

Curriculum Vitae

Paul C. Hanson, Ph.D.

Center for Limnology, University of Wisconsin, Madison, Wisconsin 53706
pchanson@wisc.edu; hanson.limnology.wisc.edu

Academic Preparation

Ph.D. Limnology and Marine Science, University of Wisconsin-Madison, 2003

M.E.P.D. Physiology, University of Wisconsin-Whitewater, 1990

B.S. Biology, University of Wisconsin - Whitewater, 1987

Appointments

2013 – Present: Distinguished Professor of Research, Univ. of Wisconsin, Center for Limnology

2011 – 2013: Research Professor, Univ. of Wisconsin, Center for Limnology

2009 – 2011: Associate Research Professor, Permanent Principal Investigator, Univ. of Wisconsin, Center for Limnology

2008 – 2009: Associate Research Scientist, Univ. of Wisconsin, Center for Limnology

2003 – 2008: Assistant Research Scientist, Univ. of Wisconsin, Center for Limnology

Research Interests

Landscape-scale aquatic carbon cycling; harmful algal blooms & water quality; biogeochemical and ecosystems modeling; environmental sensor networks; team science

Publications

Kuha, J., L. Arvola, P.C. Hanson, J. Huotari, T. Huttula, J. Juntunen, M. Järvinen, K. Kallio, M. Ketola, K. Kuoppamäki, A. Lepistö, A. Lohila, R. Paavola, J. Vuorenmaa, L. Winslow and J. Karjalainen. 2016. Response of boreal lakes to episodic weather-induced events. *Inland Waters* (6) 523–534

Snorheim CA, PC Hanson, KD McMahon, JS Read, CC Carey, HA Dugan. 2016. Meteorological drivers of hypolimnetic anoxia in a eutrophic, north temperate lake. *Ecological Modeling* (343) 39-53.

Read JS, Gries C, Read EK, Klug J, Hanson PC, Hipsey MR, Jennings E, O'Reilly CM, Winslow LA, Pierson D, McBride C, Hamilton D. 2016. Generating community-built tools for data sharing and analysis in environmental network. *Inland Waters*. 6:637-644

Gries, C, Gahler M, Hanson PC, Kratz TK, Stanley EH. *In press*. Information management at the North Temperate Lakes Long-Term Ecological Research site – successful support of research in a large, diverse, and long running project. *Ecological Informatics*

Hanson, PC, K Weathers, TK Kratz. 2016. Networked lake science: How the Global Lake Ecological Observatory Network (GLEON) works to understand, predict and communicate lake ecosystem responses to global change. *Inland Waters*.

Subratie K, Aditya S, Figueiredo R, Carey CC, Hanson PC. 2015. GRAPLER: A distributed collaborative environment for lake ecosystem modeling that integrates overlay networks, high-throughput computing, and Web services. PRAGMA Workshop on International Clouds for Data Science (PRAGMA-ICDS'15). [arXiv:1509.08955](https://arxiv.org/abs/1509.08955) [cs.DC]

Read, E.K., M. O'Rourke, G.S. Hong, P.C. Hanson, L.A. Winslow, S. Crowley, and K.C. Weathers. 2016. Building the Team for Team Science. *Ecosphere*. *Ecosphere* 7(3):e01291.10.1002/ecs2.1291

Winslow, L.A., J.A. Zwart, R.D. Batt, H. Dugan, R.L. Woolway, J. Corman, P.C. Hanson and J.S. Read. *In press*. LakeMetabolizer: An R package for estimating lake metabolism from free-water oxygen using diverse statistical models.

Dugan, H.A., A.B. Santoso, J.R. Corman, A. Jaimes, E.R. Nodine, V. Patil, R.I. Woolway,

