Marie-Christine Düker

Friedrich-Alexander University Erlangen-Nürnberg
Department of Data Science
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Affiliation

Assistant Professor, *Friedrich-Alexander University Erlangen-Nürnberg* 2023–present

Education

Cornell University, Department of Statistics and Data Science 2020–2023
Postdoctoral Associate
Advisors: Dr. David Matteson

Ruhr-University Bochum, Faculty of Mathematics 2016–2020
Ph.D. Mathematics
Summa Cum Laude
Thesis: *High-dimensional time series under long-range dependence and nonstationarity*
Advisor: Dr. Herold Dehling

The University of North Carolina at Chapel Hill, 2018–2019
Department of Statistics and Operations Research
Visiting Scholar
Advisor: Dr. Vladas Pipiras

Ruhr-University Bochum, Faculty of Mathematics 2014–2016
MS Mathematics with Minor Economics
Summa Cum Laude

Ruhr-University Bochum, Faculty of Mathematics 2011–2014
BS Mathematics with Minor Economics

Publications

Peer-Reviewed Papers

[1] M.-C. Düker, D. S. Matteson, T. Ruey and I. Wilms. Vector AutoRegressive Moving Average Models: A Review. *To appear in WIREs Computational Statistics, 2025+* [arXiv].

[2] M.-C. Düker, R. Lund and V. Pipiras. High-dimensional latent Gaussian count time series: Concentration results for autocovariances and applications. *Electronic Journal of Statistics*, 18(2):5484–5562, 2024: [doi] [arXiv].

[3] Y. Xu, M.-C. Düker, and D. S. Matteson. Testing simultaneous diagonalizability. *Journal of the American Statistical Association*, 119(546):2386–2414, 2024: [doi] [arXiv].

[4] C. Baek, M.-C. Düker, and V. Pipiras. Local Whittle estimation of high-dimensional long-run variance and precision matrices. *The Annals of Statistics*, 51(6):2386–2414, 2023: [doi] [arXiv] [Supplement].

[5] M.-C. Düker, S.-O. Jeong, and T. Lee, C. Baek. Detection of multiple change-points in high-dimensional panel data with cross-sectional and temporal dependence. *Statistical Papers*, 1–33, 2023: [doi] [Link].

[6] M. Davidow, T. Schafer, M. Cory, J. Che-Castaldo, M.-C. Düker, E. Feng, D. S. Matteson. Clustering Future Scenarios Based on Predicted Range Maps. *Methods in Ecology and Evolution*, 14(5), 1346–1360, 2023: [doi] [arXiv].

[7] C. Goolsby, J. Losey, A. Fakharzadeh, Y. Xu, M.-C. Düker, M. Sherman Getmansky, D. S. Matteson, M. Moradi. Addressing the embeddability problem in transition rate estimation from Markov state models. *Journal of Physical Chemistry A*, 127(27), 5745–5759, 2023: [doi] [bioarXiv].

[8] M.-C. Düker, V. Pipiras, and R. R. Sundararajan. Cotrending: testing for common deterministic trends in varying means model. *Journal of Multivariate Analysis*, page 104825, 2021: [doi] [Link] [Supplement].

[9] M.-C. Düker. Limit theorems in the context of multivariate long-range dependence. *Stochastic Processes and their Applications*, 130(9):5394–5425, 2020: [doi] [arXiv].

[10] M.-C. Düker and V. Pipiras. Asymptotic results for multivariate local Whittle estimation with applications. *8th IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, pages 1–5, 2019: [doi] [Link] [Supplement].

[11] M.-C. Düker. Limit theorems for Hilbert space-valued linear processes under long-range dependence. *Stochastic Processes and their Applications*, 128(5):1439–1465, 2018: [doi] [arXiv].

Preprints

[11] M.-C. Düker and P. Zoubouloglou. Breuer-Major Theorems for Hilbert Space-Valued Random Variables. *Preprint, 2024:* [arXiv].

[12] Y. Kim, M.-C. Düker, Z. F. Fisher and V. Pipiras. Latent Gaussian dynamic factor modeling and forecasting for high-dimensional count time series. *Preprint, 2024:* [arXiv].

[13] M.-C. Düker and V. Pipiras. Testing for common structures in high-dimensional factor models. *Preprint, 2024:* [arXiv] [Supplement].

[14] A. Betken and M.-C. Düker. Second order asymptotics of the empirical process under long-range dependence. *Preprint, 2023:* [arXiv].

[15] M.-C. Düker. Sample autocovariance operators of long-range dependent Hilbert space-valued linear processes. *Preprint, 2022:* [Link].

Grants

Emerging Talents Initiative Grant ($\sim$ 14.000 Euros) 2024

Submitted: DFG research grant, PI of TRR 154, Hector Research Career Development Award.

