



**32<sup>nd</sup> Symposium on the Interface:  
Computing Science and Statistics**

**Modeling the Earth's Systems:  
Physical to Infrastructural**

**April 5-8, 2000  
Monteleone Hotel  
New Orleans, Louisiana**

**PROGRAM**

**SPONSORED BY**

The Interface Foundation of North America

**HOSTED BY**

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## INTERFACE 2000

### CONFERENCE CHAIRS

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### CONFERENCE ORGANIZERS

Paul Black, Neptune and Company, Inc.  
Andreas Buja, AT&T  
Lorraine Denby, Bell Labs---Lucent Technologies  
Cathy Dippo, Bureau of Labor Statistics  
Luis Escobar, Louisiana State University  
Alan Karr, National Institute of Statistical Sciences  
Sallie Keller-McNulty, Los Alamos National Laboratory  
Vicki Lancaster, Neptune and Company, Inc.  
Dorothy Merritts, Franklin and Marshall College  
Leslie M. Moore, Los Alamos National Laboratory  
Sally C. Morton, RAND  
Barry Moser, Louisiana State University  
Doug Nychka, National Center for Atmospheric Research  
Bonnie Ray, New Jersey Institute of Technology  
William Shannon, Washington University School of Medicine  
Nancy Spruill, Office of the Under Secretary of Defense  
Ed Wegman, George Mason University



**WEDNESDAY, APRIL 5, 2000****8:00 A.M.–NOON****SHORT COURSES**

REGISTRATION FOR INTERFACE	7:00 A.M.–5:45 P.M.	ROOM: TBD
REGISTRATION FOR SHORT COURSES	7:00 A.M.–NOON AND 7:00–9:00 P.M.	ROOM: TBD

<b>SHORT COURSE I</b>	<b>8:00 A.M.–NOON</b>	<b>ROOM: LA NOUVELLE ORLEANS WEST</b>
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**BUILDING AND FITTING RANDOM EFFECTS MODELS**

William Cleveland, Lorraine Denby, Chuanhai Liu  
 Statistics Research Department  
 Bell Labs, Murray Hill, New Jersey

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.

<b>LUNCH</b>	<b>12:00–1:30 P.M.</b>
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<b>SHORT COURSE II</b>	<b>1:30–5:30 P.M.</b>	<b>ROOM: LA NOUVELLE ORLEANS WEST</b>
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**AN INTRODUCTION TO MODEL BUILDING WITH REPRODUCING KERNEL HILBERT  
 WITH APPLICATIONS IN BIOSTATISTICS AND ATMOSPHERIC SCIENCES**

Grace Wahba  
 Department of Statistics  
 University of Wisconsin  
 Madison, Wisconsin

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.

<b>EVENING MIXER</b>	<b>8:00–10:00 P.M.</b>	<b>ROOM: RIVER VIEW ROOM</b>
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THURSDAY, APRIL 6, 2000

8:00–9:45 A.M.

KEYNOTE ADDRESS

REGISTRATION FOR INTERFACE 2000

7:00 A.M.–NOON AND 7:00–9:00 P.M.

ROOM: TBD

KEYNOTE ADDRESS

8:00–9:45 A.M.

ROOM: LA NOUVELLE ORLEANS EAST AND WEST

<b>WELCOME TO INTERFACE</b>	Vicki Lancaster, Neptune and Company, Inc.
<b>WELCOME TO NEW ORLEANS</b>	TBD
<b>KEYNOTE INTRODUCTION</b>	Sallie Keller-McNulty, Los Alamos National Laboratory

**COMBINING OBSERVATIONS WITH MODELS: PENALIZED LIKELIHOOD AND  
RELATED METHODS IN NUMERICAL WEATHER PREDICTION**

Grace Wahba  
University of Wisconsin

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 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.

BREAK

9:45–10:30 A.M.

ROOM: QUEEN ANNE

THURSDAY, APRIL 6, 2000

10:30 A.M.–12:15 P.M.