- J. Zwart, J. Brentrup, A. Hetherington, S. Oliver, J. Read, K. Winters, P.C. Hanson, E. Read, L.A. Winslow, K. Weathers. 2016. Consequences of gas flux model choice on the interpretation of metabolic balance across 15 lakes. *Inland Waters* (6) 581-592
- Carey, C.C., P.C. Hanson, R. Lathrop, and A.S. Amand. 2016. Using wavelet analyses to examine variability in phytoplankton seasonal succession and annual periodicity. *Journal Plankton Research*. 38:27-40. doi:10.1093/plankt/fbv116
- Hipsey, M.R., D.P. Hamilton, P.C. Hanson, C.C. Carey, J.Z. Coletti, J.S. Read, B.W. Ibelings, F. Valesini, and J.D. Brookes. 2015. Predicting the resilience and recovery of aquatic systems: a framework for model learning in observatory systems. *Water Resources Research*. 51:7023-7043. DOI: 10.1002/2015WR017175
- Gil, Y., F. Michel, V. Ratnakar, M. Hauder, C. Duffy, and P.C. Hanson. 2015. A task-centered framework for computationally-grounded science collaborations.
- Gil, Yi, F. Michel, V. Ratnakar, J.S. Read, M. Hauder, C. Duffy, P.C. Hanson, and H. Dugan. 2015. Supporting Open Collaboration in Science Through Explicit and Linked Semantic Description of Processes. In: Gandon F, Sabou M, Sack H, D'Amato C, Cudré-Mauroux P, Zimmermann A, editors. *The Semantic Web: Latest Advances and New Domains; 12th European Semantic Web Conference, ESWC 2015, Portoroz, Slovenia, May 31 – June 4, 2015, Proceedings*. New York: Springer. p 830.
- Read, E.K., V. Patil, S.K. Oliver, A.L. Hetherington, J. Brentrup, J. Zwart, K. Winters, J. Corman, E. Nodine, R.I. Woolway, H. Dugan, A. Jaimes, A. Santoso, G.S. Hong, L.A. Winslow, P.C. Hanson, K.C. Weathers. 2015. The importance of lake-specific characteristics for water quality across the continental United States. *Ecological Applications*, 25: 943-955
- Winslow, L.A., J.S. Read, P.C. Hanson, and E.H. Stanley. 2015. Does lake size matter? Combining morphology and process modelling to examine the contribution of lake classes to population-scale processes *Inland Waters*. 5:7-14.
- Winslow, L.A., J. Read, G. Hansen, P.C. Hanson. 2015. Small lakes show muted climate change signal in deep-water temperatures. *Geophysical Research Letters* 42:355-361.
- Crawford, J.T., N.R. Lottig, E.H. Stanley, J.F. Walker, P.C. Hanson, J. Findlay, and R.G. Stiegl. 2014. CO₂ and CH₄ emissions from streams in a lake-rich landscape: Patterns, controls and regional significance. *Global Biogeochemical Cycles*, 28, doi:10.1002/2013GB004661.
- Hamilton, D.P., C.C. Carey, L. Arvola, P. Arzberger, C. Brewer, J.J. Cole, E. Gaiser, P.C. Hanson et al. 2014. A Global Lake Ecological Observatory Network (GLEON) for synthesising high-frequency sensor data for validation of deterministic ecological models. *Inland Waters*. 5: 49-56.
- Hanson, P.C., M. Pace, J.J. Cole, and S.R. Carpenter. 2014. Integrating Landscape Carbon Cycling: Research Needs for Resolving Organic Carbon Budgets of Lakes. *Ecosystems*. 18:363-365. DOI: 10.1007/s10021-014-9826-9
- Watras, C.J., K.A. Morrison, J.T. Crawford, C.P. McDonald, S.K. Oliver and P.C. Hanson. 2014. Diel cycles in the fluorescence of dissolved organic matter in dystrophic Wisconsin seepage lakes: Implications for carbon turnover. *Limnol. Oceanogr.* 60(1)
- Read, J.S., L.A. Winslow, G.A. Hansen, J. Van den Hoek, P.C. Hanson, L.C. Bruce, and C.D. Markfort. 2014. Simulating 2,368 temperate lakes reveals weak coherence in stratification phenology. *Ecological Modelling* 291: 142-150
- Rigosi, A. P.C. Hanson, D. Hamilton, M. Hipsey, J. Bois, J.D. Brookes. *In press*. Determining the probability of cyanobacterial blooms: the application of Bayesian networks in multiple lake systems. *Ecological Applications*
- Read, E.K., M. Ivancic, P.C. Hanson, B. Cade-Menun, and K.D. McMahon. 2014. Phosphorus speciation in a eutrophic lake by ³¹P NMR spectroscopy. *Water research* 62: 229-240

