

**American Statistical Association (ASA)  
Section on Statistics and the Environment (ENVR)**



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**Computational Environmetrics Conference**

Short Course and Workshop  
October 21-23, 2004  
Chicago, Illinois

October 21-23, 2004, Palmer House, Chicago, Illinois, is an opportunity to learn all about Computational Environmetrics - in theory and in practice. The Statistics and Environment Section of the American Statistical Association (ASA) and the Center for Integrating the Statistical and the Environmental Science (CISES) at the Department of Statistics, University of Chicago, are sponsoring three short courses on October 21st, 18 invited speakers and approximately 20 contributed posters on October 22nd and 23rd in a workshop environment. The papers will focus on how computational methods have changed our approach to the analysis of environmental data.

Application areas include ecology, air quality, water resources, environmental health effects, climate and geosciences. Jim Clark (Duke University), Peter Legendre (U of Montreal), Marc Coram (U of Chicago), and Devin Johnson (U of Alaska Fairbanks) will discuss ecological applications. Mark Berliner (Ohio State U), Thomas Bengtsson (UC Berkeley), Doug Nychka (National Center for Atmospheric Research) will discuss geoscience and climate applications. Robert Shumway (UC Davis), Jay Breidt (Colorado State U), and Trend McDonald (WEST, Inc) will discuss water resource applications. Jim Zidek (U of British Columbia), Monserrat Fuentes (North Carolina State U), and Catherine Calder (Ohio State U) will discuss air quality applications. Scott Zeger (Johns Hopkins U), Paul Rathouz (U of Chicago), and Chris Paciorek (Harvard U) will discuss environmental health applications.

Three half-day short courses will be given on October 21st. Cost for each short course is \$150 for ENVR section members and \$200 for non-ENVR section members.

Two courses will be presented by **Geof Givens and Jennifer Hoeting** (Colorado State U). The first is "**Methods of integration for environmental problems in statistics: quadrature, Monte Carlo integration and Markov chain Monte Carlo methods.**" This half-day course will introduce a variety of computational methods discussed in the new book "Computational Statistics", by Givens and Hoeting (Wiley and Sons). Many problems in environmental statistics require the evaluation of integrals that cannot be solved analytically, particularly in Bayesian statistics. We will introduce a variety of techniques ranging from classic to state-of-the-art, including Newton-Cotes and Gaussian quadrature, Monte Carlo integration, importance sampling and variance reduction techniques, and Markov chain Monte Carlo methods. Quantitative scientists and statisticians who are unfamiliar with these methods should find this course to be accessible. This session could be a useful prelude to Bryan Manly's afternoon session on randomization and bootstrap methods.

Givens and Hoeting will present an afternoon short course on "**Optimization methods for environmental problems in statistics: Numerical maximum likelihood, combinatorial optimization, EM Algorithm.**" This half-day course will introduce a variety of computational methods discussed in the new book "Computational Statistics", by Givens and Hoeting (Wiley and Sons). Optimization plays a central role in statistics, particularly in maximum likelihood estimation. We will introduce a variety of techniques ranging from classic to state-of-the-art, including Newton and quasi-Newton methods, tabu algorithms, simulated annealing, genetic algorithms, the EM algorithm and its variants. Quantitative scientists and statisticians who are unfamiliar with these methods should find this course to be accessible.

**Bryan Manly** (Western Ecosystems Technology, Inc) will present "**Randomization, Bootstrap and Other Computer-Intensive Methods in Environmental Science.**" This half-day course will begin with a brief overview of elementary applications of randomization and bootstrap methods with analysis of variance, regression and multivariate methods, as covered in the book *Randomization, Bootstrap and Monte Carlo Methods in Biology* by Bryan Manly, followed by a review of recent developments in those areas. This will then lead on to the presentation of several case studies involving the application of randomization, bootstrap and other computer-intensive methods in the context of environmental monitoring, the assessment of environmental impacts, and the estimation of environmentally important parameters for animal populations. The aim of the workshop will be to demonstrate how computer-intensive methods can often allow relatively simple solutions to the problems involved in analyzing complex data sets.

A limited number (approximately 20) of poster presentations will be available for those wishing to contribute to the conference. Abstracts for potential poster presentation must be submitted electronically by email. Abstracts must include a title, poster author(s) and affiliation(s), and abstract less than 500 words. Submit abstracts to Anthony R. Olsen at [Olsen.Tony@EPA.gov](mailto:Olsen.Tony@EPA.gov). Abstracts must be submitted before July 15, 2004. Authors will be notified of acceptance by August 15, 2004.

Registration and hotel information is available on the conference web site: <http://galton.uchicago.edu/~cises/events/envr/>

Members of the conference organizing committee are David Higdon (Los Alamos National Laboratory), Jennifer Hoeting (Colorado State U), Richard Levine (San Diego State U), Bryan Manly (WEST, Inc), Sandra McBride (Duke U), Anthony Olsen (US EPA Western Ecology Division), Robert Shumway (UC Davis), Michael Stein (U Chicago, CISES), Chris Wikle (U of Missouri), and Linda Barrows (U Chicago, CISES).

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