



Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Institute of Environmental Engineering

Prof. Dr. Paolo Burlando
Professor and Chair of Hydrology and Water Resources
Management

SEMINAR

Friday, May 3, 11:00 h, ETH Hönggerberg HIL D 10.2

Prof. Dr. Li Li
Department of Civil and Environmental Engineering
The Pennsylvania State University, USA

Catchments as complex hydro-biogeochemical systems: what can we learn from virtual experiments?

Abstract:

Catchments are complex systems where hydrological and biogeochemical processes interact and together dictate the magnitude, timing, and spatial distribution of stream water flow and chemistry. These processes are governed not only by external hydroclimatic forcing but also their internal architecture (e.g., land cover, topography, soil properties). The process interactions often give rise to non-linear, emergent behaviors that are convoluted signature of catchment systems, presenting major challenges for answering questions at the heart of catchment sciences. In particular, how fast does stream flow respond to precipitation? How and how fast does biogeochemical signature respond to hydrological variations (and environmental change in general)? These questions have lingered the catchment science community for decades, with literature now boasting decades of stream discharge and concentration data that record the Earth system's integrated response to changing environmental conditions. In this talk I will discuss the recent development of a process-based model, BioRT-Flux-PIHM, that integrates hydrological and biogeochemical processes at the catchment scale. I will show a couple of examples of using this model to build "digital catchments" that utilize the largely available earth surface observation and earth system response data, and to carry out virtual experiments to interrogate the role of individual variables and processes in influencing streamflow generation and reactive solute export.

For more information contact: Peter Molnar (molnar@ifu.baug.ethz.ch)