- Rose KC, Winslow LA, Read JS, Read EK, Solomon CT, Adrian R, Hanson PC. 2014. Improving the precision of lake ecosystem metabolism estimates by identifying predictors of model uncertainty. *Limnology & Oceanography Methods*. (12):303-312.
- Watras, C. J., K.A. Morrison, J. Mather, P. Milewski, and P.C. Hanson. 2014. Correcting CDOM fluorescence measurements for temperature effects under field conditions in freshwaters. *Limnol. Oceanogr. Methods* 12: 23–24.
- Davies, N., D. Field, L. Amaral-Zettler..., P.C. Hanson et al. 2014. The founding charter of the Genomic Observatories Network. *GigaScience*, 3:2. www.gigasciencejournal.com/content/3/1/2
- Cheruvilil, K.S., P.A. Soranno, K.C. Weathers, P.C. Hanson, S. Goring. 2014. Creating and maintaining high-performing collaborative research teams: the importance of diversity and socio-cognitive skills. *Frontiers in Ecology and the Environment*.
- Hanson, P.C., I. Buffam, J. Rusak, E.H. Stanley, C. Watras. 2014. Quantifying organic carbon loads to lakes using a simple equilibrium model. *Limnol. Oceanogr.* 59:167-181
- Winslow, L.A., J.S. Read, P.C. Hanson, E.H. Stanley. 2014. The distribution of lake aquatic-terrestrial interface in the contiguous United States. *Freshwater Biology*. 59: 213-223, doi:10.1111/fwb.12258
- Watras, C.J., M. Morrow, K.M. Morrison, S. Scannell, S. Yazicioglu, P.C. Hanson, J.S. Read, and Y-H Hu. 2013. Wetland observatories: monitoring the impact of weather and climate on hydrochemical dynamics with wireless sensor networks (WSNs). *Environ Monitor and Assess*. 10.1007/s10661-013-3424-8
- Solomon, C.T., D.A. Bruesewitz, D.C. Richardson, D.C. Rose, M.C. Van de Bogert, P.C. Hanson et al. 2013. Ecosystem respiration: drivers of daily variability and background respiration in lakes around the globe. *Limnol. Oceanogr.* 58: 849-866.
- Gil, Y., V. Ratnakar, and P.C. Hanson. 2013. Organic Data Publishing: A Novel Approach to Scientific Data Sharing. 2nd International Workshop on Linked Science 2012—Tackling Big Data (LISC2012). Boston, MA.
- Van de Bogert, M.C., D.L. Bade, S.R. Carpenter, J.J. Cole, M.L. Pace, P.C. Hanson, O.C. Langman. 2012. Spatial heterogeneity strongly affects estimates of ecosystem metabolism in two north temperate lakes. *Limnol. Oceanogr.* 57:1689-1700.
- Kara, E.L., P.C. Hanson, Y.H. Hu, L.A. Winslow, and K.D. McMahon. 2012. A decade of seasonal dynamics and co-occurrences within freshwater bacterioplankton communities from eutrophic Lake Mendota, Wisconsin, USA. *ISME J*. doi:10.1038/ismej.2012.118
- Read, J.S., D.P. Hamilton, A.R. Desai, K.C. Rose, S. MacIntyre, J.D. Lenters, R.L. Smyth, P.C. Hanson, J.J. Cole, P.A. Staehr, J.A. Rusak, D.C. Pierson, J.D. Brookes, A. Laas, and C. Wu. 2012. Lake-size dependency of wind shear and convection as controls on gas exchange. *Geophysical Research Letters*, 39, doi:10.1029/2012GL051886.
- Kara, E.L., P.C. Hanson, D.P. Hamilton, M. Hipsey, K.D. McMahon, J. Read, L. Winslow, J. Dedrick, K. Rose, C.C. Carey, S. Bertilsson, D. Motta Marques, L. Beversdorf, T. Miller, C. Wu, Y.F. Hsieh, E. Gaiser, and T.K. Kratz. 2012. Time-scale dependence in numerical simulations: Assessment of physical, chemical, and biological predictions in a stratified lake at temporal scales of hours to months. *Environmental Modelling & Software*. 35:104-121, doi: 10.1016/j.envsoft.2012.02.014.
- Davies, N., D. Field, et al. 2012. Sequencing data: A genomic network to monitor Earth. *Nature* 481: 145 doi:10.1038/481145a.
- Carey, C.C., P.C. Hanson, D.A. Bruesewitz, et al. 2012. Organized Oral Session 43. Novel Applications of High-Frequency Sensor Data in Aquatic Ecosystems: Discoveries from GLEON, the Global Lake Ecological Observatory Network. *Bulletin of the Ecological Society of America* 93:100–105. [doi:<http://dx.doi.org/10.1890/0012-9623-93.1.100>]
- Lottig, N.R., E.H. Stanley, P.C. Hanson, and T.K. Kratz. 2011. Comparison of regional

