



Institut für Angewandte Analysis
Universität Ulm
89069 Ulm

ulm university universität
uulm

Prof. Dr. Wolfgang Arendt
Prof. Dr. André Schlichting
Prof. Dr. Anna Dall'Acqua
Prof. Dr. Rico Zacher

OBERSEMINAR IM INSTITUT FÜR ANGEWANDTE ANALYSIS

Wintersemester 26-27

Im Rahmen des Oberseminars spricht am Dienstag, den **13. Oktober 2026**:

SAYAN BANERJEE

Long-time behavior of optimal transport-based sampling algorithms

Stein variational gradient descent (SVGD) is a deterministic interacting-particle method for sampling from a target distribution. It is based on evolving the empirical distribution of N particles via a kernelized projection of the Wasserstein gradient flow of relative entropy. Although its mean-field formulation is well understood, obtaining quantitative guarantees for a finite number of particles—particularly over long time horizons—presents several challenges.

In this talk, I will describe recent progress on these questions. I will first present an entropy-dissipation approach that yields near-i.i.d. $N^{-1/2}$ finite-particle convergence rates in kernel Stein discrepancy, as well as convergence in Wasserstein distance and long-time propagation of chaos (POC) for time-averaged particle laws. I will then discuss a cutoff principle that combines finite-time propagation-of-chaos estimates with quantitative convergence of the particle and mean-field dynamics to the target. This gives uniform-in-time POC in kernel Stein discrepancy and Wasserstein metrics, but the associated rates are logarithmic in N .

Finally, I will show that for noisy SVGD, obtained by adding a small Brownian diffusion to the particle dynamics, the resulting Fisher information dissipation can be utilized to obtain polynomial-in- N uniform-in-time POC rates.

Based on joint works with Krishnakumar Balasubramanian, Promit Ghosal, Ye He, Anna Korba and Dohyeon Kim.

Der Vortrag findet in **Raum 1.42, Helmholtzstr. 22** statt.

Beginn: 10 Uhr (c.t.). Alle Interessierten sind herzlich eingeladen.

W. Arendt, A. Dall'Acqua, A. Schlichting, R. Zacher.