INVITED SESSIONS

**INVITED SESSION:** Models for the Earth's Atmosphere and Ocean**ORGANIZER/CHAIR:** Doug Nychka, National Center for Atmospheric Research

10:30 A.M.–12:15 P.M.

Room: TBD

10:30 A.M. *Air-sea Interaction in the Labrador Sea:  
Deep Water Formation and Climate*Ralph Milliff  
National Center for Atmospheric  
Research11:20 A.M. *Hierarchical, Space-time Models:  
Physically Based Models for Combining  
Geophysical Data*L. Mark Berliner  
Ohio State University**POSTERS\*:***Statistical Computing for Large Geophysical  
Datasets: Blending Ocean Wind Measurements*  
Timothy Hoar  
National Center for Atmospheric Research*Stochastic Parameterizations in General Circulation  
Models for the Atmosphere: Cloud Motion*Rachel Buchberger  
National Center for Atmospheric Research and  
Colorado State University**INVITED SESSION:** Critical Infrastructure Modeling**ORGANIZER/CHAIR:** Sallie Keller-McNulty, Los Alamos National Laboratory

10:30 A.M.–12:15 P.M.

Room: TBD

10:30 A.M. *Critical Infrastructure System of  
Systems Simulation*J. Darrell Morgeson  
Los Alamos National Laboratory11:05 A.M. *Generation and Measurement of Large  
Dynamical Systems*Chris Barrett  
Los Alamos National Laboratory11:40 A.M. *Calibration versus Assessment in  
Dynamical System Simulation Models*Richard Beckman and  
Katherine Campbell  
Los Alamos National Laboratory**POSTERS\*:***Cyber Crime and Counter Measures*  
Matt Schonlau  
RAND*Statistical Visualization Methods in Intrusion  
Detection*Jeffrey L. Solka, David Marchette  
Naval Surface Warfare Centerand  
Bradley Wallet  
Chroma, Inc.*Hidden Markov Modeling of Freeways Traffic Status*Jaimyoung Kwon  
UC Berkeley**INVITED SESSION:** Information Technology and Federal Statistics**ORGANIZER/CHAIR:** Cathy Dippo, Bureau of Labor Statistics

10:30 A.M.–12:15 P.M.

Room: TBD

10:30 A.M. *Creating an Integrated Information  
System with Statistical Data and  
Services*Amamath Gupta, Chaitanya Baru,  
Richard Marciano  
University of California San Diego  
and  
Ilya Zaslavsky  
San Diego State University11:05 A.M. *Statistical Information Seeking and  
System Design*Carol Hert  
Syracuse University11:40 A.M. *The Role of Ontologies in Statistical  
Information Seeking*Ed Hovy  
University of Southern California  
and  
Judith Klavans  
Columbia University**POSTERS\*:***Statistical Information Seeking and System Design*  
Carol Hert  
Syracuse University*The Role of Ontologies in Statistical Information  
Seeking*Ed Hovy  
University of Southern California

LUNCH

12:15–1:30 P.M.

\*POSTER SESSIONS WILL BE UP ALL DAY IN THE QUEEN ANNE ROOM.

**THURSDAY, APRIL 6, 2000**

**1:30–3:15 P.M.**

**CONTRIBUTED SESSIONS**

**TBD**

**\*POSTER SESSIONS WILL BE UP ALL DAY IN THE QUEEN ANNE ROOM.**

THURSDAY, APRIL 6, 2000

4:00–5:45 P.M.

INVITED SESSIONS

**INVITED SESSION:** CSNA Sponsored Session: Applications of Clustering and Classification to Large Datasets  
**ORGANIZER/CHAIR:** William Shannon, Washington University School of Medicine  
**4:00–5:45 P.M.** **Room: TBD**

4:00 P.M. *New Algorithms, Architectures and Science for Data Mining of Massive Astrophysics Sky Surveys*  
 Andrew Moore  
 Carnegie Mellon University

4:45 P.M. *Current Approaches to Gene Chip Data Analysis*  
 Dan Weaver  
 Genomica Corporation

