

Dr. Michael Mühlbauer

Data Scientist | Statistics & Machine Learning

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PROFILE

Statistician and data scientist working at the intersection of statistics and machine learning. My research recovers fine-grained insight from coarsened data: small area estimation for sparse survey samples, kernel density estimation from spatially aggregated data, and ordinal random forests for discretized responses. Growing interest in AI transformation and the strategic adoption of AI in organizations.

EXPERIENCE

- 08.2021 – 03.2026 **Scientific Research Associate**
Full-time [University of Bamberg](#) | Bamberg, Germany
– Built end-to-end data pipelines in R for large-scale statistical analyses (survey, census, and geospatial data)
– Extended an open-source R package (fabOF) with partial dependence plots for explainable ML
– Designed and automated a reproducible analysis pipeline for district-level mobility estimation across 400 German districts
– Delivered an applied data analysis project for the City of Jena (urban safety perception study)
– Designed and taught a graduate-level Python data science course (4 semesters)
– Represented academic staff interests in institute-level governance and decision-making bodies
– Served on the examination board for M.Sc. Survey Statistics and Data Analysis
- 01.2020 – 06.2021 **Student Research Assistant**
Part-time [University of Bamberg — Chair of Statistics and Econometrics](#) | Bamberg, Germany
– Contributed to a research project on demographic development
- 05.2020 – 07.2020 **Student Research Assistant**
Part-time [University of Bamberg — Chair of Economic Policy](#) | Bamberg, Germany
– Developed course materials for an applied econometrics lecture
- 09.2018 – 02.2019 **Working Student — Strategic Projects**
Part-time [Krones AG](#) | Neutraubling, Germany
– Designed and conducted a survey to identify structural issues in after-sales
– Proposed an organizational redesign to improve cross-regional coordination
– Presented findings and recommendations to senior leadership
- 09.2016 – 02.2017 **Innovation Management Intern**
Internship [Continental AG](#) | Regensburg, Germany
– Evaluated ideas from a corporate ideation platform for innovation decision-making
– Conducted technology and patent research for senior decision-makers
– Analyzed gamification methods and recommended platform enhancements
– Processed and visualized innovation KPIs for corporate reporting

EDUCATION

- 2021 – 2026 **Doctorate in Statistics**
[University of Bamberg](#) | Bamberg, Germany
Cumulative dissertation: "Reversing the Coarse: Statistical Methods for Recovering Structure from Aggregated, Sparse, and Discretized Data".
- 2019 – 2021 **M.Sc. in European Economic Studies**
[University of Bamberg](#) | Bamberg, Germany

Advanced studies in economics with focus on quantitative methods and European economic policy.

2015 – 2019

B.A. in Business Administration

OTH Regensburg | Regensburg, Germany

Foundation in business administration and quantitative analysis.

RESEARCH INTERESTS

Small Area Estimation Developing statistical methods for reliable estimates in small geographic areas or subpopulations with limited sample sizes.

Spatial Data Analysis Analyzing geographically referenced data, including density estimation from aggregated spatial information and choropleth mapping.

Kernel Density Estimation Extending measurement error models for density estimation when precise geocoordinates are unavailable due to privacy constraints.

Random Forests for Ordinal Data Applying and adapting machine learning methods, particularly ordinal random forests, for analyzing categorical and linguistic data.

PUBLICATIONS

[1] Michael Mühlbauer, Timo Schmid. **Density Estimation from Aggregated Data with Integrated Auxiliary Information: Estimating Population Densities with Geospatial Data.** *Submitted, 2025.* DOI [10.48550/arXiv.2508.03610](https://doi.org/10.48550/arXiv.2508.03610)

[2] Michael Mühlbauer, Lukas Sönning. **Ordinal random forests in language data analysis.** *Submitted, 2025.* DOI [10.31234/osf.io/s4bv2](https://doi.org/10.31234/osf.io/s4bv2)

[3] Michael Mühlbauer. **Estimating Disaggregated Mobility Indicators using Area-Level Models on Survey Data.** *Submitted, 2026.*

PROJECTS

Arboretum | Beta | github.com/muehlbauer-m/arboretum

AI-curated research digests from OpenAlex and arXiv. A cross-platform desktop app that turns plain-language research interests into weekly Markdown newsletters, delivered to disk or email. Built with Rust, Tauri v2, React, TypeScript.

Zotero MCP Server | Released | github.com/muehlbauer-m/zotero-mcp-server

Expose a local Zotero library to AI assistants via the Model Context Protocol. A maintained fork of an open-source MCP server that lets Claude, Cursor, and other MCP clients search, cite, and export from your personal Zotero library — including full-text PDF extraction. Built with Python, MCP Python SDK, PyZotero.

SKILLS

Statistical Methods: Regression & GLMs | Mixed-Effects Models | Bayesian Methods | LASSO / Regularization | Spatial Statistics | Survey Methodology | Small Area Estimation | Kernel Density Estimation | Monte Carlo Simulation | Experimental Design

Programming & Tools: R | Python | SQL | LaTeX | Typst | Git / GitHub | Quarto | Bash | High-Performance Computing (Condor)

Machine Learning: Random Forests | Neural Networks | Ensemble Methods | Ordinal Classification | Predictive Analytics | Cross-Validation | Feature Engineering | Model Validation

LLM & AI Engineering: Generative AI | Prompt Engineering | RAG | MCP | Agentic AI | AI Strategy & Transformation