Julia L.A. Knapp, Ph.D.

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Research Interests

My research focusses on reactive transport modeling and experiments to gain a better understanding of contaminant degradation and nutrient turnover in streams. I have worked extensively on reach-scale tracer tests with fluorescent dye tracers to quantify hyporheic exchange. This includes methodological and technical improvements of tracer applications in the field, a quantification of uncertainties and the derivation of PDE-based, one-dimensional transport and reaction models. I am also interested in high-resolution, in-situ measurements of dissolved gases and the effect of travel time distribution shapes on the analysis of time-series in reactive transport modeling.

Education

10/2013 – 05/2017	Ph.D. candidate at the Department of Geosciences of the University of Tübingen, Germany. (In a fast-track procedure from 10/2013 until 08/2014) Title of Ph.D. thesis: *Advancing Stream-Tracer Techniques and their Mathematical Analysis* (doi: 10.15496/publikation-18510).
10/2012 – 08/2014	Master Studies in *Applied & Environmental Geoscience* at the University of Tübingen, Germany. Area of specialization: Hydrogeology Title of M.Sc. thesis: *Comparing Gas and "Smart" Tracer Tests for the Estimation of Aerobic Respiration Rates in Streams.*
10/2009 – 08/2012	Bachelor Studies in *Environmental Sciences* at the University of Tübingen, Germany. Title of B.Sc. thesis: *Comparative Reactive Tracer Experiments in Streams.*
10/2007 – 09/2009	Prediploma in Psychology, University of Tübingen.

Work and Research Experience

since 05/2018	ETH Zurich Postdoctoral Fellow (Research Group: Physics of Environmental Systems, Department of Environmental Systems Science)
08/2017 – 04/2018	Postdoctoral Researcher at the University of Tübingen, Germany, developing in-situ mass spectrometer techniques for the analysis of dissolved gases and the application in gas-tracer tests in streams.
06/2017 – 08/2017	Maternity leave
09/2015 – 11/2015	Visiting Researcher at the US Geological Survey, Reston, Virginia at the Surface Water Hydrology Group of Dr. Judson W. Harvey.
07/2014, 06/2015, 06/2016	Participation in the *Leverhulme Hyporheic Zone Network* field campaigns (2014: Selke River – Germany, 2015: Urban River Lab – Spain, 2015: Hammer Stream – UK, 2016: HJ Andrews Experimental Forest – USA)

Fellowships & Awards

05/2018 – 04/2020	ETH Postdoctoral Fellowship
10/2013 – 12/2016	Doctoral fellowship of the Carl-Zeiss-Foundation.
09/2015 – 11/2015	Fellowship of the German Academic Exchange Service (DAAD) supporting a research stay at the US Geological Survey, Reston, Virginia, USA.
04/2012 – 09/2014	Scholarship of the German National Academic Foundation (Studienstiftung des deutschen Volkes), supporting my B.Sc. and M.Sc. studies.
08/2011 – 12/2011	Scholarship of the Baden-Wuerttemberg Foundation, supporting a semester at the Universidad Católica de Argentina, Buenos Aires, Argentina.

Publications in Peer-Reviewed Journals

P. J. Blaen, M. J. Kurz, J. D. Drummond, **J. L. A. Knapp**, C. Mendoza-Lera, N. M. Schmadel, M. J. Klaar, A. Jäger, S. Folegot, J. Lee-Cullin, A. S. Ward, J. P. Zarnetske, T. Datry, A. M. Milner, J. Lewandowski, D. M. Hannah, and S. Krause (in press). Woody debris determines reach-scale hotspots of lowland stream ecosystem respiration. *Ecohydrology*

J. L. A. Knapp, and O. A. Cirpka (2017). Determination of Hyporheic Travel-Time Distributions and other Parameters from Concurrent Conservative and Reactive Tracer Tests by Local-in-Global Optimization. *Water Resour. Res.,* 53*,* 4984–5001. doi: 10.1002/2017WR020734.

J. L. A. Knapp, R. González-Pinzón, J. D. Drummond, L. G. Larsen, O. A. Cirpka, and J. W. Harvey (2017). Tracer-based characterization of hyporheic exchange and benthic biolayers in streams. *Water Resour. Res. 53*(2), 1575-1594. doi: 10.1002/2016WR019393.

N. M. Schmadel, A. S. Ward, M. J. Kurz, J. H. Fleckenstein, J. P. Zarnetske, D. M. Hannah, T. Blume, M. Vieweg, P. J. Blaen, C. Schmidt, **J. L. A. Knapp**, M. J. Klaar, P. Romeijn, T. Datry, T. Keller, S. Folegot, A. I. M. Arricibita, and S. Krause (2016). Stream solute tracer timescales changing with discharge and reach length confound process interpretation. *Water Resour. Res*. 52, 3227–3245. doi: 10.1002/2015WR018062.

J. L. A. Knapp, K. Osenbrück, and O. A. Cirpka (2015). Impact of non-idealities in gas-tracer tests on the estimation of reaeration, respiration, and photosynthesis rates in streams, *Water Res.* 83, 205–216. doi: 10.1016/j.watres.2015.06.032.

Conference Presentations (personal oral presentations at international conferences only)

AGU Fall Meeting, New Orleans, 12/2017	**J. L. A. Knapp**, K. Osenbrück, M. S. Brennwald, and O. A. Cirpka: Using high resolution measurements of gas tracers to determine metabolic rates in streams
AGU Fall Meeting, San Francisco, 12/2016	**J. L. A. Knapp**, R. González-Pinzón, J. D. Drummond, L. G. Larsen, O. A. Cirpka, and J. W. Harvey*: Apples & Oranges of Hyporheic Transport – How Benthic Biolayers are Characterized by In-Stream and Subsurface Tracer Observations.*
EGU General Meeting, Vienna, 04/2015	**J. L. A. Knapp**, K. Osenbrück, and O. A. Cirpka: *Accounting for Dispersion and time-dependent Input Signals in Gas Tracer Tests and their Effect on the Estimation of Reaeration, Respiration & Photosynthesis in Streams.*