Paul C. Frost
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Professional Positions

Professor. 2017-present
Department of Biology, Trent University, Peterborough, Ontario
Associate Professor. 2013-2017
Department of Biology, Trent University, Peterborough, Ontario
Assistant Professor. 2010-2013
Department of Biology, Trent University, Peterborough, Ontario
Assistant Professor (Limited term). 2007-2010
Department of Biology, Trent University, Peterborough, Ontario
Postdoctoral Research Associate. 2002-2005
Department of Biological Sciences, University of Notre Dame, Notre Dame, Indiana

Education

Ph.D. Biology. *Arizona State University*, Tempe, Arizona. 2001
Ecological stoichiometry of trophic interactions in the benthos of boreal lakes.
Advisor: James J. Elser
M.S. Zoology. *The Ohio State University*, Columbus, Ohio. 1997
Zooplankton in western Lake Erie: Before and after zebra mussels.
Advisor: David A. Culver
B.S. Biological Sciences. *University of Rochester*, Rochester, New York. 1995

Honors and Awards

- Returning Fellowship for Experienced Researchers. 2017. Alexander von Humboldt Foundation.
- Sustaining Fellow. 2017. Association for the Sciences of Limnology and Oceanography.
- Fellowship for Experienced Researchers. 2011. Alexander von Humboldt Foundation.
- Rosemary Mackay Fund Award. 2002. North American Benthological Society.
- Graduate Academic Scholarship. 2000. Arizona State University.
- National Science Scholarship. 1991-1995. United States Department of Education.
- Bausch and Lomb Scholarship. 1991-1995. University of Rochester.
- Valedictorian. 1991. Nyssa High School.

Research Interests

- Ecological Stoichiometry
- Nutritional Indicators
- Nutrients in Environment

- Algal and Invertebrate Nutrition

Peer-Reviewed Publications

Prater, C., **P.C. Frost**, E.T. Howell, S.B. Watson, A. Zastepa, S.S.E. King, R.J. Vogt, and M.A. Xenopoulos. In press. Variation in particulate C:N:P stoichiometry across Lake Erie. Limnology and Oceanography.

Conine, A.L., D.C. Rearick, M.A. Xenopoulos and **P.C. Frost**. 2017. Variable silver nanoparticle toxicity to *Daphnia* in boreal lakes. Aquatic Toxicology 192: 1-6.

Banks, L.K. and **P.C. Frost**. 2017. Biomass loss and nutrient release from decomposing aquatic macrophytes: effects of detrital mixing. Aquatic Sciences 79: 881-890.

Wagner, N.D., C. Prater, and **P.C. Frost**. 2017. Dynamic responses of phosphorus metabolism to acute and chronic dietary phosphorus-limitation in *Daphnia*. Frontiers in Environmental Science 5(doi.org/10.3389/fenv)

Prater, C., N.D. Wagner and **P.C. Frost**. 2017. Interactive effects of genotype and food quality on consumer growth rate and elemental content. Ecology 98: 1399-1408.

Striebel, M., **P.C. Frost** and J.J. Elser. 2017. Biological Stoichiometry. In: Encyclopedia of Life Sciences (ELS). John Wiley & Sons. DOI: 10.1002/9780470015902.a0021229

Vincent, J.L., M.J. Paterson, B.C. Norman, E.P. Gray, J.F. Ranville, A.B. Scott, **P.C. Frost** and M.A. Xenopoulos. 2017. Chronic and pulse exposure effects of silver nanoparticles on natural lake phytoplankton and zooplankton. Ecotoxicology 26: 502-515.

Loiselle, S.A., **P.C. Frost**, E. Turak and I. Thornhill. 2017. Citizen scientists supporting environmental research priorities. Science of the Total Environment 598: 937.

Scott, A.B. and **P.C. Frost**. 2017. Monitoring water quality in Toronto's urban stormwater ponds: Assessing participation rates and data quality of water sampling by citizen scientists in the FreshWater Watch. Science of the Total Environment 592: 738-744.

