Jacob A. Zwart

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South Bend, IN 46617
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EDUCATION

Updated on Sept. 7, 2020

PhD 2017 **University of Notre Dame –** Notre Dame, IN
Ecology, Evolution and Environmental Science
Advisor: Dr. Stuart Jones

BS 2012 **Calvin College –** Grand Rapids, MI
Bachelor of Science in Biology

EMPLOYMENT

2019- USGS Mendenhall Postdoctoral Fellow
USGS Integrated Information Dissemination Division

2017-2019 NSF Earth Sciences Postdoctoral Fellow
USGS Integrated Information Dissemination Division

2014-2017 NSF Graduate Research Fellow
University of Notre Dame

2012-2014 Research & Teaching Assistant
University of Notre Dame

PEER-REVIEWED PUBLICATIONS (* indicates undergraduate mentee)

Number of Publications	Journal	Impact Factor
3	Limnology and Oceanography	4.3
3	Inland Waters	1.7
2	Limnology and Oceanography: Letters	5.2
2	Ecosystems	4.0
1	Science Advances	11.5
1	Global Change Biology	9.0
1	Ecology	4.6
1	Global Biogeochemical Cycles	4.5
1	Ecological Applications	4.4
1	Geophysical Research Letters	4.3
1	Journal of Geophysical Research - Biogeosciences	3.5
1	Canadian Journal of Fisheries and Aquatic Sciences	2.6
1	Journal of American Water Resources Association	2.2
1	Limnology and Oceanography: Methods	2.1

In Press

Zwart, J.A., W.S. Beck, J.E. Brandt, M.M. Brisbin, K.J. Farrell, K.L. Hondula, D.W. Kincaid, E.I. Larson, A.J. Shogren. Wikipedia can help resolve information inequality in the aquatic sciences. *Limnology and Oceanography Letters*.

---- 2020 ----

22. Jia, X., Willard, J., Karpatne, A., Read, J.S., **Zwart, J.A.,** Steinbach, M. and Kumar, V., 2020. Physics-guided machine learning for scientific discovery: An application in simulating lake temperature profiles. *arXiv preprint arXiv:2001.11086*.

---- 2019 ----

21. Read, J.S., X. Jia, J. Willard, A.P. Appling, **J.A. Zwart**, S.K. Oliver, A. Karpatne, G. Hansen, P.C. Hanson, W. Watkins, M. Steinbach, V. Kumar. 2019. Process-guided deep learning predictions of lake water temperature. *Water Resources Research*, 55, https://doi.org/10.1029/2019WR024922

20. **Zwart, J.A.,** Z.J. Hanson, J.S. Read, M.N. Fienen, A.F. Hamlet, D. Bolster, S.E. Jones. 2019. Cross-scale interactions dictate regional lake carbon flux and productivity response to future climate. *Geophysical Research Letters*, 46. https://doi.org/10.1029/2019GL083478

19. Jia, X., J. Willard, A. Karpatne, J. Read, **J.A. Zwart**, M. Steinbach, V. Kumar. 2019. Physics-guided RNNs for modeling dynamical systems: a case study in simulating lake temperature profiles. In *Proceedings of the 2019 SIAM International Conference on Data Mining* (pp. 558-566). Society for Industrial and Applied Mathematics.

18. **Zwart, J.A.,** O. Hararuk, Y.T. Prairie, S.E. Jones, C.T. Solomon. 2019. Improving estimates and forecasts of lake carbon dynamics using data assimilation. *Limnology and Oceanography: Methods* 17:97-111. DOI: 10.1002/lom3.10302

17. Tiegs, S., et al. (148 co-authors), **Zwart, J.A**. 2019. Global patterns and drivers of ecosystem functioning in rivers and riparian zones. *Science Advances* 5: eaav0486

---- 2018 ----

16. Hanson, Z.J., **J.A. Zwart**, J. Vanderwall, C.T. Solomon, S.E. Jones, A.F. Hamlet, D. Bolster. 2018. Integrated, regional-scale hydrologic modeling of inland lakes. *Journal of American Water Resources Association* 54: 1302-1324

