
ANDREA E. KIRKWOOD

Faculty of Science | University of Ontario Institute of Technology | Oshawa, Ontario L1H 7K4
(905) 721-8668 ext. 3622 | andrea.kirkwood@uoit.ca | <http://kirkwoodlab.weebly.com/>



RESEARCH INTERESTS

AQUATIC ECOLOGY

- Algal-bacterial diversity and interactions across environmental gradients in aquatic ecosystems
- Diversity and function of microbial communities and their role in contaminant fate
- Characterization and functional role of urban aquatic systems

ALGAL BIOTECHNOLOGY

- Characterization of algae from degraded and wastewater systems for bioproduct and wastewater treatment applications

EDUCATION

2003 **Ph.D.** in *Environmental Microbiology*, University of Toronto, Toronto, ON

- thesis research investigated the role of cyanobacteria in pulp and paper waste-treatment systems
- field research conducted in Idaho, USA and Rotorua, New Zealand

1996 **M.Sc.** in *Aquatic Ecology*, McMaster University, Hamilton, ON

- thesis research focused on seasonal mercury accumulation in phytoplankton and the effects of whole-lake fish biomanipulation on phytoplankton community structure
- field work conducted in south-central Ontario in affiliation with the Dorset Research Centre

1994 **B.E.S. (Joint Honours)** in *Environment and Resource Studies and Biology* (Co-op), University of Waterloo, Waterloo, ON

- Honours thesis: *Environmental Risk Assessment as a Proactive Tool in Environmental Assessments*

EXTERNAL GRANTS

2017-2020 Environment Canada and Climate Change (via Central Lake Ontario Conservation Authority) (\$37,500) (Principal Investigator)

2017-2020 Ontario Trillium Foundation Grow Grant (via Scugog Lake Stewards) (\$124,500) (Principal Investigator)

2016 Scugog Lake Stewards Research Grant (\$10,200) (Principal Investigator)

2016 City of Oshawa – Fecal Bacteria Source Tracking Study (\$18,000) (Principal Investigator)

2015-2018 Ministry of Environment and Climate Change Research Grant (\$85,000) (Principal Investigator)

2014-16 NSERC Discovery Grant Extension (\$48,000) (Principal Investigator)

2014 City of Oshawa - Consortium Water Monitoring Program (\$16,000 of \$30,000) (Co-Principal Investigator)

2013-14 Lake Simcoe-Georgian Bay Clean-Up Fund (\$12,500 of \$103,000) (Co-Principal Investigator)

2013	City of Oshawa - Consortium Water Monitoring Program (\$15,000 of \$30,000) (Co-Principal Investigator)
2012-15	BioFuelNet National Centre of Excellence (\$68,750) (Principal Investigator)
2012-13	FEDDEV grant (\$32,420) (Principal Investigator)
2011	NSERC PromoScience Grant (\$7,500) (Principal Investigator)
2009-10	RBC Bluewater Grant (\$10,000 out of \$25,000) (Co-Principal Investigator)
2009-14	NSERC Discovery Grant (\$110,000) (Principal Investigator)
2007-08	Alberta Sustainable Resource Development Research Grant (\$50,000) (Co-Principal Investigator)
2006-07	Alberta Conservation Association Grant Eligible Conservation Fund Grant (\$25,000) (Co-Principal Investigator)

