INTERFACE 2000

April 5-8, 2000
New Orleans, Louisiana

REGISTRATION BEGINS APRIL 5, 8:00 A.M. THROUGH APRIL 8, 12:00 NOON.

WEDNESDAY, APRIL 5, 2000

RM. A **8:00 A.M.–12:00 NOON**

SHORT COURSE: Building And Fitting Random Effects Models

INSTRUCTORS: William Cleveland, Lorraine Denby, Chuanhai Liu, Bell Labs, New Jersey

OVERVIEW

The use of random effects models in practice, often in the form of Bayesian hierarchical models, is growing rapidly because of major developments in computational methods for these models. In this short course we present models and building methods for data with random location and scale effects. Data visualization methods play a fundamental role in all phases of this model building: data exploration, model identification, and model checking. From the model building stage we move to Bayesian models for the data because, as a practical matter, the location and scale distributions fit readily into a hierarchical Bayesian framework. We describe computational methods for fitting these models.

EXAMPLE

Several data sets will be used to motivate the models and methods. One example of such data, which occurs widely in the social and business sciences is rater data: respondents in a survey rate attributes on a subjective scale from 1 to10.

WHAT'S NEW

Random-effects models with measurements of a response on a continuous measurement scale typically specify the random effects as location effects; the number of treatments of random scale effects we have been able to uncover amount to about a dozen. But the data sets with random location effects canalso have random scale effects. Our presentation includes models and methods for both location and scale effects. Typically, random location effects are taken to be normal and random scale effects to be square root inverse gamma. But in practice, other distributions often occur. Our presentation describes methods for identifying the random effects distributions.

BIOGRAPHIES

WILLIAM CLEVELAND is a member of the Statistics Research Department of Bell Labs, the research and development part of Lucent Technologies. Bill's areas of research have included data visualization, model building, smoothing, Bayesian statistics, the foundations of data analysis, time series, data network measurement, graphical perception, environmental science, and customer opinion polling. Bill has published 110 papers in these areas and three books on data visualization. He is a fellow of the ASA, IMS, AAAS, and a member of the ISI. In 1996 he was chosen as the statistcian of the year by the Chicago chapter of the ASA. Bill has taught short courses extensively during the past 20 years for many organizations including the ASA, ACM, Icon Multimedia Publishing, CSIRO, George Washington University, Institut fuer Datenanalyse, and Versuchsplanung, and U.S. Army.

LORRAINE DENBY is a member of the Statistics Research Department of Bell Labs, the research and development part of Lucent Technologies. Lorraine's areas of research include graphical analysis, data analysis, regression modelling and diagnostics, graphical user interface for statistical analysis, and customer opinion polling. She is a fellow of the ASA and an elected member of ISI. She has served on the ASA Board of Directors. Lorraine has taught short courses at the ASA annual and winter conferences, NCTM annual meeting, ASA chapter meetings, and NCGA.

CHUANHAI LIU is a member of the Statistics Research Department of Bell Labs, the research and development part of Lucent Technologies. Chuanhai received his Ph.D. from Harvard University in 1994. His research interests include Bayesian statistics, scientific model building and checking, missing data and multiple imputation, expectation-maximization (EM) algorithms, Markov chain Monte Carlo (MCMC) methods, and time series.

LUNCH **12:00 NOON–1:00 P.M.**

RM. A **1:00–5:00 P.M.**

SHORT COURSE: An Introduction to Model Building with Reproducing Kernel Hilbert with Applications in Biostatistics and Atmospheric Sciences

INSTRUCTOR: Grace Wahba, U Wisconsin

OVERVIEW

We assume no knowledge of reproducing kernel Hilbert spaces, but review some basic concepts, with a view towards demonstrating how this setting allows the building of interesting statistical models which allow the simultaneous analysis of heterogeneous, scattered observations, and other information. Methods appropriate for very large data sets will be discussed.

EXAMPLE

The abstract ideas will be illustrated with several specific data analyses, including modeling risk factors for eye diseases and examining historical climate data for signals of greenhouse effects.

