Lukas Trottner

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Employment

Assistant Professor, School of Mathematics, **University of Birmingham** — since Sep. 2024

Postdoc, Department of Mathematics, **Aarhus University** — Sep. 2021 – Sep. 2024

Education

University of Mannheim

PhD in Mathematics (Dr. rer. nat.) — 2018 – 2021

Thesis: *Implications of Markov stability theory for nonparametric statistics, Markov additive fluctuations and data-driven stochastic control*, Advisor: Prof. Dr. Leif Döring, grade: summa cum laude

MSc in Mathematics in Business and Economics — 2016 – 2018

Thesis: *Lamperti transformation for self-similar Markov processes*, first class honors (1.0)

BSc in Mathematics in Business and Economics — 2012 – 2016

Thesis: *Verzweigungsprozesse: Aussterben einer Population*, first class honors (1.1)

California State University Fullerton

Semester abroad — 2014

Research Interests

Statistics for stochastic processes, concentration of measure, transfer learning, MCMC, generative models, data-driven stochastic optimal control, high-dimensional statistical inference, Lévy processes and Markov additive processes

Publications

Peer-reviewed

Data-driven rules for multidimensional reflection problems (with Sören Christensen and Asbjørn Holk Thomsen)
appears in *SIAM/ASA Journal on Uncertainty Quantification*, arXiv:2311.06639

Markov additive friendships (with Leif Döring and Alex Watson)
Transactions of the American Mathematical Society 377 (2024), no. 11, pp. 7699–7752, DOI:10.1090/tran/9266

The uniqueness of the Wiener–Hopf factorisation of Lévy processes and random walks
(with Leif Döring, Mladen Savov and Alex Watson)
Bulletin of the London Mathematical Society 56 (2024), no. 9, pp. 2951–2968, DOI:10.1112/blms.13112

Covariate shift in nonparametric regression with Markovian design
Information and Inference 13 (2024), no. 2, paper no. iaae011. DOI: 10.1093/imaiai/iaae011

Learning to reflect: A unifying approach for data-driven stochastic control strategies (with S. Christensen and C. Strauch)
Bernoulli 30 (2024), no. 3, pp. 2074–2101. DOI: 10.3150/23-BEJ1665

Stability of overshoots of Markov additive processes (with Leif Döring)
Annals of Applied Probability 33 (2023), no. 6B, pp. 5413–5458. DOI: 10.1214/23-AAP1951

Concentration analysis of multivariate elliptic diffusions (with Cathrine Aeckerle-Willems and Claudia Strauch)
Journal of Machine Learning Research 24 (2023), paper no. 106, pp. 1–38. ISSN: 1532-4435.

Adaptive invariant density estimation for continuous-time mixing Markov processes under sup-norm risk
(with Niklas Dexheimer and Claudia Strauch)
Annales de l'Institut Henri Poincaré B (Probab. et Stat.) 58 (2022), no. 4, pp. 2029–2064. DOI: 10.1214/21-aihp1235

Preprints

Multivariate change estimation for a stochastic heat equation from local measurements (2024)
with Anton Tiepner, arXiv:2409.15059

Change point estimation for a stochastic heat equation (2023)
with Markus Reiß and Claudia Strauch, arXiv:2307.10960

Awards and Fellowships

Award for best master's degree in Mathematics, University of Mannheim	2018
Award for best master's thesis in Mathematics, University of Mannheim	2018
Award for best bachelor's degree in Mathematics, University of Mannheim	2016
Deutschlandstipendium, scholarship, University of Mannheim	2012 – 2018

Teaching

University of Birmingham

Lecturing

Bayesian Statistics and Computation	Spring 2025
Foundations of Statistical Inference	Fall 2024

Aarhus University

Lecturing

Statistics for Stochastic Processes	Spring 2024
Statistics for Stochastic Processes	Spring 2022

Supervision

joint supervision of PhD student Asbjørn Holk Thomsen (with Claudia Strauch)	since April 2023

Tutoring

Introduction to Probability Theory and Statistics	Fall 2023
Introduction to Probability Theory and Statistics	Fall 2022
Calculus	Fall 2021

University of Mannheim

Supervision

supervision of a Master thesis on Q-Learning and stochastic approximation	Spring 2021

Tutoring

Introduction to Statistical Learning Theory	Fall 2019
Analysis II	Spring 2019
Introduction to Mathematical Statistics	Fall 2018
Advanced Mathematical Finance	Spring 2018
Mathematical Finance	Fall 2017