5:30 P.M. **DISCUSSANT:** William Shannon

**POSTERS\*:**  
*Preliminary Studies on Combining Wavelet and Cluster Analysis for Gene Chip Data*  
 William Shannon  
 Washington University School of Medicine  
*The UC Irvine Knowledge Discovery in Databases Archive*  
 Stephen D. Bay, Dennis Kibler, Michael J. Pazzani, and Padhraic Smyth  
 University of California, Irvine

**INVITED SESSION:** Best of the *Journal of Computational and Graphical Statistics*: New Developments in EM  
**ORGANIZER:** Andreas Buja, AT&T  
**CHAIR:** Bonnie Ray, New Jersey Institute of Technology  
**4:00–5:45 P.M.** **Room: TBD**

4:00 P.M. *An Interval Analysis Approach to the EM Algorithm*  
 Kevin Wright  
 Pioneer Hi-Bred International  
 and  
 William J. Kennedy  
 Iowa State University

4:45 P.M. *Fitting Mixed-Effects Models Using Efficient Em-Type Algorithms*  
 David A. van Dyk  
 Harvard University

**INVITED SESSION:** Characterizing Large Complex Natural Systems and Beyond  
**ORGANIZER/CHAIR:** Lorraine Denby, Bell Labs—Lucent Technologies  
**4:00–5:45 P.M.** **Room: TBD**

4:00 P.M. *Statistics and Models for Complex Systems in Engineering and Biology*  
 John Doyle  
 Caltech University

**RECEPTION** **6:00 P.M.** **Room: TBD**

**BANQUET**  
**INTRODUCTION:** Sally Morton, RAND  
**SPEAKER:** David J. Hand, Imperial College, London, England  
**TOPIC:** Measuring the Earth  
**7:00–10:30 P.M.** **Room: TBD**

\***POSTER SESSIONS WILL BE UP ALL DAY IN THE QUEEN ANNE ROOM.**

FRIDAY, APRIL 7, 2000

8:00–9:45 A.M.

INVITED SESSIONS

<b>REGISTRATION FOR INTERFACE 2000</b>	<b>7:00 A.M. –NOON</b>	<b>Room: TBD</b>
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<b>INVITED SESSION:</b> A Tutorial on Inverse Theory <b>ORGANIZER/CHAIR:</b> Vicki Lancaster, Neptune and Company, Inc. <b>8:00–9:45 A.M.</b>	<b>Room: TBD</b>
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8:00 A.M. *A Tutorial on Inverse Theory*  
Luis Tenorio  
Colorado School of Mines

**POSTERS\*:**  
*Velocity Estimation in Exploration Geophysics, A Bootstrap Approach*  
Alberto Villarreal-Cueva, Colorado School of Mines  
*Estimating the Influence of Random Noise on Picked Travel times*  
Albena Mateeva, Colorado School of Mines

<b>INVITED SESSION:</b> Defining, Measuring, and Analyzing Quality of Care: Statistical and Computational Challenges <b>ORGANIZER/CHAIR:</b> Sally C. Morton, RAND <b>8:00–9:45 A.M.</b>	<b>Room: TBD</b>
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8:00 A.M. *Framing the Clinical Context: The HIV Performance Measurement Perspective from New York*  
Bruce Agins  
New York State Department of Health

9:15 A.M. *Simulation in Models of Health Care Quality*  
Karl Heiner, SUNY at New Paltz

8:25 A.M. *Measuring and Improving Quality in Managed Care: Some Statistical and Computing Issues*  
Randall K. Spoeri  
HIP Health Plans, New York

**POSTERS\*:**  
*Casemix Adjustment of Consumer Satisfaction with Health Care Plans*  
Marc N. Elliott, RAND  
Richard Swartz, Rice University  
John Adams, RAND and Ron D. Hays, UCLA

8:50 A.M. *Building Aggregate Health Care Quality Scales*  
John Adams, RAND

*Imputing Treatment Differences in Meta-Analyses with Missing Data*  
I. Elaine Allen, Babson College and  
Ingram Olkin, Stanford University