Song K., C. Winters, M.A. Xenopoulos, J. Marsalek and **P.C. Frost**. 2017. Phosphorus cycling in urban aquatic ecosystems: Connecting biological processes and water chemistry to sediment P fractions in urban stormwater management ponds. Biogeochemistry 132: 203-212.

Conine, A.L. and **P.C. Frost**. 2017. Variable toxicity of silver nanoparticles to *Daphnia magna*: Effects of algal particles and animal nutrition. Ecotoxicology 26: 118-126.

Wagner, N.D., Z. Yang, A.B. Scott and **P.C. Frost**. 2017. Effects of food quality on free amino acid metabolism in *Daphnia*. Aquatic Sciences 79: 127-137.

Blakelock, G.C., M.A. Xenopoulos, B.C. Norman, J.L. Vincent and **P.C. Frost**. 2016. Effects of silver nanoparticles on bacterioplankton in a boreal lake. Freshwater Biology 61: 2211-2220.

Larson, J.H., **P.C. Frost**, J.M. Vallazza, J.C. Nelson and W.B. Richardson. 2016. Do rivermouths alter nutrient and seston delivery to the nearshore? Freshwater Biology 61: 1935-1949.

Narr, C.F. and **P.C. Frost**. 2016. Exploited and excreting: Parasite type affects host nutrient recycling. Ecology 97: 2012-2020.

Vogt, R., **P.C. Frost**, S. Nienhuis, D. Woolnough and M.A. Xenopoulos. 2016. The dual

synchronizing influences of precipitation and land use on stream properties in a rapidly urbanizing watershed. Ecosphere 7(9):e01427.10.1002/ecs2.1427

Ger, K.A., P. Urrutia-Cordero, **P.C. Frost**, L.-A. Hansson, O. Sarnelle, A.E. Wilson and M Lürling. 2016. The interaction between cyanobacteria and zooplankton in a more eutrophic world. Harmful Algae 54: 128-144.

Prater, C., N.D. Wagner and **P.C. Frost**. 2016. Effects of calcium and phosphorus limitation on the nutritional ecophysiology of *Daphnia*. Limnology and Oceanography 61: 268-278 (doi: 10.1002/lno.10208).

Williams, C.J., **P.C. Frost**, A.M. Morales-Williams, J.H. Larson, W.B. Richardson, A.S. Chiandet and M.A. Xenopoulos. 2016. Human activities cause distinct dissolved organic matter composition across freshwater ecosystems. Global Change Biology 22: 613-626 (doi: 10.1111/gcb.13094)

Narr, C.F. and **P.C. Frost**. 2015. Does infection tilt the scales? Disease effects on the mass-balance of an invertebrate nutrient recycler. Oecologia 179: 969-979 (doi: 10.1007/s00442-015-3412-5)

Frost, P.C., K. Song, J.M. Buttle, J. Marsalek, A. McDonald and M.A. Xenopoulos. 2015. Trace metal chemistry of sediments in urban stormwater ponds. Urban Ecosystems 18: 763-775.

Conine, A., E. Porter-Goff, and **P.C. Frost**. 2015. Phosphorus export from a small forested stream: Are there effects from human residential development in the riparian zone? Fundamental and Applied Limnology 187: 55-62.

Song, K., M.A. Xenopoulos, J. Marsalek and **P.C. Frost**. 2015. The fingerprints of urban nutrients: Dynamics of phosphorus speciation in water flowing through developed landscapes. Biogeochemistry 125: 1-10.

Furtado, L.M., B.C. Norman, M.A. Xenopoulos, **P.C. Frost**, C.D. Metcalfe, and H. Hintelmann. 2015. Environmental fate of nanoparticles in boreal lake ecosystems. Environmental Science and Technology 49: 8441-8450.

