

Dr. Isabella Schalko
Senior Research Assistant

•
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EDUCATION

Doctorate, Environmental Engineering , ETH Zurich, Switzerland	09/2015-09/2018
<ul style="list-style-type: none"> • Doctoral examination on September 12, 2018 • Doctoral supervisors: Prof. Dr. Robert M. Boes, Dr. Volker Weitbrecht, Dr. Lukas Schmocker 	
Visiting Doctoral Student , Colorado State University with Prof. Ellen Wohl	06/2018
M.Sc. with distinction, Environmental Engineering , University of Natural Resources and Life Sciences Vienna (BOKU), Vienna, Austria	11/2009-11/2011
Erasmus Exchange Semester, Environmental Engineering , ETH Zurich, Switzerland	02/2009-08/2009
B.Sc., Environmental Engineering , BOKU, Vienna, Austria	10/2005-11/2009

EMPLOYMENT HISTORY AND RESPONSIBILITIES

Senior Research Assistant <i>Laboratory of Hydraulics, Hydrology and Glaciology (VAW), ETH Zurich, Switzerland</i>	11/2020-present
<ul style="list-style-type: none"> • Investigation of wood accumulation processes at bridge piers using field experiments. The objectives are to validate physical modeling results and to improve the process understanding of wood-pier interaction • Collaboration with Marie-Curie Fellow Dr. Gabriel Spreitzer (VAW, ETH Zurich) on the application of novel sensor technology to study wood transport dynamics in the field • Preparation of new lecture at ETH Zurich in Fall 2021 on "River Engineering I" (co-lecturer) 	
Research Affiliate <i>Nepf Environmental Fluid Mechanics Laboratory; Prof. Dr. Heidi Nepf Massachusetts Institute of Technology (MIT), Cambridge, MA, USA</i>	11/2020-present
<ul style="list-style-type: none"> • Continuing collaboration to study flow structures and morphologic processes associated with wood placements to inform river restoration 	
Postdoctoral Fellow <i>Nepf Environmental Fluid Mechanics Laboratory; Prof. Dr. Heidi Nepf, MIT</i>	04/2019-10/2020
<ul style="list-style-type: none"> • Received an Early Postdoc Mobility Fellowship by the Swiss National Science Foundation (SNSF) to study hydrodynamic and morphologic processes associated with log placements using physical modeling • Project aims to provide necessary physical description of flow-sediment-wood interaction to allow the successful application of log placements for river restoration • Knowledge transfer with the Yurok Tribe to plan experiments based on their successful river restoration of the Trinity River in CA (USA) using log placements • Collaboration with a graduate student on the effect of vegetation generated turbulence on bedload transport using physical modeling 	
Postdoctoral Associate <i>VAW, ETH Zurich, Switzerland</i>	11/2018-03/2019
<ul style="list-style-type: none"> • Designed and performed flume experiments on sediment continuity and large wood retention at check dams • Numerical modeling of large wood transport in rivers using IberWood in cooperation with Dr. Virginia Ruiz-Villanueva at University of Geneva 	

Doctoral Researcher

09/2015-10/2018

VAW, ETH Zurich, Switzerland

- Dissertation on modeling hazards related to large wood in rivers
 - Combined approach of physical and numerical modeling
 - Part of interdisciplinary research project *WoodFlow* funded by the Swiss Federal Office for the Environment (FOEN)
 - Collaboration with University of Geneva, Bern University of Applied Sciences, and Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)
- Expertise on wood recruitment and transport processes at the River Renggbach, Lucerne, Switzerland
- Analysis of effect of hydropower plant expansion on waterfall appearance using existing visual and acoustic data sets of various waterfalls in Switzerland, Austria, and Norway

Scientific Assistant

03/2012-12/2013

*Institute of Hydraulics and Rural Water Management (IWHW), Prof. Willibald Loiskandl
University of Natural Resources and Life Sciences Vienna (BOKU), Vienna, Austria*

- Numerical modeling of a standing wave at the River Sill in Innsbruck, Austria with OpenFOAM

APPROVED RESEARCH PROJECTS

SNSF Early Postdoc Mobility Fellowship: Project 184263

04/2019

SUPERVISION**Master thesis in Civil and Environmental Engineering***Massachusetts Institute of Technology, Cambridge, MA, USA*

- Effect of vegetation generated turbulence on bedload transport: *T. Zhao (Fall 2019)*

Undergraduate Research Opportunity Project (UROP) in Civil and Environmental Engineering*Massachusetts Institute of Technology, Cambridge, MA, USA*

