Timo Schmid

CONTACT INFORMATION

Otto-Friedrich-Universität Bamberg
Chair of Statistics and Econometrics
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RESEARCH INTERESTS

Computational statistics, poverty mapping, small area estimation, spatial and spatio-temporal statistics, survey statistics, statistical modelling.

EDUCATION

University of Trier, Trier, Germany

Ph.D., Statistics, January, 2012

- Dissertation topic: *Spatial robust small area estimation applied on business data*
- Advisors:
  Prof. Dr. Ralf Münnich (University of Trier, Germany)
  Prof. Dr. Ray Chambers (University of Wollongong, Australia)
- Mark: Summa cum laude

Eberhard Karls Universität Tübingen, Tübingen, Germany

M.Sc. (Diploma), Mathematics, January, 2008

- Master topic: *Numerical range of power-bounded operators*
- Advisor: Prof. Dr. Rainer Nagel (Eberhard Karls Universität, Tübingen, Germany)
- Mark: 1.0

HONORS AND AWARDS

Ph.D. scholarship of the Foundation of German Economy (Stiftung der Deutschen Wirtschaft).
Eberhard Karls Universität Tübingen: Honors in Mathematics.

ACADEMIC EXPERIENCE

Otto-Friedrich-Universität Bamberg, Bamberg, Germany

Full Professor **April, 2021 - present**

- Head of the Bamberg center for empirical studies (BACES).
- Ongoing research in statistical modelling, spatial and survey statistics.
- Research/consulting projects.
- Teaching in graduate and undergraduate classes.

Freie Universität Berlin, Berlin, Germany

Associate Professor **May, 2017 - March, 2021**
Assistant Professor **October, 2012 - May, 2017**
Postdoctoral Research Fellow **April, 2012 - September, 2012**

- Head of the statistical consultancy *fu:stat* of the Freie Universität Berlin.
- Research/consulting projects.
- Teaching in graduate and undergraduate classes.

University of Trier, Trier, Germany

Doctoral Research Fellow **April, 2010 - April, 2012**

- Research for FP7-SSH-2009-6-BLUE-ETS: BLUE-Enterprise and Trade Statistics.
- Teaching experience included service as co-instructor.

Selected Publications

1. *Small area estimation with generalized random forests: Estimating poverty rates in Mexico*, with N. Frink and N. Würz, **Journal of the Royal Statistical Society: Series A**, 2026, forthcoming.
2. *Random forests and mixed effects random forests for small area estimation of general parameters: A poverty mapping case study in Mozambique*, with P. Krennmair, N. Tzavidis and N. Würz, **Annals of Applied Statistics**, 2026, 20, 809 – 832.
3. *Gradient boosting for hierarchical data in small area estimation*, with P. Messer, **Statistics and Computing**, 2026, forthcoming.
4. *Analysing opportunity cost of care work using mixed effects random forests under aggregated census data*, with P. Krennmair, and N. Würz, **Journal of the Royal Statistical Society: Series C**, 2026, 75, 1 – 20.
5. *Small area prediction of counts under machine learning-type mixed models*, with N. Frink, **Computational Statistics & Data Analysis**, 2025, 211. 1 – 16.
6. *Small area estimation of poverty in four West African countries by integrating survey and geospatial data*, with I. Edochie, E. Foster, A. L. Hernandez, D. Newhouse, A. Ouedraogo, A. Sanoh, A. Savadogo, and N. Tzavidis, **Journal of Official Statistics**, 2025, 41, 96 – 124.
7. *Estimating regional unemployment with mobile network data for functional urban areas in Germany*, with S. Hadam, A.-K. Kreutzmann, and N. Würz, **Statistical Methods & Applications**, 2024, 33, 205 – 233.
8. *Latent-variable modelling of ordinal outcomes in language data analysis*, with M. Krug, A. Leucht, P. Messer, L. Sönning, and F. Vetter, **Journal of Quantitative Linguistics**, 2024, 31 (2), 77 – 106.
9. *Small area estimation with multiple imputed survey data*, with M. Runge, **Journal of Official Statistics**, 2023, 39, 507 – 533.
10. *A framework for producing small area estimates based on area-level models in R*, with S. Harmening, A.-K. Kreutzmann, N. Salvati, and S. Schmidt, **The R Journal**, 2023, 15, 316 – 341.
11. *Variable selection using conditional AIC for linear mixed models with data-driven transformations*, with Y. Lee, M. Runge, and N. Rojas-Perilla, **Statistics and Computing**, 2023, 33 (27), 1 – 17.
12. *Releasing survey microdata with exact cluster locations and additional privacy safeguards*, with A. Arias-Salazar and T. Koebe, **Humanities and Social Sciences Communications**, 2023, 10, 1 – 13.
13. *Flexible domain prediction using mixed effects random forests*, with P. Krennmair, **Journal of the Royal Statistical Society: Series C**, 2022, 71, 1865 – 1894.
14. *Estimating regional income indicators under transformations and access to limited population auxiliary information*, with N. Tzavidis, and N. Würz, **Journal of the Royal Statistical Society: Series A**, 2022, 185, 1679 – 1706.
15. *Iterative kernel density estimation applied to grouped data: Estimating poverty and inequality indicators from the German Microcensus*, with M. Gross, P. Walter, and K. Weimer, **Journal of Official Statistics**, 2022, 38, 599 – 635.
16. *Intercensal updating using structure-preserving methods and satellite imagery*, with A. Arias-Salazar, T. Koebe, and N. Rojas-Perilla, **Journal of the Royal Statistical Society: Series A**, 2022, 185 (S2), 170 – 196.
17. *Kernel density smoothing of composite spatial data on administrative area level*, with K. Erfurth, M. Gross, and U. Rendtel, **AStA Wirtschafts- und Sozialstatistisches Archiv**, 2022, 16, 25–49.
18. *Experimental UK regional consumer price inflation with model-based expenditure weights*, with J. Dawber, T. Flower, P. Smith, H. Thomas, N. Tzavidis, and N. Würz, **Journal of Official Statistics**, 2022, 38, 213 – 237.