15. **Zwart, J.A.,** Z.J. Hanson, J. Vanderwall, D. Bolster, A.F. Hamlet, S.E. Jones. 2018. Spatially-explicit, regional-scale simulation of lake carbon cycling. *Global Biogeochemical Cycles* 32: 1276-1293

14. Hararuk, O., **J.A. Zwart**, S.E. Jones, Y.T. Prairie, C.T. Solomon. 2018. Model-data fusion to test hypothesized drivers of lake carbon cycling reveals importance of physical controls. *Journal of Geophysical Research – Biogeosciences* 123: 1130-1142

13. Kelly, P.T., C.T. Solomon, **J.A. Zwart,** S.E. Jones. 2018. A framework for understanding variation in pelagic gross primary production of lake ecosystems. *Ecosystems* 21: 1364-1376

12. Koizumi, S., N. Craig, **J.A. Zwart**, P.T. Kelly, J.P. Ziegler, B.C. Weidel, S.E. Jones, C.T. Solomon. 2018. Whole-lake experimental increase in DOC leads to a zero-sum change in fish productivity. *Canadian Journal of Fisheries and Aquatic Sciences* 75: 1859-1867

11. Jones, S.E., **J.A. Zwart**, P.T. Kelly, C.T. Solomon. 2018. Hydrologic context constrains lake heterotrophy and terrestrial carbon fate. *Limnology and Oceanography Letters* 3: 256-264; DOI: 10.1002/lol2.10054

---- 2017 ----

10. Vizza, C., **J.A. Zwart**, S.E. Jones, S.D. Tiegs, G.A. Lamberti. 2017. Landscape patterns shape wetland pond ecosystem function from glacial headwaters to ocean. *Limnology and Oceanography* 62: S207-S221. DOI: 10.1002/lno.10575

9. Giling, D.P., P.A. Staehr, H.P. Grossart, M.R. Andersen, B. Boehrer, C. Escot, F. Evrendilek, L. Gómez-Gener, M. Honti, I.D. Jones, N. Karakaya, A. Laas, E. Moreno-Ostos, K. Rinke, U. Scharfenberger, S.R. Schmidt, M. Weber, R.I. Woolway, **J.A. Zwart**, B. Obrador. 2017. Delving Deeper: Metabolic processes in the metalimnion of stratified lakes. *Limnology and Oceanography* 62: 1288-1306.

8. Weidel, B.C., Baglini, K., Jones, S.E., Kelly, P.T., Solomon, C.T., and **Zwart, J.A.** 2017. Differences in light climate due to dissolved organic carbon concentration drive species-specific changes in fish zooplanktivory. *Inland Waters* 7: 210-217.

7. **Zwart, J.A.,** S.D. Sebestyen, C.T. Solomon, and S.E. Jones. 2017. The influence of hydrologic residence time on lake carbon cycling dynamics following extreme precipitation events. *Ecosystems* 20: 1000-1014.

---- 2016 ----

6. Kelly, P.T., N Craig, C.T. Solomon, B.C. Weidel, **J.A. Zwart,** and S.E. Jones. 2016. Experimental whole-lake increase of dissolved organic carbon concentration produces unexpected increase in crustacean zooplankton density. *Global Change Biology* 22: 2766-2775.

5. Dugan, HA, RI Woolway, AB Santoso, JR Corman, A Jaimes, ER Nodie, VP Patil, **JA Zwart**, JA Bentrup, AL Hetherington, SK Oliver, JS Read, KM Winters, PC Hanson, EK Read, LA Winslow, KC Weathers. 2016. Consequences of gas flux model choice on the interpretation of metabolic balance across 15 lakes. *Inland Waters* 6: 581-592.

4. **Zwart, J.A.,** N Craig, P.T. Kelly, S.D. Sebestyen, C.T. Solomon, B.C. Weidel, and S.E. Jones. 2016. Metabolic and physiochemical responses to a whole-lake experimental

increase in dissolved organic carbon in a north-temperate lake. *Limnology & Oceanography* 61(2): 723-734.