- Effect of log placement on local bedload transport: *R. Porter (Fall 2019)*

Master theses in Civil Engineering and Environmental Engineering*VAW, ETH Zurich, Zurich, Switzerland*

- Sediment continuity and large wood retention at check dams: *J. Holland (2018)*
- Sediment continuity of check dams in the Canton Zurich: *C. Sieger (2018)*
- Flood protection and river revitalization at the River Chommlibach: *A. Joost (2017)*
- Sediment continuity of large wood retention racks: *A. Höttinger (2017)*
- Integral flood protection concept at the River Luthern (Ct. Lucerne): *C. Staub (2016)*
- Effect of inclined large wood retention racks on sediment continuity: *C. Lageder (2016)*
- Experimental investigation of large wood at fish guidance structures: *A. Gudde (2016)*
- Backwater rise due to large wood accumulation: *D. Schaller (2015)*
- Effect of hydropower plant expansion on waterfall appearance for case study Diesbach: *F. Arnold (2015)*
- Measures against reservoir sedimentation at reservoir Livigno (Ct. Grisons): *P. Heggin, A. Meyer (2015)*
- Hydropower due to glacial retreat in Switzerland: *S. Fallegger, A. Iten (2014)*
- Hydropower at the Gorner glacier (Ct. Valais): *P. Maurizio, V. Plozza (2014)*
- Measures against reservoir sedimentation at Lai da Ova Spin (Ct. Grisons): *D. Sieber (2014)*

In addition, supervision of **29 project theses students** and **9 Bachelor theses students** on topics of flood protection, reservoir sedimentation, large wood transport, and wood retention racks.

TEACHING ACTIVITIES

Guest Lecturer 10/2019-10/2020

Massachusetts Institute of Technology, Cambridge, MA, USA

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

Teaching Assistant (Full position) 01/2014-08/2015

VAW, ETH Zurich, Zurich, Switzerland

The activities comprise organizational tasks, exam preparation and correction, and exercise lectures

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

Lecture Assistant 03/2012-12/2013

IWHW, BOKU, Vienna, Austria

The activities comprise organizational tasks and exercise lectures

- Hydrodynamik (Hydrodynamics; M.Sc.; 120 students)

PROFESSIONAL ACTIVITIES

Expert Panel Member for DWA worksheet on 'Hydraulic effects of wood in rivers' since 11/2020

Associate Editor, Journal of Coastal and Hydraulic Structures (JCHS) since 09/2020

Review Editor, Water and Hydrocomplexity (specialty section of Frontiers in Water) since 09/2020

Founder of IAHR Coffee Chat for Female Young Professionals since 09/2020

International Scientific Committee Member for Webinar on 11/2020-04/2021

'*Experimental Methods and Laboratory Instrumentation in Hydraulics*' organized by the Institute of Geophysics of the Polish Academy of Sciences and IAHR

Co-Convener Special Session for River Flow Conference 2020 on 07/2020

'*Instream wood: restoration opportunities, flood-related hazards, and management practices*'

Guest Editor, Special Issue in Water on 'Impact of Large Wood on River Ecosystems' 05/2020-07/2021

Organizer of MIT Water Summit on 'Drowning in Plastic' 11/2019

Organizer of 18th Meeting of Young Researchers in Hydraulic Engineering at VAW, ETH Zurich 08/2016

Reviewer

Environmental Fluid Mechanics (EFM), Earth Surface Processes and Landforms (ESPL), Frontiers in Earth Science, Geomorphology, Journal of Hydrology, Journal of the American Water Resources Association (JAWRA), Journal of Flood Risk Management (JFM), Journal of Hydraulic Engineering, Landslides, Natural Hazards and Earth System Sciences, Physical Review Fluids, Science of the Total Environment, Water Practice and Technology (WPT), Water Resources Research (WRR)

Active Memberships

American Geosciences Union (AGU)

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

UNIVERSITY SERVICE

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

Member of 'Forum Nachwuchsförderung' (Support of young researchers' careers) 09/2016-03/2019

Project Manager ALEA Award (**A**rt of **L**eadership Award) 02/2016-12/2017

Jury Member for KITE Award (**K**ey Innovation in Teaching at **E**TH) 04/2016

Board Member AVETH 02/2015-09/2016

Politics Team Coordinator AVETH 02/2015-09/2016

AVETH Delegate in ActionUni (Representation of Scientific Staff in Switzerland) 02/2015-09/2016

