American Statistical Association
Mid-Michigan Chapter

The Chapter is pleased to announce its 2014 fall meeting. Our guest speaker is Dr. Douglas Nychka, Director of Institute for Mathematics Applied to Geosciences, National Center for Atmospheric Research, Boulder, Colorado.

Douglas Nychka is a statistical scientist with an interest in the problems posed by geophysical data sets. His Ph. D. (1983) is from the University of Wisconsin and he subsequently spent 14 years as a faculty member at North Carolina State University. His original core area of research was in the fitting curves and surfaces to scattered data and noisy data with a focus on splines. This interest led to working on data analysis problems for spatial and environmental data. His first work was in statistical methods for air quality assessment sponsored by the EPA and supported through the National Institute of Statistical Sciences. He assumed leadership of the Geophysical Statistics Project at the National Center for Atmospheric Research (NCAR) in 1997, an NSF program to build collaborative research and training between statistics and the geosciences. In 2004, he became Director of the Institute of Mathematics Applied to Geosciences, an interdisciplinary component at NCAR with a focus on transferring innovative mathematical models and tools to the geosciences. His current interests are in quantifying the uncertainty of numerical experiments that simulate the Earth's present and possible future climate and spatial statistics applied to large data sets. He has received the Jerry Sacks Award for Multidisciplinary Research (2004) and is a Fellow of the American Statistical Association.

Tuesday, November 4, 2014, 7:00 – 8:30 pm

Chapter business meeting and presentation

Social hour & meeting: 7:00 – 7:30 pm

Presentation: **7:30 – 8:30 pm**

Location: **Michigan State University, C405 Wells Hall**

Title of presentation: **Reconstructing carbon dioxide for the last 2000 years: a hierarchical success story**

Abstract: Knowledge of atmospheric carbon dioxide (CO2) concentrations in the past are important to provide an understanding of how the Earth's carbon cycle varies over time. This project combines ice core CO2 concentrations, from Law Dome, Antarctica and a physically based forward model to infer CO2 concentrations on an annual basis. Here the forward model connects concentrations at given time to their depth in the ice core sample and an interesting feature of this analysis is a more complete characterization of the uncertainty in "inverting" this relationship. In particular, Monte Carlo based ensembles are particularly useful for assessing the size of the decrease in CO2 around 1600 AD. This reconstruction problem, also known as an inverse problem, is used to illustrate a general statistical approach where observational information is limited and characterizing the uncertainty in the results is important. These methods, known as Bayesian hierarchical models have become a mainstay of data analysis for complex problems and have wide application in the geosciences. This work is in collaboration with Eugene Wahl (NOAA), David Anderson (NOAA) and Catherine Trudinger (CSIRO).

Chapter web address: http://asa.mth.cmich.edu/