

PROGRAM OF EVENTS: FEBRUARY 22-24, 2006

■ NSF WORKSHOP ON RELIABLE ENGINEERING COMPUTING ■
MODELING ERRORS AND UNCERTAINTY IN ENGINEERING COMPUTATIONS



HONORARY CO-CHAIRS

Ramon E. Moore
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CHAIR

Rafi L. Muhanna
Georgia Institute of Technology

CO-CHAIR

Robert L. Mullen
Case Western Reserve University

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EVENT COORDINATION

Center for Reliable Engineering Computing
Georgia Tech Savannah

■ NSF WORKSHOP ON RELIABLE ENGINEERING COMPUTING ■ MODELING ERRORS AND UNCERTAINTY IN ENGINEERING COMPUTATIONS

PROGRAM: WEDNESDAY, FEBRUARY 22, 2006

Georgia Tech Savannah | PARB, Room 126

8:00 - 8:30 Opening Remarks

Session I Session Chair: Rafi L. Muhanna

8:30 - 9:15 Ivo Babuska
How Reliable are Computational Predictions in the Engineering Sciences?

9:15 - 9:45 Fulvio Tonon
Discrete Mechanics on Interval Algebra

9:45 - 10:00 Coffee Break

Session II Session Chair: George Corliss

10:00 -10:30 Feodor Vainstein and Clint Jones
Checking Computation of Numerical Functions by the Use of Functional Equations

10:30 -11:00 Francisco Chaves and Marc Daumas
A Library to Taylor Models for PVS Automatic Proof Checker

11:00 -11:30 Ph. Langlois and N. Louvet
Compensated Horner Scheme in K-Fold Working Precision

11:30 -12:00 S. Graillat and N. Louvet
Applications of Fast and Accurate Summation in Computations Geometry

12:00 - 1:00 Lunch

Session III Session Chair: Robert Mullen

1:00 - 1:45 Bruce R. Ellingwood
Modeling Uncertainties in Seismic Vulnerability and Risk Assessment

1:45 – 2:15 Isaac Elishakoff and Roberto Santoro
Reliability of Structural Reliability Estimation

2:15 - 2:45 G.F. Corliss, R. B. Kearfott, N. Nedialkove, S. Smith
Towards an Interval Subroutine Library

2:45 -3:15 Michael Nooner and Chenyi Hu
A Computational Environment for Interval Matrices in C++

3:15 - 3:45 Coffee Break

Session IV Session Chair: Scott Ferson

3:45 - 4:15 H. Munoz and E. Pierre
Interval Arithmetic Technique for Constrained Reliability Optimization Problems

4:15 - 4:45 Ingo Neumann, Hansjörg Kutterer and Steffen Schön
Outlier Detection in Geodetic Applications with Respect to Observation Imprecision

4:45 - 5:15 D.K. Wittenberg and T.J. Hickey
Modeling Hysteris in CLIP – The Two Tanks Problem

NOTES: Transportation has been arranged to and from the Savannah campus of Georgia Tech for all workshop participants. Trolleys will begin boarding each morning at 7:15 AM at the entrance to the Hampton Inn, and will return to the hotel at the conclusion of each workshop day. An additional shuttle will be available immediately after lunch for anyone who wishes to return to the hotel.

All participants are invited to a welcome reception at the [Mulberry Inn](#) on February 21st, from 7:00-9:00 PM.

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PROGRAM: THURSDAY, FEBRUARY 23, 2006