3. Winslow L.A., **J.A. Zwart**, R.D. Batt, H.A. Dugan, R.I. Woolway, J. Corman, P.C. Hanson, and J.S. Read. 2016. LakeMetabolizer: An R package for estimating lake metabolism from free-water oxygen using diverse statistical models. *Inland Waters* 6: 622-636.

---- 2015 ----

2. Read, E., V. Patil, S. Oliver, A. Hetherington, J. Brentrup**, J.A. Zwart**, K. Winters, J. Corman, E. Nodine, R.I. Woolway, H. Dugan, A. Jaimes, A. Santoso, G. Hong, P. Hanson, L. Winslow, K. Weathers. 2015. The importance of lake-specific characteristics for water quality across the continental United States. *Ecological Applications* 25(4):943-955.

1. **Zwart, J.A.,** C.T. Solomon, and S.E. Jones. 2015. Phytoplankton traits predict ecosystem function in a global set of lakes. *Ecology* 96(8): 2257-2264.
Paper was awarded the Exceptional Promise in Graduate Research for 2015 from the *Ecological Society of America Aquatic Ecology Section

OTHER PUBLICATIONS

4. **Zwart, J.A.,** A. Shiklomanov, K. McHenry, D.S. Katz, R. Kooper, C. Boettiger, B. Mecum, M. Dietze, Q. Thomas. 2020. Reproducible Forecasting Workflows https://ecoforecast.org/reproducible-forecasting-workflows/

3. Stachelek, J., K. Hondula, D. Kincaid, A. Shogren, **J. Zwart.** 2020. Ripples on the web: Spreading lake information via Wikipedia. *Limnology and Oceanography Bulletin* 29: 70-72.

2. Farrell, K.J., A.N. Cramer, K.L. Hondula, S.K. Thompson, **J.A. Zwart.** 2019. Support of early-career researchers supports the future of ASLO. *Limnology and Oceanography Bulletin* 28: 34-34.

1. Wilkinson, G.M., C. Gaynus, T. Moore, S. Rosengard, H. Schiebel, **J.A. Zwart.** 2017. Innovations and solutions for ASLO student travel grants. *Limnology and Oceanography Bulletin.* DOI: 10.1002/lob.10168

AUDIO PUBLICATIONS

1. Larson, E. (Host), **J. A. Zwart,** and A. J. Shogren (Guests). "Making Waves Ep. 39". *Making Waves | Society for Freshwater Science*. [audio podcast] April 17, 2019. Retrieved from https://freshwater-science.org/news/making-waves-ep-39

TECHNICAL PRODUCTS

2. Winslow L.A., **J.A. Zwart**, R.D. Batt, J. Corman, H.A. Dugan, P.C. Hanson, G. Holtgrieve, A. Jaimes, J.S. Read and R.I. Woolway. 2014. LakeMetabolizer: Tools for

the analysis of ecosystem metabolism. R package version 1.1. http://CRAN.R-project.org/package=LakeMetabolizer

1. Winslow, L., J. Read, R. Woolway, J. Brentrup and **J. A., Zwart**. 2013. rLakeAnalyzer: Package for the analysis of lake physics. R package version 1.0. http://CRAN.R-project.org/package=rLakeAnalyzer

DATA PUBLICATIONS

1. **Zwart, J.A.,** Hanson, Z.J., Read, J.S., Fienen, M.N., Hamlet, A.F., Bolster, D., and Jones, S.E., 2019, Lake Biogeochemical Model Output for One Retrospective and 12 Future Climate Runs in Northern Wisconsin & Michigan, USA: U.S. Geological Survey data release, https://doi.org/10.5066/P9S7EMTB
2. Read, J.S., Jia, X., Willard, J., Appling, A.P., **Zwart, J.A.,** Oliver, S.K., Karpatne, A., Hansen, G.J.A., Hanson, P.C., Watkins, W., Steinbach, M., and Kumar, V., 2019, Data release: Process-guided deep learning predictions of lake water temperature: U.S. Geological Survey data release, https://doi.org/10.5066/P9AQPIVD

INVITED PRESENTATIONS

Zwart, J.A., J.S. Read, X. Jia, J. Willard, A.P. Appling, S.K. Oliver, A. Karpatne, G.J.A. Hansen, P.C. Hanson, W. Watkins, M. Steinbach, V. Kumar. Process-guided deep learning predictions of lake water temperature. *Great Lakes Science Center – Ann Arbor, MI.* October, 2019.

