Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Laboratory of Hydraulics,
Hydrology and Glaciology

**Master's Thesis or Project Work**
**FS 2025**

Head: Prof. Dr. Robert Boes
Supervision: Simone Speltoni
Partner: Dr. Isabella Schalko (WSL)

# Large Scale Particle Image Velocimetry: study case at the Töss River

The restoration project implemented at the Töss River in 2022 consisted in removing the existing wooden sills and installing a series of macro-roughness elements (boulders, rootstocks, logjams) to induce flow heterogeneity and help habitat diversity. To quantify these velocity gradients, Large Scale Particle Image Velocimetry (LSPIV, Fig. 1) has been conducted on specific sites in 2023 and 2024. The analysis showed that macro-roughness elements increased flow and riverbed complexity. To relate flow heterogeneity and discharge, additional tests need to be carried out, together with a further analysis of such datasets.

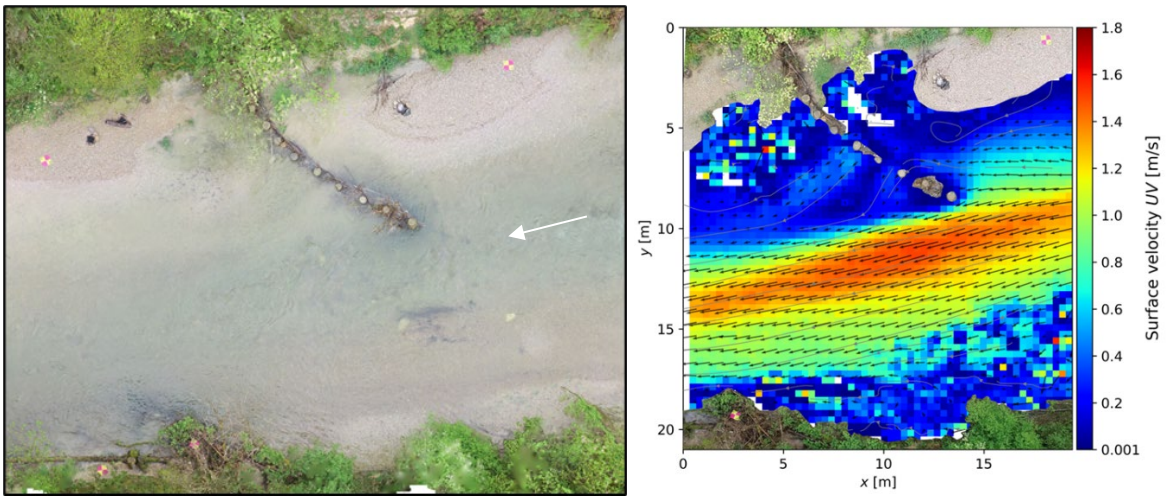


Fig. 1: Flow velocity map obtained through LSPIV around an engineered logjam in the Töss River, Switzerland.

This thesis aims at improving the current dataset by performing field experiments and data analysis. Specifically, the student will use the current workflow (Matlab and Python) to analyze videos and images and provide more results about parameters (velocity gradients and classes, turbulent kinetic energy) that depend on the specific macro-roughness element and vary with the discharge. The scope is to inform river practitioners and scientists about similarities and differences among macro-roughness elements.

**Contact:** Simone Speltoni
HIA C 53
+41 446324155, speltoni@vaw.baug.ethz.ch

**Remarks:** Field experiments;
Project language: English;
1 student for Master's thesis or up to 2 students for project work