Viktor Stein - PhD candidate, Applied Maths

stein@math.tu-berlin.de
https://viktorajstein.github.io/

Positions

08.2024 − 09.2024   **Research visit (Wuchen Li at the University of South Carolina)** (Accelerated Stein metric gradient flows with general bilinear kernels on Gaussian families.)

In the Applied Mathematics group at Technical University Berlin.

08.2023 −   **PhD candidate** (with teaching responsibilities from 2024 on, funded by the German Federal Ministry of Education and Research under the project "VI-Screen" until then.)

04.2023 − 07.2023   **PhD Stipend** (Researching Wasserstein gradient flows with respect to the Rényi divergence and entropy.)

06.2021 − 03.2023   **Student research assistant** (Research on Wasserstein gradient flows, writing a script for the lecture "Approximation theory" and rewriting the script for the lecture "Convex Analysis" in the setting of infinite-dimensional spaces, proofreading manuscripts.)

At the Department of Mathematics, Technical University Berlin.

10.2019 − 03.2021   **Tutor** (Giving tutorials and correcting homework for the lectures "Functional Analysis I", "Differential Equations I" and "Linear Algebra for Engineers".)

Publications

22.07.2025   **R. Duong, V. Stein, R. Beinert, J. Hertrich, G. Steidl: Wasserstein Gradient Flows of MMD Functionals with Distance Kernel and Cauchy Problems on Quantile Functions** (Accepted subject to minor modifications by the journal ESAIM: Control, Optimisation and Calculus of Variations)

06.2025   **V. Stein, W. Li: Accelerated Stein Variational Gradient Flow** (Accepted for publication in the Springer LNCS proceedings of GSI'25: Geometric Science of Information in Information Geometry)

05.06.2025   **R. Duong, N. Rux, V. Stein, G. Steidl: Wasserstein Gradient Flows of MMD Functionals with Distance Kernels under Sobolev Regularization** (Phil. Trans. R. Soc. A., vol. 383, issue 0243 "Partial differential equations in data science")

04.2025   **V. Stein, S. Neumayer, N. Rux, G. Steidl: Wasserstein Gradient Flows for Moreau Envelopes of f-Divergences in Reproducing Kernel Hilbert Spaces** (Accepted for publication by the journal "Analysis and Applications".)

Preprints

05.09.2025   **Towards understanding Accelerated Stein Variational Gradient Flow - Analysis of Generalized Bilinear Kernels for Gaussian target distributions** (Joint work with Wuchen Li (University of South Carolina).)

30.04.2024   **Interpolating between Optimal Transport and KL regularized Optimal Transport using Rényi Divergences** (Joint work with Jonas Bresch (TU Berlin). Submitted in revised form to the Journal Results in Mathematics.)

Talks

31.10.2025	**Accelerated Stein Variational Gradient Flow** (GSI'25: Geometric Structures of Statistical & Quantum Physics, Information Geometry, and Machine Learning (Saint-Malo, France), fully founded by the DAAD.)
22.09.2025	**Wasserstein Gradient Flows for Moreau Envelopes of f-Divergences in Reproducing Kernel Hilbert Spaces** (MML'25: Conference on Mathematics of Machine Learning 2025 (Hamburg, Germany))
21.04.2025	**Accelerated Stein Variational Gradient Flow** (Stan Osher's UCLA level set seminar)
12.09.2024	**Interpolating between Optimal Transport and KL regularized Optimal Transport using Rényi Divergences.** (University of South Carolina Mathematics Graduate Colloquium)
30.08.2024	**Wasserstein Gradient Flows of MMD Functionals with Distance Kernel and Cauchy Problems on Quantile Functions.** (Joint Applied and Computational Mathematics (Changhui Tan & Siming He) and RTG data science seminar (Wuchen Li), University of South Carolina.)
19.08.2024	**Wasserstein Gradient Flows for Moreau Envelopes of f-Divergences in Reproducing Kernel Hilbert Spaces** (Stan Osher's UCLA level set seminar)