19. *The Fay-Herriot model for multiply imputed data with an application to regional wealth estimation in Germany*, with A.-K. Kreutzmann, P. Marek, M. Runge, and N. Salvati, **Journal of Applied Statistics**, 2022, 49, 3278 – 3299 .

20. *Domain prediction with grouped income data*, with M. Gross, N. Tzavidis, and P. Walter, **Journal of the Royal Statistical Society: Series A**, 2021, 184, 1501 – 1523.

21. *Data-driven transformations in small area estimation*, with N. Rojas-Perilla, S. Pannier, and N. Tzavidis, **Journal of the Royal Statistical Society: Series A**, 2020, 183, 121 – 148.

22. *Smoothing and benchmarking for small area estimation*, with R. Steorts, and N. Tzavidis, **International Statistical Review**, 2020, 88, 580 – 598.

23. *Switching between different non-hierarchical administrative areas via simulated geo-coordinates: A case study for student residents in Berlin*, with M.Gross, A.-K. Kreutzmann, U. Rendtel, and N. Tzavidis, **Journal of Official Statistics**, 2020, 36, 297 – 314.

24. *The R package emdi for estimating and mapping regionally disaggregated indicators*, with A.-K. Kreutzmann, S. Pannier, N. Rojas-Perilla, M. Templ and N. Tzavidis, **Journal of Statistical Software**, 2019, 91, 1 – 33.

25. *Analysing radon accumulation in the home by flexible M-quantile mixed effect regression*, with R. Borgoni, A. Carcagni, and N. Salvati, **Stochastic Environmental Research and Risk Assessment**, 2019, 33, 375 – 394.

26. *The fayherriot command for estimating small-area indicators*, with C. Halbmeier, A.-K. Kreutzmann, and C. Schröder, **Stata Journal**, 2019, 19, 626 – 644.

27. *From start to finish: A framework for the production of small area official statistics*, with A. Luna, N. Rojas-Perilla, N. Tzavidis and L.-C. Zhang, **Journal of the Royal Statistical Society: Series A**, 2018, Read paper, 181 (4), 927 – 979.

28. *Modelling the distribution of health related quality of life of advanced melanoma patients in a longitudinal multi-center clinical trial*, with R. Borgoni, P. Del Bianco, N. Salvati and N. Tzavidis, **Statistical Methods in Medical Research**, 2018, 27 (2), 549 – 563.

29. *Robust small area estimation under spatial non-stationarity*, with C. Baldermann and N. Salvati, **International Statistical Review**, 2018, 86 (1), 136 – 159.

30. *Constructing socio-demographic indicators for National Statistical Institutes using mobile phone data: Estimating literacy rates in Senegal*, with F. Bruckschen, N. Salvati and T. Zbiranski, **Journal of the Royal Statistical Society: Series A**, 2017, 180 (4), 1163 – 1190.

31. *Estimating the density of ethnic minorities and aged people in Berlin: Multivariate kernel density estimation applied to sensitive geo-referenced administrative data protected via measurement error*, with M. Gross, U. Rendtel, S. Schmon and N. Tzavidis, **Journal of the Royal Statistical Society: Series A**, 2017, 180 (1), 161 – 183.

