Current members of the Geophysical Statistics Project

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GSP postdoctoral visiting scientists

Thomas Bengtsson

B.S. Mathematics 1991, University of Redlands, CA
Ph.D. Statistics 2000, University of Missouri-Columbia, MO

State-space methodology for time series

In my thesis work I developed time-series methodology appropriate in the state-space framework. In particular, I derived procedures for time-series discrimination and model selection based on Kullback's directed divergence.

At NCAR I have mainly worked on models pertaining to the spatio-temporal aspects of weather forecasting and climate modeling. This problem is characterized by very high-dimensional systems, strongly non-linear (possibly chaotic) dynamics, and real-time requirements for assimilating data and physical models.

After completing my postdoc with NCAR I aim to work in research developing statistical methodology and theory applicable in the natural sciences.

Enrica Bellone

B.S. Statistics 1993, University of Pavia, Italy
M.S. Statistics 1996, University of Washington
Ph D. Statistics 2000, University of Washington

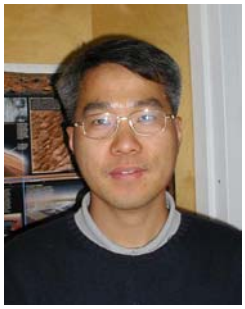
Nonhomogeneous hidden Markov models for downscaling synoptic atmospheric patterns to precipitation amounts.

My thesis research was on hidden Markov models, with application to precipitation modeling. The focus was the extension of non-homogeneous hidden Markov models for precipitation occurrences to also include precipitation amounts.

At NCAR, I am continuing my research on hidden Markov models, focusing specifically on applications that involve large networks of precipitation gauges covering extensive geographical regions. I have also been modeling vertical overlap properties of clouds. For this project, I have had the opportunity of collaborating with two groups of scientists, those concerned with the mesoscale dynamics for clouds and climate modelers.

I hope to find a research position where I can continue my research on spatio-temporal modeling, especially with application to atmospheric and environmental problems.

Hee-Seok Oh



B.A. Applied Statistics 1990, Yonsei University, Seoul, Korea
M.S. Applied Statistics 1992, Yonsei University, Seoul, Korea
Ph.D. Statistics 1999, Texas A&M University
EPSRC postdoctoral fellow 2000, University of Bristol, UK

Spherical wavelets and their statistical analysis with applications to meteorological data
In my dissertation, I developed wavelets on the sphere that can be applied to scattered data, and presented is spatially adaptive. This approach has the capability of adapting to the multiscale characteristics of the data by coupling the spherical wavelets with different thresholding techniques.

I have been involved in two major projects since I joined GSP. One project is on the statistical analysis of external (solar, volcanic) forcings and their relationship to temperature records. By using a time-scale decomposition based on a non-decimated wavelet transform, we not only have detected long- and short-term variation of solar forcing, but also have characterized major internal components of the climate system. Another project at NCAR is the period analysis of variable stars. The main objective of this project is to estimate the period and the light curve (or periodic function) of a variable star. I use robust smoothing spline regression to estimate the light curve given a period and then find the period, which minimizes a robust, cross-validation criterion.

I would like to work at an academic institute such as a university or a research center. Teaching and advising students will allow me to communicate statistics, statistical thought and the usefulness of statistics. Also, I want to do theoretical and applied research based on novel data sets, which come from a variety of scientific fields. By collaborating with people in other fields, I want to make contributions in science and engineering.

Sarah Streett

B.S. Mathematics 1992, Hendrix College, Conway, AK
M.S. Actuarial Mathematics 1994, Northern Arizona University
Ph.D. Statistics 2000, Colorado State University

Some observation driven models for time series
My thesis concerns the derivation of stationarity properties for several types of observation driven models used for count processes.

While working at NCAR, I have been part of a project with Linda Mearns that concerns the quantification of uncertainties involved in crop modeling. To date, my involvement has been in quantifying uncertainties involved in the generation of weather ensembles which are used as inputs to the crop models. What I perceive as my most useful training at NCAR is the ability to convey statistical methods and concepts to scientists in other disciplines. I have also found it very interesting to learn more about the atmospheric sciences through seminars offered at NCAR as well as presentations offered by other post-docs in our group.

Although I am still uncertain of my career path following my employment at NCAR, I would like to continue to work in an academic setting and would enjoy focusing on the environmental sciences. I also hope to remain connected to the Geophysical Statistics Project and possibly return for short visits. I believe that my experiences at NCAR will help me in pursuit of these goals.

Brandon Whitcher

B.S. Applied Mathematics (Statistics) 1993, Carnegie Mellon University
M.S. Statistics 1995, University of Washington
Ph.D. Statistics 1998, University of Washington
Research Scientist, EURANDOM, Eindhoven, The Netherlands

Assessing nonstationary time series using wavelets
The two main areas of my research were detection of single and multiple variance changes in long-memory processes and the rigorous establishment of wavelet analysis for bivariate Gaussian time series with application to atmospheric series. While at EURANDOM, I worked on a variety of topics including: speckle reduction in remote sensing images, wavelet analysis of seasonal long-memory processes, estimation of time-varying long-memory processes, and applications of wavelet methodology in economics and finance.

At NCAR I have initiated several projects centered around, but not exclusive to, the atmospheric sciences such as: modeling coherent structures in vorticity fields, seasonal spectral analysis of atmospheric time series, investigating multiscale features in hydrological time series, and applications of wavelet methodology in economics and finance.

My goal is to find a permanent position where I can manage my time between teaching, administration, and research.

Statistics Project Staff

Tim Hoar, Associate Scientist

B.S. Physics, Geophysics and Geology 1983, State University of New York at Fredonia
M.A. Geophysics 1993, University of Texas at Austin

1993-present, Associate Scientist, Geophysical Statistics Project
1987-1990, Research Associate, University of Texas at Austin, Institute for Geophysics (1990-1993) and Applied Research Laboratories (1987-1990)
1984-1987, Processing Geophysicist, Geophysical Service Incorporated

Rick Katz, Principle Investigator

B.A. Mathematics 1970, University of Virginia
Ph.D. Statistics 1974, Pennsylvania State University

1979-1983, Assistant research professor, Oregon State University
1983 - present, Scientist, Environmental and Societal Impacts Group, NCAR

Joesph Tribbia, Co-principle Investigator

B.S. Physics 1971, Illinois Institute of Technology
M.S Meteorology 1972, University of Michigan
Ph.D. Meteorology 1972, University of Michigan

1980 - present, Scientist, Section Head (1992-), Climate Dynamics and Predictability Section, Climate and Global Dynamics Division, NCAR

Doug Nychka, Project Leader

B.A. Mathematics and Physics 1978, Duke University
Ph.D. Statistics 1983, University of Wisconsin - Madison

1997 - present Project Leader and Senior Scientist (1999 - present), Geophysical Statistics Project, National Center for Atmospheric Research, Boulder, CO.
1983-1999 Assistant (1983-1989), Associate (1989-1994) and Full Professor (1994-1999), Department of Statistics North Carolina State University, Raleigh, NC
1994 - present Senior Fellow (1994-) and trustee (2000-) National Institute of Statistical Sciences, Research Triangle Park, NC