Jakob Weissteiner

PH.D. IN COMPUTER SCIENCE · M.SC. IN FINANCIAL MATHEMATICS · M.SC. QUANTITATIVE FINANCE

weissteiner@ifi.uzh.ch | jakobweissteiner.com | github.com/weissteiner | linkedin.com/in/jakob-weissteiner-503400166

Personal Profile

Ph.D. in Computer Science from UZH & ETH AI Center. My research focuses on the intersection of **ML and economics**, with an emphasis on leveraging machine learning algorithms to design electronic market platforms. Prior to that, I completed **two M.Sc. programs in Financial Mathematics** and **Quantitative Finance**. I have working experience as a **junior data scientist** in the Department of Advanced Analytics of the Raiffeisen Bank International AG.

RESEARCH FIELDS

Machine Learning, Deep Learning, Probabilistic AI, Uncertainty Quantification of Neural Networks, Combinatorial Optimization and Resource Allocation, Preference Elicitation, Market Design.

Education

University of Zurich — *Zurich, Switzerland*

Ph.D. in Computer Science | summa cum laude — *Okt 2018 - Apr 2023*

- Computation and Economics Research Group
- Thesis: Integrating Advanced Machine Learning Methods Into Market Mechanisms
- Grade point average weighted by ECTS credits 6.00 (scale 6 = best, 1 = worst)
- Advisor: Prof. Sven Seuken, Ph.D.

Vienna University of Economics and Business — *Vienna, Austria*

M.Sc. in Quantitative Finance | passed with distinction — *Sept 2016 - Sept 2018*

- Top student of the 2016–2018 cohort
- Grade point average weighted by ECTS credits 1.00 (scale 1 = best, 5 = worst)

Technical University of Vienna — *Vienna, Austria*

M.Sc. in Mathematics | passed with distinction — *Oct 2015 - Jan 2018*

- Specialized in Financial Mathematics
- Grade point average weighted by ECTS credits 1.02 (scale 1 = best, 5 = worst)

Technical University of Vienna — *Vienna, Austria*

B.Sc. in Mathematics | passed with distinction — *Oct 2012 - Sept 2015*

- Specialized in Financial and Insurance Mathematics
- Grade point average weighted by ECTS credits 1.41 (scale 1 = best, 5 = worst)

Research and Work Experience

May 2023 - now — **University of Zurich**, Postdoctoral Researcher — *Zurich, Switzerland*

- Computation and Economics Research Group

Sept 2021 - now — **ETH AI Center**, Associated PhD Student — *Zurich, Switzerland*

- Advisor: Prof. Sven Seuken, Ph.D.
- Presentation of research at yearly ETH+X AI Summit

Sept 2017 - Jul 2018 — **Raiffeisen Bank International AG**, Junior Data Scientist — *Vienna, Austria*

- Department of Advanced Analytics
- Development of ML-powered loan-sale-signal-system (Random Forest, Elastic Net, NN)
- Programming Languages: R, Python

Oct 2015 - Mar 2017 — **Raiffeisen Bank International AG**, Freelancer — *Vienna, Austria*

- Department of Investment Finance
- Maintenance and development of VBA applications for the European Recovery Program
- Programming Languages: VBA

Aug 2015	**Raiffeisenlandesbank Niederösterreich-Wien**, Internship • Department of Data Quality Management	*Vienna, Austria*
Jul 2014	**Oberösterreichische Versicherung AG**, Internship • Department of Life Insurance	*Linz, Austria*

Technical Skills

Programming languages	**Python (advanced)**, **R (advanced)**, VBA (familiar)
(ML-)Libraries	PyTorch, Tensorflow, Numpy, Scikit-learn, Pandas
Optimization Software	CPLEX, Gurobi
Miscellaneous	Git, LaTeX, Overleaf, Microsoft Office, VSCode

Professional Activities, Leadership, and Service

Conference Organization

Oct 2021 - Sept 2022	**ACM Conference on Economics and Computation (EC'22)**, Workflow Chair • Leading scientific conference on advances in theory, empirics, and applications at the interface of economics and computation • Development of conference-schedule-optimizer	*Colorado, USA*

