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Swiss Federal Institute for Forest, Snow and Landscape Research WSL
Research Group Torrents and Mass Movements
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RESEARCH INTEREST

I am a hydraulic engineer with expertise in environmental fluid mechanics. My research aims to create a better understanding of transport processes in fluvial systems to have a positive impact on the environment. I integrate physical modeling and field observations to study the interaction of flow with (in)organic matter in rivers. I seek to develop models of physical processes in rivers to improve the management of natural resources and the design of hydraulic structures.

EDUCATION

09/2015-09/2018	**Doctorate with distinction, Environmental Engineering,** ETH Zurich, Switzerland Faculty advisor: Prof. Dr. Robert M. Boes Project: Modeling hazards related to large wood in rivers
06/2018	**Visiting Doctoral Student,** Colorado State University with Prof. Dr. Ellen Wohl
11/2009-11/2011	**M.Sc. with distinction, Environmental Engineering,** University of Natural Resources and Life Sciences Vienna (BOKU), Austria
02/2009-08/2009	**Erasmus Exchange Semester,** ETH Zurich, Switzerland
10/2005-11/2009	**B.Sc. in Environmental Engineering,** BOKU, Austria

RESEARCH EXPERIENCE

01/2024-present	**Research Scientist (tenure-track)** *Research Group Torrents and Mass Movements, Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Switzerland* Projects: Continuation of SNSF Ambizione project; FOEN Hydraulic Engineering and Ecology sub-project on design of macro-roughness elements
11/2022-12/2023	**SNSF Ambizione Fellow (Junior Group Leader)** *Institute of Fluid Dynamics, Department of Mechanical and Process Engineering, ETH Zurich, Switzerland* Host faculty: Prof. Dr. Filippo Coletti Project: Ecological fluid dynamics for habitat creation in river systems
11/2020-present	**Research Affiliate** *Nepf Environmental Fluid Mechanics Laboratory, Massachusetts Institute of Technology (MIT), USA* Faculty Advisor: Prof. Dr. Heidi Nepf Projects: Fine material deposition due to logjams; Effect of wood placements on river bed de-clogging
05/2022-07/2022	**International Excellence Fellow** *Institute of Water and River Basin Management – Hydraulic Engineering and Water Resources Management, Karlsruhe Institute of Technology (KIT), Germany* Faculty Advisor: Prof. Dr. Mário Franca

Project: Evaluation of instream structures to improve fish habitat in rivers using large scale particle image velocimetry

11/2020-10/2022 **Senior Research Assistant and Lecturer**
Laboratory of Hydraulics, Hydrology and Glaciology (VAW), ETH Zurich, Switzerland
Projects: Hydrodynamics due to partially spanning logjams;
Design of countermeasures for macroplastics retention; Numerical modeling of logjams in rivers; Transport of wood in rivers using SmartWood; Design of macro-roughness elements
Lectures: River Engineering and River Revitalization

04/2019-10/2020 **Postdoctoral Fellow**
Nepf Environmental Fluid Mechanics Laboratory, MIT, USA
Faculty Advisor: Prof. Dr. Heidi Nepf
Project: Hydrodynamic and morphological processes associated with wood accumulation patches

11/2018-03/2019 **Postdoctoral Associate**
VAW, ETH Zurich, Switzerland
Advisor: Dr. Volker Weitbrecht
Project: Bedload continuity and large wood retention at check-dams

09/2015-10/2018 **Scientific Assistant**
VAW, ETH Zurich, Switzerland
Faculty Advisor/Advisor: Prof. Dr. Robert Boes, Dr. Volker Weitbrecht
Projects: Wood recruitment and transport processes at the River Renggbach; Lucerne, Switzerland; Effect of hydropower plant expansion on waterfall appearance

03/2012-12/2013 **Scientific Assistant**
Institute of Hydraulics and Rural Water Management, BOKU, Austria
Faculty Advisor: Prof. Dr. Willibald Loiskandl
Projects: Numerical modeling of a standing wave at the Sill River in Innsbruck, Austria using OpenFOAM

APPROVED RESEARCH PROJECTS

Postdoctoral work at ETH Zurich, Switzerland

SNSF Ambizione Fellowship (966'890 CHF, Principal Investigator)

1. Ecological fluid dynamics for habitat creation in river systems (Project 209091)

SNSF Project funding – Project partner of Prof. Dr. Filippo Coletti

2. Transport of plastic particles floating on turbulent waters (Project 207318)

Karlsruhe Institute of Technology (7'700 CHF)

3. Evaluation of instream structures to improve fish habitat in rivers using large scale particle image velocimetry

Federal Office for the Environment

4. Hydraulic Engineering and Ecology: Resilient Rivers: Refugia – Connectivity – Stepping stones
5. Measurement and Analysis of Wood Transport: SmartWood_3D (project partner)

Postdoctoral work at MIT, USA

MISTI Global Seed Fund

6. Hybrid Strategies for Stream Restoration (collaboration between MIT and University of Stuttgart)

SNSF Early Postdoc Mobility Fellowship (77'700 CHF)

7. Hydrodynamic and morphological processes associated with wood accumulation patches (Project 184263)

SUPERVISION AND TEACHING EXPERIENCE

Supervision

ETH Zurich, Switzerland (2014-present)

Supervision of 20 Master, 19 Project and 11 Bachelor theses on topics of flood protection, hydropower, plastics in rivers, and wood retention measures in the degree programs of Civil Engineering, Environmental Engineering, Material Science and Engineering, and Mechanical and Process Engineering.