Member of ETH University Assembly as a Representative of the Scientific Staff 02/2015-09/2016

AWARDS, FELLOWSHIPS, AND SCHOLARSHIPS

SNSF Early Postdoc Mobility Fellowship	04/2019-09/2020
ETH medal for outstanding doctoral thesis (awarded to best 8% of doctoral theses)	05/2019
1 st Place at John F. Kennedy Student Paper Competition at 37 th IAHR World Congress	08/2017
Best Presentation Award at D-BAUG Meet & Share your Research Day, ETH Zurich	10/2016
2 nd Place at Student Poster Competition at 13 th Interpraevent, Lucerne, Switzerland	06/2016
Scholarship for Master Thesis in Environmental Engineering	11/2011
Scholarship for Master Studies in Environmental Engineering	09/2010
Scholarship for Exchange semester at ETH Zurich	02/2009

PUBLICATIONS

[ORCID Profile](#) || [Google Scholar Profile](#) || [ResearchGate Profile](#) || [Personal Website](#)

1. Peer-Reviewed Journal Publications

- [9] Friedrich H., Ravazzolo D., Ruiz-Villanueva V., **Schalko I.**, Spreitzer G., Tunnicliffe J., Weitbrecht V. (2020). Sediment dynamics in the presence of large wood (LW): state of the art laboratory techniques. *Earth Surface Processes and Landforms*, (in prep.).
- [8] **Schalko I.** and Weitbrecht V. (2020). Wood blockage and sediment transport at inclined bar screens. *Journal of Hydraulic Research*, (under review).
- [7] Follett E., **Schalko I.**, Nepf H. (2020). Momentum and energy predict the backwater rise generated by a large wood jam. *Geophysical Research Letters*, <https://doi.org/10.1029/2020GL089346>
Remark: The study was featured on MIT News.
- [6] **Schalko I.** (2020). Wood retention at inclined racks: effects on flow and local bedload processes. *Earth Surface Processes and Landforms*, <https://doi.org/10.1002/esp.4864>
- [5] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R.M. (2019). Risk reduction measures of large wood accumulations at bridges. *Environmental Fluid Mechanics*, <https://doi.org/10.1007/s10652-019-09719-4>
- [4] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R.M. (2019). Laboratory study on wood accumulation probability at bridge piers. *Journal of Hydraulic Research*, <https://doi.org/10.1080/00221686.2019.1625820>
- [3] **Schalko I.**, Lageder C., Schmocker L., Weitbrecht V., Boes R.M. (2019). Laboratory flume experiments on the formation of spanwise large wood accumulations Part II: Effect on local scour. *Water Resources Research*, <https://doi.org/10.1029/2019WR024789>
- [2] **Schalko I.**, Lageder C., Schmocker L., Weitbrecht V., Boes R.M. (2019). Laboratory flume experiments on the formation of spanwise large wood accumulations Part I: Effect on backwater rise. *Water Resources Research*, <https://doi.org/10.1029/2018WR024649>
- [1] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R.M. (2018). Backwater rise due to large wood accumulations. *Journal of Hydraulic Engineering*, [https://doi.org/10.1061/\(ASCE\)HY.1943-7900.0001501](https://doi.org/10.1061/(ASCE)HY.1943-7900.0001501)

2. Peer-Reviewed Monographs

- [1] **Schalko I.** (2018). Modeling hazards related to large wood in rivers. [VAW-Mitteilungen 249](#), Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie (VAW), ETH Zurich, Switzerland.

3. Non-Peer-Reviewed Journal Publications

- [5] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R. (2019). Gefahrenbeurteilung von Schwemmholzverklauungen in Flüssen: Teil 2 – Aufstau ('Hazard assessment of large wood accumulations in rivers: Part 2 – Backwater rise'), [Wasser Energie Luft 111\(2\): 71-77](#) (in German); WEL Cover Image.