Service

Mar 2023 - now	**Tennis Club Engematt**, CFO	*Zurich, Switzerland*
Sept 2019 - Mar 2022	**Club Alpbach Zurich**, Vice President • Non-profit association; granting scholarships to attend the European Forum Alpbach • Responsibilities: scholarship application review, sponsor acquisition, event organization	*Zurich, Switzerland*
Jul 2017 - Jul 2018	**Quantitative Finance Club**, Vice President • Club for alumni and students of the master program Quantitative Finance at WU Vienna	*Vienna, Austria*
Sept 2011 - Apr 2012	**Pro Mente**, Civil service	*Grieskirchen, Austria*

Peer Review

2022	**International Conference on Machine Learning (ICML'22)**, Reviewer
2021	**ACM Conference on Economics and Computation (EC'21)**, Reviewer

Publications

For a full updated list of my publications see Google Scholar

Conference Publications

Conference publications in Computer Science are archival and selectively refereed (acceptance rates ≈20%).

Bayesian Optimization-based Combinatorial Assignment (pdf) (Git)
Jakob Weissteiner*, Jakob Heiss*, Julien Siems*, Sven Seuken
Proceedings of the 37th AAAI Conference on Artificial Intelligence, ***AAAI'23***, Washington D.C., USA, 2023

NOMU: Neural Optimization-based Model Uncertainty (pdf) (Git)
Jakob M Heiss*, **Jakob Weissteiner***, Hanna S Wutte*, Sven Seuken, Josef Teichmann
Proceedings of the 39th International Conference on Machine Learning , ***ICML'22***, Baltimore, USA, 2022

Monotone-Value Neural Networks: Exploiting Preference Monotonicity in Combinatorial Assignment (pdf) (Git)
Jakob Weissteiner*, Jakob Heiss*, Julien Siems*, Sven Seuken
Proceedings of the 31st International Joint Conference on Artificial Intelligence, ***IJCAI'22***, Vienna, Austria, 2022

Fourier Analysis-based Iterative Combinatorial Auctions (pdf) (Git)
Jakob Weissteiner*, Chris Wendler*, Sven Seuken, Ben Lubin, Markus Püschel
Proceedings of the 31st International Joint Conference on Artificial Intelligence, ***IJCAI'22***, Vienna, Austria, 2022

Deep Learning-powered Iterative Combinatorial Auctions (pdf) (Git)
Jakob Weissteiner, Sven Seuken
Proceedings of the 34th AAAI Conference on Artificial Intelligence, ***AAAI'20***, New York, USA, 2020

Preprints under Submission

Machine Learning-powered Course Allocation (pdf)
Ermis Soumalias*, Behnoosh Zamanlooy*, **Jakob Weissteiner**, Sven Seuken
arXiv preprint arXiv:2210.00954. 2023

**These authors contributed equally to the paper.*

Presentations

Conference and Workshop Talks

Oct 2022	**Invited Talk**, Monotone-Value Neural Networks and Combinatorial Bayesian Optimization • INFORMS Annual meeting 2022	*Indianapolis, USA*
Jul 2022	**Contributed Talk**, Fourier Analysis-based Iterative Combinatorial Auctions • International Joint Conference on Artificial Intelligence 2022 (IJCAI'22)	*Vienna, Austria*
Jul 2022	**Contributed Talk**, Monotone-Value Neural Networks: Exploiting Preference Monotonicity in Combinatorial Assignment • International Joint Conference on Artificial Intelligence 2022 (IJCAI'22)	*Vienna, Austria*
Oct 2021	**Invited Talk**, Fourier Analysis-based Iterative Combinatorial Auctions • INFORMS Annual meeting 2021	*Virtual*
Feb 2020	**Contributed Talk**, Deep Learning-powered Iterative Combinatorial Auctions • AAAI Conference on Artificial Intelligence (AAAI'20)	*New York, USA*
Oct 2019	**Invited Talk**, Deep Learning-powered Iterative Combinatorial Auctions • INFORMS Annual meeting 2019	*Seattle, USA*