Norman, B.C., M.A. Xenopoulos, D. Braun and **P.C. Frost**. 2015. Phosphorus availability alters the effects of silver nanoparticles on periphyton growth and stoichiometry. PLoS ONE 10: e0129328. doi:10.1371/journal.pone.0129328

Borlestean, A., **P.C. Frost**, and D.L. Murray. 2015. A mechanistic analysis of density dependence in algal population dynamics. Frontiers in Ecology and Evolution 3:37. doi: 10.3389/fevo.2015.00037

Wagner, N.D., B.P. Lankadurai, M.J. Simpson, A.J. Simpson and **P.C. Frost**. 2015. Metabolomic differentiation of nutritional stress in an aquatic invertebrate. Physiological and Biochemical Zoology 88: 43-52.

Larson, J.H., **P.C. Frost**, M.A. Xenopoulos, C.J. Williams, A.M. Morales-Williams, J. Vallazza, J.C. Nelson, and W.B. Richardson. 2014. Controls over spatial variation in dissolved organic matter change along the river to lake transition. Ecosystems 17: 1413-1425.

Middleton, C.M. and **P.C. Frost**. 2014. Slow and steady wins the race: Stoichiometric and growth responses of a freshwater filamentous green alga to varying nutrient supplies. Freshwater Biology 59: 2225–2234.

Furtado, L.M., M.E. Hoque, D. Mitrano, J. Ranville, B. Cheever, **P.C. Frost**, M.A. Xenopoulos, H. Hintlemann, and C.D. Metcalfe. 2014. Transformations of silver nanoparticles in lake mesocosms. Environmental Chemistry 11: 419-430.

Frost, P.C., K. Song, and N.D. Wagner. 2014. A beginner's guide to nutritional profiling in physiology and ecology. Integrative and Comparative Biology 54: 873-879.

Lukas, M., **P.C. Frost**, and A. Wacker. 2013. Neonate nutrition hypothesis: early feeding affects the body stoichiometry of *Daphnia* offspring. Freshwater Biology 58: 2333-2344.

McEnroe, N.A., C.J. Williams, M.A. Xenopoulos, P. Porcal, and **P.C. Frost**. 2013. Distinct optical chemistry of dissolved organic matter in urban pond ecosystems. PLoS ONE 8: e80334. doi:10.1371/journal.pone.0080334

Spooner, D.R., **P.C. Frost**, H. Hillebrand, M.T. Arts, O. Puckrin and M.A. Xenopoulos. 2013. Nutrient loading associated with agriculture land-use dampens the importance of consumer-mediated niche construction. Ecology Letters 16: 1115-1125.

Williams, C.J., **P.C. Frost**, and M.A. Xenopoulos. 2013. Beyond best management practices: Pelagic biogeochemical dynamics in urban stormwater ponds. Ecological Applications 23: 1384-1395.

Song, K., M.A. Xenopoulos, J.M. Buttle, J. Marsalek, N.D. Wagner, F.R. Pick and **P.C. Frost.** 2013. Thermal stratification patterns in urban ponds and their relationships with vertical nutrient gradients. Journal of Environmental Management 127: 317-323.

McEnroe, N.A., J.M. Buttle, J. Marsalek, F.R. Pick, M.A. Xenopoulos and **P.C. Frost.** 2013. Thermal and chemical stratification of urban ponds: Are they 'completely mixed reactors'? Urban Ecosystems 16: 327-339.

Wagner, N.D., H. Hillebrand, A. Wacker, and **P.C. Frost**. 2013. Nutritional indicators and their uses in ecology. Ecology Letters 16: 535-544.

Porter-Goff, E.R., **P.C. Frost** and M.A. Xenopoulos. 2013. Changes in riverine benthic diatom community structure along a chloride gradient. Ecological Indicators 32: 97-106.

Frost, P.C. and A.L. Hicks. 2012. Human shoreline development and the nutrient stoichiometry of aquatic plant communities in Canadian Shield lakes. Canadian Journal of Fisheries and Aquatic Science 69: 1642-1650.

Wagner, N.D. and **P.C. Frost**. 2012. Responses of alkaline phosphatase activity in *Daphnia* to poor nutrition. Oecologia 170: 1-10.

Lessard, C.R. and **P.C. Frost**. 2012. Phosphorus nutrition alters herbicide toxicity on *Daphnia magna.* Science of the Total Environment 421-422: 124-128.

