University of Stuttgart
Institute for Modelling Hydraulic and Environmental Systems
Department of Hydromechanics and Modelling of Hydrosystems (LH²)

Invitation to the 2020 Darcy Lecture by Reed Maxwell

3rd February 2020 | 4 pm
Pfaffenwaldring 47
Lecture Hall 47.04

Title
„Hydrology in the supercomputing age: How computational advances have revolutionized our field, and what big data and massively parallel simulations mean for the future of hydrologic discovery“

About Reed Maxwell
Professor and Director of the Integrated GroundWater Modeling Center | Geology and Geological Engineering Department | Colorado School of Mines

About the Darcy Lecture
The Henry Darcy Distinguished Lecture Series in Groundwater Science fosters interest and excellence in groundwater science and technology. It was established in 1986 and named in honor of Henry Darcy for his 1856 investigations that established the physical basis upon which groundwater hydrogeology has been studied ever since. The series is organized by the Groundwater Foundation of the National Ground Water Association (USA).

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Abstract

We are in the midst of a revolution in computing and data. In the past 50 years we have moved from electrical analog models to massively parallel computer systems. The fastest computers in the world when landmark papers such as Freeze and Harlan were written are much slower than the average smartphone of today. Hydrology is taking advantage of this revolution in many ways. Computational Hydrology seeks to leverage modern computing capacity to study water and energy fluxes and stores across the hydrologic cycle at spatial scales and complexity not previously possible. Integrated hydrologic simulations that couple boundary layer, vegetation, and land energy processes with surface and subsurface hydrology have great potential to advance our understanding of terrestrial hydrology spanning small catchments to the continental scale. Several movements within hydrology, such as the so-called hyperresolution approach, have organized and accelerated this goal. Hydrologic simulation from a historical perspective, starting with the early watershed models to more modern, integrated approaches that realize blueprints laid out fifty years ago will be presented. The lecture will discuss how computational advances are shaping our simulation capabilities, changing the questions that we are able to ask as scientists, and changing how we educate our students. High-resolution, continental-scale simulation is an exciting component of computational hydrology forecasting and scientific discovery. It will outline a path to move beyond our traditional siloed simulation platforms and to leverage these large datasets and massive community development investments to better connect our hydrologic models to the communities outside of hydrology.

More information: https://www.groundwater.org/lecture/darcy/