OPEN WATER

Editor's Note: The 2017 CUAHSI Conference

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The proliferation of electronic access to water data and the cyberinfrastructure to support analysis and visualization has created a new environment for discovering water-resources information, conducting research, community modeling, and conducting educational activities. This flood of information and systems, however, can be difficult to navigate and has added challenges to scientific and teaching workflows. To fully realize the advantages of information technology in water-related research and education, we must develop, maintain, support, and employ data tools and supporting infrastructure that are useful, enable transformative science, and have low barriers for use.

The third CUAHSI Conference on Hydroinformatics was held in July 2017 in association with the National Water Center (NWC) in Tuscaloosa, AL. The conference followed the completion of CUAHSI's Summer Institute (SI) at the NWC, which was a seven-week intensive research fellowship for graduate students to learn about the National Water Model (NWM) and to conduct projects to enhance capabilities and product delivery for the model. The SI Capstone Meeting was held on Monday, July 24, prior to the official start of the conference, and included presentations by all the SI participants; a CUAHSI – NOAA technical report summarizes outcomes from the SI. Students from the SI participated in the Hydroinformatics Conference and presented their findings.

This special issue of Open Water presents five papers from among the more than 100 papers and posters that were presented at the conference. Two of the papers address NWM issues. Hooper presents a study design to assess performance of the NWM, as well as another process-based hydrologic model and a conceptual hydrologic model in representing surface and sub-surface water transport. McEnry discusses the National Weather Service's extensible web services framework which will integrate currently fragmented water information into a connected hydroinformatics system to support national water resources objectives. A workflow for inundation modeling used by the U.S. Army Corps of Engineers to rapidly generate high-resolution flood inundation maps almost anywhere in the world is described by Gutenson. Two papers discuss the use of hydroinformatics to improve scheduling of hydropower generation. Shariffi uses options theory to guide allocation of hydropower generation from one period to another. Finally, methods to achieve optimal hydropower production flexibility in ten inter-connected multi-objective reservoirs in the Columbia River basin, U.S.A., is discussed by Atrabi.

As with most "big data" applications, the field of hydroinformatics is exploding. The greatest opportunity for growth may be in systems that are heavily instrumented, such as water treatment and delivery infrastructure. The growing realization of the efficiencies and cost savings that can be attained using increasingly cheaper and more robust sensors is leading to more applications of hydroinformatics and development of new approaches. Nevertheless, water in the environment is under-measured, but it seems likely that application of sophisticated hydroinformatics can help extend those measurements in combination with simulation models and remotely-sensed information.