32. *Outlier robust small area estimation under spatial correlation*, with R. Chambers, R. Münnich and N. Tzavidis, **Scandinavian Journal of Statistics**, 2016, 43 (3), 806 – 826.

33. *Longitudinal analysis of the strengths and difficulties questionnaire scores of the millennium cohort study children in England using quantile and M-quantile multilevel models*, with E. Flouri, E. Midouhas, N. Salvati and N. Tzavidis, **Journal of the Royal Statistical Society: Series A**, 2016, 179 (2), 427 – 452.

34. *Simulation tools for small area estimation: Introducing the R-Package saeSim*, with S. Warnholz, **Austrian Journal of Statistics**, 2016, 45, 55 – 69.

35. *Spatial robust small area estimation*, with R. Münnich, **Statistical Papers**, 2014, 55, 653 – 670.

Selected book chapters

1. *Assessing discontinuities and rotation group bias in rotating panel designs*, with D. Elliott, S. Krieg, P. Smith, N. Tzavidis and J. van den Brakel, In Advances in Longitudinal Survey Methodology (ed. P. Lynn), 2021, 399 – 423.
2. *Refugees in undeclared employment - A case study in Turkey*, with F. Bruckschen, T. Koebe, M. Ludolph and M. Marino, In Guide to Mobile Data Analytics in Refugee Scenarios, 2019, 329 – 346.

Papers in preparation

1. *Small area estimation under limited auxiliary data and complex survey data*, with S. Neef and N. Würz, Working paper, 2026.
2. *Twofold nested error regression models with data-driven transformation*, with R. Kyalo and N. Würz, Working paper, 2026.
3. *Area-level small area estimation with random forests: Estimating consumption at grid-level in Mozambique*, with S. Harmening, Y. Lee and M. Runge, Working paper, 2026.
4. *Can a model pretrained on synthetic data accurately estimate statistics for places that surveys barely reach?*, with S. Popp and N. Würz, Working paper, 2026.
5. *Scale estimation and data-driven tuning constant selection for M-quantile regression*, with J. Dwaber, N. Salvati, and N. Tzavidis, Working paper, 2021.
6. *Asymptotic distribution of regression quantiles in a mixed effects model*, with S. Hensel, S. Pannier, and N. Tzavidis, Working paper, 2021.

Grants and Statistical Consulting

mFUND - Federal Ministry for Digital Transformation and Government Modernisation
Principal investigator **April, 2025 - March, 2028**
NeDaMo - The project aims to integrate mobile network data with official statistics and improve data quality through supplementary surveys to support transport and mobility planning.
Volume: € 2,971,456
Further information

DFG - German Research Foundation
Principal investigator **October, 2024 - October, 2027**
BSLVC - The main objective is to investigate the use of lexical and grammatical structures in varieties of English with new statistical methods in ordinal data analysis.
Volume: € 809,415

Federal Statistical Office of Germany
Principal investigator **January, 2023 - December, 2026**
RIFOSS II - The project aims to advance official statistics by integrating mobile network data with traditional data sources to produce reliable small-area population estimates.
Volume: € 68,000

Civey
Principal investigator **Mai, 2021 - Mai, 2024**
The aim of the project is to develop adequate methodology for small area estimation in the context of non-probabilistic (online) surveys.
Volume: € 136,000

DFG - German Research Foundation
Principal investigator **Mai, 2019 - October, 2022**
TESAP - The main objective is to construct time-stable estimates for the Household Finance and Consumption Survey (HFCS) for the German Central Bank.
Volume: € 140,472

Berlin University Alliance
Principal investigator **April, 2020 - March, 2021**
The main aim is to forecast study-success or drop-out based on survey- and administrative examination data.
Volume: € 55,363

Statistical consulting unit *fu:stat* of the Freie Universität Berlin
Head of consulting unit **October, 2012 - March 2021**
Statistical consulting for companies, statistical courses and support for students.
Volume: € 100,000 (per year)

Economic and Social Research Council
Co-investigator **January, 2016 - May, 2019**
The project focuses on developing innovations in small area estimation methodologies.
Principal investigator: Nikos Tzavidis (University of Southampton)
Volume: £ 815,000
Further information

Federal Ministry for Economic Affairs and Energy
Principal investigator **April, 2018 - March, 2019**
Deep Mobility/ Knuper - The project focuses on combining traditional survey data with mobile phone data for predicting socio-demographic indicators.
Volume: € 122,600
Further information

