Paul Peter Hager

Curriculum Vitae

Technische Universität Berlin
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March 1, 2024

Professional Experience

since March 2024	Junior Research Group Leader at the Technische Universität Berlin, on "*Stochastic Analysis and Quantitative Finance*".
October 2021 - February 2024	Postdoctoral Researcher at the Humboldt University of Berlin, in the research group "*Applied Financial Mathematics & Applied Stochastic Analysis* ".
April 2019 - September 2021	Scientific Assistant at the Technische Universität Berlin, in the MATH+ project AA4-2 "*Optimal control in energy markets using rough analysis and deep networks*".

Education

April 2019 - September 2021	**Dr. rer. nat.**, Technische Universität Berlin / Berlin Mathematical School, graduated with "summa cum laude", Thesis: "*Rough Analysis with Application in Markets and Related Fields*", supervision by Prof. P. K. Friz and Dr. habil. C. Bayer.
April 2016 - March 2019	**Master of Science**, Technische Universität Berlin Mathematics with emphasis on stochastic analysis and mathematical finance, Thesis: "*The Multiplicative Chaos of Fractional Brownian Motions with Vanishing Hurst Parameters*", supervision by Prof. P. K. Friz.
September 2012 - March 2016	**Bachelor of Science**, Technische Universität Berlin, Mathematics with emphasis on probability theory, Thesis: "*Bayesian Change Point Detection with an Asymmetric Miss Criterion*", supervision by Prof. P. Bank.
September 2009 - August 2012	**Fachgebundene Hochschulreife**, Fachoberschule Bamberg (tech. branch), Seminar work: "*Logarithmus- und Exponentialrechnung im Komplexen*".

Prices

July 2022	MATH+ Dissertation Award

Research Publications

Preprints

[6] G. Fu, P. P. Hager, and U. Horst. "Mean-Field Liquidation Games with Market Drop-out". In: *arXiv e-prints*, arXiv:2303.05783 (2023) (accepted at *Mathematical Finance*)

Publications in Peer Reviewed Journals

[5] C. Bayer, P. P. Hager, S. Riedel, and J. Schoenmakers. "Optimal stopping with signatures". In: *Annals of Applied Probability* 33.1 (2023), pp. 238–273

[4] C. Bayer, D. Belomestny, P. Hager, P. Pigato, J. Schoenmakers, and V. Spokoiny. "Reinforced optimal control". In: *Communications in Mathematical Sciences* 20.7 (2022), pp. 1951–1978

[3] P. K. Friz, P. P. Hager, and N. Tapia. "Unified signature cumulants and generalized Magnus expansions". In: *Forum of Mathematics, Sigma* 10 (2022), e42

[2] P. Hager and E. Neuman. "The multiplicative chaos of $H = 0$ fractional Brownian fields". In: *Annals of Applied Probability* 32.3 (2022), pp. 2139–2179

[1] C. Bayer, D. Belomestny, P. Hager, P. Pigato, and J. Schoenmakers. "Randomized Optimal Stopping Algorithms and Their Convergence Analysis". In: *SIAM Journal on Financial Mathematics* 12.3 (2021), pp. 1201–1225

Teaching Experience

upcoming Spring 2024	Lecture on Stochastic Processes in Continuous Time
Fall 2023/24	Lecture on Stochastic Differential Equations
Spring 2023	Lecture on Continuous Time Finance
Fall 2022/23	Lecture on Discrete Time Finance
Spring 2022	Lecture on Continuous Time Finance
Fall 2021/22	Exercise Class on Analysis III for Physicists

Selected Talks

- *"Advancing Optimal Stochastic Control with Signatures"*:
  - January 23, 2024, Research Seminar on Applied Stochastics (online), FernUni Hagen,
  - January 11, 2024, Public hearing, University of Vienna,.
- *"A Mean Field Game of Optimal Portfolio Liquidation with Market Drop-out"*:
  - July 30, 2023, 11th General AMaMeF Conference, Bielefeld,
  - August 29, 2022, Workshop on Many Player Games and Applications, Humboldt University of Berlin.
- *"Time Scales in Rough Volatility"*:
  - February 2, 2023, Thematic Einstein Forum – Lecture Series on Models of Time and Probability, Free University of Berlin.
- *"Unified Signature Cumulants and Generalized Magnus Expansions"*:
  - June 15, 2023, Vienna Seminar in Mathematical Finance and Probability, TU Vienna,
  - May 12th, 2022, 15th Oxford-Berlin Young Researchers Meeting on Applied Stochastic Analysis, WIAS Berlin,
  - February 24, 2021, Cumulants in Stochastic Analysis (online), TU Berlin.
- *"Optimal Stopping with Signatures"*:
  - June 7, 2023, Conference on Financial Mathematics and Engineering, SIAM Philadelphia,
  - September 15, 2022, DMV Annual Meeting, Free University of Berlin,
  - September 7, 2022, New interfaces of Stochastic Analysis and Rough Paths, (remote), Banff.
- *"Mini-Course on Machine Learning Methods in Finance - Lecture on Deep Signature Stopping"*:
  - May 23, 2022, Stochastic Numerics Meeting, KAUST.
- *"Optimal Stopping with Signatures – Reinforced Optimal Control"*:
  - December 1, 2021, DataSıg Research Seminar, (online), University of Oxford / Imperial College London.
- *"The Multiplicative Chaos of H=0 fractional Brownian Fields"*:
  - June 4, 2021, Conference on Financial Mathematics and Engineering (online), SIAM Philadelphia.

Industry Experience

October 2017 - March 2019	Student job at Digitec GmbH, Hamburg, researching and developing software for interest rate term structure modelling with multiple yield curves.
April 2017 - September 2017	Student job at Onwrks (StarTUp Incubator), Berlin, developing statistical and machine learning methods for maintenance prediction of wind turbines.

Miscellaneous

Languages	German (mother tongue), English (fluent), Italian (intermediate).
Programming Languages	Python, Cython, Scala.
Memberships	MATH+ postdoctoral member.
Referee Activity	For the *Annals of Applied Probability* and the Journal of *Mathematical Finance*.