Albuquerque Marriott Hotel
August 6 – 7, 2002

The purpose of the Epistemic Uncertainty Workshop is to focus attention and discussion on the topic of epistemic uncertainty in real systems.The Epistemic Uncertainty Project has constructed a sequence of challenge problems. The challenge problems are intended to provide a common starting point for the discussion of the representation, aggregation, propagation, and interpretation of uncertainty.

This Workshop is an opportune time to bring together leading researchers with differing viewpoints to discuss and exchange ideas on the issue of epistemic uncertainty. Specifically, we wish to bring together traditional probabilists, Bayesians, generalized information theorists, and decision theorists. These researchers are joined by leading reliability engineering and risk analysts who face the issue of epistemic and aleatory uncertainty in the assessment of high consequence engineered and natural systems.

Organizing Committee
William Oberkampf, Chair
Sandia National Laboratories
wloberk@sandia.gov

Jon Helton
Sandia National Laboratories
jchelto@sandia.gov

Steve Wojtkiewicz
Sandia National Laboratories
sfwojtk@sandia.gov

Cliff Joslyn
Los Alamos National Laboratory
joslyn@lanl.gov

Scott Ferson
Applied Biomathematics
scott@ramas.com

Workshop Coordinator
Mindy Morgan Hutchings
mmorgan@sandia.gov
Phone (505) 284-5896
Fax (505) 844-4523

The Workshop is organized and sponsored by
Sandia National Laboratories
A Department of Energy National Laboratory

Monday, August 5

6:00 - 8:00 pm — Informal reception and Workshop registration
Location: Sandia Room

Tuesday, August 6

Opening Session

8:00 - 8:30 am — Workshop registration and continental breakfast
Location: Salon A-D

8:30 - 8:45 am — Welcoming Remarks

8:45 – 9:00 am — Context of the Challenge Problems
William Oberkampf, Sandia National Laboratories

Session 1

Chair: Jon Helton, Consultant, Sandia National Laboratories

9:00 – 9:45 am — "Generalized Uncertainty-Based Information Theory: Aims, Results, Open Problems"
George Klir, Department of Systems Science and Industrial Engineering
Binghamton University

9:45 – 10:30 am — "From Dissecting Ignorance to Solving Algebraic Problems“
Bilal M. Ayyub, Department of Civil and Environmental Engineering
University of Maryland

10:30 – 11:00 am — Coffee break

Session 2

Chair: Cliff Joslyn, Los Alamos National Laboratory

11:00 – 11:45 am — "Don't Open That Envelope: Solutions to the Sandia Problems Using Probability Boxes"
Scott Ferson, Applied Biomathematics, Setauket, NY
Janos Hajagos, State University of New York at Stony Brook

11:45 – 12:30 pm — "Uncertainty, Probability and Information-gaps"
Yakov Ben-Haim, Department of Mechanical Engineering
Technion – Israel Institute of Technology

12:30 - 1:45 pm — Lunch provided
Location: The Pavillion

Session 3

Chair: Scott Ferson, Applied Biomathematics, Setauket, NY

1:45 – 2:30 pm — "Probability is perfect, but I can't elicit it perfectly"
Anthony O'Hagan, Department of Probability and Statistics
University of Sheffield

2:30 – 3:15 pm — "Solving the Sandia problem set using the theory of coherent lower previsions"
Gert de Cooman and Matthias C. M. Troffaes, Onderzoeksgroep SYSTeMS
Universiteit Gent

3:15 – 3:45 pm — Coffee Break

Session 4

Chair: Steve Wojtkiewicz, Sandia National Laboratories

3:45 – 4:30 pm — "An exploration of alternative approaches to the representation of uncertainty in model predictions"
Jon Helton, Consultant Sandia National Laboratories

4:30 – 5:15 pm — "Probabilities, Intervals, What Next: Representation, Elicitation, and Aggregation of Uncertainty in Risk Analysis - From Traditional Probabilistic Techniques to More General, More Realistic Approaches"
Vladik Kreinovich, Computer Science Department
University of Texas at El Paso

Tuesday, August 6 ~ Evening

Poster Session

6:00 - 6:30 pm — Social and Cash bar
Location: Pecos Room

6:30 - 7:30 pm — Banquet dinner provided

7:30 - 9:00 pm — Poster paper discussions

"$(a + b)^a$: Cumulative Credibility, and the Distribution Envelope Determination (DEnv) Algorithm"
Daniel Berleant and Jianzhong Zhang
Department of Electrical and Computer Engineering
Iowa State University

"Solving the Challenge Problems Using Expert Knowledge Principles and Methods"
Jane M. Booker and Laura A. McNamara
Weapons Response Group and Statistical Sciences Group
Los Alamos National Laboratory

"Solution to Challenge Problem 1 in the framework of sets of probablity measures"
Thomas Fetz and Michael Oberguggenberger
Department of Engineering Mathematics, Geometry, and Computer Science
University of Innsbruck

"Random Set Analysis of System Response Given Uncertain Parameters"
Jim Hall and Jonathan Lawry
Department of Civil Engineering and Department of Engineering Mathematics
University of Bristol

"Evidence Theory and Bayesian Probability for Characterizing Epistemic Uncertainty"
Shatos Nikolaidis, University of Toledo
Prabhu Soundappan, University of Toledo
Rafi Haftka, University of Florida
Ramana Grandhi, Wright State University
Robert Canfield, Air Force Institute of Technology

"Uncertainty Quantification in Multidisciplinary Design Optimization"
Harish Agarwal, John Renaud, and Dhanesh Padmanabhan
Department of Aerospace and Mechanical Engineering
University of Notre Dame

"Using Random Set Theory to Solve Challenge Problem B"
Fulvio Tonon
Geology and Geophysics Department
University of Utah

Wednesday, August 7

8:00 – 8:30 am	Continental breakfast Location: Salon A-D

Session 5

Chair: Kari Sentz, Los Alamos National Laboratory

8:30 – 9:15 am	"An approach to combining unreliable pieces of evidence and their propagation in a system response analysis" Igor Kozine, Systems Analysis Department, RISO National Laboratory Lev Utkin, Institute of Statistics, Munich University
9:15 – 10:00 am	"A Probabilistic Approach to UQ Using Approximate Information" John Red-Horse, Sandia National Laboratories Allan Benjamin, ARES Corp, Albuquerque, NM
10:00 – 10:30 am	Coffee break

Session 6

Chair: Marty Pilch, Sandia National Laboratories

10:30 – 11:15 am	"Toward a General Framework for Uncertainty Representation" Ronald R. Yager, Machine Intelligence Institute Iona College
11:15 – 12:00 pm	"The Anatomy of the Squizzel: the role of operational definitions in representing uncertainty" Roger M. Cooke, Department of Mathematics Delft University of Technology
12:00 - 1:15 pm	Lunch provided Location: The Pavillion

Session 7

Chair: William Oberkampf, Sandia National Laboratories

1:15 – 2:00 pm	"Data Structures and Computer Arithmetic for Quantifying Uncertainty" Mac Hyman and Weiye Li Los Alamos National Laboratory
2:00 – 2:45 pm	"Implications of the Research on Overconfidence for Challenge Problem Solution Strategies" Vicki Bier, Industrial Engineering Department University of Wisconsin Madison
2:45 – 3:15 pm	Coffee Break

Session 8

Moderator: Ciff Joslyn, Los Alamos National Laboratory

3:15 – 4:15 pm	Open discussion of results and unresolved issues (all attendees invited to participate)