

INTRODUCTION

The University of Illinois at Urbana-Champaign is pleased to host the XIX International Conference on Computational Methods in Water Resources (CMWR 2012), held from June 17-21.



Since its inception in 1976, the conference has served as the premier venue for engineers, geoscientists, hydrologists, computer scientists and applied mathematicians to present and discuss their latest research in the development of advanced computational techniques and their application to problems in water resources and related fields. The conference also serves as a unique forum to bring together researchers from the computer science/applied math community, working on methods and tools, with those from engineering, geoscience, government and industry who are responsible for addressing pressing water-related problems. The inexorable increase in raw computational power, software developments, availability of online hydrologic data, and recent advances in cyber-infrastructure make this a particularly exciting time for computational applications to water resources and geoscience challenges.

The conference venue is always different, traditionally alternating between locations in North America and Europe for the 18 previous biennial meetings. Although the venue for XIX perhaps lacks some of the flair and sophistication of the previous two locations (Barcelona in 2010 and San Francisco in 2008), the University of Illinois at Urbana-Champaign is an ideal location for the conference due to its tradition of excellence in both water resources and advanced scientific computing.

Research in the broad areas of hydrology, hydraulics, and water resources takes place across the campus in many departments and colleges. Within the Civil and Environmental Engineering Department, a focal point is the Ven Te Chow Hydrosystems Laboratory (<http://vtchl.uiuc.edu/>). The Illinois State Water and Geological Surveys, located on our campus, are well-known for their applied water-related research activities. Particularly noteworthy is that Illinois State Geological Survey is a leader in the Midwest Geological Sequestration Consortium, which is conducting a Phase III large-scale sequestration demonstration project in the Mt. Simon Sandstone (<http://www.isgs.illinois.edu/research/sequestration/seq-01-2008.shtml>).

Our tradition of leadership in computing (<http://cs.illinois.edu/csillinois/history>) dates back to the ILLIAC computer in 1952, through establishment of the National Center for Supercomputing Applications (NCSA -- <http://www.ncsa.illinois.edu/>) in 1985, and up to the present construction of National Petascale Computing Facility ("Blue Waters" -- <http://www.ncsa.illinois.edu/BlueWaters/>). Finally, the University of Illinois is proud to claim Professor George Pinder (Ph.D., Geology, 1968) as one of our alumni. Dr. Pinder is one of the founding figures in the application of computational methods to problems of fluid flow in the subsurface, and an organizer of the very first Computational Methods in Water Resources conference at Princeton University in 1976.

Organizing this major conference required the collaboration and support of the many persons and organizations listed in the following pages. I would like to gratefully acknowledge the financial support

of our sponsors: the Hydrologic Sciences and Computational Mathematics Programs at the National Science Foundation, the Subsurface Biogeochemical Research Program at the Department of Energy, Army Research Office, Midwest Geological Sequestration Consortium, National Center for Supercomputing Applications and the University of Illinois College of Engineering and Department of Civil and Environmental Engineering. I thank the organizing committee for their overall guidance in planning the conference. I particularly want to thank the organizers of the special sessions, who were largely responsible for soliciting and reviewing papers. Their outstanding efforts have led to the excellent quality of the technical program as reflected in the papers and abstracts in these proceedings. I thank Laura Hayden in the College of Engineering and Vicki Dixon in the Department of Civil and Environmental Engineering for developing and maintaining the conference web site. Finally, I acknowledge the University of Illinois Conferences and Institutes, particularly Michelle Chappell and Bridget Haas, for their help planning and managing the conference.

Albert J. Valocchi
May 2012