- stream and lake chemistry: Differences, similarities, and potential drivers. *Limnology and Oceanography* 56:1551-1562, doi:10.4319/lo.2011.56.5.1551
- Porter, J.H., P.C. Hanson, C.C. Lin. 2012. Staying afloat in the sensor data deluge. *TREE* 1484:1-9.
- Trolle, D., D.P. Hamilton, M.R. Hipsey, K. Bolding, J. Bruggeman, W.M. Mooij, J.H. Janse, A. Nielsen, E. Jeppesen, J.A. Elliot, V. Makler-Pick, T. Petzoldt, K. Rinke, M.R. Flindt, G.B. Arhonditsis, G. Gal, R. Bjerring, K. Tominaga, J. Hoen, A.S. Downing, D. M. Marques, C.R. Fragoso, M. Sondergaard, P.C. Hanson. 2011. A community-based framework for aquatic ecosystem models. *Hydrobiologia*. DOI 10.1007/s10750-011-0957-0.
- Hanson, P.C., D.P. Hamilton, E.H. Stanley, N. Preston, O.C. Langman, E.L. Kara. 2011. Fate of Allochthonous Dissolved Organic Carbon in Lakes: A Quantitative Approach. *Plos One*. 6:E21884. <http://dx.plos.org/10.1371/journal.pone.0021884>.
- Watras, C.J., P.C. Hanson, T.L. Stacey, K.M. Morrison, J. Mather, Y.H. Hu, and P. Milewski. 2011. A temperature compensation method for CDOM fluorescence sensors in freshwater. *Limnol. Oceanogr. Methods*. 9: 296-301. DOI: 10.4319/lom.2011.9.296
- Tsai, J.W., T.K. Kratz, P.C. Hanson, N. Kimura, W.C. Liu, F.P. Lin, H.M. Chou, J.T. Wu, and C.Y. Chiu. 2011. Metabolic changes and the resistance and resilience of a subtropical heterotrophic lake to typhoon disturbance. *Can. J. Fish. Aquat. Sci.* 68: 768-780.
- Staehr, P.A., D. Bade, M. Van de Bogert, G. Koch, C. Williamson, P.C. Hanson, J. Cole, and T.K. Kratz. 2010. Lake metabolism and the diel oxygen technique: State of the science. *Limnol. Oceanogr. Methods*. 8: 268-644.
- Buffam, I., M.G. Turner, A.R. Desai, P.C. Hanson, J.A. Rusak, N.R. Lottig, and S.R. Carpenter. 2010. Integrating aquatic and terrestrial components to construct a complete carbon budget for a north temperate lake district. *Global Change Biology*. doi:10.1111/j.1365-2486.2010.02313.x
- Langman, O.C., P.C. Hanson, S.R. Carpenter, K. Chiu, and Y.H. Hu. 2010. Control of dissolved oxygen in northern temperate lakes over scales ranging from minutes to days. *Aquatic Biology* (9): 193–202, 2010doi: 10.3354/ab00249
- Buffam, I., S.R. Carpenter, W. Yeck, P.C. Hanson, and M.G. Turner. 2010. Filling holes in regional carbon budgets: predicting peat depth in a north-temperate lake district. *Journal of Geophysical Research* (115), G01005, doi:10.1029/2009JG001034.
- Cardille, J.A., S.R. Carpenter, J.A. Foley, P.C. Hanson, M.G. Turner, and J.A. Vano. 2009. Climate changes and lakes: estimating sensitivities of water and carbon budgets. *J. Geophys. Res. Biogeosciences*, 114, doi:10.1029/2008JG000891.
- Kamarainen, A.M., R. Penczykowski, M. Van de Bogert, P.C. Hanson, and S.R. Carpenter. 2009. Phosphorus sources and demand during summer in a eutrophic lake. *Aquatic Biology*, 71: 214-227.
- Porter, J., E. Nagy, P.C. Hanson, T.K. Kratz, S. Collins, and P.A. Arzberger. 2009. New Eyes on the World: Advanced Sensors for Ecology. *Bioscience* (59): 385-397.
- Hanson, P.C., S.R. Carpenter, N. Kimura, C. Wu, S.P. Cornelius, and T.K. Kratz. 2008. Evaluation of metabolism models for free-water dissolved oxygen methods in lakes. *Limnol. Oceanogr. Methods*. 6:454-465.
- Hanson, P.C. 2008. New ecological insights through the Global Lake Ecological Observatory Network (GLEON). *Ecological Science*. 27(5): 300-302.
- Winslow, L.A., B.J. Benson, K.E. Chiu, P.C. Hanson, T.K. Kratz. 2008. Vega: A flexible data model for environmental time series data. Environmental Information Management Conference. Albuquerque, NM.
- Coloso, J.J., J.J. Cole, P.C. Hanson, and M.L. Pace. 2008. Depth-integrated, continuous, estimates of metabolism in a clear-water lake. *Can. J. Fish. Aquat. Sci.* 65:712-722.