<b>INVITED SESSION:</b> The Use of Modeling and Statistics in Defense Analysis <b>ORGANIZER/CHAIR:</b> Nancy Spruill, Office of the Under Secretary of Defense (Acquisition and Technology) <b>8:00–9:45 A.M.</b>	<b>Room: TBD</b>
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8:00 A.M. *Use of Modeling and Simulation in Science and Technology--Assessing Potential Military Capability*  
Colonel William Crain  
Defense Modeling and Simulation Office

9:00 A.M. *Simulation Support and Army Resource Decisions*  
Craig E. College, Chief of Staff, Army

8:20 A.M. *The Joint Warfare System (JWARS): A Tool to Improve Combat Simulation for the Information Age Military*  
Lieutenant Colonel Daniel Maxwell  
Office of the Secretary of Defense

9:20 A.M. **DISCUSSANT:** Nancy Spruill

8:40 A.M. *Improving Inventory Performance by Rightsizing Inventory Reorder Points*  
Ron Fricker, RAND

**POSTERS\*:**  
*Modeling Support Infrastructure for the Expeditionary Aerospace Force*  
Lionel Galway, RAND  
*Information and Knowledge Organization to Support Modeling and Statistics in Defense*  
Yvonne Martinez, Los Alamos National Laboratory

<b>BREAK</b>	<b>9:45–10:30 A.M.</b>	<b>Room: QUEEN ANNE</b>
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\*POSTER SESSIONS WILL BE UP ALL DAY IN THE QUEEN ANNE ROOM.

FRIDAY, APRIL 7, 2000

10:30 A.M.–12:15 P.M.

INVITED SESSIONS

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

10:30 A.M.–12:15 P.M.

Room: TBD

10:30 A.M. *Systems Thinking in Supply Chain Management*Charu Chandra  
University of Michigan11:30 A.M. *Forecasting Methods for Supply Chain Management: A Review*Bonnie K. Ray  
New Jersey Institute of Technology11:00 A.M. *Planning Experiments with Computer Models of Complex Phenomena*Leslie M. Moore  
Los Alamos National Laboratory

NOON

**DISCUSSANT:** Max Morris  
Iowa State University**INVITED SESSION:** Using Statistical Modeling to Identify Perturbations in Earth System Processes: Examples from Landscape Evolution and Tectonics**ORGANIZER/CHAIR:** Dorothy Merritts, Franklin and Marshall College

10:30 A.M.–12:15 P.M.

Room: TBD

10:30 A.M. *Numerical Landscapes in Various Tectonic and Climatic Settings: Can they be Distinguished?*Mike Ellis  
University of Memphis11:40 A.M. *Deviations in Slope-area Relations that Indicate Geologically Recent Crustal Deformation*Tim C. Hesterberg  
MathSoft, Inc.11:05 A.M. *Methodologies for Statistical Testing of the Validity of Landform Evolution Model Predictions*Garry Willgoose  
University of Newcastle, Australia**POSTERS\*:***Conjugate Gradient Methods for Large-Scale Sparse Regression with Applications to Seismic Deformation Estimation*Derek Stanford  
MathSoft, Inc.*River Network Scaling Laws: Deviations and Fluctuations*Peter Dodds  
MIT Ph.D. Student**INVITED SESSION:** Statistics in Precision Agriculture**ORGANIZER/CHAIR:** Barry Moser, Louisiana State University

10:30 A.M.–12:15 P.M.

Room: TBD

10:30 P.M. *Hypothesis Tests in the Presence of Spatial Correlation*Robert G. Downer  
Louisiana State UniversityRaul E. Macchiavelli  
University of Puerto Rico11:00 P.M. *Statistical Issues in the Analysis of Remotely Sensed Data as Pertains to Precision Agriculture*Patrick D. Gerard  
David Evans and Michael Cox  
Mississippi State University

NOON

**DISCUSSANT:** E. Barry Moser**POSTERS\*:***Number of Seed Affects Genetic Variability When Using a Pod Bulk Generation Advance Method*  
James Beaver and Raul E. Macchiavelli  
University of Puerto Rico11:30 P.M. *Spatial Models for Designing Sampling Plans for Plant Disease Control**Geostatistical Analysis of Spatial Nutrient Data in a Precision Agriculture Experiment*  
Bradley Tiffée and Robert G. Downer  
Louisiana State University

LUNCH

12:15–1:30 P.M.