- [4] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R. (2019). Gefahrenbeurteilung von Schwemmholzverklausungen in Flüssen: Teil 1 – Verklausungswahrscheinlichkeit ('Hazard assessment of large wood accumulations in rivers: Part 1 – Accumulation probability'), [Wasser Energie Luft 111\(2\): 63-70](#) (in German); WEL Cover Image.
- [3] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R. (2019). Klein aber mit grosser Wirkung: Wie Äste und Blätter den Rückstau einer Schwemmholzverklausung in Flüssen vergrössern ('Small but with great effect: How branches and leaves in wood accumulations increase backwater rise'), *Ingenieurbiologie* 1: 21-28 (in German).
- [2] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R. (2017). Schwemmholz: Gefahrenbeurteilung und Massnahmenplanung am Fallbeispiel Renggbach, Kanton Luzern ('Large wood: hazard evaluation and action planning for the case study Renggbach, Canton Lucerne'), [Wasser Energie Luft 109\(4\): 271-278](#) (in German).
- [1] **Schalko I.**, Arnold F., Demarchi L., Hiller P.H., Boes R. (2016). Einfluss der Wasserführung auf das Erscheinungsbild und die Akustik von Wasserfällen, Restwasserbestimmung bei Wasserentnahmen oberhalb von Wasserfällen ('Effect of hydropower plant expansion on waterfall appearance and acoustics'), [Wasser Energie Luft 108\(3\): 207-219](#) (in German).

4. Conference Publications

- [19] **Schalko I.**, Nepf H.M. (2020): Flow structure associated with wood in rivers. *American Geosciences Union Fall Meeting 2020*, San Francisco, USA.
- [18] Follett E., **Schalko I.**, Nepf H.M. (2020): Impact of large wood jams on channel hydraulics and backwater rise. *American Geosciences Union Fall Meeting 2020*, San Francisco, USA.
- [17] Follett E., **Schalko I.**, Nepf H.M. (2020): Effect of wood jams on flow structure and local sediment transport. *73rd Annual Meeting of the American Physical Society Division of Fluid Dynamics*, Chicago, Illinois, USA.
- [16] **Schalko I.**, Nepf H.M. (2020): How to design wood accumulation patches to increase flow variability – a flume study. *River Flow 2020*, Delft, The Netherlands.
- [15] **Schalko I.**, Ruiz-Villanueva V., Weitbrecht V. (2020): Effect of wood accumulation on sediment continuity at permeable sediment traps. *River Flow 2020*, Delft, The Netherlands.
- [14] Follett E., **Schalko I.**, Nepf H.M. (2019). Energy losses induced by channel-spanning brush accumulations. *72nd Annual Meeting of the American Physical Society Division of Fluid Dynamics*, Seattle, Washington, USA.
- [13] **Schalko I.**, Lageder C., Schmocker L., Weitbrecht V., Boes R.M. (2019). Laboratory flume experiments on the formation of spanwise large wood accumulations – effect on backwater rise and local scour. **Invited talk** at *American Geosciences Union Fall Meeting 2019*, San Francisco, USA.
- [12] **Schalko I.**, Wohl E., Nepf H.M. (2019): Modeling the effect of wood accumulation patches on flow and morphology. *American Geosciences Union Fall Meeting 2019*, San Francisco, USA.
- [11] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R.M. (2019): Inclined large wood retention racks: scour and backwater rise. *4th Wood in World Rivers Conference*, Valdivia, Chile.
- [10] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R.M. (2018). Hazards due to large wood accumulations: Local scour and backwater rise. *Proc. River Flow 2018*, Lyon, France. <https://doi.org/10.1051/e3sconf/20184002003>.
- [9] **Schalko I.** (2017). Large wood accumulation probability at a single bridge pier. *Proc. of the 37th IAHR World Congress*, Kuala Lumpur, Malaysia: 1704-1713.
- [8] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R. (2017). Verklausungswahrscheinlichkeit und Aufstau – Aktuelle Forschung zum Thema Schwemmholz an der VAW ('Accumulation probability and backwater rise – current research on large wood at VAW'). *Proc. Symposium 'Naturgefahren – von der Sturzflut zur Schwemmholzverklausung'*, TU München, *Mitteilung 137* (P. Rutschmann, ed.), ISBN 978-3-943683-12-7: 75-84 (in German).