Zwart, J.A., J.S. Read, X. Jia, J. Willard, A.P. Appling, S.K. Oliver, A. Karpatne, G.J.A. Hansen, P.C. Hanson, W. Watkins, M. Steinbach, V. Kumar. Process-guided deep learning predictions of lake water temperature. *Community for Data Integration.* June, 2019.

Zwart, J.A., Z. Hanson, J.S. Read, M.N. Fienen, D. Bolster, A. Hamlet, S.E. Jones. Regional lake carbon flux and productivity response to future climate. *Calvin College*. March 2019.

Zwart, J.A., Z. Hanson, J. Vanderwall, D. Bolster, A. Hamlet, J.S. Read, S.E. Jones. Spatially-explicit scaling of lake water and biogeochemical fluxes. *University of Wisconsin – Madison*. March 2018.

Zwart, J.A., Z. Hanson, J. Vanderwall, D. Bolster, A. Hamlet, J.S. Read, S.E. Jones. Spatially-explicit scaling of lake water and biogeochemical fluxes. *Miami University of Ohio*. March 2018.

Zwart, J.A., Z. Hanson, J. Vanderwall, D. Bolster, A. Hamlet, S.E. Jones. Spatially-explicit scaling of lake water and carbon fluxes. *Geological Society of America*. October 2017.

Zwart, J.A., S.E. Jones, C.T. Solomon, Y. Li, M.E. Pfrender. Scaling from phytoplankton traits to lake ecosystem function. *Unifying Ecology Across Scales, Gordon Research Seminar*. July 2016.

Zwart, J.A., S.E. Jones, C.T. Solomon, Y. Li, M.E. Pfrender. Phytoplankton traits predict ecosystem function in a global set of lakes. *Association for Sciences of Limnology and Oceanography*. June 2016.

Zwart, J.A., Z. Hanson, D. Bolster, C. Chiu, A. Hamlet, & S.E. Jones. Spatially explicit scaling of lake carbon cycling: coupling climatic, hydrologic, and biological processes. *Catchment Science: Interactions of Hydrology, Biology & Geochemistry Gordon Research Seminar*. June 2015.

Zwart, J.A., N. Craig, and P.T. Kelly. The effects of terrestrial carbon on aquatic consumers: potential implications from global browning of inland waters. *University of Notre Dame Environmental Research Center*. July 2013.

CONTRIBUTED PRESENTATIONS

Zwart, J.A., Beck, W., Brandt, J.E., Brisbin, M.M., Farrell, K.J., Hondula, K.L., Kincaid, D.W., Larson, E.I. and Shogren, A.J., 2019, August. Curating open scientific information on Wikipedia: A case study of WikiProject Limnology and Oceanography. In *2019 ESA Annual Meeting (August 11--16)*. ESA.

Zwart, J.A., A. Appling, L. DeCicco, D. Blodgett, F. Salas, X. Jia, J. Willard, V. Kumar, J. Read. Towards real-time water quality forecasts for streams of the United States. *National Water Quality Monitoring Conference*. March 2019.

Zwart, J.A., A. Appling, L. DeCicco, D. Blodgett, F. Salas, X. Jia, J. Willard, V. Kumar, J. Read. Towards real-time water quality forecasts for streams of the United States. *American Geophysical Union*. December 2018.

Zwart, J.A., O. Hararuk, Y.T. Prairie, S.E. Jones, C.T. Solomon. Improving estimates and forecasts of lake carbon pools and fluxes using data assimilation. *American Geophysical Union*. December 2017.

Zwart, J.A., S.E. Jones, C.T. Solomon, Y. Li, M.E. Pfrender. Scaling from phytoplankton traits to lake ecosystem function. *Unifying Ecology Across Scales, Gordon Research Conference*. July 2016. (Poster).

