-159-02136701 | lorenz.vaitl@outlook.com | lenz3000 | Lorenz Vaitl | Lorenz Vaitl

*Driven by curiosity and a passion for problem-solving, I thrive on tackling challenging problems, especially those that combine mathematics and ML. Eager to learn and grow, I seek opportunities to contribute through innovative research and applications.*

## Experience

**PhD Student & Teaching Assistant** — *Berlin, Germany*

Machine Learning Group, Technische Universität Berlin — *05/2019 – 12/2024*

- Research: generative models for high energy physics, supervised by Prof. Klaus-Robert Müller and graduated with **summa cum laude**
- Focus on gradient estimators and Geometric Deep Learning, yielding **4 first-author publications** in top-tier conferences and journals
- Teaching classes in Deep Learning and fundamentals of Machine Learning with **over 100 students each semester**

**Research Internship** — *Nikosia, Cyprus*

Computation-based Science and Technology Research Center, Cyprus Institute — *03/2022 – 04/2022*

Investigating $SU(N)$-equivariant continuous normalizing flows for lattice gauge theory. Proposed model **set new State of the Art** using only hundreds of parameters instead of millions

**Guest Researcher** — *Postdam, Germany*

Digital Health & Machine Learning, Hasso Plattner Institute — *05/2019 – 05/2020*

Researching Sparse Gaussian Processes for Genome-Wide Association Studies

**Student Assistant** — *Berlin, Germany*

Robotics and Biology Laboratory, Technische Universität Berlin — *05/2017 – 12/2018*

Implemented reinforcement learning methods and supervised models for teleoperating a robotic hand

## Education

**M.Sc. Computer Science** — *Berlin, Germany*

Technische Universität Berlin — *10/2016 – 01/2019*

Focus: Machine Learning and Robotics | Thesis: *Sparse Gaussian Processes for classification with correlated noise*

**M.Sc. Computer Science** — *Valencia, Spain*

Universitat Politécnica de Valéncia — *09/2015 – 07/2016*

Focus: Artificial Intelligence and Pattern Recognition | Stay abroad with ERASMUS+

**B.Sc. Informatik** — *Aachen, Germany*

RWTH Aachen University — *10/2012 – 08/2015*

Minor: Mechanical Engineering | Thesis: Developing embedded systems for detecting faults in ECLA therapy

## Skills

| | |
|---|---|
| **Programming** | Python, Pytorch, LaTeX, SLURM, C++, Git |
| **Languages** | German (mother tongue), English (C1), Spanish (C1) |
| **Expertise** | Generative AI, interdisciplinary work, student supervision, research |

## Selected publications


- **Vaitl, Lorenz**, K. A. Nicoli, S. Nakajima, and P. Kessel. *Path-Gradient Estimators for Continuous Normalizing Flows. ICML 2022*. **Oral presentation** (top 2%).
- Bacchio, Simone, P. Kessel, S. Schaefer, and **Vaitl, Lorenz**. *Learning Trivializing Gradient Flows for Lattice Gauge Theories. Physical Review D*, 2023.
- **Vaitl, Lorenz**, L. Winkler, L. Richter, and P. Kessel. *Fast and Unified Path Gradient Estimators for Normalizing Flows. ICLR 2024*.