Kevin A. Bierlein

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Education

Doctor of Philosophy, Civil Engineering
Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, Virginia, USA
Dissertation: *Predicting Induced Sediment Oxygen Demand in Oxygenated Lakes and Reservoirs*
Advisor: Dr. John C. Little

Master of Science, Environmental Engineering
Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, Virginia, USA
Thesis: *Modeling Manganese Sorption and Oxidation During Filtration*
Advisor: Dr. John C. Little

Bachelor of Science, Environmental Engineering
Michigan Technological University (Michigan Tech), Houghton, Michigan, USA
Minor in International German
Magna Cum Laude

Research Experience

Ph.D. Research, Virginia Tech, 2011 - 2015
- Investigated the relationship between hypolimnetic oxygenation-induced turbulence and sediment oxygen demand in two lakes, comparing in situ field data with existing physical models of interfacial flux
- Fit kinetic models for oxygen consumption in lake sediment to in situ oxygen microprofiles collected in two oxygenated lakes
- Applied a coupled bubble-plume and 3-D hydrodynamic lake model to two lakes, modifying the source code to estimate sediment oxygen demand as a function of near-sediment turbulence
- Planned, coordinated, and conducted three major, continuous field-sampling campaigns ranging from one to four weeks in duration on a water-supply reservoir in Virginia and a lake in Switzerland
- Analyzed temperate, dissolved oxygen, velocity, turbulence, and meteorological data collected during field sampling campaigns
- Assisted writing and preparing research grant proposals

M.S. Research, Virginia Tech, 2010 - 2012
- Created a first-principles computer model for simulating manganese removal from drinking water via adsorption to oxide-coated filter media and subsequent oxidation by chlorine

Undergraduate Research, Michigan Tech, 2008 - 2009
- Conducted assays of labile carbon in lake sediment under aerobic and anaerobic conditions
- Characterized lake sediments from Onondaga Lake in New York
- Measured *Diporeia* abundance during a seven-day research cruise aboard the EPA R/V Lake Guardian on Lake Superior

Professional Experience

Environmental Engineer, Hydros Consulting, Inc., 2015 – Present
- Developed water-quality models using CE-QUAL-W2 to estimate water quality in two proposed reservoirs.
- Assisted with development and application of a custom 1-D river water-quality model.
- Analyzed data and prepared the 2014, 2015, and 2016 Annual Operational and Water-Quality Reports for the Three Lakes System in Colorado.
- Prepared proposals, budgets, and scopes of work for bidding on projects in response to RFPs and RFQs.

Water Operations Intern, Western Virginia Water Authority, 2010 - 2012
- Managed hypolimnetic oxygenation systems in two municipal water-supply reservoirs
- Organized and performed regular monitoring of reservoir water quality and hypolimnetic oxygenation systems
- Evaluated the performance of a mechanical surface mixer for controlling algae and cyanobacteria
- Trained coworkers to use sampling equipment and interpret field data

Engineering Senior Design (Capstone) Project, Michigan Tech, 2009
- Designed and suggested improvements to the spring-box and gravity-fed water distribution system in Punta Sirain, Panama, a small, remote native fishing village
- Visited Punta Sirain to interview village leaders, perform site assessment, and collect data necessary for designing improvements to existing water infrastructure

Engineering Intern, Golder Associates, Inc., May 2007 - December 2007; July - August 2008
- Performed construction quality assurance and quality control documentation at four municipal solid waste landfill construction sites in three states
- Analyzed hundreds of soil and concrete samples in soils testing laboratory
- Assisted writing and compiling two landfill construction certification reports

Surveying Intern, Wilcox Associates, May 2006 - August 2006
- Assisted professional surveyors with property boundary and construction staking land surveys

Skills

- Programming with Matlab, Fortran, R, Python, and Visual Basic
- Use of field sampling equipment: microprofiler, CTD, ADCP, ADV, thermistors, weather stations
- Spatial data analysis with ArcGIS
- Proficient German
- Basic Spanish