- [7] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R.M. (2017). Backwater rise due to large wood accumulations: Effect of organic fine material. *European Geosciences Union General Assembly 2017*, Vienna, Austria.
- [6] Schmocker L., **Schalko I.**, Weitbrecht V. (2017). Effect of large wood retention at check dams on sediment continuity. *European Geosciences Union General Assembly 2017*, Vienna, Austria.
- [5] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R.M. (2016). Modeling the effect of organic fine material in a driftwood accumulation on backwater rise. *Proc. River Flow 2016*, St. Louis, USA, Constantinescu, Garcia & Hanes (Eds.), ISBN 978-1-138-02913-2: 2326-2332.
- [4] Ruiz-Villanueva V., Badoux A., Boes R.M., Rickenmann D., Rickli C., **Schalko I.**, Schmocker L., Schwarz M., Steeb N., Stoffel M., Weitbrecht V. (2016). Large wood research in Swiss watercourses. *Proc. River Flow 2016*, St. Louis, USA, Constantinescu, Garcia & Hanes (Eds.), ISBN 978-1-138-02913-2: 2307-2314.
- [3] **Schalko I.**, Schmocker L., Weitbrecht V., Boes R. (2016). Schwemmh Holzrisiko und Massnahmenplanung am Fallbeispiel Renggbach. ('Large wood risk assessment and action planning for the case study Renggbach'). Proc. Int. Symposium 'Wasserbau – mehr als Bauen im Wasser', TU München, *Mitteilung 134* (P. Rutschmann, ed.), ISBN 978-3-940476-10-3: 456-466 (in German).
- [2] **Schalko I.**, Brändli D., Schmocker L., Weitbrecht V., Boes R. (2016). Backwater rise due to driftwood accumulation. *Proc. 13th Congress Interpraevent*, Lucerne, Switzerland, ISBN 978-3-901164-24-8: 628-637.
- [1] Ruiz-Villanueva V., Badoux A., Boes R., Rickenmann D., Rickli C., **Schalko I.**, Schmocker L., Schwarz M., Steeb N., Stoffel M., Weitbrecht V. (2016). Large wood management in rivers – a practice-oriented research project in Switzerland. *Proc. 13th Congress Interpraevent*, Lucerne, Switzerland, ISBN 978-3-901164-23-1: 244-245.

5. Reports

- [5] **Schalko I.**, Weitbrecht V. (2019). Schwemmh Holzrückhalt und Geschiebedurchgängigkeit bei Geschiebesammlern ('Large wood retention and sediment continuity at sediment retention basins'). *VAW Report 0895*, Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie (VAW), ETH Zurich, Switzerland (in German).
- [4] **Schalko I.**, Jacob R., Kuzmanovska I. (2017). AVETH follow-up survey on salary and duties of ETH doctoral students. *AVETH Report*. <https://doi.org/10.3929/ethz-b-000200614>.
- [3] **Schalko I.**, Schmocker L., Weitbrecht V. (2016). Schwemmh Holzgutachten Renggbach. *VAW Report 4334*, Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie (VAW), ETH Zurich, Switzerland (in German).
- [2] Fuchs H., **Schalko I.**, Emaury F. (2016). AVETH survey on representation of permanent scientific staff at ETH. *AVETH Report*.
- [1] Emaury F., Fuchs H., **Schalko I.**, Senn R., Thöle F. (2014). AVETH survey on salary and duties of ETH doctoral students. *AVETH Report*.

6. Contributions to Scientific Conferences / Invited Talks

Year	Conference / Location	Title	Type
2020	Parsons Remote Seminar Series, MIT, USA	Wood as a tool for river restoration	Oral presentation
2020	Swiss commission for flood protection (KOHS), Olten, CH	Schwemmholz-Verklausung ('Wood accumulation') (in German)	Invited talk
2019	AGU, San Francisco, USA	Laboratory flume experiments on the formation of spanwise large wood accumulations – effect on backwater rise and local scour	Invited talk and panelist in 'Recent Advances in the Hydrologic Sciences I'
2019	AGU, San Francisco, USA	Modeling the effect of wood accumulation patches on flow and morphology	Poster
2019	Technical University Delft	Hydrodynamic and Morphodynamic Modelling of River Systems	Invited talk
2019	École Polytechnique Fédérale de Lausanne (EPFL)	Strengthening the resilience of hydraulic infrastructures and water systems	Invited talk
2019	Wood in World Rivers, Valdivia, Chile	Inclined large wood retention racks: scour and backwater rise	Oral presentation
2018	River Flow, Lyon, France	Hazards due to large wood accumulations: Local scour and backwater rise	Oral presentation
2017	IAHR, Kuala Lumpur, Malaysia	LW accumulation probability at a single bridge pier	Oral presentation [Paper award]
2017	EGU, Vienna, Austria	Backwater rise due to large wood accumulations: Effect of organic fine material	Pico Session
2016	Meet & Share your Research Day, ETH Zurich, CH	Backwater rise due to large wood accumulations	Oral presentation [Presentation award]
2016	River Flow, St. Louis, USA	Modeling the effect of organic fine material in a driftwood accumulation on backwater rise	Oral presentation
2016	Interpraevent, Lucerne, CH	Backwater rise due to driftwood accumulation	Poster [Poster award]