Research Groups

Member of Research Training Group 1953 "Statistical Modeling of Complex Systems"	2018 – 2021
Research Assistant, Digital Economy, Leibniz Centre for European Economic Research	2012 – 2017

Professional Activities

Presentations and Seminars

11$^{\text{th}}$ International Conference on Lévy Processes, Sofia, *invited talk*	July 2025
Stochastic Partial Differential Equations: Statistics Meets Numerics, Institut Mittag-Leffler, *invited talk*	June 2025
Frontiers of Statistics and Machine Learning, Mathematisches Forschungsinstitut Oberwolfach, *invited talk*	March 2025
Algorithms & Computationally Intensive Inference seminars, University of Warwick, *invited talk*	Nov. 2024
Statistics Seminar, University of Cambridge, *invited talk*	Nov. 2024
Data Science and Computational Statistics Seminar, University of Birmingham, *invited talk*	Nov. 2024
12$^{\text{th}}$ World Congress of the Bachelier Finance Society, Rio de Janeiro	July 2024
Institute of Statistics and Operations Research Colloquium, University of Vienna, *invited talk*	April 2024
Workshop on Stochastic Analysis and Statistics, Tokyo, *invited talk*	Feb. 2024
NeurIPS 2023, New Orleans, *poster*	Dec. 2023
43$^{\text{rd}}$ Conference on Stochastic Processes and their Applications, Lisbon, *two presentations*	July 2023
European Meeting of Statisticians 2023, Warsaw	July 2023

Informs APS 2023, Nancy, *invited talk*	June 2023
Stochastics Seminar, Aarhus University, *invited talk*	April 2023
German Probability and Statistics Days 2023, Essen	March 2023
SIAM Conference on Computational Science and Engineering 2023, Amsterdam, *invited talk*	March 2023
Seminar Department of Mathematics, Kiel University, *invited talk*	Nov. 2022
Workshop on Statistics for Stochastic Processes, Luxembourg, *invited talk*	Sep. 2022
10th International Conference on Lévy processes, Mannheim, *invited talk*	July 2022
International Symposium on Nonparametric Statistics, Paphos, *invited talk*	June 2022
Stochastics Seminar, Aarhus University, *invited talk*	Nov. 2021
German Probability and Statistics Days 2021, Mannheim	Sep. 2021
IRTG "Stochastic Analysis in Interaction", Berlin Mathematical School, *invited talk*	June 2021
Seminar Department of Mathematics, Kiel University, *invited talk*	Dec. 2020
Fifth Conference on Ambit Fields and Related Topics, Aarhus University, *invited talk*	Aug. 2020 (canceled)
Bernoulli-IMS One World Symposium 2020	Aug. 2020
German Probability and Statistics Days 2020, Dresden	March 2020 (canceled)
Mannheim meets Konstanz: Workshop in Statistics, University of Konstanz	Dec. 2019
GWOT '19: Stochastic Modeling of Complex Systems, University of Heidelberg/Mannheim	April 2019
Stochastics Seminar, University of Heidelberg/Mannheim	March 2019

Organization of scientific events

MFO Mini-Workshop on "Statistical Challenges for Deep Generative Models", Oberwolfach	Feb. 2025
DYNSTOCH Satellite Summer School, Kiel	May 2024
Contributed session "High-dimensional statistics for stochastic processes" at SPA 2023, Lisbon	July 2023
The Midsummer Lectures 2023	June 2023
Aarhus–Copenhagen Data Science Meeting 2022	Dec. 2022

Research visits

University College London, host: Alex Watson	March 2023
Kiel University, host: Sören Christensen	Nov. 2022
Humboldt-Universität zu Berlin, host: Markus Reiß	Oct. 2022
Humboldt-Universität zu Berlin, host: Markus Reiß	Aug. 2022

Summer/Spring/Fall Schools

SFB1294 Spring School on Data Assimilation, Döllnsee	March 2022
RTG1953 Fall School on Causal Inference and Stein's method, Mannheim	Nov. 2019
Satellite Summer School to the 9th International Conference on Lévy Processes, Athens	July 2019

Refereeing

Annals of Statistics, Annales de l'Institut Henri Poincaré (Probab. et Stat.), Electronic Journal of Probability, Electronic Journal of Statistics, Electronic Communications in Probability, Annales Henri Lebesgue, Stochastic Processes and their Applications, Annals of the Institute of Statistical Mathematics, Statistics, NeurIPS

Vita Date: 10 October 2024.