CURRICULUM VITAE

Robert Ladwig

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(a) Research interests

(i) Water Resources Management, (ii) Aquatic Ecosystem Modeling, (iii) Ecosystem Metabolism, (iv) Computational Fluid Dynamics, (v) Knowledge-Guided Machine Learning

(b) Research & Professional Experience

2019 – present	Postdoctoral Fellow, Center for Limnology, UW-Madison, USA
2017	Visiting Researcher, Hydraulic and Env. Engineering, Saitama University, JPN
2015 – 2019	Research Assistant, Biogeochemistry, IGB Berlin, DE
2015	Research Assistant, Chair of Hydrology, TU Dresden, DE

(c) Education & Training

Technische Universität Berlin	Berlin, DE	Civil Engineering	PhD *magna cum laude*, 2019
Technische Universität Dresden	Dresden, DE	Hydrology	M.Sc *1.5*, 2015
Friedrich-Schiller University Jena	Jena, DE	BioGeoSciences	B.Sc. *1.7*, 2012

(d) Publications

Peer-Reviewed Journal Papers

1. R. Ladwig, P. Hanson, H. Dugan, C. Cayelan, Y. Zhang, L. Shu, C. Duffy, and K. Cobourn, Lake thermal structure drives inter-annual variability in summer anoxia dynamics in a eutrophic lake over 37 years, Hydrology and Earth System Sciences (2021).
2. C.C. Barbosa, M.C. Caliijuri, A.C. Albe dos Santos, R. Ladwig, L.F.A de Oliveira, and A.C. Sarmento, Future projections of water level and thermal regime changes of a multipurpose subtropical reservoir (Sao Paulo, Brazil), Science of the Total Environment (2021).
3. M. Hupfer, S. Jordan, C. Herzog, C. Ebeling, R. Ladwig, M. Rothe, and J. Lewandowski, Chironomid larvae enhance phosphorus burial in lake sediments: Insights from long-term and short-term experiments, Science of the Total Environment **663**, 254–264 (2019).
4. R. Ladwig, E. Furusato, G. Kirillin, R. Hinkelmann, and M. Hupfer, Climate change demands adaptive management of urban lakes: Model-based assessment of management scenarios for Lake Tegel (Berlin, Germany), Water **10(2)**, 186 (2018).
5. R. Ladwig, L. Heinrich, G. Singer, and M. Hupfer, Sediment core data reconstruct the management history and usage of a heavily modified urban lake in Berlin, Germany, Environ Sci Pollut Res. **24**, 25166–25178 (2017).

Submitted and under review

6. R. Woolway, A. Devolskiy, G. Golub, D. Mercado-Bettin, M. Perroud, V. Stepanenko, Z. Tan, R. Ladwig, J. Mesman, T. Moore, J. Schew, T. Shatwell, I. Vanderkele, R. Marce, D. Pierson, W. Thiery, and E. Jennings, Phenological shifts in lake stratification under climate change, Nature Climate Change .
7. T. Moore, J. Mesman, R. Ladwig, J. Feldbauer, F. Olsson, R. Pilla, J. Venktieswaran, A. De-

lany, T. Shatwell, K. Rose, H. Dugan, and J. Read, LakeEnsemblR v.1.0: A framework for ensemble modeling and environmental data processing of lake systems, Environmental Modelling and Software .

8. D. Robertson, B. Siebers, R. Ladwig, D. Hamilton, P. Reneau, C. McDOnald, S. Prellwitz, and R. Lathrop, Response in water quality of Green Lake, Wisconsin, to changes in phosphorus loading with special emphasis on metalimnetic oxygen minima and total phosphorus concentrations, USGS Scientific Investigations Report .

