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".)

Preprints

18.11.2024 **Wasserstein Gradient Flows of MMD Functionals with Distance Kernels under Sobolev Regularization** (Joint work with Richard Duong (TU Berlin), Nicolaj Rux (TU Berlin) and Gabriele Steidl (TU Berlin).)

14.08.2024 **Wasserstein Gradient Flows of MMD Functionals with Distance Kernel and Cauchy Problems on Quantile Functions** (Joint work with Richard Duong, Robert Beinert (TU Berlin), Johannes Hertrich (UCL) and Gabriele Steidl (TU Berlin).)

30.04.2024 **Interpolating between Optimal Transport and KL regularized Optimal Transport using Rényi Divergences** (Joint work with Jonas Bresch (TU Berlin).)

07.02.2024 **Wasserstein Gradient Flows for Moreau Envelopes of f-Divergences in Reproducing Kernel Hilbert Spaces** (Joint work with Sebastian Neumayer, (TU Chemnitz), Gabriele Steidl and Nicolaj Rux (TU Berlin).)

Talks

12.09.2024 **Interpolating between Optimal Transport and KL regularized Optimal Transport using Rényi Divergences.** (University of South Carolina Mathematics Graduate Colloqium)

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** (UCLA level set seminar (Stan Osher))

Posters and presentations at conferences

28.10. - 01.11.2024	**SIGMA (Signal - Image - Geometry - Modelling - Approximation) Workshop** (Wasserstein Gradient Flows for Moreau Envelopes of f-Divergences in Reproducing Kernel Hilbert Spaces, Poster)
17.–21.06.2024	**Learning and Optimization in Luminy (LOL)** (Wasserstein Gradient Flows for Moreau Envelopes of f-Divergences in Reproducing Kernel Hilbert Spaces, Poster)
11.–15.03.2024	**Workshop on Optimal transport from theory to applications - Interfacing dynamical systems, optimization and machine learning** (Wasserstein Gradient Flows for Moreau Envelopes of f-Divergences in Reproducing Kernel Hilbert Spaces, Poster)

Teaching

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

Compulsory module in the Mathematics program, covering multidimensional derivatives, inverse function theorem, ...

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

Elective advanced module in the Mathematics program.

Summer 2024 **Convex Analysis** (Lecture assistant)

Elective advanced module in the Mathematics program.

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

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

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.

Community service

I have reviewed for the Journal Of Optimization Theory and Applications (JOTA), Transactions on Machine Learning Research (TMLR) as well as a 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

I 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.