Julian Müller

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Research interests. Generative modeling, particularly flow matching and diffusion; learning from imperfect data; reinforcement learning and reward-based fine-tuning.

Education

University of Oxford — Oxford, United Kingdom
M.Sc. in Statistical Science — Oct 2025 – Sep 2026

- Overall grade: **77% (Distinction)**; ranked in the **top 10%** of the cohort.
  Highest grade in the cohort in: Statistical Programming practical **(100/100)**

University of Mannheim — Mannheim, Germany
B.Sc. in Economics — Sep 2022 – Jul 2025

- Overall grade: **1.0 (highest possible grade)**; ranked in the **top 0.3%** of graduates across three cohorts.
  Highest exam grade in: Statistics I, Introduction to Econometrics, Applied Multivariate Statistics, Resampling Methods, Statistical Learning Methods.

Theses and Manuscripts

Workshop Manuscript — SigmaFlow — In preparation
SigmaFlow: Less Integration, More Exploration in Generative Protein–Ligand Docking
Based on MSc thesis research | In collaboration with Prof. Garrett M. Morris

- Preparing a concise account of the trade-off between integration accuracy and candidate exploration in generative docking, showing how few-step flow matching can improve ranked success by reallocating a fixed inference budget toward more candidate poses.

M.Sc. Thesis — SigmaFlow *[GitHub]* — 2026
SigmaFlow: Riemannian Flow Matching for Generative Protein–Ligand Docking
University of Oxford | Supervisor: Prof. Garrett M. Morris | Grade: 81%

- Developed an SE(3)-equivariant Riemannian flow-matching variant of SigmaDock with geodesic training paths, targeting few-step generation to shift inference compute toward exploring a larger, more diverse set of candidate binding poses.
- Evaluated on 308 PoseBusters and 85 Astex complexes under matched 72-hour single-GPU training budgets. At 1,000 network evaluations per complex, SigmaFlow-NE achieved **72.3% Top-1 success versus 64.5%** for retrained SigmaDock on PoseBusters (RMSD < 2 Å and PoseBusters-valid). Diversity and cluster-oracle analyses revealed broader pose distributions and identified between-mode selection as the main source of recoverable ranking error.

B.Sc. Thesis — MSARM *[GitHub]* — 2025
From Theory to Application: Developing MSARM, an R Package for Markov-Switching Autoregressive Models
University of Mannheim | Supervisor: Dr. Ingo Steinke | Grade: 1.0

- Derived explicit EM estimating equations for Gaussian Markov-switching autoregressive models with user-specified switching in intercepts, individual lag coefficients, and innovation variance.
- Developed MSARM, an R package for estimation, forecasting, and visualization; across 288 simulated processes, MSARM met predefined estimation-quality criteria where `MSwM` failed in **70 cases**, versus **7 cases** with the reverse outcome.

Research Experience

Research Collaborator — SigmaFlow Sep 2026 – Present
Independent collaboration with Prof. Garrett M. Morris, Oxford Protein Informatics Group

- Continuing SigmaFlow development and preparing a workshop manuscript based on the MSc thesis.
- Supporting the integration and evaluation of SigmaFlow as a docking method in a DPhil research project building on VSynthesis2.

Quantitative Research Intern Sep 2026 – Present
Ansa Capital Management | Frankfurt am Main, Germany

- Researching deep generative models, particularly flow matching and diffusion, for probabilistic reconstruction of implied-volatility surfaces from raw equity-option quotes, examining whether modeling uncertainty in the reconstructed surfaces helps separate signal from noise.
- Investigating different reinforcement learning-based fine-tuning approaches for flow-matching and diffusion models, studying how their optimization mechanisms shape generated distributions and their suitability for task-specific, potentially non-differentiable quality objectives.

Research Assistant — Empirical Economic Research Jan 2025 – Aug 2025
University of Mannheim

- Reproduced empirical studies in R and Stata; investigated discrepancies arising from unavailable data, undocumented specifications, software defaults, and sensitivity to modeling choices.

Research Assistant — Quantitative Economics Feb 2024 – Aug 2024
University of Mannheim

- Built a longitudinal EU Emissions Trading dataset in R by reconciling heterogeneous sources; resolved installation and firm identifiers through address matching and geospatial verification, and mapped industrial emissions in Germany.

Teaching Experience

Teaching Assistant — University of Mannheim Sep 2023 – Jan 2025
Led tutorials in Statistics I, Statistics II, and Analysis and Linear Algebra A. Marked problem sets and exams for the statistics courses.

Scholarships

Friedrich Naumann Foundation for Freedom
Hans-Dietrich-Genscher Scholarship (master's study in England) 2025 – 2026
Graduate Scholarship 2025 – 2026
Undergraduate Scholarship 2022 – 2025

Additional Industry Experience

Deloitte, Valuation & Modelling Intern Jul 2023 – Sep 2023

Rödl & Partner, Transaction & Valuation Services Intern Jan 2023 – Mar 2023

Technical Skills

Programming: Python, R, SQL, Stata, LaTeX; R package development (devtools, roxygen2).
Libraries: PyTorch, PyTorch Geometric, NumPy, SciPy, pandas, scikit-learn.
Research computing: Git, Linux, Slurm, GPU training on Oxford ARC.