Paul Friedrich

✉ paul.friedrich@uzh.ch   🌐 pfriedric.github.io

Employment history

2020 – now	**Ph.D. Candidate in Computer Science**, University of Zurich Associated Researcher with the ETH AI Center Planned graduation: early 2026. Available for internships year-round. Research Areas: Multi-Agent Reinforcement Learning, Mechanism Design, Game Theory, Machine Learning, Planning Advisors: Sven Seuken (Computation and Economics Research Group), Giorgia Ramponi (Autonomous Learning & Predictive Intelligence Lab)
2021 & 2022	**Head Teaching Assistant**, University of Zurich Course: *Algorithmic Game Theory and Mechanism Design (CompSci M.Sc.)*
2020 & 2023	**Teaching Assistant**, University of Zurich Course: *Algorithmic Game Theory and Mechanism Design (CompSci M.Sc.)*
2020	**Quant & Analytics Consultant (Intern in 2018/19)**, Ernst & Young Financial Services Risk Management (Zurich, Switzerland) *Worked on regulatory & financial audits of, and advisory projects for globally active Swiss financial institutions. Audited statistical and scenario-based risk models, critically verified documentation, designed and implemented independent challenger models in Python and R.*
2016 – 2018	**Teaching Assistant**, ETH Zurich Courses: *Topology, Complex Analysis, Real Analysis I (Math B.Sc.&M.Sc.)*

Education

2017 – 2020	**M.Sc. in Mathematics**, ETH Zurich Focus: Machine Learning, Computational Statistics, Mathematical Finance Thesis: *"A Machine Learning Perspective on the Kyle Model" (graded 6.0/6.0)* Supervisor: Josef Teichmann (ETH Zurich)
2017	**Exchange semester**, The Hong Kong University of Science and Technology
2014 – 2018	**B.Sc. in Mathematics**, ETH Zurich Focus: Optimization, Probability Theory, Quantitative Risk Management Thesis: *"Risk Measures and their Applications: an Exposition" (graded 6.0/6.0)* Supervisor: Mete Soner (Princeton University)

Research Papers

Paul Friedrich, Yulun Zhang, Michael J. Curry, Ludwig Dierks, Stephen McAleer, Jiaoyang Li, Tuomas Sandholm, and Sven Seuken, "Scalable Mechanism Design for Multi-Agent Path Finding," *International Joint Conference on Artificial Intelligence (IJCAI)*, 2024, (PDF link).

Paul Friedrich, Barna Pásztor, and Giorgia Ramponi, "Learning Collusion in Episodic, Inventory-Constrained Markets," *under review, preprint at arXiv:2410.18871*, 2024, (PDF link). *Earlier version appeared at Agentic Markets Workshop, ICML '24.*

Paul Friedrich, Ludwig Dierks, and Sven Seuken, "Machine Learning-Enhanced Market Design for Drone Traffic Management," *working paper*, 2022-2024.

Sven Seuken, **Paul Friedrich**, and Ludwig Dierks, "Market Design for Drone Traffic Management," *AAAI Conference on Artificial Intelligence (AAAI)*, 2022, (PDF link). *Won Blue Sky Best Paper Award (third place).*

Paul Friedrich and Josef Teichmann, "Deep Investing in Kyle's Single Period Model," *preprint at arXiv:2006.13889*, 2020, (PDF link).

Professional Experience

Supervision

2021 – 2022   **Master's project**, University of Zurich
Supervised a team of three Computer Science M.Sc. students who developed a simulator for auction-based drone traffic management as part of my line of research.

Volunteering

2017 – 2018   **Organising committee of yearly job fair**, MindPhair at ETH Zurich

2015 – 2016   **Board member for university's policy**, The Association of Mathematics, Physics and Computational Science & Engineering Students at ETH Zurich

Competitions

2023   **2nd place**, Computational Social Choice Competition *at IJCAI 2023*

Summer Schools

2024   Multi-Agent Reinforcement Learning (MARL)
Organised by ETHZ & EPFL. Lausanne, Switzerland

       Deep Learning + Reinforcement Learning (DLRL)
Organised by CIFAR & Vector Institute. Toronto, Canada

2021   Data Science, Optimization and Operations Research
Organised by Prof. Michel Bierlaire, EPFL. Zinal, Switzerland

Skills

Coding	**Python**, R, MATLAB, C++
Tools & Frameworks	**Numpy**/**Scipy**, **JAX**, Keras, Gurobi, CPLEX, SQL, Eikon
Languages	**German (mothertongue)**, **English (proficient)**, French (fluent), Spanish (intermediate). Basic Ukrainian, Russian, Mandarin Chinese
Interests	Sports (running, sailing, surfing, diving), violin, cooking, traveling & cultural exchange, languages, volunteering

References

Available on request.