Paul Friedrich

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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)

2020 – 2023 **(Head) 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, Y. Zhang, M. Curry, L. Dierks, S. McAleer, J. Li, T. Sandholm, and S. Seuken, "Scalable Mechanism Design for Multi-Agent Path Finding," *International Joint Conference on Artificial Intelligence (IJCAI)*, 2024, (PDF link).

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

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

S. Seuken, **Paul Friedrich**, and L. 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 J. 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.