Berlin Senate for Urban Development
Principal investigator **January, 2018 - May, 2019**
The aim of the project is to forecast the population in Berlin on district-level for 2018-2030.
Volume: € 25,000
Further information

DFG - German Research Foundation
Principal investigator **April, 2016 - July, 2018**
QUESSAMI - The main objective of the project is to develop an adequate methodology for high quality estimates for the Household Finance and Consumption Survey (HFCS).
Volume: € 162,970

MIUR-DAAD Joint Mobility Program
Principal investigator **May, 2016 - April, 2018**
The aim of the project is to investigate multidimensional poverty by using small area estimation.
Volume: € 40,000

Bill and Melinda Gates Foundation
Principal investigator **June, 2015 - December, 2016**
The main objective is to construct socio-demographic indicators based on mobile phone data.
Volume: € 40,000

Welsh Government
Co-Principal investigator **June, 2016 - December, 2016**
The primary objective is to investigate discontinuities in the National Survey.
Principal investigator: Paul Smith (University of Southampton)
Volume: £ 25,000

Berlin Senate for Urban Development
Principal investigator **January, 2016 - April, 2016**
The aim of the project is to estimate on spatially disaggregated level where students live in Berlin.
Volume: € 11,000

Center for Research Strategy (E-Club), Freie Universität Berlin
Co-Principal investigator **July, 2015 - March, 2016**
The main objective is to develop a novel statistical method to analyze large functional magnetic resonance imaging datasets.
Principal investigator: Dirk Ostwald (Freie Universität Berlin)
Volume: € 13,800

National Statistical Institute Mexico
Co-Principal investigator **January, 2015 - December, 2015**
The aim of the project is to produce small area estimates of income related indicators for municipalities in Mexico.
Principal investigator: Nikos Tzavidis (University of Southampton)
Volume: £ 15,000

Teaching and Supervision

Lectures (ongoing):

- Master level: Multivariate Statistics, Poverty mapping, Small area estimation I and II
- Bachelor level: Statistics I, Statistics II, Generalized linear models
- Several **best teaching awards** for the lectures Statistics I and II

Seminars:

- Master level: Computational statistics, Spatial statistics, Statistical consulting

Supervision of Ph.D. candidates:
Finalized:

1. Michael Mühlbauer, *Reversing the coarse: statistical methods for recovering structure from aggregated, sparse and discretized data*, 2026.
2. Nicolas Frink, *Generalized tree-based machine learning methods with applications to small area estimation*, 2024.
3. Yeonjoo Lee, *Recent advances in small area estimation of economic and poverty indicators using traditional and alternative data*, 2024.
4. Gloria Remlein, *A statistical learning framework for multi-target prediction of image processing parameters*, 2024.
5. Sandra Hadam, *On the usage of mobile phone data in official statistics*, 2023.
6. Marina Runge, *Strategies for multiply imputed survey data and modeling in the context of small area estimation*, 2023.
7. Alejandra Arias-Salazar, *Structure preserving estimators to update socio-economic indicators in small areas*, 2022.
8. Till Koebe, *Utilizing alternative data sources for official statistics*, 2022.
9. Patrick Krennmair, *A framework for the estimation of disaggregated statistical indicators using tree-based machine learning methods*, 2022.
10. Noah Mutai, *Estimating selected disaggregated socio-economic indicators using small area estimation techniques*, 2022.
11. Nora Würz, *Small area estimation under limited auxiliary population data dealing with model violations and their economic applications*, 2022.
12. Sören Pannier, *Combining data sources: A path to improved understanding and prediction*, 2021.
13. Mursala Khan, *The fade-away phenomenon of initial non-response bias in panel surveys*, 2020.

14. Ann-Kristin Kreutzmann, *Estimation of disaggregated indicators with application to the household finance and consumption survey*, 2018.
15. Natalia Rojas-Perilla, *The use of data-driven transformations and their applicability in small area estimation*, 2018.
16. Paul Walter, *A selection of statistical methods for interval-censored data with applications to the German microcensus*, 2018.
17. Claudia Baldermann, *Robust small area estimation under spatial non-stationarity for unit-level models*, 2017.
18. Marcus Gross, *Measurement error models applied to survey statistics*, 2016.
19. Sebastian Warnholz, *Small area estimation using robust extensions to area level models*, 2016.
20. Beate Weidenhammer, *On the consistency of quantile regression in linear mixed models*, 2016.

