Universität Stuttgart

IWS Department of Hydraulic Engineering and Water Resources Management
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B.Sc / M.Sc. Programme Flow Experiments (2025-2030)

"Retention induced by large wood and other flow obstacles in rivers"

B.SC /M.SC series

Flow experiments: Retention induced by large wood and other obstacles in rivers

Background

Vegetation, large wood or boulders are typical flow obstructions in rivers and associated with the formation of wake flows. They provide local flow and sediment diversity, turbulence and mixing, but also a stable low-velocity wake core zone. Here, sediment, leaves and organic fines are trapped and retained from the current. This retention or 'transient storage' controlled by flow physics has many implications for ecology and the stream metabolism, which makes it an ideal and relevant feature for trans-disciplinary studies.

At the Hydraulics Lab of IWS, continuous series of physical experiments in flumes are conducted to research the effects of object properties (shape, porosity, single and multiple objects, spatial configurations) on the flow and sediments. Flow measurements are conducted with particle-tracking methods of the mean flow field (orthovideos using kopters/drones), point measurements of turbulence (ADVs and ADVprofilers) and tracer tests to determine transient storage parameters. Sediment tests have recently started at IWS with substitute plastic particles that represent fine sediments or organic matter.

The experimental programme at IWS allows for continuous and also parallel B.SC or M.Sc. studies within the next 5 years. Contact us to get an overview what is going on at the moment and what experiments are planned next!

General Thesis Overview

1. Get introduced to the basics of wake flow and sediment retention.
2. Learn about and master the methods we use in the lab.
3. Help to optimise the design of your experiments (tested parameters/configurations, time-plan)
4. Organise and conduct experiments and measurements in the hydraulics lab.
5. Analyse your data and put your results in the context of previous studies and real life significance ☺

Required Skills / Basic Kowledge

1. Flow, turbulence and sediment transport in rivers and/or aquatic ecology and water quality.
2. Practical skills for lab work.
3. A positive attitude toward creating diagrams and figures….the primary way to present data ☺

Apply now!

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The thesis can be written in German or English