Zwart, J.A., S. Sebestyen, C.T. Solomon, B.C. Weidel, & S.E. Jones. Incorporating catchment processes in lake carbon cycling. *Catchment Science: Interactions of Hydrology, Biology & Geochemistry Gordon Research Conference*. June 2015. (Poster)

Zwart, J.A. & S.E. Jones. Phytoplankton traits predict ecosystem function in a global set of lakes. *100th Annual Ecological Society of America Meeting*. August 2015. (Jones as presenter)

Zwart, J.A., C.T. Solomon, B.C. Weidel, and S.E. Jones. Spatiotemporal controls of lake heterotrophy: Insights from coupling high frequency carbon loads and lake metabolism estimates. *Science in the Northwoods*. October 2014.

Zwart, J.A., C.T. Solomon, B.C. Weidel, and S.E. Jones. Spatiotemporal controls of lake heterotrophy: Insights from coupling high frequency carbon loads and lake metabolism estimates. *Global Lake Ecological Observatory Network*. October 2014. (Poster)

Zwart, J.A., C.T. Solomon, B.C. Weidel, and S.E. Jones. Lake heterotrophy supported by labile terrestrial carbon: coupling high frequency carbon loads and lake metabolism estimates. *Joint Aquatic Sciences Meeting*. May 2014.

Zwart, J. A., C. T. Solomon, and S. E. Jones. Ecological applications of sensor technology: phytoplankton traits detected at the ecosystem scale. Global Lake Ecological Observatory Network: 15. Bahia Blanca, Argentina. Nov. 6, 2013 (Poster).

Elser, S*, **J.A. Zwart.** Distribution of Chaoborus larvae in water columns across a dissolved organic carbon gradient. *Midwest Ecology and Evolution Conference*. March 2013.

Baglini, K*., **J.A. Zwart**, B.C. Weidel, S.E. Jones. The effect of dissolved organic carbon (DOC) on planktivorous feeding habits. *Midwest Ecology and Evolution Conference*. March 2013.

Zwart, J.A, C.T. Solomon, and S.E. Jones. Environmental drivers of phytoplankton light use efficiency in 25 globally distributed lakes. *Midwest Ecology and Evolution Conference*. March 2013.

Zwart, J.A., S. Godwin, C.T. Solomon, B.C. Weidel, S.D. Sebestyen, J.J. Coloso, and S.E. Jones. Magnitude and composition of basal carbon supplies in lake ecosystems across a dissolved organic carbon gradient. *Association for Sciences of Limnology and Oceanography*. February 2013.

Zwart, J.A., C.T. Solomon, B.C. Weidel, S.D. Sebestyen, J.J. Coloso, and S.E. Jones. Lake hydrology determines organic carbon sources and retention in a small northern seepage lake. *Global Lake Ecological Observatory Network*. October 2012.

Zwart J.A. Quantifying terrestrial carbon sources of a small northern seepage lake. *Van Andel Institute West Michigan Regional Undergraduate Science Research Conference*. November 2011.

Zwart J.A. Quantifying terrestrial carbon sources of a small northern seepage lake. *University of Notre Dame Environmental Research Center Undergraduate Summer Research Presentation*. July 2011.

Zwart J.A. Summer phenology of the open water at Flat Iron Lake. *Van Andel Institute West Michigan Regional Undergraduate Science Research Conference*. October 2010.

Zwart J.A. Summer phenology of the open water at Flat Iron Lake. Calvin College Undergraduate Summer Research Presentation. Grand Rapids, MI. October 22, 2010.

UNDERGRADUATE RESEARCH MENTORSHIP

Joseph Brennan – University of Notre Dame. *Combining data assimilation and deep learning for improved predictions of lake water temperature.* 2019.

Dagon Young – Ivy Tech Community College, REU. *Determining the impact of lake volume uncertainty on modeled estimates of regional lake carbon cycling*. 2017.

Henri Chung – University of Notre Dame. *Physical and chemical effects on lake tDOC mineralization and CO_2 flux*. 2017.

Joseph Vanderwall – University of Notre Dame. *Determining the importance of in-lake CO_2 production for the carbon budgets of north temperate lakes.* 2016-2017.