Posters presentations at conferences

08.2025	**Mathematical and Scientific Machine Learning (Naples, Italy)** (Accelerated Stein Variational Gradient Flow)
10.2024	**SIGMA (Signal - Image - Geometry - Modelling - Approximation) Workshop (CIRM, France)** (Wasserstein Gradient Flows for Moreau Envelopes of f-Divergences in Reproducing Kernel Hilbert Spaces)
06.2024	**LOL: Learning and Optimization in Luminy (CIRM, France)** (Wasserstein Gradient Flows for Moreau Envelopes of f-Divergences in Reproducing Kernel Hilbert Spaces)
103.2024	**Workshop on Optimal transport from theory to applications - Interfacing dynamical systems, optimization and machine learning (Berlin)** (Wasserstein Gradient Flows for Moreau Envelopes of f-Divergences in Reproducing Kernel Hilbert Spaces)

Teaching

Winter 2025/26	**Harmonic Analysis** (Lecture assistant)

Elective BMS advanced module in the Mathematics program.

Winter 2025/26	**Numerical Mathematics I** (Tutor)

Third-semester's compulsory module (in German) in the Mathematics Bachelors program.

Summer 2025	**Mathematical Physics II - Statistical Mechanics** (Lecture assistant)

Advanced BMS module for masters students in the Mathematics program.

Summer 2025	**Probability Theory I - Statistical Mechanics** (Tutor)

Compulsory fourth-semester undergraduate course in the Mathematics program.

Winter 2024/25	**Analysis II for Mathematicians** (Tutor)

Compulsory module in the Mathematics program, covering multidimensional differentiation.

Winter 2024/25	**Harmonic Analysis** (Lecture assistant)
Summer 2024	**Convex Analysis** (Lecture assistant)

Elective advanced module in the Mathematics program.

01.2024 - 02.2024	**Numerical Mathematics I** (Lecture assistant)

Education

04.2021 − 05.2023   **Mathematics Master** (Technische Universität Berlin. Final grade: 1.1)

Focus on further Functional Analysis topics as well as Topology, Differential Geometry, Complex Analysis and Statistics. Master's thesis: Wasserstein gradient flows - with an eye towards positive matrix-valued measures. Supervised by Prof. Gabriele Steidl and Dr. Robert Beinert.

10.2017 − 04.2021   **Mathematics Bachelor** (Technische Universität Berlin. Final grade: 2.0)

Focus on Functional Analysis and Differential Equations with a minor in Machine Learning. Bachelor's thesis: Atomic Norm Minimisation for Superresolution. Supervised by Prof. Gabriele Steidl and Dr. Robert Beinert.

Supervised Thesis

03.2025   **Roxane Leitheiser, Technische Universität Berlin** (Wasserstein Gradient Flows of the MMD with Riesz Kernels on the Real Line. Bachelor's thesis. 1st supervisor: Gabriele Steidl.)

Community service

I have reviewed for the Journal of Optimization Theory and Applications (JOTA), Transactions on Machine Learning Research (TMLR) as well as for the Bayesian Decision-making and Uncertainty Workshop at NeurIPS 2024.

Awards

At the 17. annual Dies Mathematicus in 2022 at the TU Berlin I received a prize for the best Bachelor's thesis talk.

IT Skills

I have a good knowledge of Python, including torch and using a HPC cluster. Furthermore, am comfortable with MATLAB and well versed in LaTeX.

Volunteer work

In the school year 2022/23 I have been tutoring around fourteen seventh-graders in weekly sessions discussing mathematical puzzles and questions from the German Mathematical Olympiad.

I have also served as corrector at the team competition at the Tag der Mathematik 2022 (Mathematics Day) organized by the three Berlin universities, where sixty-nine teams of high schoolers participated.

Language skills

My native language is German. I have received English lessons since preschool and in Primary and Middle School, where many subjects were taught in English by native speakers. Furthermore I have been instructed in Spanish by native speakers from grade four to grade ten and started teaching myself French in December 2023.

References

Prof. Dr. Gabriele Steidl
Institute of Mathematics,
Technical University of Berlin, Germany
steidl@math.tu-berlin.de

Wuchen Li, Associate Professor
Department of Mathematics,
University of South Carolina,
wuchen@mailbox.sc.edu

Prof. Dr. Sebastian Neumayer
Faculty of Mathematics Chair of Inverse Problems,
Technical University Chemnitz, Germany
sebastian.neumayer@mathematik.tu-chemnitz.de

Last update: September 11, 2025.