THE TRIPLE CROWN
2015 STATISTICS EDITION

NORTH CAROLINA STATE UNIVERSITY
TEXAS A&M UNIVERSITY
UNIVERSITY OF MICHIGAN

You are invited to participate in an afternoon of statistics seminars at NCAR.

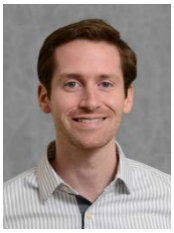
Date: Wednesday, July 15, 2015

Time: 1:00 - 4:00pm

Location: National Center for Atmospheric Research in Boulder, Colorado

Fleischmann Building, Conference Room

We have three speakers lined up for this year's edition. Each presentation will be followed by a short discussion and a coffee break.



Efficient Computation of Gaussian Likelihoods for Stationary Markov Random Field Models
Joe Guinness, Department of Statistics, North Carolina State University

We introduce new methods for efficiently computing the Gaussian likelihood for spatial models that consist of a Gaussian Markov random field (GMRF) with stationary covariances and an additive uncorrelated error term, when the data locations fall on a possibly incomplete regular grid. The calculations can be made exact up to machine precision and are efficient both in memory allocation and computation time and are particularly fast when the uncorrelated error term is not present. Our approach handles boundary effects and missing values in a natural fashion. Frequentist methods are highlighted, but the availability of the likelihood allows for Bayesian inference as well. We demonstrate our results in simulation and timing studies, as well as with an application to gridded satellite data, where we use the exact likelihood both for parameter estimation and model comparison.

Statistical Analysis of Remote-Sensing Datasets Using Basis-Function Representations
Matthias Katzfuss, Department of Statistics, Texas A&M University

The spatial statistical analysis of remote-sensing datasets poses several challenges. The datasets are large or even massive, which leads to computational infeasibility. Often, it is advantageous to combine ("fuse") measurements on the same or related spatial processes from several instruments, but these instruments typically exhibit different spatial footprints and measurement-error characteristics. In addition, complementary, massive datasets might be stored in different locations and are costly to move to one location, which means that the analysis must be moved to the data, instead of the other way around. I will discuss how all of these problems can be tackled using statistical models that can be written as linear combinations of spatial basis functions at multiple resolutions. These basis functions can represent arbitrary processes, allow change-of-support, and enable scalable, parallel, and distributed computations.

Analyzing Spatial Data Locally
Tailen Hsing, Department of Statistics, University of Michigan

Stationarity is a common assumption in spatial statistics. The justification is often that stationarity is a reasonable approximation if data are collected "locally." In this talk we first review various known approaches for modeling nonstationary spatial data. We then examine the notion of local stationarity in more detail. In particular, we will consider a nonstationary model whose covariance behaves like the Matern covariance locally and an inference approach for that model based on gridded data.

After the seminar sessions you are welcome to join the group for Happy Hour at Under the Sun at 5:00pm

We look forward to your participation!

Dorit Hammerling and Doug Nychka, NCAR organizers