

## Statistics and Data Science Seminar

### *Dynamic Multiscale Spatiotemporal Models for Multivariate Gaussian Data*

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**Abstract:** We discuss classes of dynamic multiscale models for multivariate Gaussian spatiotemporal data. First, we develop multiscale spatial factorizations to decompose the data at each time point into spatiotemporal multiscale coefficients. We then connect these spatiotemporal multiscale coefficients through time with state-space evolutions. Further, we propose simulation-based Bayesian posterior analysis. In particular, we develop filtering equations for updating of information forward in time and smoothing equations for integration of information backward in time, and use these equations to develop forward filter backward samplers for the spatiotemporal multiscale coefficients. Because the multiscale coefficients are conditionally independent a posteriori, our Bayesian posterior analysis is scalable, computationally efficient, and highly parallelizable. Finally, we illustrate the usefulness of our dynamic multiscale spatiotemporal methodology with applications to multivariate spatiotemporal data on temperatures in the upper troposphere and lower stratosphere over North America.

Wednesday, April 3 at 4:00 PM in 636 SEO