



Florian Krach

Curriculum Vitae

PERSONAL DETAILS

Birth November 5, 1994, in Graz, Austria
Address ETH HG G62.1, D-MATH, Rämistrasse 101, 8092 Zürich, Switzerland
Homepage <https://floriankrach.github.io>
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EDUCATION

PhD in Mathematics 09/2019 - present
ETH Zürich

I am a PhD student under the supervision of Prof. Josef Teichmann. My research interest is machine learning, in particular deep learning, with a connection to mathematical finance and on its own.

MSc. Mathematics (Degree application in 06/2019) 09/2017 - 03/2019
ETH Zürich

Specialization on stochastic finance, mathematical optimization and computational statistics (machine learning). Seminar project on model calibration with neural networks. Master thesis about generative adversarial networks (GANs). Graduation with distinction (overall GPA: 6.0/6.0) and awarded the Willi Studer Prize 2020.

BSc. Mathematics (Degree application in 02/2018) 09/2014 - 08/2017
ETH Zürich

First year joint program of mathematics and physics. Second year compulsory mathematical courses. Third year specialization on probability theory, statistics, functional analysis, discrete mathematical finance and stochastic calculus. Bachelor thesis about optimal investment. (Overall GPA: 5.62/6.0).

Academic High School 09/2005 - 07/2013
BRG Kepler, Graz, Austria

Eight year general education with focus on mathematics and natural sciences. Competed in several mathematical competitions. Class representative for eight years, second school representative for one year. Graduation with distinction (overall GPA: 1.0/1.0).

WORK EXPERIENCE

Quantitative Research & Machine Learning 04/2019 - 03/2020
Araneum Technologies & Z22 Technologies

Research and implementation of fully automatic trading algorithms using Python. (Full time until end of 06/2019, then as sideline.)

Community Service 10/2013 - 06/2014
Lebenshilfe Graz und Umgebung

Tasks in the front and back office as well as work with people with disabilities.

PUBLICATIONS & PREPRINTS

Mathematics

- Florian Krach, Josef Teichmann and Hanna Wutte. Robust Utility Optimization via a GAN Approach. 2024. arXiv preprint.
- Florian Krach, Andrea Macrina, Ashley Kanter, Eba Hampwaye, Siphokazi Hlalukana and Nchakha Ratelee. The Financial Impact of Carbon Emissions on Power Utilities Under Climate Scenarios. 2023. SSRN preprint.
- Xuwei Yang, Anastasis Kratsios, Florian Krach, Matheus Grasselli and Aurelien Lucchi. Regret-Optimal Federated Transfer Learning for Kernel Regression with Applications in American Option Pricing. 2023. arXiv preprint.
- William Andersson, Jakob Heiss, Florian Krach and Josef Teichmann. Extending Path-Dependent NJ-ODEs to Noisy Observations and a Dependent Observation Framework. 2023. Transactions on Machine Learning Research (TMLR) (2024).
- Florian Krach, Marc Nübel and Josef Teichmann. Optimal Estimation of Generic Dynamics by Path-Dependent Neural Jump ODEs. 2022. arXiv preprint.
- Calypso Herrera, Florian Krach, Pierre Ruysen and Josef Teichmann. Optimal Stopping via Randomized Neural Networks. 2021. arXiv preprint.
- Calypso Herrera, Florian Krach and Josef Teichmann. Neural Jump Ordinary Differential Equations: Consistent Continuous-Time Prediction and Filtering. 2021. International Conference on Learning Representations (ICLR).
- Calypso Herrera, Florian Krach and Josef Teichmann. Estimating Full Lipschitz Constants of Deep Neural Networks. 2020. arXiv preprint.
- Calypso Herrera, Florian Krach, Anastasis Kratsios, Pierre Ruysen and Josef Teichmann. Denise: Deep Robust Principal Component Analysis for Positive Semidefinite Matrices. 2020. Transactions on Machine Learning Research (TMLR) (2023).

Thesis

- Master Thesis: A Study of Generative Adversarial Networks, under the supervision of Josef Teichmann at ETH Zurich, 2019. Available on GitHub.

Medical Research

- Alina Ofenheimer, Marie-Kathrin Breyer, Emiel F.M. Wouters, Caspar Schiffrers, Sylvia Hartl, Otto C. Burghuber, Florian Krach, David M. Maninno, Frits M.E. Franssen, Tobias Mraz, Patricia Puchhammer, Robab Breyer-Kohansal. The effect of body compartments on lung function in childhood and adolescence. Clinical Nutrition. 2023.
- Ofenheimer, Alina and Breyer-Kohansal, Robab and Hartl, Sylvia and Burghuber, Otto C. and Krach, Florian and Franssen, Frits M. E. and Wouters, Emiel F. M. and Breyer, Marie-Kathrin. Using Body Composition Groups to Identify Children and Adolescents at Risk of Dyslipidemia. Children. 2021.
- Ofenheimer, A., Breyer-Kohansal, R., Hartl, S. et al. Reference values of body composition parameters and visceral adipose tissue (VAT) by DXA in adults aged 18–81 years—results from the LEAD cohort. Eur J Clin Nutr. 2020.

- Ofenheimer, A., Breyer-Kohansal R, Hartl S, Burghuber OC, Krach F, Schrott A, Franssen FME, Wouters EFM, Breyer MK. Reference charts for body composition parameters by dual-energy X-ray absorptiometry in European children and adolescents aged 6 to 18 years – Results from the Austrian LEAD (Lung, hEart , sociAl , boDy) cohort. *Pediatric Obesity*. 2020.