- Tsai, J.W., T.K. Kratz, P.C. Hanson, J.T. Wu, W.Y.B. Chang, P.W. Arzberger, B.S. Lin, F.P. Lin, H.M. Chou, C.Y. Chiu. 2008. Seasonal dynamics and regulation of lake metabolism in a subtropical humic lake. *Freshwater Biology*. 53:1929-1941.
- Tilak, S., P. Arzberger, B. Benson, R. Bhalerao, K. Chiu, T. Fountain, D. Hamilton, P. Hanson, T.K. Kratz, F.P. Lin, and L. Winslow. 2007. Conceptual Challenges and Practical Issues in Building The Global Lake Ecological Observatory Network. ISSNIP07 conference proceedings.
- Hanson, P.C. A grassroots approach to sensor and science networks. 2007. *Frontiers in Ecology and the Environment*. 5(7): 343.
- Hanson, P.C., S.R. Carpenter, J.A. Cardille, M.T. Coe, and L.A. Winslow. 2007. Small lakes dominate a random sample of regional lake characteristics. *Freshwater Biology*. 52: 814-822.
- Carpenter, S.R., B.J. Benson, R. Biggs, J.W. Chipman, J.A. Foley, S.A. Golding, R.B. Hammer, P.C. Hanson, P.T.J. Johnson, A.M. Kamarainen, T.K. Kratz, R.C. Lathrop, K.D. McMahon, B. Provencher, J.A. Rusak, C.T. Solomon, E.H. Stanley, M.G. Turner, M.J. Vander Zanden, C.-H. Wu and H. Yuan. 2007. Understanding regional change: Comparison of two lake districts. *BioScience*. 57(4): 323-335.
- Cardille, J. A., Carpenter, S. R., Coe, M. T., Hanson, P. C., Foley, J. A., Turner, M. G., and J. A. Vano. 2007. Integrating carbon and water cycling in lake-rich landscapes: effects of landscape connections on lake hydrology and biogeochemistry. *Journal of Geophysical Research - Biogeosciences*. 112, G02031, doi:10.1029/2006JG000200.
- Kratz, T.K., P. Arzberger, B.J. Benson, C.Y. Chiu, K. Chiu, L. Ding, T. Fountain, D. Hamilton, P.C. Hanson, Y.H. Hu, F.P. Lin, D.F. McMullen, S. Tilak, C. Wu. 2006. Towards a Global Lake Ecological Observatory Network. *Publications of the Karelian Institute* 145:51-63. (http://www.gleon.org/Gleon_Kratz_etal_2006.pdf)
- Hanson, P.C., S.R. Carpenter, D. Armstrong, E.H. Stanley, and T.K. Kratz. 2006. Lake dissolved inorganic carbon and dissolved oxygen: changing drivers from days to decades. *Ecological Monographs*. 76(3): 343-363.
- Lyons, J., P.C. Hanson, E.A. White. 2006. A photo-based computer system for identifying Wisconsin fishes. *Fisheries*. 31: 269-275.
- Lauster, G. H., P. C. Hanson, and T.K. Kratz. 2006. Gross primary production and respiration differences among littoral and pelagic habitats in North Temperate lakes. *Canadian Journal of Fisheries and Aquatic Sciences*. 63(5): 1130-1141.
- Porter, J., P. Arzberger, P. Hanson, T. Kratz, S. Gage, T. Williams, S. Shapiro, P. Bryant, F. Lin, H. King, T. Hansen, H. Braun, W. Michener. 2005. Wireless sensor networks for ecology. *Bioscience*. 55: 561-572.
- Benson, B. J., P. C. Hanson, J. W. Chipman, and C. J. Bowser. 2004. Breaking the data barrier: research facilitation through information management. Chapter 13 *in* Long-Term Ecological Research of North Temperate Lakes: Dynamics of Lakes in the Landscape. J. J. Magnuson, T. K. Kratz, and B. B. Benson, eds. Oxford University Press.
- Hanson, P. C., A. Pollard, D. L. Bade, K. Predick, S. R. Carpenter, and J. Foley. 2004. A model of carbon evasion and sedimentation in temperate lakes. *Global Change Biology*. 10: 1285-1298.
- Bade, D. L., S. R. Carpenter, J. J. Cole, P. C. Hanson, and R. H. Hesslein. 2003. Controls of $\delta^{13}\text{C}$ -DIC in lakes: Geochemistry, lake metabolism, and morphometry. *Limnol. Oceanogr.* 49: 1160-1172.
- Hanson, P.C., Bade, D. L., Carpenter, S. R., and T. K. Kratz. 2003. Lake metabolism: Relationships with dissolved organic carbon and phosphorus. *Limnol. Oceanogr.* 48: 1112-1119.
- Harvey, C.J., P.C. Hanson, T.E. Essington, P.B. Brown, and J.F. Kitchell. 2002. Using bioenergetics models to predict stable isotope ratios in fishes. *Canadian Journal of*

- Fisheries and Aquatic Sciences. 59: 115-124.
- Carpenter, S., W. Brock, and P. Hanson. 1999. Ecological and social dynamics in simple models of ecosystem management. *Conservation Ecology* 3(2): 4. [online] URL: <http://www.consecol.org/vol3/iss2/art4>
- Hanson, P.C., Johnson, T.B., Schindler, D.E., and Kitchell, J.F. 1997. Fish Bioenergetics 3.0. Technical Report WISCU-T-97-001. University of Wisconsin Sea Grant Institute, Madison, WI.

Teaching

- 2013-2017 Instructor, international graduate student fellowship program, *Building analytical, synthesis, and human network skills needed for macrosystem science*
- 2007-present Instructor/organizer, GLEON training workshops associated with all-hands meetings, G7-G16
- 2012 Instructor, international graduate student course, *Summer Course 2012: Cyber-enabled Ecological Analysis in a Network Era*, Trout Lake Station, WI
- 2011 Instructor, international graduate student course, *Summer Course 2011: Automatic Stations and High-Frequency Data Analysis*, Lake Erken, Sweden
- 2009 Instructor, *PASEO: Pan-American Sensors for Environmental Observations*, graduate course, Bahia Blanca, Argentina
- 2009 Instructor, *The management and analysis of ecological data*, graduate workshop, Kangwon National University, Chunchon, South Korea
- 2008 Instructor, *Information management in ecology*, graduate seminar, Univ. of Wisc.