\*POSTER SESSIONS WILL BE UP ALL DAY IN THE QUEEN ANNE ROOM.

**FRIDAY, APRIL 7, 2000**

**1:30–3:15 P.M.**

**CONTRIBUTED SESSIONS**

**TBD**

FRIDAY, APRIL 7, 2000

4:00–5:45 P.M.

INVITED SESSIONS

**INVITED SESSION:** The Utility of Bayesian Decision Analysis for Environmental Problems**ORGANIZER/CHAIR:** Paul Black, Neptune and Co., Inc.

4:00–5:45 P.M.

Room: TBD

4:00 P.M. *Scenario and Parametric Uncertainty in GESAMAC: A Methodological Study in Nuclear Waste Disposal Risk Assessment*  
David Draper  
University of Bath, England

4:25 P.M. *A Probability Network for Water Quality Modeling and Decision Support*  
Kenneth H. Reckhow  
and  
Mark E. Borsuk  
Duke University

4:50 P.M. *Bayesian Assessment of Uncertainty and Variability in Deterministic Environmental Exposure Models*  
Samantha Bates  
University of Washington Ph.D. Student  
and  
Adrian Raftery  
University of Washington

5:15 P.M. *Application of Probabilistic Methods for Modeling Fate and Transport of Buried Radioactive Waste*  
Tom Stockton  
and  
Paul Black  
Neptune and Company, Inc.

**INVITED SESSION:** IASC Sponsored Session: Applications to Earth Systems**ORGANIZER/CHAIR:** Ed Wegman, George Mason University

4:00–5:45 P.M.

Room: TBD

4:00 P.M. *Using Smoothing to Reconstruct the Holocene Temperature in Lapland*  
Lasse Holmström  
Rolf Nevanlinna Institute

4:35 P.M. *Analysis of Oronsay Particle-size Sand Data Using Linked Graphics*  
Adalbert Wilhelm  
Universität Augsburg

5:10 P.M. *Applications of Deepest Regression*  
Mia Hubert  
and  
Peter J. Rousseeuw  
Universitaire Instelling Antwerpen

EXCURSION

6:45–10:30 P.M.

\*POSTER SESSIONS WILL BE UP ALL DAY IN THE QUEEN ANNE ROOM.

**SATURDAY, APRIL 8, 2000**

**8:00–9:45 A.M.**

**CONTRIBUTED SESSIONS**

**REGISTRATION FOR INTERFACE 2000**

**7:30–8:30 A.M.**

**Room: TBD**

**TBD**

SATURDAY, APRIL 8, 2000

10:30 A.M.–12:15 P.M.

INVITED SESSIONS

**INVITED SESSION:** Statistics and Information Technology**ORGANIZER/CHAIR:** Alan Karr, National Institute of Statistical Sciences**8:00–9:45 A.M.****Room: TBD**

10:30 A.M. *How Should We Publish Data in the Web Age?*  
Todd L. Graves  
Los Alamos National Laboratory

11:05 A.M. *Geographic Aggregation Procedures for Data Disclosure Limitation*  
Ashish Sanil  
National Institute of Statistical Sciences

11:40 A.M. *Detecting Defection: Mining Massive Online Data to Model ISP Customer Churn*  
Nandini Raghavan  
AT&T Labs-Research

**INVITED SESSION:** Statistical and Computational Methods for Survival and Reliability Data**ORGANIZER/CHAIR:** Luis Escobar, Louisiana State University**8:00–9:45 A.M.****Room: TBD**

10:30 A.M. *Reliability Analysis Using JMP Version 4.0*  
Bradley Jones  
SAS Institute Inc.

11:40 A.M. *Random Effects Survival Models for Familial Data*  
Terry M. Therneau  
Mayo Clinic

11:05 A.M. *Reliability Data Analysis Using S-Plus*  
William Q. Meeker  
Iowa State University

**BREAK****9:45–10:30 A.M.****Room: QUEEN ANNE**