Zalewski, O., N.D. Wagner and **P.C. Frost**. 2011. Antibiotics affect the growth responses of *Daphnia magna* to poor food quality. Aquatic Ecology 45: 493-504.

McFeeters, B.J. and **Frost, P.C.** 2011. Temperature and the effects of elemental food quality on *Daphnia.* Freshwater Biology 59: 1447-1455.

McFeeters, B.J., M.A. Xenopoulos, D.E. Spooner, N.D. Wagner and **Frost, P.C.** 2011. Interspecific mass-scaling of field metabolic rates of a freshwater crayfish varies with stream land cover. Ecosphere 2:art13 [doi:10.1890/ES10-00112.1]

Hicks, A.L. and **Frost, P.C.** 2011. Shifts in aquatic macrophyte abundance and community

composition in cottage developed lakes of the Canadian Shield. Aquatic Botany 94: 9-16.

Frost, P.C., D. Ebert, J.H. Larson, M.A. Marcus, N.D. Wagner, and A. Zalewski. 2010. Transgenerational effects of poor elemental food quality on an aquatic invertebrate. Oecologia 162: 865-872.

McCarthy, S.D.S., S.P. Rafferty, and **P.C. Frost.** 2010. Responses of alkaline phosphatase activity to phosphorus-stress in *Daphnia magna*. Journal of Experimental Biology 213: 256-261.

Frost, P.C., L.E. Kinsman, C.A. Johnston, and J.H. Larson. 2009. Watershed discharge modulates relationships between landscape components and nutrient ratios in stream seston. Ecology 90: 1631-1640.

Frost, P.C., D. Ebert, and V.H. Smith. 2008. Bacterial infection changes the elemental composition of *Daphnia magna*. Journal of Animal Ecology 77: 1265-1272.

Frost, P.C. and J.J. Elser. 2008. Biological Stoichiometry. In: Encyclopedia of Life Sciences (ELS). John Wiley & Sons. DOI: 10.1002/9780470015902.a0021229

Frost, P.C., D. Ebert, and V.H. Smith. 2008. Responses of a bacterial pathogen to phosphorus limitation of its host. Ecology 89: 313-318.

Hansen, L.K., **P.C. Frost**, J.H. Larson, and C.D. Metcalfe. 2008. Poor elemental food quality reduces the toxicity of fluoxetine on an aquatic invertebrate. Aquatic Toxicology 86: 99-103.

Hillebrand, H., **P.C. Frost**, and A. Liess. 2008. Ecological stoichiometry of indirect grazer effects on periphyton nutrient content. Oecologia 155: 619-630.

Johnston, C.A., B.A. Shmagin, **P.C. Frost**, C. Cherrier, J.H. Larson, G.A. Lamberti, and S.D. Bridgham. 2008. Wetland types and wetland maps differ in ability to predict dissolved organic carbon concentrations in streams. Science for the Total Environment 404: 326-334.

Larson, J.H., **P.C. Frost**, and G.A. Lamberti. 2008. Variable toxicity of ionic liquids to *Lemna minor* and the influence of dissolved organic matter. Environmental Toxicology and Chemistry 27: 676-681.

Rothlisberger, J.D., M.A. Baker, and **P.C. Frost**. 2008. Effects of periphyton stoichiometry on mayfly excretion rates and nutrient ratios. Journal of the North American Benthological Society 27: 497-508.

Frost, P.C., J.H. Larson, C.T. Cherrier, S. Bridgham, and G.A. Lamberti. 2007. Subsidy effect of dissolved organic matter on accrual, stoichiometry, and algal taxonomy of stream periphyton. Freshwater Biology 52: 319-330.

James, L.A.H., M.A. Xenopoulos, H.F. Wilson, and **P.C. Frost**. 2007. Landscape controls of nutrient excretion by stream invertebrates along a gradient of agricultural land use. Journal of the North American Benthological Society 26: 523-531.