Awards, fellowships, invited lectures

- 2016 Hanson PC, Wagoner C, Gaines M, Brown D. The art of science, music edition; Tail of two distributions: The probability of harmful algal blooms in model simulations. EPSSI Seminar Series, Michigan Tech Univ., Houghton.
- 2016 Hanson, PC, CC Carey, HA Dugan. Exploring the controls over carbon storage and emission in lakes through simulation models. Invited talk at the June 2016 ASLO national meeting, Sante Fe.
- 2015 Hanson, PC, HA Dugan, J Read. Organic carbon cycling in lakes: exploring the source and sink balance through process modeling. Invited talk at the Canadian Geophysical Union conference, Montreal
- 2014 Invited talk at the US NSF and Taiwan MOST summit on international science collaboration, National Science Foundation, Arlington, VA
- 2013-2014 Research Affiliate, Morgridge Institute for Research, Madison, WI
- 2013 Invited keynote address, annual Finnish Limnology Society meeting, Helsinki, Finland
- 2011 UW Chancellor's Award for Excellence in Research: Individual Investigator
- 2010 Invited lecture, *Emerging science from lake sensor networks: Phytoplankton blooms and carbon cycling*, Miami University, Ohio.
- 2009 Outstanding Reviewer for L&O (August)
- 2009 Invited lecture, *The role of lakes in landscape carbon cycling*, IGERT lecture series on biogeochemistry, Cornell University.
- 2009 Invited lecture, *New science from a new ecological sensor network*. University of Illinois, Chicago.
- 2007-2008 ICE WaRM fellowship, Adelaide, South Australia
- 2006 Visiting Scientist Award, University of Quebec, Montreal
- 2006 John S. Eaton Fellowship, Institute of Ecosystem Studies, New York

- 2006 University of Wisconsin, Mid Career Achievement Award
- 2006 Visiting Scientist Fellowship, University of Connecticut, Marine Sciences

Boards and Advisory Panels

- Advisory Panel Member, Coweeta LTER external advisory committee
- Advisory Board Member, New York City Department of Environmental Protection Climate Change Program
- Advisory Board Chair, Global Observatory of Lake Responses to Environmental Change (GloboLakes); National Environment Research Council, UK
- Steering committee Co-Chair, Global Lake Ecological Observatory Network (GLEON)
- Advisory committee Co-Chair, LTER Network Information System Advisory Committee (NISAC)
- Advisory panel, RCN SEES, Rocky Mountain Aquatic Systems
- Advisory panel, CCE-LTER
- Advisory panel, Danish Natural Science Council project, *Carbon dynamics and atmospheric CO₂ exchange in lakes*.

Reviewer for Professional Journals

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| Aquatic Biology | Ecosystems |
| Archiv fuer Hydrobiologia | Global Change Biology |
| Canadian Journal of Fisheries and Aquatic Sciences | Limnology and Oceanography |
| Ecological Modelling | Marine Freshwater Research |
| Frontiers in Ecosystems Science | Proceedings of the National Academy of Sciences |

Editorial Services

- Associate Editor of *Inland Waters*, the journal of the International Society of Limnology

Reviewer for Research Programs and Proposals

- 2015 NSERC, Canada, Collaborative Research and Training Experience
- 2014 NSF, [REDACTED]
- 2013 NYCDEP, Climate Change Research Program for NYC Water
- 2012 NSERC, Canada, Collaborative Research and Training Experience
- 2012 NSF, [REDACTED]
- 2012 NSF, [REDACTED]
- 2012 EPSCoR, Nebraska
- 2012 NSF, NEON site review
- 2011 NERC, UK, Biodiversity for Ecosystem Service Sustainability (BESS)
- 2011 NSF, [REDACTED]
- 2011 NSF, [REDACTED]
- 2010 NSF, review of hydrology synthesis program
- 2010 NSF, Panel member of [REDACTED]
- 2010 National Geographic Society, field programs
- 2008 NSF, Panel member [REDACTED]
- 2008 NSF, [REDACTED]
- 2007 NSF, Site review of Center for Embedded Networked Sensing
- 2006 NSF, NEON Conceptual Design Review
- 2006 NSF, [REDACTED]
- 2006 EPSCoR
- 2006 NSERC, Canada
- 2005 NSF, [REDACTED]

- 2005 NSF, [REDACTED]
2005 NSF, Oceanographic Instrumentation Program

Professional Affiliations

Memberships: American Geophysical Union ; Ecological Society of America; American Society of Limnology and Oceanography; Global Lake Ecological Observatory Network