Seminars at Universities

Jul 2019	**Invited Talk**, Uncertainty Bounds for Neural Networks - An Algorithmic Approach • Learning & Adaptive Systems Group ETH Zurich, Research Seminar	*Zurich, Switzerland*

Events

Oct 2022	**Invited Booth and Poster**, Machine Learning-powered Market Design • ETH AI+X Summit 2022	*Zurich, Switzerland*
Oct 2021	**Invited Booth and Poster**, Machine Learning-powered Market Design • ETH AI+X Summit 2021	*Zurich, Switzerland*

Scholarships and Awards

2023	**Summa cum laude** Doctoral Program in Informatics at the University of Zurich
2018	**Excellence scholarship Vienna University of Economics and Business** Awarded by the Austrian Federal Ministry of Science and Research
2017	**Excellence scholarship Vienna University of Economics and Business** Awarded by the Austrian Federal Ministry of Science and Research
2016	**Excellence scholarship Technical University of Vienna** Awarded by the Austrian Federal Ministry of Science and Research
2015	**Excellence scholarship Technical University of Vienna** Awarded by the Austrian Federal Ministry of Science and Research

Theses

2023	**PhD Thesis**, Integrating Advanced Machine Learning Methods Into Market Mechanisms • Advisor: Prof. Sven Seuken, Ph.D. • External Reviewers: Prof. Craig Boutilier, Ph.D. and Prof. Benjamin Lubin, Ph.D.	(pdf)
2018	**Master Thesis**, Variable Importance Measures in Regression and Classification Methods • Advisor: Prof. Kurt Hornik, Ph.D.	(pdf)

2017	**Master Thesis**, Modeling of Limit Order Books Using Markov Chains in Continuous Time • Advisor: Prof. Friedrich Hubalek, Ph.D.	(pdf)
2015	**Bachelor Thesis**, Analysis of a Unit-Linked Product in the CRR Model • Advisors: Christian Weber, Ph.D. and Karin Hirhager, Ph.D.	

Teaching

University Courses

2021	**Head Teaching Assistant**, Market Design and Machine Learning	*University of Zurich*
2021	**Head Teaching Assistant**, Advanced Topics in Economics and Computation	*University of Zurich*
2020	**Head Teaching Assistant**, Advanced Topics in Economics and Computation	*University of Zurich*
2019	**Head Teaching Assistant**, Advanced Topics in Economics and Computation	*University of Zurich*
2019	**Teaching Assistant**, Economics and Computations	*University of Zurich*
2018	**Teaching Assistant**, Economics and Computations	*University of Zurich*
2018	**Teaching Assistant**, Mathematics II	*WU Vienna*
2017	**Teaching Assistant**, Probability Theory	*WU Vienna*
2016	**Teaching Assistant**, Risk Management in Finance and Insurance	*TU Vienna*

(Co-)Supervised Theses

2022	**Semester Thesis of Aurelio Dolfini**, ML-based Uncertainty Quantification on Real World Data	*ETH Zurich*
2020	**Master Thesis of Marius Högger**, Bayesian Optimization with Neural Networks	*University of Zurich*

Languages

German	Native
English	Business fluent

References (available upon request)

PhD Advisor
Prof. Sven Seuken, Ph.D.
seuken@ifi.uzh.ch
Department of Informatics, University of Zurich

PhD Thesis Committee
Prof. Benjamin Lubin, Ph.D.
blubin@gmail.com
Information Systems Department, Boston University

Collaborator
Prof. Josef Teichmann, Ph.D.
jteichma@math.ethz.ch
Department of Mathematics (Stochastic Finance), ETH Zurich

Master Thesis Advisor
Prof. Kurt Hornik, Ph.D.
Kurt.Hornik@wu.ac.at
Institute for Statistics and Mathematics, WU Vienna