Awards and Fellowships

Outstanding thesis award in STEM, Dr. Heinrich-Kost-Preis Gesellschaft der Freunde der RUB

Ph.D. Fellowship, DFG (German Research Foundation) funded,
Research Training Group 2131 *High-dimensional Phenomena in Probability* 2016–2019

Certificates

Certificate for Teaching in Higher Education of the Bavarian Universities 2024

Employment

Assistant Professor (tenure track), Friedrich Alexander University Erlangen-Nürnberg,
Department of Statistics and Data Science 2023–present

Postdoctoral Associate, Cornell University, Department of Statistics and Data Science 2020–2023

Research Assistant, Ruhr-University Bochum, Faculty of Mathematics
Research Training Group 2131 *High-dimensional Phenomena in Probability* 2016–2020

Student Research Assistant, Ruhr-University Bochum, Faculty of Mathematics
Collaborative Research Center 823 *Statistical modeling of nonlinear dynamic processes* 2015–2016

Student Teaching Assistant, Ruhr-University Bochum, Faculty of Mathematics 2015–2016

Student Research Assistant, Ruhr-University Bochum, Institute of Hydrology,
Water Resources Management and Environmental Engineering 2014–2015

Teaching

Advanced topics in time series (Winter term 2024/25)

Seminar in Statistical foundations of Data Science (Winter term 2024/25)

Introduction to mathematical data analysis (Summer term 2024)

Seminar in Statistical foundations of Data Science (Summer term 2024)

Lecturer Special topics in Statistical learning theory (Summer term 2023 and Winter term 2023/24)

Seminar in Statistical foundations of Data Science (Winter term 2023/24)

Teaching Assistant Financial Mathematics (Summer term 2020)

Teaching Assistant Analysis III (Winter term 2017)

Teaching Assistant Analysis I (Winter term 2016)

Co-advisor for the seminar ”Statistics in everyday life" (Winter term 2015)

I am currently advising 4 Master students and 1 Bachelor student.

Professional Service and Outreach

Chair for organizing the Section Time Series at the 17th German Probability and Statistics Days (GPSD 2025).

Session organizer: Bernoulli-IMS, 11th World Congress in Probability and Statistics.

Kolloquium organizer: Stochastics and Data Science Seminar at FAU Winter term 23/24.

Co-organizer KDD 2021 Workshop *Risk identification and quantification in complex human-natural systems via convergent data intensive research.*

Equal opportunities representative, Faculty of Mathematics, *Ruhr-University Bochum* (2017).

Associate Editor for the Journal Data Science in Science.

Referee for the following journals:

- Annals of Statistics
- Biometrika
- Stochastic Processes and their Applications
- Journal of Econometrics
- Journal of Statistical Planning and Inference
- Econometrics and Statistics
- The American Statistician
- Journal of the Korean Statistical Society
- Applications of Mathematics
- ASA Student paper award 2021
- IEEE-Transactions on signal processing
- IEEE-Transactios on information theory
- Journal of time series analysis
- International Statistical Review
- Journal of Computational and Graphical Statistics

Languages and Computer skills

German, English

R, Python, MATLAB, C, VBA

R package development

Presentations

18th International Conference of the ERCIM WG on Computational and Methodological Statistics, London, 14–16th December 2024 (invited).

Seminar, Department of Mathematics, Otto-von-Guericke University Magdeburg, November 2024 (invited).

7th International Conference on Econometrics and Statistics (EcoSta 2024), Beijing, 17–19th July 2024 (invited).

16th International Conference of the ERCIM WG on Computational and Methodological Statistics, Berlin, 16–18th December 2023 (invited).

Seminar, Department of Mathematics, University of Athens, December 2023 (invited).

Seminar, Department of Mathematics, EPFL, November 2023 (invited).

NBER-NSF Time Series Conference, Montreal, September 2023.

Joint Statistical Meetings (JSM), Toronto, August 2023 (invited).

6th International Conference on Econometrics and Statistics (EcoSta 2023), Waseda University Tokyo, virtual, August 2023 (invited).

13th Extreme Value Analysis Conference, Bocconi University Milan, June 2023 (invited).

Conference "Women in Data Science", Friedrich-Alexander University Erlangen, virtual, April 2023 (invited).

Seminar, Department of Statistics and Mathematics, University of Massachusetts at Amherst, March 2023 (invited).

Conference "Adaptive and high-dimensional spatio-temporal methods for forecasting", CIRM Luminy, September 2022 (invited).

Seminar, Econometrics and Statistics, University of Chicago, Booth School of Business, virtual, March 2022 (invited).

Seminar, Department of Statistics, University of Wisconsin Madison, virtual, February 2022 (invited).

Seminar, Department of Statistics, University of Michigan, January 2022 (invited).

10th International Conference of the ERCIM WG on Computational and Methodological Statistics, virtual, 18–20th December 2021 (invited).

Stochastic Seminar, Department of Mathematics, University of Utah, October 2021 (invited).

Joint Statistical Meeting 2021, virtual, 7–12th August 2021.

10th World Congress, virtual, July 19th–23rd.

Graduate Seminar, Department of Statistics and Operations Research, UNC Chapel Hill, September 2019.

40th Conference on Stochastic Processes and their Applications, Gothenburg, 11–15th of June 2018.

13th German Probability and Statistics Days, Freiburg, 27th February–02nd March 2018.

10th International Conference of the ERCIM WG on Computational and Methodological Statistics, London, 16–18th December 2017.

Graduate Seminar, Department of Statistics and Operations Research, TU Dortmund, November 2017.

31st European Meeting of Statisticians, Helsinki, 24–28th July 2017.

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