WORKING WITH UNCERTAINTY WORKSHOP: REPRESENTATION, QUANTIFICATION, PROPAGATION, VISUALIZATION, AND COMMUNICATION OF UNCERTAINTY, PROVIDENCE, RHODE ISLAND, OCTOBER 2011

Chris Johnson[1] & Alex Pang[2,∗]

[1] *Scientific Computing and Imaging Institute, University of Utah, Salt Lake City, UT 84112, USA*

[2] *Computer Science Department, University of California, Santa Cruz, Santa Cruz, CA 95064*

PREFACE

When was the last time you saw an isosurface with error bars or streamlines with standard deviations or volume visualizations with representations of confidence intervals? With the increased interest in uncertainty quantification comes a coupled need to visually represent both data and their associated uncertainty in a clear, unbiased fashion. In addition, visualization plays a key role in effectively communicating risk for decision making in many important applications in medicine, security, and severe weather [1, 2].

This special issue of the *International Journal for Uncertainty Quantification* include papers that were presented at the Working with Uncertainty Workshop: Representation, Quantification, Propagation, Visualization, and Communication of Uncertainty (http://www.sci.utah.edu/uncertainty2011/) that took place in Providence, Rhode Island, October 2011 in conjunction with the IEEE VisWeek 2011 Conference (visweek.org), the the premier forum for advances in scientific and information visualization will be published as Volume 3, Issues 2 and 3.

The workshop was partitioned into three themes: Working with Uncertainty; Uncertainty Quantification and Propagation, and Uncertainty Visualization and Communication. Each theme was led off by an invited speaker namely Dongbin Xiu (Purdue University), Pierre Lermusiaux (MIT), and Paul Han (Maine Medical Center Research Institute), followed by presentations of peer reviewed papers. The workshop was accompanied by poster presentations and concluded with a capstone panel. The workshop brought together researchers and practitioners from different fields who have a strong interest in the proper treatment of uncertainty, providing a venue for describing and identifying open problems, current best practices, and discussions on challenges and long term directions.

The authors of workshop papers and other strong submissions were invited to submit expanded versions of their papers to be considered for a special issue of *International Journal for Uncertainty Quantification* focusing on visual analysis and representation of uncertainty. These papers were submitted to IJUQ for review. Of the reviewed papers, we chose 10 papers to include in this special issue.

The papers span a wide range of both algorithmic and application topics from papers that focus on quantitative uncertainty visualization algorithms, such as the paper by Pothkow et al. on Approximate Level-Crossing Probabilities for Interactive Visualization of Uncertainty Isocontours and the paper by Maljovec et al. on Adaptive Sampling with Topological Scores and the the paper by Pfaffelmoser and Westermann on Correlation Visualization for Structural Uncertainty Analysis to several application papers, including the paper by Knoll et al. on Uncertainty Classification and Visualization of Molecular Interfaces and the paper by Cox et al. on Visualizing Uncertainty in Predicted Hurricane Tracks.

∗Correspond to Alex Pang, E-mail: pang@soe.ucsc.edu, URL: http://www.soe.ucsc.edu/ pang/

We hope the readers of the *International Journal for Uncertainty Quantification* will enjoy these papers and think about uncertainty quantification from a more visual point of view. We wish to thank all the authors for their valuable contributions and wish to thank all the reviewers for their critical comments, which undoubtedly improved the original technical value of all contributions.

ACKNOWLEDGMENTS

REFERENCES

1. Pang, A., Wittenbrink, C., and Lodha, S., Approaches to uncertainty visualization, *Vis. Comput.*, 13(8):370–390, November 1997.

2. Johnson, C. and Sanderson, A., A next step: Visualizing errors and uncertainty, *IEEE Comput. Graph. Appl.*, 23(5):6–10, 2003.