WHAT'S NEW

Random-effects models with measurements of a response on a continuous measurement scale typically specify the random effects as location effects; the number of treatments of random scale effects we have been able to uncover amount to about a dozen. But the data sets with random location effects can also have random scale effects. Our presentation includes models and methods for both location and scale effects. Typically, random location effects are taken to be normal and random scale effects to be square root inverse gamma. But in practice, other distributions often occur. Our presentation describes methods for identifying the random effects distributions.

BIOGRAPHY

GRACE WAHBA is the John Bascom Professor of Statistics and Professor of Biostatistics at the University of Wisconsin, Madison. She is a Fellow of the Institute of Mathematical Statistics, The American Statistical Association, and the American Association for the Advancement of Science, and was recently elected to the American Academy of Arts and Sciences. She received the first Emanuel and Carol Parzen Prize for Statistical Innovation, the COPSS Elizabeth Scott Award, and the International Meetings on Statistical Climatology Achievement Award. Her research involves multivariate function estimation and model building with heterogeneous sources of information with applications in numerical weather prediction, climate, biostatistical model building and risk factor estimation, and supervised machine learning. She is most proud of her many and talented former students.

EVENING MIXER **5:45 P.M.**

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THURSDAY, APRIL 6, 2000

RM. B **8:00–9:45 A.M.**
WELCOME Sallie Keller-McNulty, Los Alamos National Laboratory

KEYNOTE ADDRESS: Combining Observations with Models: Penalized Likelihood and Related Methods in Numerical Weather Prediction
SPEAKER: Grace Wahba, U of Wisconsin

ABSTRACT

We will look at variational data assimilation as practiced by atmospheric scientists, with the eyes of a statistician. Recent operational numerical weather prediction models operate on what might be considered a very grand penalized likelihood point of view: A variational problem is set up and solved to obtain the evolving state of the atmosphere, given heterogeneous observations in time and space, a numerical model embodying the nonlinear equations of motion of the atmosphere, and various physical constraints and prior physical and historical information. The idea is to obtain a sequence of state vectors which are "close" to the observations, close to a trajectory satisfying the equations of motion, and simultaneously respects the other information available. The state vector may be as big as 10^7, and the observation vector 10^5 or 10^6, leading to some interesting implementation questions. Interesting nonstandard statistical issues abound.

BIOGRAPHY

Grace's picture (need)

Grace Wahba is the John Bascom Professor of Statistics and Professor of Biostatistics at the University of Wisconsin, Madison. She is a Fellow of the Institute of Mathematical Statistics, The American Statistical Association, and the American Association for the Advancement of Science, and was recently elected to the American Academy of Arts and Sciences. She received the first Emanuel and Carol Parzen Prize for Statistical Innovation, the COPSS Elizabeth Scott Award, and the International Meetings on Statistical Climatology Achievement Award. Her research involves multivariate function estimation and model building with heterogeneous sources of information with applications in numerical weather prediction, climate, biostatistical model building and risk factor estimation, and supervised machine learning. She is most proud of her many and talented former students.

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BREAK/POSTER SESSION **9:45–10:15 A.M.**

RM. C **10:15 A.M.–12:00 NOON**
INVITED SESSION: Defining, Measuring, and Analyzing Quality of Care: Statistical and Computational Challenges
ORGANIZER: Sally Morton, RAND

10:15 A.M. Title, Speaker, Affiliation
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RM. D **10:15 A.M.–12:00 NOON**
INVITED SESSION: Statistics and Information Technology
ORGANIZER: Alan Karr, National Institute of Statistical Sciences

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RM. E **10:15 A.M.–12:00 NOON**
INVITED SESSION: The Use of Statistics in Defense Analysis
ORGANIZER: Nancy Spruill, US Office for the Under Secretary of Defense

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LUNCH **12:00 NOON–1:00 P.M.**

RM. F **1:00–2:45 P.M.**
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RM. H **1:00–2:45 P.M.**

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RM. J **1:00–2:45 P.M.**

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BREAK/POSTER SESSION **2:45–3:15 P.M.**