Larson, J.H., **P.C. Frost**, D.M. Lodge, and G.A. Lamberti. 2007. Photodegradation of dissolved organic matter from forested streams of the northern Great Lakes region. Journal of the North American Benthological Society 26: 416-425.

Larson, J.H., **P.C. Frost**, Z. Zheng, C.A. Johnston, S.D. Bridgham, D.M. Lodge, and G.A. Lamberti. 2007. Effects of upstream lakes on dissolved organic matter in streams. Limnology and Oceanography 52: 60-69.

Frost, P.C., J.P Benstead, W.F. Cross, H. Hillebrand, J.H. Larson, M.A. Xenopoulos, and T. Yoshida. 2006. Threshold elemental ratios of carbon and phosphorus in aquatic consumers. Ecology Letters 9: 774-779.

Frost, P.C., A. Mack, J.H. Larson, S. Bridgham, and G.A. Lamberti. 2006. Environmental controls of UV radiation in forested streams of northern Michigan. Photochemistry and Photobiology 82: 781-786.

Frost, P.C., J.H. Larson, C.A. Johnston, K.C. Young, P.A. Maurice, G.A. Lamberti, and S.D. Bridgham. 2006. Landscape predictors of stream dissolved organic matter concentration and physiochemistry in a Lake Superior river watershed. Aquatic Sciences 68: 40-51.

Cross, W.F., J.P. Benstead, **P.C. Frost** and S.A. Thomas. 2005. Ecological stoichiometry in freshwater benthic systems: recent progress and perspectives. Freshwater Biology 50: 1895-1903.

Frost, P.C., W.F. Cross, and J.P. Benstead. 2005. Ecological stoichiometry in freshwater benthic ecosystems: an introduction. Freshwater Biology 50: 1781-1785.

Frost, P.C., H. Hillebrand, and M. Kahlert. 2005. Low algal carbon content and its effect on the C:P stoichiometry of periphyton. Freshwater Biology 50: 1800-1808.

Frost, P.C. and N.C. Tuchman. 2005. Nutrient release rates and ratios by two stream detritivores fed leaf litter grown under elevated atmospheric CO_2. Archiv für Hydrobiologie 163: 463-477.

Frost, P.C., M.A. Evans-White, Z.V. Finkel, T.C. Jensen, and V. Matzek. 2005. Are you what you eat? Physiological constraints on organismal stoichiometry in an elementally imbalanced world. Oikos 109: 18-28.

Frost, P.C., J.H. Larson, L.E. Kinsman, G.A. Lamberti, and S.D. Bridgham. 2005. Attenuation of ultraviolet radiation in streams of northern Michigan. Journal of the North American Benthological Society 24: 246-255.

Frost, P.C., M.A. Xenopoulos, and J.H. Larson. 2004. Stoichiometry of dissolved organic carbon, nitrogen, and phosphorus release by a planktonic grazer, *Daphnia*. Limnology and Oceanography 49: 1802-1808.

Frost, P.C., S.E. Tank, M.A. Turner, and J.J. Elser. 2003. Elemental composition of littoral invertebrates from oligotrophic and eutrophic Canadian lakes. Journal of the North American Benthological Society 22: 51-62.

Frost, P.C., P.A. Maurice, and J.B. Fein. 2003. The effect of cadmium on fulvic acid adsorption by *Bacillus subtilis.* Chemical Geology 200: 217-224.

Xenopoulos, M.A. and **P.C. Frost**. 2003. Ultraviolet radiation changes the taxonomic composition of phytoplankton in a boreal lake. Journal of Phycology 39: 291-302.

Frost, P.C. and J.J. Elser. 2002. Effects of light and nutrients on the accumulation and elemental composition of epilithon in boreal lakes. Freshwater Biology 47: 173-184.

Frost, P.C. and J.J. Elser. 2002. Growth responses of littoral mayflies to the phosphorus content of their food. Ecology Letters 5: 232-240.

Frost, P.C. and M.A. Xenopoulos. 2002. Ambient solar ultraviolet radiation and its effects on phosphorus-flux into boreal lake phytoplankton communities. Canadian Journal of Fisheries

and Aquatic Sciences 59: 1090-1095.

