Curriculum Vitae

Shayan Hundrieser

Date of Birth	May 18^{th}, 1996	**Email**	s.hundrieser@utwente.nl
Languages	German (native speaker), English (fluent)	**Affiliation**	Department of Applied Mathematics University of Twente Enschede, The Netherlands
Nationality	German		

Research Summary

During my Master's and Ph.D. studies, I built a strong foundation in mathematics and statistics, with a particular focus on optimal transport. This has shaped my passion for advancing data science and machine learning. My research centers on statistical optimal transport, statistics on non-Euclidean spaces, and neural networks, with applications to the natural sciences. Recent work has addressed problems in super-resolution microscopy, protein shape analysis, and wind data modeling, where I have combined theoretical advances with refined statistical methods to achieve both methodological innovation and practical impact. Looking ahead, I aim to expand this research at the intersection of mathematical statistics, machine learning, and the natural sciences, developing frameworks that drive both theoretical progress and scientific discovery.

Work Experience

May 2025 - Present Postdoctoral Researcher – University of Twente, Enschede, The Netherlands
Research interests: Statistical Theory for Neural Networks and Optimal Transport
Funded by Leopoldina Postdoctoral Scholarship (05/2025 – 04/2026: University of Twente, Enschede, The Netherlands; 05/2026 – 04/2027 at Yale University, New Haven, CT, USA)

Mar 2024 - Apr 2025 Postdoctoral Researcher – University of Göttingen, Göttingen, Germany
Research interests: Statistical Analysis of Optimal Transport and their Applications, Super-resolution Microscopy and Deconvolution, Estimation in Finite Mixture Models

Apr 2020 - Feb 2024 Research Assistant – University of Göttingen, Göttingen, Germany
Research interests: Statistical Analysis of Empirical Optimal Transport and Variants, Statistical Methodology with Fréchet Means on Metric Spaces

Education

Apr 2020 - Feb 2024 Ph.D. studies in Mathematical Sciences – University of Göttingen, Germany
Ph.D. Thesis: *"Statistical Optimal Transport and its Entropic Regularization: Compared and Contrasted"*, *Grade: Summa Cum Laude* (supervisor: Prof. Dr. Axel Munk)

Jul 2023 Research visit – Carnegie Mellon University, Pittsburgh, USA
Research topics: Parameter Estimation in Finite Mixture Models for Deconvolution

Oct 2017 - Mar 2020 M.Sc. in Mathematics, Minor in Economics – University of Göttingen, Germany
Grade: Very good (1.0) *with distinction*
Specialization: Mathematical Statistics, Statistical Data Analysis, Optimization

Oct 2017 - Jul 2018 Study Abroad - Erasmus+ Programme – University of Warwick, United Kingdom
Grade: First Class Honors
Specialization: Stochastic Processes, Bayesian Statistics

Oct 2014 - Sep 2017 B.Sc. in Mathematics, Minor in Economics – University of Göttingen, Germany
Grade: Very good (1.1) *with distinction*
Specialization: Mathematical Statistics, Statistics on Non-Euclidean Spaces

Publications

Publications under Review

1. Groppe, M., Niemöller, L., **Hundrieser, S.**, Ventzke, D., Blob, A., Köster, S., and Munk, A. (2025). *Optimal transport based testing in factorial design*, submitted [preprint arXiv:2509.13970].

2. Struleva*, M., **Hundrieser*, S.**, Schuhmacher, D., and Munk, A. (2025). *Sharp convergence rates of empirical unbalanced optimal transport for spatio-temporal point processes*, submitted [preprint arXiv:2509.04225].

3. **Hundrieser*, S.**, Manole*, T., Litskevich, D., and Munk, A. (2025). *Local Poisson deconvolution for discrete signals*, submitted [preprint arXiv:2508.00824].

4. **Hundrieser, S.**, Eltzner, B., and Huckemann, S. (2024). *A lower bound for estimating Fréchet means*, submitted to Annals of the Institute of Statistical Mathematics, revised [preprint arXiv:2402.12290].

5. González-Sanz, A. and **Hundrieser, S.** (2023). *Weak limits for empirical entropic optimal transport: Beyond smooth costs*, submitted [preprint arXiv:2305.09745].

