

Florian Ochs

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Oxford MSc in Mathematics student specializing in the theoretical foundations of statistics and machine learning, with research experience in probability metrics and generative models, seeking to apply these theoretical foundations in machine learning research and data-driven problems.

Education

University of Oxford, MSc Mathematical Sciences (Distinction, 4th in cohort) 10/2025 – 06/2026

- **Dissertation:** Efficient Estimation under Non-Monotone Blockwise Missingness via Iterative Augmentation
- **Coursework:** Advanced Topics in Statistical ML, Theories of Deep Learning, Statistical Learning Theory, Continuous Optimization, Bayes Methods, Advanced Simulation Methods

University of Duisburg-Essen, B.Sc. Mathematics (GPA: 1.0/1.0) 04/2022 – 03/2025

- **Thesis:** 'Rate of convergence for exponential approximation of hitting times' (Grade 1.0/1.0)
- **Relevant Coursework:** Mathematical Statistics, Continuous-Time Financial Mathematics, Probability Theory
- **Activities:** President of the student consulting club act e.V.

Publications

Why Adversarial Diffusion Trains More Stably Than GANs: A Local Jacobian View

Accepted (Poster), HiLD Workshop, ICML 2026

- Compared GAN, adversarial diffusion, and ELBO diffusion via local Jacobian analysis, showing that step-wise denoising averages the generator-discriminator coupling by $O(\log T/T)$ and explains the empirical training stability of adversarial diffusion.

Experience

Research Internship, Southern University of Science and Technology – Shenzhen 09/2025 – 09/2025

- Conducted theoretical research on generalizing concentration inequalities from linear statistics to arbitrary measurable functions of independent random variables.
- Applied the Efron-Stein inequality to prove that a refined concentration inequality (Shao & Lei, 2022) could not offer order-of-magnitude improvements over existing error bounds in the case of i.i.d. sums.
- Supported by the merit-based DUE Mobil Scholarship for international internships.

Research Internship, Luiss Guido Carli University – Rome 05/2025 – 08/2025

- Investigated the theoretical properties of a novel probability metric, proving its ability to metrize weak/vague convergence and deriving closed-form solutions for key test cases to establish analytical baselines.
- Implemented a PyTorch framework to numerically approximate the metric, overcoming the curse of dimensionality inherent in direct optimization and achieving a parametric rate of convergence.
- Developed and benchmarked algorithms to enforce Lipschitz constraints in neural networks, utilizing techniques such as spectral normalization, gradient penalties, and pairwise methods.
- Engineered a robust validation pipeline, including a measure discretization framework (Monte Carlo, grid-based), to rigorously test numerical models against the derived analytical solutions.

Internship in Data Science, Allianz – Munich 01/2025 – 04/2025

- Designed an ML framework to detect anomalies in a stochastic cash flow model.
- Engineered a data pipeline (SQL/Python) to preprocess 60+ years of high-dimensional time-series data (300k×2000), training surrogate models (NNs, XGBoost) reaching $R^2 > 0.98$ on standard sets and $R^2 > 0.9$ on tail-risk scenarios.
- Delivered an API-driven analysis tool using XAI-based error regression that successfully identified unexpected model behavior in the years leading up to projected insolvency.

Skills

Programming Languages: Python, SQL, R, Java, Typescript, HTML

Frameworks & Tools: PyTorch, Tensorflow, Scikit-learn, Pandas, Numpy, XGBoost, SHAP, LIME, React, Angular, BeautifulSoup, Git, Docker, Shiny, NLTK, Matplotlib, Seaborn