Ongoing - first supervisor:

1. Niklas Dörner, *Domain prediction in the context of informative designs.*.
2. Johanna Einhorn, *Distributional random forests in the context of hierarchical data.*
3. Sylvia Harmening, *Extended area-level modeling for applied small area estimation.*
4. Rachael Kyalo, *Small area estimation for complex data with applications to poverty and agricultural statistics.*
5. Paul Messer, *Gradient boosting for hierarchical data in small area estimation.*
6. Selina Neef, *Modern methods in official statistics.*
7. Steffen Popp, *tba.*
8. Franz Prücklmair, *From classical weighting to overfitting-robust machine learning.*
9. Rebecca Schmitz, *tba.*
10. Felix Skarke, *M-quantile regression: Theoretical developments and practical implementation.*
11. Lea Voll, *Flexible Bayesian mixed-effects models for small area estimation.*

External examiner:

1. Jamal Hossain, *Statistical estimation and inference with aggregated and displaced georeferenced data*, 2023, University of Southampton, UK.
2. Angelina Hammon, *Analysis of survey data in the presence of non-ignorable missing-data and selection mechanisms*, 2022, Humboldt-Universität zu Berlin, Germany.
3. Mehboob Ali, *Advanced survey designs for planned missing data*, 2021, Ludwig-Maximilians-Universität Munich, Germany.
4. Sara Bahrami, *Missing by design patterns for optimizing survey response by efficient and Consistent data collection*, 2020, Otto-Friedrich-Universität Bamberg, Germany.
5. Ziyang Lyu, *Asymptotic theory for linear mixed effects models with large cluster size*, 2019, The Australian National University, Canberra, Australia.
6. Alberto Sabbi, *Mixed effect quantile and M-quantile regression for spatial data*, 2019, Sapienza University of Rome, Italy.
7. Steve Donbavand, *Mapping poverty: the application and evaluation of model-based approaches to poverty level estimation within small areas*, 2015, University of Southampton, UK.
8. Innocent Ngaruye, *Small area estimation for multivariate repeated measure data*, 2014, Linköping University, Sweden.

Professional Experience

A.T. Kearney, Munich, Germany

Consultant **April, 2008 - March, 2010**

Implementation of several consulting projects, including modelling of affluent clients for an international bank, benchmarking of costs for mobile operators, and advice on analysis of airline economics data.

Roland Berger Strategy Consultants, Munich, Germany

Summer researcher **August, 2006 - October, 2006**

Carried out a consulting project for a German telecommunication company.

Computer Skills

- Languages: R, C++, LaTeX, SAS, JMP, STATA and SPSS.
- R packages: emdi, povmap, saeSim.
- Algorithms: Extensive experience programming/evaluating of simulations; parallel computing.
- Operating Systems: Unix/Linux, Windows.

Professional Service

Editor-in-Chief: AStA Wirtschafts- und Sozialstatistisches Archiv (2017-2023)

Associate Editor: Among other, Biometrical Journal (2019-2020), Journals of the Royal Statistical Society Series C (2025-2029), Metron (2019-present)

Journal reviewer: Among other, Annals of Applied Statistics, Biometrical Journal, Computational Statistics and Data Analysis, European Journal of Operational Research, International Statistical Review, Journal of American Statistical Association, Journals of the Royal Statistical Society Series A/B/C, Journal of Official Statistics, Journal of Multivariate Analysis, Mathematical Population Studies, Journal of Survey Statistics and Methodology, Metron, Scandinavian Journal of Statistics, Statistical Papers, Spatial Statistics, Statistics in Transition, Survey Methodology, Survey Research Methods, Test.

Memberships: German Statistical Society (DStatG), International Association of Survey Statisticians (IASS), International Statistical Institute (ISI), Royal Statistical Society (RSS).

Boards/Committees: Expert Committee German Census (2026-2031), Board Member of the German Statistical Society (2017-2023), IASS Council Member (2015-2019), ISI Young Statisticians Committee.

Offer of Professorship

Freie Universität Berlin, Berlin, Germany
Full Professor **June, 2020**
Offer of a Full Professorship in applied statistics at the Freie Universität Berlin.

Otto-Friedrich-Universität Bamberg, Bamberg, Germany
Full Professor **March, 2020**
Offer of a Full Professorship in statistics and econometrics at the Otto-Friedrich-Universität Bamberg.

Universität des Saarlandes, Saarbrücken, Germany
Associate Professor **August, 2017**
Offer of an Associate Professorship in quantitative methods and statistics at the Universität des Saarlandes.

Freie Universität Berlin, Berlin, Germany
Associate Professor **March, 2017**
Offer of an Associate Professorship in applied statistics at the Freie Universität Berlin.

University of Manchester, Manchester, UK
Associate Professor **May, 2016**
Offer of an Associate Professorship in social statistics at the University of Manchester.