Dennis Frauen

RESEARCHER · (CAUSAL) MACHINE LEARNING

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Education

LMU Munich   *Munich*

PHD STUDENT, CAUSAL MACHINE LEARNING   *09.2021 - present*

- Advisors: Prof. Dr. Stefan Feuerriegel (LMU Munich) and Prof. Dr. Mihaela van der Schaar (University of Cambridge)
- Thesis topic: Reliable causal machine learning for real-world data
- Expected graduation: Early 2025

University of Cambridge   *Cambridge*

RESEARCH STAY   *06.2023 - 09.2023*

- Host: Prof. Dr. Mihaela van der Schaar
- Topic: Deep generative models for causal sensitivity analysis

University of Göttingen   *Göttingen*

MASTER OF SCIENCE, MATHEMATICS   *10.2019 - 08.2021*

- Advisor: Prof. Dr. Axel Munk
- GPA: 1.1 ("Very good", German grading scale from 1.0 to 5.0)
- Focus on Mathematical Statistics, Machine Learning, and Econometrics

Lund University   *Lund*

SEMESTER ABROAD, MATHEMATICS   *08.2018 - 01.2019*

- Passed with distinction

Universtiy of Hamburg   *Hamburg*

BACHELOR OF SCIENCE, MATHEMATICS   *09.2016 - 09.2019*

- GPA: 1.36 ("Very good", German grading scale from 1.0 to 5.0)
- Minor subject: Physics

Professional Experience

Netflix   *San Fransisco Bay Area*

MACHINE LEARNING RESEARCH INTERN   *06.2024 - 08.2024*

- Research intern in the causal inference and experimentation team at Netflix

University of Göttingen   *Göttingen*

GRADUATE TEACHING ASSISTANT   *11.2020 - 08.2021*

- Teaching assistant for the lectures "Statistical foundations of data science 2" (master) and "Discrete stochastics" (bachelor)

ETH Zurich   *Zurich*

ETH STUDENT SUMMER RESEARCH FELLOW   *07.2020 - 09.2020*

- Hosts: Prof. Dr. Fanny Yang and Prof. Dr. Armeen Taeb
- Selected as one of 20 participants out of 2880 applicants

Körber Technologies   *Hamburg*

DATA SCIENCE INTERN   *02.2019 - 03.2019*

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

Publications

Frauen, D, Melnychuk, M, Feuerriegel, S. 2023. *Sharp Bounds for Generalized Causal Sensitivity Analysis*. In: **NeurIPS**.

Frauen, D, Feuerriegel, S. 2023. *Estimating Individual Treatment Effects under Unobserved Confounding using Binary Instruments*. In: **ICLR**.

Frauen, D, Melnychuk, M, Feuerriegel, S. 2023. *Estimating Average Causal Effects from Patient Trajectories*. In: **AAAI**.

Frauen, D, Imrie, F, Curth, A, Melnychuk, M, Feuerriegel, S, van der Schaar, M. 2024. *A Neural Framework for Generalized Causal Sensitivity Analysis*. In: **ICLR**.

Melnychuk, M, **Frauen, D**, Feuerriegel, S. 2023. *Partial Counterfactual Identification of Continuous Outcomes with a Curvature Sensitivity Model*. In: **NeurIPS**.

Schweisthal, J, **Frauen, D**, Melnychuk, M, Feuerriegel, S. 2023. *Reliable Off-Policy Learning for Dosage Combinations.*. In: **NeurIPS**.

Melnychuk, M, **Frauen, D**, Feuerriegel, S. 2023. *Normalizing Flows for Interventional Density Estimation*. In: **ICML**.

Frauen, D, Melnychuk, M, Feuerriegel, S. 2024. *Fair Off-Policy Learning from Observational Data*. Under review at **ICML**.

Schröder, M, **Frauen, D**, Feuerriegel, S. 2024. *Causal Fairness under Unobserved Confounding: A Neural Sensitivity Framework*. In: **ICLR**.

Melnychuk, M, **Frauen, D**, Feuerriegel, S. 2024. *Bounds on Representation-Induced Confounding Bias for Treatment Effect Estimation*. In: **ICLR**.

Hess, K, Melnychuk, M, **Frauen, D**, Feuerriegel, S. 2024. *Bayesian Neural Controlled Differential Equations for Treatment Effect Estimation*. In: **ICLR**.

Ma, Y, **Frauen, D**, Melnychuk, M, Feuerriegel, S. 2024. *Counterfactual Fairness for Predictions using Generative Adversarial Networks*. Arxiv Preprint arXiv:2310.17687. Under review at **ICML**.

Melnychuk, M, **Frauen, D**, Feuerriegel, S. 2022. *Causal Transformer for Estimating Counterfactual Outcomes*. In: **ICML**.

Feuerriegel, S, **Frauen, D**, Melnychuk, M, Schweisthal, J, Hess, Konstantin, Curth, Alicia, Bauer, Stefan, Kilbertus, Niki, Kohane, Isaac S., van der Schaar, Mihaela. 2023. *Causal Machine Learning to Predict Treatment Outcomes*. **Nature Medicine**.

Schweisthal, J, **Frauen, D**, van der Schaar, M, Feuerriegel, S. 2024. *Meta-learners for Partially Identified Treatment Effects from Multiple Environments.*. Under review at **ICML**.

Kuzmanovic, M, **Frauen, D**, Hatt, T, Feuerriegel, S. 2023. *Machine Learning Informs Cost-Effective Allocation of Development Aid*. Under review at **KDD 2024**.

Awards and Recognitions

2023	**Acceptance into the ELLIS PhD program**, ELLIS Society
2023	**NeurIPS Top Reviewer**, Conference on Neural Information Processing Systems
2021	**Member of the MCML**, Munich Center for Machine Learning (MCML)
2019-2021	**German Excellence Scholarship (Deutschlandstipendium)**, German Federal Ministry of Education and Research

Talks

Frauen, D. *Causal Machine Learning: Beyond Traditional Assumptions*. 2024. Cologne Institute for Information Systems, Cologne, Germany.

Frauen, D, Schweisthal, J. *Bounding causal effects using multiple observational datasets*. 2024. Munich Workshop on Causal Machine Learning (DFG sponsored), Munich, Germany

Frauen, D. *Causal Sensitivity Analysis*. 2023. Microsoft Research, Cambridge, UK.

Maarouf, A, **Frauen, D**, Feuerriegel, S. 2023. *Causal Machine Learning for Management Decision-Making*. Ladenburger Diskurs, Ladenburg, Germany.

Frauen, D. 2022. *Fair Off-Policy Learning from Observational Data*. Causal Data Science Meeting (online).