

**Dr. sc. (PhD) Sebastian Schwindt**

Institute for Modelling Hydraulic and Environmental Systems (IWS), University of Stuttgart

**Research Innovations for Connecting Water Resources**

12. May 2023

11:30-13:00 Uhr

KIT, Geb. 10.81, Room 305

or online:

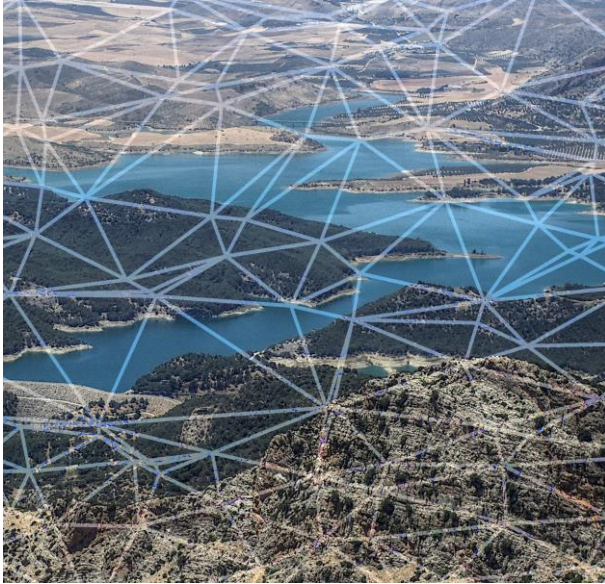
<https://kit-lecture.zoom.us/j/62377377603>



# Physics-Based and Data-Driven Modeling in Environmental Hydraulics

## Abstract

This talk explores the connectivity of river networks in a human-built hydro-environment. The speaker discusses how engineering practices have disrupted this connectivity and highlights challenges for restoring broken links. Hydraulic structures such as dams generate much-needed low-emission hydroelectric power but block longitudinal and therefore, vertical connectivity resulting in malfunctioning ecosystems. There is no sweeping solution for longitudinal and vertical connectivity disruptions, but this talk provides a journey through promising technology for restoring river dynamics. The speaker introduces cutting-edge fieldwork tools providing literally deep insights into riverbeds and their connection with surface flows. Informed by fieldwork, an application of supervised machine learning is illustrated for making numerical computer models more accurate and efficient. The talk showcases how gains in computing efficiency and accuracy can aid in developing strategies to preserve water resources. Ultimately, the talk features how the state of research prepares the future state-of-the-art for engineering a sustainable hydro-environment.



## Biography



Sebastian Schwindt is the head of the hydro-morphodynamic modeling group at the University of Stuttgart's Institute for Modelling Hydraulic and Environmental Systems (IWS). His group develops data streams for solving real-world problems with computer models to re-engineer four-dimensional connectivity. Their fieldwork and computer models embrace novel devices for sediment analysis, data-driven techniques to inform numerical models for restoring freshwater resources in a changing climate. Before heading the hydro-morphodynamics research group, Sebastian Schwindt completed his undergrad studies at the Technical University of Munich (TUM), accomplished his PhD at the Swiss EPFL, and did a postdoc at the University of California, Davis, USA.