



THE UNIVERSITY OF
CHICAGO

DEPARTMENT OF STATISTICS

Statistics Colloquium

MATTHIAS KATZFUSS

Department of Statistics
Texas A&M University

“Scalable Gaussian-Process Inference via Sparse Inverse Cholesky Factorization”

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Jones 303, 5747 S. Ellis Avenue

ABSTRACT

Gaussian processes (GPs) are popular, flexible, and interpretable probabilistic models for functions in geospatial analysis, computer-model emulation, and machine learning. However, direct application of GPs involves dense covariance matrices and is computationally infeasible for large datasets. We consider a framework for fast GP inference based on the so-called Vecchia approximation, which implies a sparse Cholesky factor of the inverse covariance matrix. The approximation can be written in closed form and computed in parallel, and it includes many popular existing approximations as special cases. We discuss various applications and extensions of the framework, including high-dimensional inference and variable selection, variational approximations for latent GPs, and nonparametric learning of non-Gaussian distributions.