Peer-Reviewed Publications

6. **Hundrieser*, S.**, Heinemann*, F., Klatt, M., Struleva, M., and Munk, A. (2025). *Unbalanced Kantorovich-Rubinstein distance, plan, and barycenter on finite spaces: A statistical perspective*, Journal of Machine Learning Research 26(37), pp. 1–70.

7. Staudt, T., **Hundrieser, S.**, and Munk, A. (2025). *On the uniqueness of Kantorovich potentials*, SIAM Journal on Mathematical Analysis, 57(2) pp. 1452–1482.

8. Staudt, T. and **Hundrieser, S.** (2025). *Convergence of empirical optimal transport in unbounded settings*, Bernoulli 30(4), pp. 2846–2877.

9. Groppe, M. and **Hundrieser, S.**, (2024). *Lower complexity adaptation for empirical entropic optimal transport*, Journal of Machine Learning Research, 25(344), pp. 1–55, awarded with Student Travel Award from ICSDS 2023, Lisbon, Portugal.

10. **Hundrieser, S.**, Mordant, G., Weitkamp, C.A., and Munk, A. (2024). *Empirical optimal transport under estimated costs: Distributional limits and statistical applications*, Stochastic Processes and their Applications, 178(104462), pp. 1–45.

11. **Hundrieser, S.**, Eltzner, B., and Huckemann, S. (2024). *Finite sample smeariness of Fréchet means with application to climate*, Electronic Journal of Statistics, 18(2), pp. 3274–3309.

*Equal contribution

12. **Hundrieser, S.**, Klatt, M., Munk, A., and Staudt, T. (2024). *A unifying approach to distributional limits for empirical optimal transport*, Bernoulli, 30(4) pp. 2846–2877.

13. **Hundrieser, S.**, Staudt, T., and Munk, A. (2024). *Empirical optimal transport between different measures adapts to lower complexity*, Annales de l'Institut Henri Poincaré, Probabilités et Statistiques, 60(2), pp. 824–846.

14. **Hundrieser, S.**, Klatt, M., and Munk, A. (2024). *Limit distributions and sensitivity analysis for empirical entropic optimal transport on countable spaces*, The Annals of Applied Probability, 34(1B), pp. 1403–1468.

15. **Hundrieser, S.**, Klatt, M., and Munk, A. (2022). *The statistics of circular optimal transport*, Proceedings of Directional Statistics for Innovative Applications, pp. 57–82.

16. Eltzner, B., **Hundrieser, S.**, and Huckemann, S. (2021). *Finite sample smeariness on spheres*, Proceedings of 5th International Conference on Geometric Science of Information, pp. 12–19.

Software

1. R-package "FSS" based on publication "Finite sample smeariness of Fréchet means on the circle and the torus" available on "*github.com/hundrieser/FSS*".

2. R-package "circularOT" based on publication "The statistics of circular optimal transport" available on "*gitlab.gwdg.de/shundri/circularOT*".

Awards, Prizes, and Scholarships

2025 - 2027 Leopoldina National Academy of Science Postdoctoral Scholarship
Project title: "Towards high-dimensional statistical optimal transport with sparse PCA and neural networks" — *15 – 20 fellows per year within Germany, Austria and Switzerland*
Full funding for one year at University of Twente, Enschede, Netherlands and one year at Yale University, New Haven, CT, USA.

2025 - 2027 Walter-Benjamin Postdoctoral Scholarship by German Research Foundation (DFG, Deutsche Forschungsgemeinschaft) – Declined due to acceptance of Leopoldina Postdoctoral Scholarship.

