THE UNIVERSITY OF CHICAGO | THE COMMITTEE ON COMPUTATIONAL AND APPLIED MATHEMATICS

JOHN REINTZ MEMORIAL LECTURE

NATHAN WANIOREK

Computational and Applied Mathematics
University of Chicago

Long-Time Accuracy of Ensemble Kalman Filters for Chaotic Dynamical Systems and Surrogate Models

THURSDAY, October 23rd at 4:00 PM
Jones 303, 5747 S. Ellis Ave. Chicago, IL 60637

ABSTRACT

Filtering is concerned with online estimation of the state of a dynamical system from partial and noisy observations. In applications where the state is high dimensional, such as numerical weather prediction, ensemble Kalman filters are often the method of choice. This work studies the long-time accuracy of ensemble Kalman filters. We introduce conditions on the dynamics and the observations under which the estimation error remains small in the long-time horizon. Our theory covers a wide class of dissipative chaotic dynamical systems, which includes the Navier-Stokes equations and Lorenz models. In addition, we prove long-time accuracy of ensemble Kalman filters with surrogate dynamics, thus validating the use of machine-learned or misspecified forecast models in ensemble data assimilation.

Organizers:
Guillaume Bal, Department of Statistics (CCAM), guillaumebal@uchicago.edu