

Dennis Frauen

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Date of birth: 28.11.1997

About

I am a PhD student and researcher at the Institute of AI in Management, LMU Munich. My research focusses mainly on (causal) machine learning and algorithmic fairness. I am interested in developing efficient, robust, and reliable machine learning methods for causal inference. Furthermore, I use ideas from causality to make data-driven decision-making optimal and fair.

EDUCATION

- Sep.2021 – **LMU Munich** PhD, Machine Learning
today
- Supervisor: Prof. Dr. Stefan Feuerriegel
- Jun. 2023 – **University of Cambridge** Visiting PhD student, Machine Learning
Sep. 2023
- Supervisor: Prof. Dr. Mihaela van der Schaar
 - Topic: Deep generative models for causal sensitivity analysis
- Oct. 2019 – **University of Göttingen** MSc, Mathematics
Aug. 2021
- GPA: 1.1 (“Very good”, German grading scale from 1.0 to 5.0)
 - Focus on Mathematical Statistics and Machine Learning
 - Master thesis on statistical inference based on optimal transport
- Aug. 2018 - **Lund University** Erasmus exchange semester, mathematics
Jan. 2019
- Passed with Distinction
- Sep. 2016 - **University of Hamburg** BSc, Mathematics
Sep. 2019
- GPA: 1.36 (“Very good”, German grading scale from 1.0 to 5.0)
 - General studies in Pure and Applied Mathematics
 - Minor subject: Physics

PUBLICATIONS

Frauen, D., Hatt, T., Melnychuk, V., & Feuerriegel, S. Estimating average causal effects from patient trajectories. *arXiv preprint arXiv:2203.01228*. (AAAI 2023)

Frauen, D. & Feuerriegel, S. Estimating individual treatment effects under unobserved confounding using binary instruments. *arXiv preprint arXiv:2208.08544*. (ICLR 2023)

Melnchuk, V., Frauen, D., & Feuerriegel, S. Causal transformer for estimating counterfactual outcomes. *arXiv preprint arXiv:2204.07258*. (ICML 2022)

Melnchuk, V., Frauen, D., & Feuerriegel, S. Normalizing flows for interventional density estimation. *arXiv preprint arXiv:2209.06203*. (ICML 2023)

Frauen, D., Malnychuk, V. & Feuerriegel, S. Sharp bounds for generalized causal sensitivity analysis. *arXiv preprint arXiv:2305.16988*. (NeurIPS 2023)

Schweisthal, J., Frauen, D., Malnychuk, V. & Feuerriegel, S. Reliable off-policy learning for dosage combinations. *arXiv preprint arXiv:2305.19742*. (NeurIPS 2023)

Melnychuk, V., Frauen, D., & Feuerriegel, S. Partial counterfactual identification of continuous outcomes with a curvature sensitivity model. *arXiv preprint arXiv:2306.01424*. (NeurIPS 2023)

Frauen, D., Malnychuk, V. & Feuerriegel, S. Fair off-policy learning from observational data. *arXiv preprint arXiv:2303.08516*. (2023, under review)

WORK & RESEARCH EXPERIENCE

Nov. 2020 – **Teaching Assistant, University of Göttingen, Department of Mathematics**

Aug. 2021

- Tutor for the lectures “Statistical foundations of data science 2” (Master) and “Discrete stochastics” (Bachelor)

Jul. 2020 - **Summer Research Internship (Remote), ETH Zurich, Department of Computer Science**

Sep. 2020

- Remote Research (due to COVID-19) under supervision of Fanny Yang (Department of Computer Science) and Armeen Taeb (Seminar of Statistics)
- Responsible for algorithm implementation and performing simulation experiments in R
- Weekly participation in the group meetings of the Statistical Machine Learning group and presentation of results

Feb. 2019 - **Data Science Internship, Körber Technologies, Hamburg**

Mar. 2019

- Statistical data analysis, in particular high-resolution time-series from machine production

Talks

26.09.2023 **Ladenburger Diskurs, Ladenburg** Causal Machine Learning for Management Decision Making

24.08.2023 **Microsoft Research, Cambridge** Causal Sensitivity Analysis: Frontiers in Reliable Causal Inference under Unobserved Confounding

08.11.2022 **Causal Data Science Meeting 2022, Online** Fair Policy Learning from Observational Data

Awards

Oct. 2019 - **German excellence scholarship (Deutschlandstipendium)**

Sep. 2021

- Scholarship holder of the Germany Scholarship for academic achievements

Other Skills & Activities

Languages	English (fluent), German(native)
Programming	Python, R, SQL, MATLAB, Java
Academic Reviewing	AAAI 2023, UAI 2023, NeurIPS 2023, ICLR 2024, Nature Machine Intelligence
Python Packages	PyTorch (lightning), Pyro, Pandas, NumPy, SciPy, Pandas, matplotlib
Volunteering	Member of ESN Munich, welcoming international students to the university
Other Interests	Piano and (electric) bass, table tennis, squash