TALKS

- Applied Machine Learning Days (AMLD) 2024, EPFL, Lausanne, March 25, 2024, Invited Talk, Path-Dependent Neural Jump ODEs and their forecasting capabilities in LOBs.
- 16ème Colloque Bachelier en Mathématiques Financières et Calcul Stochastique, Métabief, France, January 15-19, 2024, Path-Dependent Neural Jump ODEs and their Application to Stochastic Filtering.
- 10th International Congress on Industrial and Applied Mathematics (ICIAM 2023 Tokyo), Waseda University, Tokyo, Japan, August 20-25, 2023, Invited Talk, Path-Dependent Neural Jump Ordinary Differential Equations.
- 7th International Conference on Mathematics in Finance 2023, Berg-en-Dal Rest Camp, Kruger National Park, South Africa, July 24-28, 2023, Contributed Talk, Robust Utility Optimization via a GAN Approach.
- Oxford-ETH Workshop on Mathematical Finance, University of Oxford, June 26-28, 2023, Regret-Optimal Federated Transfer-Learning.
- Freiburg-Wien-Zürich (FWZ) Seminar, Lindauer Hütte, Februar 27 - March 2, 2023, Contributed Talk, Robust Utility Optimization via a GAN Approach
- 2nd Edition of the School on Machine Learning of Dynamic Processes and Time Series Analysis, Scuola Normale Superiore Pisa, November 09-10, 2022, Contributed Talk, Path-Dependent Neural Jump Ordinary Differential Equations.
- Oxford-ETH Workshop on Mathematical Finance, ETH Zürich, June 20-21, 2022, Contributed Talk, (Extended) Neural Jump Ordinary Differential Equations.
- 11th World Congress of Bachelier Finance Society, virtually in Hong Kong, China, June 17, 2022, Contributed Talk, Optimal Stopping via Randomized Neural Networks.
- Rough Paths & SPDE Seminar, TU Berlin, June 9, 2022, Invited Talk, (Extended) Neural Jump Ordinary Differential Equations.
- Quantitative Finance Workshop 2022, Rome, April 1, 2022, Contributed Talk, Neural Jump Ordinary Differential Equations.
- AMaMeF Conference 2021, June 24, 2021, Contributed Talk, Neural Jump Ordinary Differential Equations.
- International Conference on Learning Representations (ICLR) 2021, May 3, 2021, Poster & Video Presentation, Neural Jump Ordinary Differential Equations: Consistent Continuous-Time Prediction and Filtering.

CO-ORGANISATION

- Minisymposium, Neural differential methods in Finance, 12th Bachelier World Congress of the Bachelier Finance Society, July 8 - 12, Rio de Janeiro, Brazil.

TEACHING EXPERIENCE

Financial Mathematics Team Challenge (FMTC) July 2023

University of Cape Town

I participated as team leader at the FMTC 2023. Team Members: Eba Hampwaye, Siphokazi Hlalukana, Nchakha Thato Rateele. Mentors: Ashley Kanter, Andrea Macrina. Project Title: South Africa's Carbon Opportunity.

Coordinator and/or Teaching Assistant 2018 - present

ETH Zürich

Diskrete Mathematik for D-ITET (HS 2018), Stochastik for D-MATL, D-MAVT, RW (HS 2019), Wahrscheinlichkeit und Statistik for D-MATH (FS 2020), Mathematik 3 for D-HEST (HS 2020), Mathematik 1&2 for D-HEST, D-BIOL, D-PHARM (HS 2021, FS 2022, HS 2023).

CO-SUPERVISION

- Markus Chardonnet, Probabilistic Forecasting for Time Series Anomaly Detection, Master Thesis at ETH Zürich under Supervision of Josef Teichmann, 2023.
- William Andersson, Overcoming Independence between the Observed Process and the Observation Framework in PD-NJ-ODEs, Semester Project at ETH Zürich under Supervision of Josef Teichmann, 2023.
- Tengyingzi Ma, Limit Order Book Simulation with GANs, Semester Project at ETH Zürich under Supervision of Josef Teichmann, 2022.
- Marc Nübel, Neural ODE Models for Continuous Time Prediction of Non-Markovian Processes, Master Thesis at ETH Zürich under Supervision of Josef Teichmann, 2021.
- Group Project of Lecture Machine Learning in Finance, Neural Jump ODEs and their Application to Classification Tasks, ETH Zürich, 2021.
- Kei Ishikawa, Multilevel Quasi Monte Carlo Methods for Neural SDEs, Semester Project at ETH Zürich under Supervision of Markus Kalisch and Josef Teichmann, 2021.
- Jonas Baggenstos, Reinforcement Learning in Financial Markets using Lipschitz Extensions, Bachelor Thesis at ETH Zürich under Supervision of Josef Teichmann, 2020.

SKILLS & HOBBIES

Software PYTHON (ML, deep learning, data science & stats, parallel programming, web-scraping, PyScript), C++, R (several machine learning techniques), MATLAB, SWIFT, GIT, L^AT_EX, HTML & JS & SQL (basics) MS OFFICE

Languages German (native language), English (fluent), Italian (fluent speaking),
French (intermediate)

Various Swiss Skitouring Guide (esa Leiterkurs Skitouren) since January 2023

Hobbies Skitouring (tour guide for TC Zollikon), Skiing, Hiking, Climbing, Golf,
Tennis, Swimming, Cooking