Eawag
Überlandstrasse 133
Postfach 611
8600 Dübendorf
Schweiz
Telefon +41 (0)58 765 55 11
Telefax +41 (0) 58 765 50 28
www.eawag.ch

Dept. Water Resources and Drinking Water
Prof. Dr. habil. Mario Schirmer
Senior Scientist
Research Group Leader Hydrogeology
Phone direct +41 (0)58 765 5382
mario.schirmer@eawag.ch

2020 Darcy Lecture

Friday, January 31, 2020, at 15:00
Eawag, Swiss Federal Institute of Aquatic Science and Technology
8600 Dübendorf, Ueberlandstrasse 133, Forum Chriesbach, FC C20

Reed Maxwell, Ph.D.

Colorado School of Mines, Golden, Colorado, USA

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

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 scientist, 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.

Link to Darcy-Lecture-series:

https://www.groundwater.org/lecture/darcy/darcy-2020.html