Frost, P.C., J.J. Elser, and M.A. Turner. 2002. Effects of caddisfly grazers on the elemental composition of epilithon in a boreal lake. Journal of the North American Benthological Society 21: 54-63.

Frost, P.C., R.S. Stelzer, G.A. Lamberti, and J.J. Elser. 2002. Ecological stoichiometry of trophic interactions in the benthos: Understanding the role of C:N:P ratios in lentic and lotic habitats. Journal of the North American Benthological Society 21: 515-528.

Elser, J.J., **P.C. Frost**, M. Kyle, J. Urabe, and T. Andersen. 2002. Effects of light and nutrients on plankton stoichiometry and biomass in a P-limited lake. Hydrobiologia 481: 101-112.

Xenopoulos, M.A., **P.C. Frost**, and J.J. Elser. 2002. The combined effects of ultraviolet radiation and phosphorus supply on phytoplankton growth rates and elemental composition. Ecology 83: 423–435.

Frost, P.C. and D.A. Culver. 2001. Spatial and temporal variability of phytoplankton and zooplankton in western Lake Erie. Journal of Freshwater Ecology 16: 435-443.

Competitive Grants

2017. Ecotoxicology and stoichiometry workshop. United States National Institute of Mathematical and Biological Synthesis. (PI: Peace, Texas Tech)
2017-2019. "Operation and Maintenance Support for the Experimental Lakes Area" NSERC RTI-OM. $129,600 (PI: Xenopoulos; this proposal ranked 1/167 by Review Panel)
2016-2017. "Controlling the export of urban phosphorus: Do stormwater management ponds retain dissolved organic P?" Environment Canada Lake Simcoe Cleanup Fund. $51,625 (PI: Frost)
2014-2019. "Nutritional Ecology of Lake Foodwebs" NSERC (Canada) Discovery Grant program, $135,000 (PI: Frost)
2013-2016. "Linking regime shifts to carbon dynamics in Lake Erie" NSERC (Canada) Strategic Projects program, $574,000 (PI: Xenopoulos)
2013-2016. "Assessing water quality in urban stormwater ponds" Earthwatch Institute, $40,000 (PI: Frost)
2011-2014 "Impacts of nanosilver on a lake ecosystem" NSERC (Canada) Strategic Projects program, $787,000 (PI: Metcalfe)
2010. "Evaluation of floating islands in stormwater ponds for the reduction of thermal impacts" NSERC Engage program, $24,200 (PI: Frost)
2010. "Toxicology of urban stormwater ponds" Environment Canada Science Horizons, $10,000 (PI: Frost)
2010-2012. "Algae in the Kawartha Lakes" Collaborative research partnership with the Kawartha Lakes Stewards Association. Ontario Trillium Foundation, $52,000 (PI: Frost)
2009-2014. "Stoichiometry and metabolic ecology of lake ecosystems" NSERC Discovery Grant program, $145,000 (PI: Frost)
2008-2011. "Assessing the biogeochemical sensitivity of aquatic ecosystems to patterns of urbanized land use" NSERC Strategic Projects program, $515,500 (PI: Frost)
2008-2009. "Freshwater mussels as indicators of ecosystem health along a gradient of agricultural land use" NSERC (Canada) Strategic Projects program, $194,000 (PI: Xenopoulos)
2007. "Watershed predictors of urban pond ecology" Environment Canada Science Horizons, $10,000 (PI: Frost)
2006-2009. "Mineral nutrition of host-parasite interactions" NSERC Discovery Grant program,

$64,500 (PI: Frost)
2006-2008. "Effects of residential development on urban aquatic environments" Town of Milton, Ontario, $226,740 (PI: Frost, Xenopoulos)
2007. "Maternal effects on endoparasitic infection rates: Assessing holdover effects of food quality on the offspring of an aquatic consumer" NSRC-Trent, $2500 (PI: Frost)
2006. "Evolution of animal life-history strategies: Does fast growth reduce disease resistance in an aquatic consumer" NSRC-Trent, $2000 (PI: Frost)
2002-2005. "Interactive effects of climate change, wetlands, and dissolved organic matter on UV damage to aquatic foodwebs" US EPA, Star Program, $937,000 (PI: S. Bridgham, Univ. Oregon)

