

Additional Course Details

The Modeling Management Course is an 8 hour CEU-approved short program for Environmental Professionals with a broad range of skills, but focused on those who makes project- and management-level decisions on the basis of models. This is NOT a model development or calibration instruction course, though even experienced modelers will benefit from exposure to the latest information on identifying and evaluating sources of errors in groundwater (and other) models. The Modeling Management Course provides a unique opportunity to learn how to evaluate existing groundwater (and other) models, identify their potential for error, and implement methods that can mitigate the impacts of modeling error on decision making and defensible data collection. The primary Course objective is to teach decision-makers, managers, regulators and others how to recognize, evaluate and then manage sources of model error within a decision-making framework; what can be reasonably expected from modeling analyses; and how to ask appropriate questions of the modeler(s) that make the decision making process an informed one.

Interested in attending The Modeling Management Course?

The one day seminar will be held Tuesday March 14, 2006 at the Long Island Groundwater Research Institute, Stony Brook University (SUNY), Stony Brook, NY. Please visit the course information website at www.themodelinamanaementcourse.com or contact Matt Tonkin 508-362-7014 for course specifics.

Presented by:



Course Supporters:



Watermark Numerical Computing



Fees

Complete course fees are \$475 for consultants and industry representatives. Qualified State and Federal Government officials will be admitted for \$375. A 20 percent corporate discount applies when 3 or more persons apply from the same organization. A limited number of reduced rate academic seats (full time students and faculty) are available for \$195 each.

Registration Instructions

Course registration for the premier of *Groundwater Modeling Management and Application for Decision Making* will be provided by EnviroCourses.org via an on-line (internet-based) event management system. Please visit www.envirocourses.org for general information. Telephone reservations are also available by contacting Todd Margrave at EnviroCourses.org at 619-589-0784. Official registration begins Monday December 19, 2005.

Hotel Accommodations

Danfords on the Sound has been chosen as the official hotel for this training event. A block of 30 rooms are reserved at the special rate of \$126 per night (plus taxes.) Nestled in the heart of Historic Port Jefferson, New York, Danfords on the Sound is ideally located at the harbors edge on Long Island Sound. The upscale inn is a mere 50 miles from New York City on the heritage North Shore of Long Island, with direct access to Ferry service to Connecticut. Visit www.danfords.com/directions.htm.

Alternate lodging is available at Holiday Inn Express Stony Brook. Please visit their website www.holidayinnexpress.com or call (631) 471-8000.

Meals and Transportation

Tuesday lunch will be provided on-site. All other meal, travel and incidental expenses are the student's responsibility.

ENVIROCURSES.org

The Modeling Management Course

Groundwater Modeling Management and Application for Decision Making

Course Announcement



A One-Day Seminar on
Tuesday March 14, 2006

Long Island Groundwater
Research Institute
Stony Brook University (SUNY)
Stony Brook, NY

Course Outline

Introduction: 8:45 am – 9:00 am

9:00 am – 9:30 am - *The Role(s) of Models in Decision Support*

- Important issues facing decision makers
- Important predictions made with models
- Possible consequences of erroneous predictions

9:30 am – 10:00 am - *The Modeling Process, Past and Current*

- When is a model needed, and when should modeling commence?
- How are models validated, updated and refined?
- When is a model good enough?

10:10 am – 10:30 am – *The Modeling Deliverable*

- How are modeling results delivered?
- How *could* modeling results be delivered?

10:40 am – 12:10 pm - *Model Calibration*

- Basic statistics and classical model calibration
- Calibration software
- Measurement error and structural error
- How geologist's wisdom and knowledge can be used as parameter constraints
- Statistics and other metrics arising from the calibration process
- Methods for spatial parameter definition
- Hypothesis-testing through calibration
- The role of Bayes theorem

Lunch: *Catered On-Site and Included with Seminar Fee*

1:00 pm – 2:30 pm - *The Cost of Uniqueness*

- Regularization – what it means
- Mathematical regularization and examples
- The relationship between a calibrated parameter and its real-world equivalent
- The calibration null space and why it is important
- Where did all the detail go?
- The cost of uniqueness
- What “the deliverable” actually delivers

2:40 pm – 4:30 pm - *Model Predictive Uncertainty Analysis*

- Classical and calibration-constrained Monte-carlo analysis
- Predictive calibration
- Contributors to uncertainty and their quantification
- Optimization of data acquisition with examples
- Nonlinear uncertainty analysis with example

5:30 pm – Reception

Why Should You Attend The Course?