Kathryn Levitan – University of Kentucky, REU. *Improving estimates of lake volume using satellite-derived land surface temperature.* 2016

Brian Conner – University of Notre Dame. *Quantifying diffuse carbon flows from adjacent wetlands to lakes*. 2014

Cassandra Craig – Ashland University, Practicum in Environmental Field Biology. *The role of priming effect in lake and stream waters along a dissolved organic carbon gradient.* 2014

Bryce Penta – University of Notre Dame, Practicum in Environmental Field Biology.

Scaling from community to ecosystem ecology: using phytoplankton traits to calculate lake gross primary production. 2014

Jean A. Ruiz Cortés – University of Puerto Rico, Practicum in Environmental Field Biology. *The darkening waters: particulate organic carbon sedimentation rates along a water color gradient.* 2013

Nathan Crum – Purdue University, Practicum in Environmental Field Biology. *Diet composition and prey selectivity of yellow perch Perca flavescens from five lakes across a gradient of dissolved organic carbon at UNDERC East*. 2012

Stephen Elser - University of Notre Dame, Practicum in Environmental Field Biology. *Placement and displacement of Chaoborus larvae in water columns across a dissolved organic carbon gradient*. 2012

Katie Baglini – University of Notre Dame, Practicum in Environmental Field Biology. *Decreased feeding rate in multiple fish species in response to elevated colored dissolved organic carbon.* 2012

PROFESSIONAL SERVICE

Reviewer for: *Global Change Biology, Biogeochemistry, Ecosystems*, *Global Ecology and Biogeography*, *Ecology*, *Ecological Applications, Science of the Total Environment, Limnology & Oceanography*, *Limnology & Oceanography Letters, Journal of Limnology, Inland Waters*, *Freshwater Science, Journal of the American Water Resources Association, Geosciences,* and *PLoS ONE*

US Geological Survey Peer Support Worker

Contributor to WikiProject: Limnology and Oceanography (2017 – present)

Aquatic Sciences Advisory Committee Member for NEON (2019 – present)

ASLO 2016 special session chair: *Plugging Leaks in the Plumbing of the Inland Water Carbon Cycle*

ASLO Student Activities Committee Member (2015-2017)

GLEON Graduate Student Association Blog editing committee member (2013-2015)

University of Notre Dame Biology Graduate Student Organization Officer (2013 – 2014)

Midwest Ecology and Evolution Conference steering committee member (2013)

Student member of *Ecological Society of America*, *Association for the Sciences of Limnology and Oceanography*, and *Global Lake Ecological Observatory Network*

AWARDS

Exceptional Promise in Graduate Research Award, *Ecological Society of America Aquatic Ecology Section* (2015)

FELLOWSHIPS

U.S. Geological Survey Mendenhall Postdoctoral Fellowship (2019-2021)

National Science Foundation Earth Sciences Postdoctoral Fellowship (2017-2019): **$174,000**

National Science Foundation Graduate Research Fellowship (2014-2017): **$138,000**

University of Notre Dame Center for Aquatic Conservation Graduate Fellow (2014): **$13,330**

University of Notre Dame Environmental Research Center Graduate Research Fellowship (2013-2015): **$24,000**

University of Notre Dame Environmental Research Center Graduate Mentoring Fellowship (2012): **$6,000**

University of Notre Dame Linked Experimental Ecosystem Facility Research Grant: **$1,500**

Ecological Dissertations in the Aquatic Sciences (Eco-DAS) XIII symposia participant. The symposia seeks to bridge interdisciplinary gaps in aquatic ecology

Global Lake Ecological Observatory Network Graduate Student Fellow (2012-2014), Selective NSF-funded interdisciplinary training program in network science. Program elements included:

- Development and application of technical, conceptual and analytical skills critical to carrying out macroscale biology and network science
- Analysis and synthesis of high frequency data for peer reviewed publications
- Engaging in and leading activities within existing networks of people, data, and technologies
- Furthering the field of the Science of Team Science
- Effective communication for collaboration, education and public outreach
- Worked with experts in how to build and sustain human networks through pedagogy, organizational structure, and leadership training