RM. K **3:15–5:00 P.M.**

INVITED SESSION: CSNA Sponsored Session: Applications of Clustering and Classification to Large Datasets
ORGANIZER: William Shannon, Washington University School of Medicine

3:15 P.M. Title, Speaker, Affiliation
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RM. L **3:15–5:00 P.M.**

INVITED SESSION: Precision Agriculture
ORGANIZER: Barry Moser, Louisiana State University

3:15 P.M. Title, Speaker, Affiliation
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BANQUET **6:00 P.M.**

TITLE: Measuring the Earth
SPEAKER: David J. Hand, Imperial College, London, England

FRIDAY, APRIL 7, 2000

RM. M **8:00–9:45 A.M.**

INVITED SESSION: Models for the Earth's Atmosphere and Ocean
ORGANIZER: National Center for Atmospheric Research

8:00 A.M. Title, Speaker, Affiliation
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8:30 A.M. Title, Speaker, Affiliation
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9:00 A.M. Title, Speaker, Affiliation
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RM. N **8:00–9:45 A.M.**

INVITED SESSION: Information Technology an Federal Statistics
ORGANIZER: Cathy Dippo

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8:30 A.M. Title, Speaker, Affiliation
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9:00 A.M. Title, Speaker, Affiliation
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RM. O **8:00–9:45 A.M.**

INVITED SESSION: Fragment Reconstruction from Archaeological Digs
ORGANIZER: Lorraine Denby, Bell Labs—Lucent Technologies

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BREAK/POSTER SESSION **9:45–10:15 A.M.**

RM. P **10:15 A.M.–12:00 NOON**

INVITED SESSION: Best of Journal of Computational and Graphical Statistic
ORGANIZER: Andreas Buja, AT&T

10:15 A.M. Title, Speaker, Affiliation
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RM. Q **10:15 A.M.–12:00 NOON**

INVITED SESSION: Critical Infrastructure Modeling
ORGANIZER: Sallie Keller-McNulty, Los Alamos National Laboratory

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RM. R **10:15 A.M.–12:00 NOON**

INVITED SESSION: Enterprise Modeling: Supply Chain Design to Statistical Performance Analysis
ORGANIZER: Bonnie Ray, New Jersey Institute of Technology

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LUNCH **12:00 NOON–1:00 P.M.**

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RM. S **1:00–2:45 P.M.**
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CHAIR: NAME, AFFILIATION

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RM. T **1:00–2:45 P.M.**
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RM. U **1:00–2:45 P.M.**
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RM. V **1:00–2:45 P.M.**
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BREAK/POSTER SESSION **2:45–3:15 P.M.**

RM. W **3:15–5:00 P.M.**
INVITED SESSION: The Utility of Bayesian Decision Analysis for Environmental Problems
ORGANIZER: Paul Black, Neptune and Company, Inc.

3:15 P.M. Title, Speaker, Affiliation
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4:15 P.M. Title, Speaker, Affiliation
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RM. X **3:15–5:00 P.M.**

INVITED SESSION: The Use of Inverse Theory in Environmental Applications
ORGANIZER: Vicki Lancaster, Neptune and Company, Inc.

3:15 P.M. Title, Speaker, Affiliation
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SATURDAY, APRIL 8, 2000

RM. Y **8:00–9:45 A.M.**

INVITED SESSION: Survival and Reliability Data
ORGANIZER: Luis Escobarl, Louisiana State University

8:00 A.M. Title, Speaker, Affiliation
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RM. Z **8:00–9:45 A.M.**

INVITED SESSION: To Be Determined
ORGANIZER: Tim Hesterberg, MathSoft, Inc.

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8:30 A.M. Title, Speaker, Affiliation
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BREAK/POSTER SESSION **9:45–10:15 A.M.**

RM. AA **10:15 A.M.–12:00 NOON**

INVITED SESSION: IASC Sponsored Session: To Be Determined
ORGANIZER: Alan Karr, National Institute of Statistical Sciences

10:15 A.M. Title, Speaker, Affiliation
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RM. BB **10:15 A.M.–12:00 NOON**

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