

# **Mixed graphical-basis models for large nonstationary and multivariate spatial data problems**

William Kleiber

*Department of Applied Mathematics, University of Colorado Boulder, U.S.A.*

## **Abstract**

There is an emerging consensus in the spatial statistical literature that basis expansion models are flexible and useful to model large, nonstationary spatial datasets. Low rank models, approximate spectral decompositions, multiresolution representations, stochastic partial differential equations and empirical orthogonal functions all fall within this basic framework. In this talk we explore a graphical model representation for the stochastic coefficients relying on specification of the sparse precision matrix. Sparsity is encouraged in an L1-penalized likelihood framework. Estimation exploits a majorization-minimization approach. The result is a flexible nonstationary spatial model that is adaptable to very large datasets. The idea is readily extended to multivariate problems. Illustrations on statistical climatology datasets will be shown.