2025 Junior Researcher Travel Award to attend the IMS Conference on Statistics and Data Science in Seville, Spain in December 2025

2025 Dissertation Prize of the University Association of Göttingen (registered association)
(Dissertationspreis des Universitätsbundes Göttingen e.V.)
honoring the best dissertation of the University of Göttingen

2025 Dissertation Prize by the Probability and Statistics Group of the German Mathematical Society
(Dissertationspreis der Fachgruppe Stochastik der Deutschen Mathematiker-Vereinigung)
honoring the best dissertation in Germany in the field of Mathematical Statistics

2024 Faculty award for excellent Doctoral studies in Mathematical Sciences

2020 Faculty award for an excellent Master of Science degree in Mathematics

2018 - 2020 Fellow of German Academic Scholarship Foundation (Studienstiftung d. deutschen Volkes)
Germany's most prestigious academic scholarship

2017 Erasmus+ Scholarship for academic stay at University of Warwick, United Kingdom

2017 Faculty award for an excellent Bachelor of Science degree in Mathematics

Oral Presentations

May 2025 *New frontiers in statistical optimal transport*
Workshop on the Statistical Theory of Neural Networks (Invited Talk)
Egmond aan Zee, The Netherlands

Mar 2025 *Statistical aspects of optimal transport: Regularization, estimation, and applications*
German Probability and Statistics Days 2025, Dresden, Germany (Invited Talk)

Jan 2025 *Statistical unbalanced optimal transport*
Heidelberg-Paris Workshop on Mathematical Statistics (Invited Talk)
Heidelberg, Germany

Sep 2024 *Empirical optimal transport: Convergence rates and lower complexity adaptation*
Tata Institute of Fundamental Research, Bangalore, India (Invited Talk)

Aug 2024 *Statistical optimal transport and its entropic regularization: Compared and contrasted*
Bernoulli World Congress, Bochum, Germany (Invited Talk)

Jul 2024 *Low intrinsic dimensionality is all you need*
Workshop on Statistics & Learning Theory in the Era of AI (Invited Talk)
Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach-Walke, Germany

Mar 2024 *Empirical optimal transport: Convergence rates and lower complexity adaptation*
University of Twente, Enschede, Netherlands (Invited Talk)

Jan 2024 *Optimal transport and its entropic penalization: A statistical exploration*
University of Cambridge, Cambridge, United Kingdom (Invited Talk)

Dec 2023 *A unifying approach to distributional limits for empirical optimal transport*
IMS International Conference on Statistics and Data Science, Lisbon, Portugal

Oct 2023 *Empirical optimal transport: Convergence rates and lower complexity adaptation*
University of Cambridge, Cambridge, United Kingdom (Invited Talk)

Jul 2023 *Empirical optimal transport: Convergence rates and lower complexity adaptation*
Carnegie Mellon University, Pittsburgh, Pennsylvania, USA (Invited Talk)

Aug 2022 *Empirical optimal transport and the lower complexity adaptation principle*
7th Annual Research Training Group 2088 Workshop, Goslar, Germany

Sep 2021 *The statistics of circular optimal transport*
German Probability and Statistics Days, Mannheim, Germany

May 2021 *Entropic optimal transport on countable spaces: Statistical theory and asymptotics*
Entropy 2021: The Scientific Tool of the 21st Century, Lisbon, Portugal

Teaching Experience

Fall 2024 Assistant for lecture "Statistical foundations of data science"

Spring 2024 Seminar on "Empirical processes"

Fall 2023 Assistant for lecture "Discrete stochastics"

Fall 2023 Seminar on "Optimal transport: Foundations, computation, and statistics"

Fall 2022 Assistant for lecture "Statistical foundations of data science"

Fall 2020 Assistant for lecture "Introduction to spatial stochastics"

Co-supervision

I have served as a co-supervisor for the following thesis projects:

Aug 2024 - Apr 2025 *Bayesian estimation of Gaussian mixtures through reversible jump MCMC,* Master's thesis by Danila Litskevich

Mar 2024 - Aug 2024 *Optimal deconvolution for sparse uniform signals,* Scientific computing project by Danila Litskevich

Dec 2022 - Aug 2023 *Conjectures for empirical optimal transport and their numerical assessment,* Bachelor's thesis by David Schmotz

Aug 2022 - Apr 2023 *Lower complexity adaptation for empirical entropic optimal transport,* Master's thesis by Michel Groppe

Apr 2021 - Dec 2021 *Limit distributions for transport dependency and transport correlations on finite spaces*, Master's thesis by Rasmus Hellborn

Referee Service

I was involved in referee work for the following (peer-reviewed) journals:

- The Annals of Statistics
- Bernoulli Journal
- Annales de l'Institut Henri Poincaré, Probabilités et Statistiques
- The Electronic Journal of Statistics
- Statistical Science