Ongoing supervision of **2 doctoral theses**:

- Design of nature-based solutions for habitat creation in river systems: *F. Bross (since 12/2022)*
- Influence of macro roughness elements on flood protection in rivers: *S. Speltoni (since 10/2022)*

MIT, USA (2019-2022)

Supervision of graduate students in Civil and Environmental Engineering

- Wake structure and fine material deposition due to logjams: *R. Porter (Fall 2021 and Spring 2022)*
- Effect of vegetation generated turbulence on bedload transport: *T. Zhao (Fall 2019)*

Lecturer

ETH Zurich, Switzerland (2021-present)

- River Engineering, 101-0258-00L (M.Sc.; 40-50 students)
- River Revitalization, 101-0259-00L (M.Sc.; 40-50 students)

MIT, USA (2019-2020)

- Solving Big Engineering Problems, 1.008 (B.Sc.; 10-15 students)
- Transport Processes in the Environment, 1.061 (B.Sc.; 10-15 students)

Teaching Assistant (Full time position)

ETH Zurich, Switzerland (2014-2015)

The activities comprised organizational tasks, exam preparation and correction, exercise lectures:

- Revitalisierung von Fliessgewässern (River Revitalization; M.Sc.; 40-50 students)
- Flussbau (River Engineering; M.Sc.; 60 students)
- Wasserbau (Hydraulic Engineering; B.Sc.; 180 students)

BOKU, Austria (2012-2013)

The activities comprised organizational tasks and exercise lectures for Hydrodynamics (M.Sc.; 120 students)

PROFESSIONAL ACTIVITIES

Organization of Conferences/Sessions

2021-present	Special Session for EGU General Assembly and AGU Fall Meeting
2020	Special Session for River Flow Conference
2019	MIT Water Summit on 'Drowning in Plastic'
2016	18th Meeting of Young Researchers in Hydraulic Engineering

Scientific Committees

2023-present IAHR Technical Committee on Experimental Methods and Instrumentation; Leadership Team Member

2022-present DWA Technical Committee Member: River Engineering (FA WW-3)

2020-present DWA Expert Panel Member on 'Hydraulic effects of wood in rivers'

Editorial Work

2022-2024 Guest and Associate Editor, Journal of Coastal and Hydraulic Structures (JCHS)

2020 Guest Editor, Special Issue in Water on 'Impact of Large Wood on River Ecosystems'

Reviewer

Environmental Fluid Mechanics, Earth Surface Processes and Landforms, Environmental Science and Ecotechnology, Frontiers in Earth Science, Geomorphology, Journal of Flood Risk Management, Journal of Hydraulic Engineering, Journal of Hydraulic Research, Journal of Hydrology, Journal of Irrigation and Drainage Engineering, Journal of the American Water Resources Association, Landslides, Natural Hazards and Earth System Sciences, Physical Review Fluids, Physical Review Letters, PLOS ONE, Science of the Total Environment, Water Practice and Technology, Water Resources Research

UNIVERSITY SERVICE AND OUTREACH

International Association for Hydro-Environment Engineering and Research (IAHR)

2023 Lecturer during 9th Gerhard Jirka Summer School Environmental Fluid Mechanics

2020-present Founder of IAHR Coffee Chat for Female Young Professionals

Academic Association of the Scientific Staff at ETH Zurich (AVETH), Switzerland

2016-2019 Member of 'Forum Nachwuchsförderung' (Support of young researchers' careers)

2016-2017 Project Manager ALEA Award (**A**rt of **Lea**dership Award)

2016 Jury Member for KITE Award (**K**ey **I**nnovation in **T**eaching at **E**TH)

2015-2016 Board Member and Politics Team Coordinator

2015-2016 Member of ETH University Assembly as a Representative of the Scientific Staff

FELLOWSHIPS AND AWARDS

2022 SNSF Ambizione Fellowship

2022 KIT International Excellence Fellowship

2019 SNSF Early Postdoc Mobility Fellowship

2019 ETH medal for outstanding doctoral thesis (awarded to best 8% of doctoral theses)

2017 1st Place at John F. Kennedy Student Paper Competition at 37th IAHR World Congress

2016 Best Presentation Award at D-BAUG Meet & Share your Research Day, ETH Zurich

2016 2nd Place at Student Poster Competition at 13th Interpraevent, Lucerne, Switzerland

2011 Scholarship for Master Thesis in Environmental Engineering

2010 Scholarship for Master Studies in Environmental Engineering

2009 Scholarship for Exchange semester at ETH Zurich

TRAINING

2021 Leadership Essentials at ETH Zurich

2017 Summer School 'Fluid Dynamics of Sustainability and the Environment' at École Polytechnique

2016 'Writing Research Papers for Publication C1-C2' at ETH Zurich

2015 'Learning to teach' program for doctoral teaching assistants at ETH Zurich

2014 Voice training at ETH Zurich