Preface

Addressing the challenges in environmental sustainability requires an effective integration of sensing, observation, and inference with physical, chemical, biological, and social models. The necessary integration of data and science is multifaceted and symbiotic with applications from model-based sensing to data-driven modeling. While the attendant issues of predictability, uncertainty, and risk reduction are of great interest in multiple areas of science, engineering, and mathematics, a rigorous forum to present collective advances has been missing.

The Dynamic Data-Driven Environmental Systems Science (DyDESS) Conference coalesces the environment with computation, systems science, and machine intelligence. It provides a forum for scientists and engineers in the emerging environmental systems research issues, an opportunity for young researchers to meet leading scientists, and brings together those interested in the dynamic data-driven application systems framework for environmental applications. It provides an interdisciplinary forum to help methodology meet application, and to showcase results and new, promising methodologies.

Original papers in coupling of data and models for environmental applications are presented in this volume including methodology and experiments. As a single-track conference, DyDESS included papers are in the following areas:

(a) Sensing, imaging and retrieval for the oceans, atmosphere, space, land, earth and planets that is informed by the environmental context
(b) Algorithms for modeling and simulation, downscaling, model reduction, data assimilation, uncertainty quantification and statistical learning; methods that tackle nonlinear and high-dimensional problems
(c) Methodologies for planning and control, sampling and adaptive observation, and efficient coupling of these algorithms into information-gathering and observing system designs
(d) Applications of methodology to environmental estimation, analysis and prediction including climate, natural hazards, oceans, cryosphere, atmosphere, land, space, earth and planets

On behalf of the Program Committee, we are grateful to Prof. R. van der Hilst, Earth, Atmospheric and Planetary Sciences at MIT, for being a strong sponsor of this event. We are grateful to the General Co-Chairs, whose support significantly enhanced participation. We plan to continue the conference to bridge computational intelligence, systems engineering, and the environment, broadly inclusive of all topics in Earth, Atmospheric and Planetary Science.

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