(e) Selected software projects

2020 – 2021	LakeEnsemblR	Package to facilitate ensemble hydrodynamic modeling of lakes
2019 – now	glmtools	Tool suite to interact with the General Lake Model
2020 – now	ODEM	Two-layer lake oxygen model for metabolism studies
2019 – now	thermod	Lake temperature model that simulates heat flux dynamics

(f) Further publications and presentations

1. Virtual growing pains: Initial lessons learned from organizing virtual workshops, summits, conferences, and networking events during a global pandemic, *Limnology and Oceanography Bulletin*, 2021

2. What is driving oxygen depletion dynamics in lakes (and reservoirs, probably) over different time-scales?, Invited oral presentation, *Hydrobiological seminar at TU Dresden*, Virtual presentation, 17.12.2020

3. Coupling Bayesian modeling of lake oxygen dynamics with machine learning to advance aquatic ecosystem understanding, Poster presentation, *AGU Fall Meeting 2020*, Virtual conference, 01.-17.12.2020

4. What is driving oxygen depletion in lakes? Process-based modeling of long-term lake oxygen dynamics, Invited oral presentation, *CEREO/WRC seminar at Washington State University*, 04.11.2020

5. Two-layer Bayesian Dissolved Oxygen Model for Ecological Process Discovery, Poster presentation, *GLEON 21.5 All Hands' Meeting*, Virtual conference, 19.-22.10.2020

6. LakeEnsemblR: An R package that facilitates ensemble modelling of lakes, Poster presentation, *GLEON 21.5 All Hands' Meeting*, Virtual conference, 19.-22.10.2020

7. Ecological knowledge guides machine learning: (i) process-guided phosphorus modeling, (ii) Bayesian modeling of lake oxygen dynamics, Oral presentation, *Workshop on Knowledge Guided Machine Learning (KGML)*, Virtual Workshop, 18.- 19.08.2020

8. LakeEnsemblR: An R package that facilitates 1D ensemble modeling of lakes, Oral presentation, *Incorporating Data Science and Open Science Techniques in Aquatic Research*, Virtual Summit, 23.-24.07.2020

9. New Features to the Trinity of GLM R-packages: glmtools, GLM3r and GRAPLEr, Poster presentation, *GLEON 21 All Hands' Meeting*, Huntsville, Canada, 04.-08.11.2019

10. What is driving the death zone of Lake Mendota?, Invited oral presentation, *Wisconsin Ecology 22nd Annual Fall Symposium*, Madison, USA, 15.10.2019

11. Simulating oxythermal habitats of fish in surrogate lake ecosystems, Oral presentation, *4th Science in the Northwoods Conference*, Woodruff, USA, 09.11.2019

12. Simulation of water exchange times for contaminant risk assessment in an urban lake using a depth-averaged 2D model, Conference paper, *E-proceedings of the 38th IAHR World*

Congress, Panama City, Panama, 01.-06.09.2019

13. Adapting the water management to mitigate the impact of multiple stressors on an urban lake: Case study Lake Tegel, Germany, *PhD thesis*, Technische Universität Berlin, Berlin, Germany, 25.02.2019

14. How can we adapt urban lake management in times of climate change?, Invited oral presentation, *9th Water Research Horizon Conference*, Dresden, Germany, 03.-04.07.2018

15. From 1D to 2D: Impact of extreme weather events and climate change on the heavily stressed urban Lake Tegel in Berlin, Germany, Poster presentation, *EGU General Assembly*, Vienna, Austria, 09.-13.04.2018

16. Model-based assessment of urban water management strategies for a shallow dimictic lake, Poster presentation, *ELR2017NAGOA and ICLEE 8th Conference*, Nagoya, Japan, 22.-25.09.2017

17. Lake on life support: Evaluating urban lake management measures by using a coupled 1D-modeling approach, Oral presentation, *EGU General Assembly*, Vienna, Austria, 23.-28.04.2017

18. Abschlussbericht: Sedimentuntersuchungen am Tegeler See, Report, *on behalf of Berlin Senate Department for the Environment, Transport and Climate Protection*, Berlin, Germany, 2016

19. Qualitative Beurteilung von Bewirtschaftungsmaßnahmen im Sediment eines urbanen Sees mittels multivariater Statistik, Oral presentation (in German), *DGL Tagung Wien*, Vienna, Austria, 26.-30.09.2016