Georgia Tech Savannah | PARB, Room 126

Session I	Session Chair: Mark Stadtherr
8:15 - 9:00	Arnold Neumaier <i>Worst Case Bounds in the Presence of Correlated Uncertainty</i>
9:00 - 9:30	S. Ferson and V. Kreinovich <i>Modeling Correlation and Dependence among Intervals</i>
9:30 - 10:00	Martine Ceberio, Scott Ferson, Vladik Kreinovich, Sanjeev Chopra, Gang Xiang, Adrian Murguia, Jorge Santillan <i>How to Take into Account Dependence Between the Inputs: From Interval Computations to Constraint-Related Set Computations, With Potential Applications to Nuclear Safety, Bio- and Geosciences</i>
10:00 - 10:30	Coffee Break
Session II	Session Chair: Francisco José Chaves
10:30 - 11:00	M. Berz and K. Makino <i>Defect-based ODE Solvers Based on Taylor Model Methods</i>
11:00 - 11:30	Y. Lin and M.A. Stadtherr <i>Validated Solution of Initial Value Problems for ODEs with Interval Parameters</i>
11:30 - 12:00	Nataraj S. V. Paluri, and Nandkishor Kubal <i>Online Implementation of a Robust Controller using Hybrid Global Optimization Techniques</i>
12:00 - 1:00	Lunch
Session III	Session Chair: Vladik Kreinovich
1:00 - 1:30	F. Vainstein, V. Osorio, E. Marte and R. Romero <i>Reduction in Space Complexity and Error Detection/Correction of Fuzzy Controller</i>
1:30 - 2:00	W.W. Edmonson, R. Gupte, J. Gianchandani, S. Ocloo, and W.E. Alexander <i>Interval Arithmetic Logic Unit for Signal Processing and Control Application</i>
2:00 - 2:30	Michael Orshansky, Wei-Shen Wang, Gang Xiang, Vladik Kreinovich <i>Interval-based Robust Statistical Techniques for Non-Negative Convex Functions, with Application to Timing Analysis of Computer Chips</i>
2:30 - 3:00	Petr Sváček <i>On Reliability of Higher-Order FEM in Fluid-Structure Interaction Problems</i>
3:00 - 3:30	Coffee Break
Session IV	Session Chair: Zissimos Mourelatos
3:30 - 4:00	Pavel Solin, Rafi Muhanna, Jack Chessa, Vladik Kreinovich, Roberto Araiza, Gang Xiang <i>Interval Finite Element Methods: New Directions</i>
4:00 - 4:30	E.D. Popova, R. Yankov, Z. Bonev <i>Bounding the Response of Mechanical Structures with Uncertainties in all the Parameters</i>
7:00	Banquet

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PROGRAM: FRIDAY, FEBRUARY 24, 2006

Georgia Tech Savannah | PARB, Room 126

Session I	Session Chair: R. Baker Kearfott
8:15 – 9:00	M.S. Eldred <i>Overview of Reliability Analysis and Design Capabilities in DAKOTA</i>
9:00 - 9:30	Yan Wang <i>Semantic Tolerance Modeling Based on Modal Interval Analysis</i>
9:30 -10:00	J.M. Aughenbaugh and C.J.J. Paredis <i>Why are Intervals and Imprecision Important in Engineering Design?</i>
10:00 - 10:30	Coffee Break
Session II	Session Chair: Bernd Moeller
10:30 -11:00	M. Bruns, C.J.J. Paredis, and S. Ferson <i>Computational Methods for Decision Making Based on Imprecise Information</i>
11:00 -11:30	Michael Beer <i>Sampling Without Probabilistic Model</i>
11:30 - 12:00	Zissimos P. Mourelatos and Jun Zhou <i>Non-Probabilistic Design Optimizations with Insufficient Data</i>
12:00 - 1:00	Lunch
Session III	Session Chair: Chenyi Hu
1:00 - 1:30	Bernd Moeller and Uwe Reuter <i>Prediction of Uncertain Structural Responses with Fuzzy Time Series</i>
1:30 - 2:00	B.F. Zalewski, R.L. Mullen, R.L. Muhanna <i>Boundary Element Analysis of Systems Using Interval Methods</i>
2:00 – 2:30	K. Makino and M. Brez <i>Simultaneous Calculation of Gradient Enclosures and Their Use for n-Th Order Box Rejection</i>
2:30 - 3:00	M. Modares, R.L. Mullen and D.A. Gasparini <i>Reliable Dynamic Analysis of Transportation Systems</i>
3:00 - 3:30	Coffee Break
3:30 - 4:00	Rafi L. Muhanna, Ayše Erdolen and Robert Mullen <i>Geometric Uncertainty in Truss Systems:An Interval Approach</i>
Session IV	Session Chairs: Rafi Muhanna and Robert Mullen
4:00 - 5:00	Discussion, future plans, recommendations and workshop closing

PROGRAM: FEBRUARY 25-27, 2006

Worst Case Error Estimates for Partial Differential Equations

Presented by Arnold Neumaier

A 3-afternoon (Saturday, Sunday and Monday) informal crash course.