Synergistic Activities

- 2016 Presentation at the US National Science Foundation, Hanson PC, Figueiredo R, Carey CC, Read JS. *A new era of freshwater science: How research network collaborations and federal agencies are changing how we study lakes and reservoirs*. US NSF, May 2016
- 2016 Presentation at the US National Science Foundation, Hanson PC and K Weathers. *2016 GLEON 10 years out and 10 years forward: What's trending and what's bending in grassroots networks*. US NSF, April 2016
- 2016 Invited talk for EPA Region 5 Webinar, *Use of Buoys for Water Quality Profiling in Lakes*
- 2015 Invited talk for EPA Region 5 Webinar, *Inland Lakes Climate Change Monitoring*
- 2015 Filmed short feature on lake water quality for the Big Ten Network
- 2014 Co-sponsored and co-led the workshop, *Advancing the science of gas exchange between fresh waters and the atmosphere*, Hyytiälä Forestry Field Station, Finland
- 2013 Presentation to the Milwaukee Boater's Club: *Wisconsin's lakes: maintaining a high standard under global pressures*
- 2012 Co-Organized/funded the workshop, *Bridging Big Data Infrastructure*, Taichung, Taiwan
- 2011 Participant in the NSF-sponsored visioning meeting for the FSML program, Colorado Spring, CO.
- 2011 Co-Organized and moderated, *Novel Applications of High-Frequency Sensor Data in Aquatic Ecosystems: Discoveries from GLEON, the Global Lake Ecological Observatory Network*. session 43, ESA meeting, Austin.
- 2010 Organized and moderated session, *S32: Emerging science from aquatic sensor networks*. ASLO meeting, Santa Fe.
- 2010 Hanson, P.C., E.L. Kara, D.P. Hamilton et al. *Prediction of phytoplankton blooms: using sensor data to work at the edge of knowledge*. ASLO meeting, Santa Fe.
- 2009 Site visit to Antarctica to enable sensor networks for the LTER Antarctica Dry Valleys.
- 2009 Hanson, P.C. *From data to knowledge: integrating lake sensor network data in physical-chemical-biological models*. LTER All Scientists Meeting, Estes Park.
- 2009 Hanson, P.C. *The role of small lakes in landscape carbon cycling*. Invited talk at the conference Biogeochemistry and Carbon Cycle of Lake Superior. Kemp Natural Resources Station, Woodruff, WI.
- 2009 The GLEON/RCN was one of six research projects featured at the NSF exhibit at the AAAS national meeting, Chicago
- 2008 Hanson, P.C. *New aquatic ecology insights through the Global Lake Ecological Observatory Network (GLEON)*. Invited lecture at the National Symposium on Freshwater Ecology and Control of Eutrophication for Ph.D. Guangzhou, China.
- 2008 Hanson, P.C., D.P. Hamilton, E.H. Stanley, N. Preston, and O.C. Langman. *The fate of organic carbon pulses from watersheds to lakes in northern Wisconsin*. Ecological Society of America national meeting. Milwaukee, WI.
- 2008 Hanson, P.C. *Primary productivity in the Coorong*. Presentation at the ICE WaRM International Liaison Symposium. Adelaide, Australia.
- 2007 Hanson, P.C. *The Global Lake Ecological Observatory Network*. Presentation at the

- NSF-sponsored workshop, *International Research Network Connections*. Washington, D.C.
- 2007 Hanson, P.C. *The Research Coordination Network within the GLEON organization*. Global Lakes Ecological Observatory Network meeting. Lammi Biological Field Station, Finland.
- 2007 Hanson, P.C., S.R. Carpenter, C. Wu, N. Kimura, and S.P. Cornelius. *Processes contributing to diel dissolved oxygen dynamics in temperate lakes*. SIL, Montreal, Canada.
- 2006 Workshop co-leader. *Exploring the Effect of Scale-Dependent Processes on Ecological Systems using Networked Sensors*. Long Term Ecological Research program all scientists meeting. Estes Park, Colorado.
- 2006 Hanson, P.C., L.A. Winslow. *dbBadger: A data access, post processing, and forwarding tool designed for sensor networks*. Global Lakes Ecological Observatory Network meeting. Townsville, Australia.
- 2005 Hanson, P.C. *Automated buoy network for studying physical and biological processes of lakes*. North American Lake Management Society. Madison, Wisconsin.
- 2005 Hanson, P.C., J. Lyons, E. White. *WiscFish FishID 1.0*, and accompanying Web site <http://WiscFish.org>; fish identification system.
- 2005 Hanson, P.C., S.R. Carpenter, J. Cardille, M. Coe. *Limnological, watershed, and carbon cycling characteristics of a random sample of lakes from the Northern Highland Lake District of Wisconsin*. Ecological Society of America. Montreal, Canada.
- 2005 Workshop participant. *Building capacity and linking infrastructure in the lake and coral reef scientific communities workshop*. Scripps Institution of Oceanography, San Diego.
- 2004 Hanson, P.C., S.R. Carpenter, D. Armstrong, E. Stanley, T. Kratz. *Drivers of carbon dioxide and oxygen flux in temperate lakes over daily to decadal scales*. Ecological Society of America. Portland, OR.
- 2004 Workshop co-leader. *Building networked ecological sensor arrays using spread-spectrum radios*. Ecological Society of America. Portland, OR.
- 2004 Hanson, P.C. *Buoys, wireless, and Web services*. Web Services Training Workshop – LTER, SDSC. San Diego, CA.
- 2003 Hanson, P.C., A. Pollard, D. L. Bade, K. Predick, S. R. Carpenter, J. Foley. *A model of carbon flux and sedimentation in linked landscape-lake ecosystems*. American Geophysical Union conference. San Francisco, CA.
- 2003 Workshop leader. *Applications of Artificial Intelligence to Embedded Sensor Networks and Their Data* at the Long Term Ecological Research All Scientist Meeting. Seattle, WA.
- 2003 Member of the NSF sponsored workshop *Environmental Cyber-Infrastructure Needs for Distributed Sensor Networks*. San Diego, CA.
- 2003 Member of the NSF sponsored workshop *Polar Science and Advanced Networking*. Washington, D.C.