Modeling is now an integral part of the environmental management decision-making process. Yet many decisions made on the basis of models are made without fully understanding the limitations of the model(s) employed, and the potential ‘wrongness’ of the predictions made with the model(s). By relying on a belief that models represent a comprehensive and unbiased summary of the available information, few decision makers ask of the modeler - “*how wrong could this model be?*”. As stakeholder scrutiny intensifies the potential cost of making important decisions on the basis of misunderstandings and erroneous assumptions escalates.

Fortunately, the ability to evaluate models and their predictions is entering a new era as advances in understanding an software can support cost-effective analyses of the predictions made by models. It is becoming possible for decision makers to have the ability to evaluate potential model accuracy prior to obligating project funding. Attendees will be introduced to the theory behind these approaches and exposed to a variety of real-world examples where they have supported overall project management, optimized data acquisition, and led to improved cost control.

Course Instructors

John Doherty

Dr. John Doherty has worked in the groundwater industry for nearly 30 years, first as an exploration geophysicist and then as a modeler. He has worked in the public, private and university sectors, and today runs his own company which undertakes modeling and data processing in many different environmental contexts. John is best known as the developer of the model-independent parameter estimation and uncertainty analysis program, PEST. He currently works with the University of Queensland where, together with his students, he researches and develops calibration and predictive uncertainty analysis methods. John has developed models to support decisions in groundwater remediation, mining applications, surface water TMDLs and many other contexts. He is an invited speaker and instructor worldwide and provides training in modeling, calibration and uncertainty analysis throughout the world. Always conscious of the uncertainties that underlie predictions made with models, John developed this seminar to outline the principal sources of uncertainty, and the variety of methods available for their assessment, for those who make decisions based on models. His lecture style is informative and entertaining. Concepts are developed logically and presented clearly. Every attempt is made to avoid boring the audience, while conveying that predictive error analysis is possible, cost effective and is often essential to defensible decision making.

Matt Tonkin

Matt has consulted with SSP&A for 10 years. He focuses on the design and management of data gathering efforts; the synthesis and interpretation of these data; and the application of models to support decision-making. He has completed contracts to the USGS, USEPA and California Department of Water Resources in the areas of contaminant transport and model uncertainty analysis. Matt is a member of the Interstate Technology Research Council (ITRC) MTBE team and has presented at several of their MTBE remediation workshops. Matt is also a consultant to NYSDEC, for whom he provides technical support or oversight at several large fuel-spill investigations and remedies. Matt hosts a technical support forum for PEST users, co-teaches courses with John Doherty, and is currently embarking on his PhD under John Doherty's advisement investigating efficient methods of predictive uncertainty analysis for large models.

Joe Haas

Joe has 16 years experience working as a managing state regulator. He is a licensed Engineering Geologist and Hydrogeologist with a B.S. in Geology from SUNY, Plattsburgh (1988) and a M.S. from SUNY, Stony Brook in Hydrogeology (1997) where he researched the speciation of iron and manganese in ground water contaminated by petroleum. Joe has been collaborating with SUNY Stony Brook's Long Island Groundwater Research Institute to provide technical assistance and training to technical and regulatory groups inside and outside of his home state of New York. Joe has been involved in research with representatives of the United States Environmental Protection Agency and the United States Geological Survey. These research efforts have been credited as having made significant contributions to the understanding of the characteristics of MTBE in the sub-surface environment and having influenced the national debate on the use of MTBE in gasoline. The Office of Research and Development acknowledged his contributions, in 2002, in the form of an award for Exceptional Support to ORD.