Research Interests

- Chemical and physical processes in the hypolimnion and profundal sediments, including interfacial fluxes at the sediment-water interface
- Lake and reservoir management, particularly as drinking water sources
- Effect of climate change on lakes and reservoirs
- Surface water quality modeling
- Lake and reservoir hydrodynamics

Publications

Bierlein, K. A., Rezvani, M., Socolofsky, S.A., Bryant, L.D., Wüest, A., and Little, J.C., 2017. "Increased sediment oxygen flux in lakes and reservoirs: The impact of hypolimnetic oxygenation." *Water Resources Research*, 53(6), pg 4876-4890. DOI:10.1002/2016WR019850.

Bierlein, K. A., Knocke, W. R., Tobiason, J. E., Subramaniam, A., Pham, M., and Little, J.C., 2012. "Modeling manganese removal in a pilot-scale post-filtration contactor." *Journal of the American Water Works Association*, 107(2), pg E109-E119. http://dx.doi.org/10.5942/jawwa.2015.107.0023

Upadhyay, S., **Bierlein, K. A.,** Little, J. C., Burch, M. D., Elam, K. P., and Brookes, J. D., 2013. "Mixing potential of a surface-mounted solar-powered water mixer (SWM) for controlling cyanobacterial blooms." *Ecological Engineering*, 61, pg 245-250.

Hobson, P., Dickson, S., Burch, M., Thorne, O., Tsymbal, L., House, J., Brookes, J., Chang, D., Kao, S., Lin, T., **Bierlein, K.** and Little, J, 2012. "Alternative and Innovative Methods for Source Water Management of Algae and Cyanobacteria." Water Research Foundation, Denver, CO.

Presentations

Bierlein, K., and Boyer, J.M., "Identifying and assessing adaptive management monitoring criteria for Grand Lake clarity," *North American Lake Management Society (NALMS) 37th International Symposium*, Denver, Colorado, USA, 9 November, 2017.

Bierlein, K., Little, J., Rezvani, M., Socolofsky, S., and Rueda, F., "Predicting sediment oxygen flux in oxygenated lakes – From field observations toward a comprehensive model," *3rd International Water Association (IWA) Symposium on Lake and Reservoir Management*, Pembroke, Virginia, USA, 4 August, 2015.

Bierlein, K., Little, J., Rezvani, M., Socolofsky, S., "Modeling spatial and temporal variation of bubble-plume induced oxygen demand in a eutrophic water-supply reservoir", *North American Lake Management Society (NALMS) 33rd International Symposium*, San Diego, California, USA, 30 October 2013.

Bierlein, K., Little, J., Rezvani, M., Socolofsky, S., "Modeling spatial and temporal variation of bubble-plume induced oxygen demand in a eutrophic water-supply reservoir", *The 16th International Workshop on Physical Processes in Natural Waters*, Gold Coast, Queensland, Australia, 10 July 2013.

Honors & Awards

- NALMS Student Travel Grant, 2013
- G. V. Loganathan Fellowship, 2011
- Edna Bailey Sussman Fellowship, 2010
- Michigan Tech Civil & Environmental Engineering Department Academic Achievement Award, 2009

Leadership & Mentorship Roles

- Graduate student co-mentor for REU student Mariah Haberman, Virginia Tech, 2014
- Graduate student co-mentor for REU student Christina Urbanczyk, Virginia Tech, 2013
- Graduate student co-mentor for REU student Alex Kuhl, Virginia Tech, 2011
- Civil & Environmental Engineering Student Success Center Coach/Tutor, Michigan Tech, 2008 - 2009
- Society for Environmental Engineers (SEEn) President, Michigan Tech, 2008 - 2009

Professional Affiliations

- North American Lake Management Society (NALMS)
- Colorado Lake and Reservoir Management Association (CLRMA)
- American Water Works Association (AWWA)
- American Academy of Environmental Engineers and Scientists (AAEES)
- Chi Epsilon (XE) National Civil Engineering Honor Society