UNIVERSITÄT
BERN

Philosophisch-
naturwissenschaftliche Fakultät

Departement Mathematik und
Statistik

**Institut für mathematische Statistik
und Versicherungslehre**

Kolloquiumsvortrag in Statistik

Freitag, 03. November 2023, 15.15 Uhr

Hörsaal -203, Alpeneggstrasse 22, 3012 Bern

Prof. Dr. Geir-Arne Fuglstad, NTNU Trondheim

Title: Non-stationary Spatio-Temporal Modelling with Applications to Autonomous Sampling

The ocean is dynamic and hard to sample remotely. Numerical ocean models can provide information on typical behaviour, but cannot accurately forecast local phenomena. Autonomous underwater vehicles (AUVs) can target specific areas and provide accurate measurements, but can only sample an area sparsely. We describe how to improve AUV sampling through a Gaussian process (GP) prior constructed based on the numerical ocean model, which is updated based on measurements in real-time.

We consider stochastic convection-diffusion equations with different levels of complexity for spatially varying coefficients. These are fitted to numerical ocean model simulations, and constitute GP priors (or surrogate models) for the ocean behaviour. I will discuss ongoing work for modelling and estimation, and for computationally efficient updates of the priors onboard the AUVs.

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