Invited Seminars and Public Presentations

February 2018. Department of Biology. University of Minnesota-Duluth. Duluth, MN.
July 2017. Department of Ecology and Ecosystem Modelling. Potsdam University. Potsdam, Germany.
November 2015. Department of Physical and Environmental Sciences. University of Toronto Scarborough. Scarborough, ON.
November 2012. School of Science. University of Ontario Institute of Technology. Oshawa, ON.
December 2011. Institute for the Chemistry and Biology of the Marine Environment. Carl-von-Ossietzky University Oldenburg. Oldenburg, Germany.
November 2011. Department of Ecology and Ecosystem Modelling. Potsdam University. Potsdam, Germany.
November 2011. Department of Ecology. University of Cologne. Cologne, Germany.
September 2011. Zoological Institute. Basel University. Basel, Switzerland
October 2010. Department of Biology. University of Ottawa. Ottawa, ON.
October 2010. Guest Speaker at Annual Meeting. Kawartha Lakes Stewards Association. Bobcaygeon, ON.
October 2009. Guest Speaker at Annual Meeting. Kawartha Lakes Stewards Association. Bobcaygeon, ON.
October 2007. Institute of Ecosystem Studies. Millbrook, NY.
February 2005. Department of Biology. Trent University. Peterborough, ON.
December 2004. School of Science. University of Ontario Institute of Technology. Oshawa, ON.
March 2002. Department of Biology. University of Kentucky. Lexington, KY.
October 2001. Department of Biological Sciences. University of Alberta. Edmonton, AB.
October 1999. Department of Biological Sciences. University of Alberta. Edmonton, AB.

Professional Activities

Editor-in-Chief. Ratios Matter. 2016-present.
Special Features Editor. Aquatic Sciences. 2017-present.
Associate Editor. Limnology and Oceanography. 2016-present.
Associate Editor. Aquatic Sciences. 2015-2017.
Science Advisor. Kawartha Lake Stewards Association. 2009-2016.
Co-Guest Editor. Science of the Total Environment. Special Issue. Citizen Science and Aquatic Science. Published in 2017.
Special Session Co-organizer. SIL 2016. Turin, Italy. Community limnology: citizens and communities supporting freshwater research.
Special Session Co-organizer. Association for the Sciences of Limnology and Oceanography. 2015. Granada, Spain. People power: The role of citizen scientists in aquatic science- global opportunities and perspectives.

Special Session Organizer. International Association of Theoretical and Applied Limnology. 2007. Montreal, Quebec. Disease ecology in aquatic ecosystems.

Guest Editor. Freshwater Biology. Special Issue. Stoichiometry of benthic ecosystems. Published November 2005.

Special Session Organizer. North American Benthological Society. 2004. Vancouver, British Columbia. Photoecology of benthic habitats: Interactions among ultraviolet radiation, organisms, and the environment.

Professional Workshops and Symposia

Conference on Biological Stoichiometry 2015. *Founder and Chair of Organizing Committee.* Trent University, June 23-26, 2015. (cobs2015.org)

Advanced course. 2010. *Invited lecturer*. Leaf litter decomposition in streams. IMAR & University of Coimbra, Portugal.

Gordon Research Conference. 2008. *Invited discussion leader*. The metabolic basis of ecology. University of New England, Maine.

Gordon Research Conference. 2004, 2006, 2012. *Attendee.* The metabolic basis of ecology. Bates College, Maine.

Woodstoich 2004. *Organizing committee*. Symposium for the advancement of ecological stoichiometry. Finse, Norway.

Dissertation Initiative for the Advancement of Limnology and Oceanography V Symposium. 2003. *Attendee.* Bermuda Biological Station for Research, Bermuda