

# USA/SOUTH AMERICA SYMPOSIUM ON STOCHASTIC MODELING AND UNCERTAINTY QUANTIFICATION, LEBLON BEACH, RIO DE JANEIRO, BRAZIL, AUGUST 1–5, 2011

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## PREFACE

These special issues of the *International Journal for Uncertainty Quantification* bring together the work of scientists from various fields that emphasize the role of stochastic and statistical modeling in engineering applications. The papers included in these issues were presented at the USA/South America Symposium on Stochastic Modeling and Uncertainty Quantification that took place in Rio de Janeiro, Brazil on August 1–5, 2011.

This National Science Foundation (Mechanics of Materials Program, Division of CMMI) sponsored symposium embraced emerging topics on uncertainty quantification (UQ) applied to predictive engineering and sciences. It aimed at fostering research collaboration between North American and South American groups (mainly Brazilian, but also with participation from Argentina and Chile). In addition to generous support from the NSF, additional financial support was provided from Begell House Inc. Publishers and the *International Journal for Uncertainty Quantification*, CAPES, COPPE/UFRJ, PUC Rio, Laboratório Nacional de Computação Científica (LNCC), CNPq, Schlumberger Brazil Research & Geoengineering Center (BRGC), and Petrobras.

The symposium consisted of a number of tutorial lectures emphasizing stochastic and statistical aspects of uncertainty quantification, and approximately 35 invited presentations. Most of the presenters prepared full scientific documents for publication consideration by the *International Journal for Uncertainty Quantification*. The main themes of the symposium and of these special issues were stochastic and statistical modeling of complex systems with emphasis on the following:

- Solution of High-Dimensional Stochastic PDEs
- Model Reduction of Stochastic PDEs
- Information Theoretic Approaches to Stochastic Multiscale/Multiphysics Modeling
- Bayesian Inference, Predictive Modeling and Model Selection
- Inference in Probabilistic Graphical Models of Complex Engineering Systems
- Applications in Science and Engineering

Although the various contributions presented in these issues emphasize different application areas of stochastic differential equations, the aim of these *International Journal for Uncertainty Quantification* issues is to identify mathematical and stochastic modeling themes that are applicable to a variety of engineering and scientific systems.

In conclusion, I wish to thank all the authors for their valuable contributions. All manuscripts underwent technical peer review. I therefore also wish to thank all the reviewers for their critical comments which undoubtedly improved the original technical value of all contributions.

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