20. Urban Water Interfaces: Interfaces in Urban Surface Waters, Oral presentation, *6th German-Russian Week of the Young Researcher*, Moscow, Russia, 12.-16.09.2016

(g) Teaching and facilitation

- Co-Instructor "Zoology 955: Seminar-Limnology - An introduction to lake modeling" at UW-Madison, Madison, USA, in 2019. Full-semester graduate student course, 11 students
- Lecturer of "GLM-AED2 lake modeling workshop". 05.11.2020, CEREO seminar at Washington State University
- Organizer/Lecturer of "Process-based lake modeling in R using GLM (General Lake Model)". 14.10.2020, Virtual GLEON 21.5 All Hands' Meeting
- Co-Lecturer of "Ensemble lake modelling with LakeEnsemblR". 15.10.2020, Virtual GLEON 21.5 All Hands' Meeting
- Co-Lecturer of "GLM Workshop". 06.05.2020, Smart and Connected Communities and FCR Carbon Team - All-Hands Meeting
- Co-Organizer/Lecturer of "Introduction to running, visualizing, and calibrating the General Lake Model (GLM)". 04.-08.11.2019, GLEON 21 All Hands' Meeting, Huntsville, Canada,
- Guest lecture about "Modeling of surface water systems" in the graduate course *Water Resource and Environmental Engineering 2017* at Saitama University, Saitama, Japan

(h) Mentoring

Austin Delany	Graduate, UW-Madison	Modeling of drought effects on nutrient cycling
Aryan Adhlakha	Undergraduate, UW-Madison	Stochastic modeling of phytoplankton
Lynette Gao	Undergraduate, UW-Madison	Lake anoxia modeling
Simon Heimann	Graduate, Osnabrück University	Temperature and oxygen modeling
Lena Heinrich	Graduate, TU Berlin	Sediment biogeochemistry

(i) Project collaborations

2019 – now	ABI Development (NSF)	Modeling tools for limnological community
2019 – now	KGML (NSF)	Knowledge-guided machine learning
2019 – now	Collaborative Research (NSF)	Oxygen availability for carbon cycling
2019 – now	ISIMIP	Climate-impact modeling, contact for GLM
2019 – now	CNH Lakes (NSF)	Human-Lake relationships
2015 – 2019	Urban Water Interfaces (DFG)	Urban hydrology
2018 – now	AEMON-J	Grass-roots modeling network for ECR
2018	ISEO (CARIPLO)	Meromixis in Lake Iseo
2017	Yamagusuku Pond	Artifical reservoir destratification

(j) Reviewer

JGR Biogeosciences, Limnology and Oceanography, Hydrology and Earth System Sciences, Environmental Modelling & Software, Environmental Pollution, Inland Waters, Ecological Informatics, Limnologica, Heliyon, Water

(k) Society memberships

- Global Lake Ecological Observatory Network (GLEON)
- International Society of Limnology (SIL)
- Association for the Sciences of Limnology and Oceanography (ASLO)
- German Society for Limnology (DGL)
- American Geophysical Union (AGU)

(l) Outreach and service

- Since 2019: member of the GLM management committee
- Interview about lake turnover and anoxia for the Clean Lakes Alliance
- Part of the UW-Madison Postdoctoral Research Symposium 2019 Planning Committee
- Since June 2019: part of the UW-Madison University Apartments Assembly, Vice Chair of Communications and Newsletters

(m) Computing

Programming	*Modeling*	*Misc.*
R (6 years)	Lake: GLM, GOTM, Simstrat, FLake	Container (i.e., Docker)
MATLAB (8 years)	CFD: open TELEMAC, HEC-RAS	HPC (HLRN, HTCondor)
Python (3 years)	Groundwater: MODFLOW, PHREEQC	GIS (ArcGIS, QGIS)
		ParaView
		Graphics (Inkscape, Illustrator)
		Unix