Software and other Technical Products

- 2010-present Funding source for the new lake numerical simulation, GLM-AED2, which includes hydrodynamics and water quality.
- 2010-present Cyber-enabled Discovery and Innovation (<http://CDI.GLEON.org>) is a multi-discipline, multi-institutional project that uses computational thinking to advance lake science. Products include databases, models, and computing infrastructure that support the science activities of lake ecologists from around the world.

- 2009-present Lake Simulator (<http://Modeler.GLEON.org>): Oversee the development of an infrastructure for submitting lake numerical simulations to the Condor compute resources. This enables 100s to 1,000s of lake simulations to be run simultaneously.
- 2009-present LakeBase (<http://LakeBase.gleon.org>): Oversee the development of a repository of lake scientific data for hundreds of thousands of lakes around the world.
- 2006-present Oversight of Global Lake Ecological Observatory (GLEON) software suite development (<http://GLEON.org>): This suite of software provides for data streaming from sensor networks to data repositories. Interfaces have been developed for sensor network configuration as well as data mining and visualization. It currently services 23 sampling sites from 7 research organizations.
- 2005-present WiscFish fish identification system (<http://WischFish.org>): This software exists as a Web site and as a freely available CD for installation on Windows computers. The software assists people in identifying fishes of Wisconsin and has more than 4,000 photos in its repository. The project was a collaboration among the UW Center for Limnology (Hanson), Wisconsin Sea Grant (E. White), and the Wisconsin DNR (J. Lyons). Hanson was responsible for software development.
- 2005-2010 Oversight of the development of ChemLab: This software manages the information related to samples collected in the field and processed by the Center for Limnology (CFL) chemistry lab. It includes utilities for project and sampling event creation, label printing with barcodes, barcode scanning within the laboratory, and interfaces for entering results and printing reports. This software manages thousands of samples passing through the CFL annually.
- 1997 Fish Bioenergetics 3 (<http://limnology.wisc.edu>): This software, written by Hanson and distributed by the Wisconsin Sea Grant, allows researchers to model the growth of fish under differing environmental and feeding conditions. More than 1,200 copies of the software have been sold or distributed.
- 1997-2009 Hanson oversees a team of programmers who have developed a variety of software packages. Examples include: MobileFish, PDA software used by field crews to count and catalog fish while sampling Wisconsin lakes; ZoopOmatic, software for counting and cataloging zooplankton viewed through a microscope; FishOmatic, software for calculating fish growth rates from scales viewed under a microscope; LibraryCheckout, which is a Web-based system for checking-out software from the CFL library.

Post docs Supervised

		Current position
Li, Yu	2015 -	
Dugan, Hilary	2014 -	
Read, Emily	2012-2014	USGS-OWI
Carey, Cayelan	2012-2013	Virginia Tech
Solomon, Chris	2009-2010	McGill University

Graduate Students Supervised

Student	Graduation date	Degree	Supervisory Role
Snorheim, Craig	2015, May	Masters	Supervisor
Kraemer, Benjamin		Ph.D.	Committee member
Winslow, Luke	2014, August	Ph.D.	Supervisor
Batt, Ryan	2014, June	Ph.D.	Committee member
Hawley, Josiah	2012, September	Masters	Committee member
Gunawan, Anastasia	2012, August	Masters	Committee member
Kara, Emily	2012, June	Ph.D.	Co-Supervisor
Read, Jordan	2012, May	Ph.D.	Committee member
Winslow, Luke	2012, March	Masters	Supervisor
Stone, Amanda	2012, January	Masters	Supervisor
Althouse, Bryan	2012	Masters	Committee member
Van de Bogert, Matt	2011, December	Ph.D.	Committee member
Langman, Owen	2010, August	Masters	Supervisor
Lottig, Noah	2009, May	Ph.D.	Committee member

Current

Hart, Julia	Ph.D.	Supervisor
Magee, Madeline	Ph.D.	Committee member
Muraoka, Kohji	Ph.D.	Committee member
Goleb, Malgorzata	Ph.D.	Committee member
Brentrup, Jennifer	Ph.D.	Committee member
Oliver, Samantha	Ph.D.	Committee member
Loken, Luke	Ph.D.	Committee member
Herren, Christina	Ph.D.	Committee member
McClure, Ryan	Ph.D.	Committee member

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