PEER-REVIEWED PUBLICATIONS

*Denotes student HQP

1. *Ibsen, M., Fernando, D., Kumar, A. and Kirkwood, A.E. 2017. Prevalence of antibiotic resistance genes in bacterial communities associated with *Cladophora glomerata* mats in Lake Ontario. **Canadian Journal of Microbiology** 10.1139/cjm-2016-0803
2. *Massimi, R., Kirkwood, A.E. 2016. Screening microalgae isolated from urban storm- and wastewater systems as feedstock for biofuel. **PeerJ** 4:e2396; DOI 10.7717/peerj.2396
3. *Stemmler K., Massimi R., Kirkwood A.E. 2016. Growth and fatty acid characterization of microalgae isolated from municipal waste-treatment systems and the potential role of algal-associated bacteria in feedstock production. **PeerJ** 4:e1780 <https://doi.org/10.7717/peerj.1780>
4. *Breton, H.A., Kirkwood, A.E., Carter, D.O. and Forbes, S.L. 2016. Changes in soil microbial activity following cadaver decomposition during spring and summer months in southern Ontario. In Kars, Henk, van den Eijkel, Lida (Eds.). **Soil in Criminal and Environmental Forensics**, Springer, pp.243-262.
5. *Breton, H, Kirkwood, A., Carter, D.O., Forbes, S.L. 2015. The impact of carrion decomposition on the fatty acid methyl ester (FAME) profiles of soil microbial communities in southern Canada. **Canadian Society of Forensic Science Journal**. DOI:10.1080/00085030.2015.1108036
6. *Vincent, J. and Kirkwood, A.E. 2014. Variability of water quality, metals and phytoplankton community structure in urban stormwater ponds along a vegetation gradient. **Urban Ecosystems**. Online first March, 2014 DOI 10.1007/s11252-014-0356-1
7. *Gilbert, N., Fulthorpe, R. and Kirkwood, A.E. 2012. Microbial diversity, tolerance and biodegradation potential of urban wetlands with different input regimes. **Canadian Journal of Microbiology** 58:887-897.
8. Buchheim, M.A., Kirkwood, A.E., Buchheim, J.A., Verghese, B. and Henley, W.J. 2010. Hypersaline soil supports a diverse community of *Dunaliella* (CHLOROPHYCEAE). **Journal of Phycology** 46:1038–1047
9. Kirkwood, A.E., Jackson, L.J. and McCauley, E. 2009. Are dams hotspots for *Didymosphenia geminata* blooms? **Freshwater Biology** 54:1856–1863.
10. Kirkwood, A. E., Jackson, L.J., McCauley, E. 2008. *Didymosphenia geminata* distribution and bloom formation along the south-eastern slopes of the Canadian Rockies. In Bothwell, M. L. & Spaulding,

- S.A. (eds) Proceedings of the 2007 International Workshop on *Didymosphenia geminata*. **Canadian Technical Report on Fisheries and Aquatic Sciences** 2795: 22-24.
11. Kirkwood, A.E., Buchheim, J.A., Henley, W.J. and Buchheim, M.A. 2008. Cyanobacterial diversity and halotolerance in a variable, hypersaline environment. **Microbial Ecology** 55:453-465.
 12. Kirkwood, A.E., Shea, T., Jackson, L.J. and McCauley, E. 2007. *Didymosphenia geminata* in two Alberta headwater rivers: An emerging invasive species that challenges conventional views on algal bloom development. **Canadian Journal of Fisheries and Aquatic Sciences** 64:1703-1709.
 13. Henley, W.J., Kvíderová, J., Kirkwood, A.E., Milner, J. and Potter, A.T. 2007. Life in a hypervariable environment: algae of the Great Salt Plains of Oklahoma, U.S.A. In J. Seckbach (Ed.) **Algae and Cyanobacteria in Extreme Environments. Series: Cellular Origin, Life in Extreme Habitats and Astrobiology**, Vol. 11. Springer, NY, p814
 14. Kirkwood, A.E. and Henley, W.J. 2006. Algal community dynamics and halotolerance in a terrestrial, hypersaline environment. **Journal of Phycology** 42(3):537-547.
 15. Kirkwood, A.E., Nalewajko, C. and Fulthorpe, R.R. 2006. The effects of cyanobacterial exudates on bacterial growth and biodegradation of organic contaminants. **Microbial Ecology** 51:4-12.
 16. Major, K.M., Kirkwood, A.E., Major, C.S., McCreadie, J.W. and Henley, W.J. 2005. In situ studies of algal biomass in relation to physicochemical characteristics of the Great Salt Plains, Oklahoma, USA. **Saline Systems** 1:1-11.
 17. Kirkwood, A.E., Nalewajko, C. and Fulthorpe, R.R. 2005. The impacts of cyanobacteria on pulp and paper wastewater toxicity and biodegradation of wastewater contaminants. **Canadian Journal of Microbiology** 51:531-540.
 18. Kirkwood, A.E., Nalewajko, C. and Fulthorpe, R.R. 2003. Physiological characteristics of cyanobacteria from pulp and paper waste-treatment systems. **Journal of Applied Phycology** 15 (4):325-335.
 19. Kirkwood, A.E., Nalewajko, C. and Fulthorpe, R.R. 2001. The occurrence of cyanobacteria in pulp and paper waste treatment systems. **Canadian Journal of Microbiology** 47(8):761-766.
 20. Kirkwood, A.E., Chow-Fraser, P. and Mierle, G. 1999. Seasonal mercury levels in phytoplankton and their relationship with algal biomass in two dystrophic lakes. **Environmental Toxicology and Chemistry** 18(3):523-532.

PUBLICATIONS IN REVIEW

1. *Strangway, C., Bowman, M.F. and Kirkwood, A.E. 2016. Assessing landscape and contaminant point-sources as spatial determinants of water quality in the Vermillion River System, Ontario, Canada. **Environmental Science and Pollution Research**. (submitted Dec. 26, 2016)

THESIS PUBLICATIONS

1. Kirkwood, A.E. 2003. *The role of cyanobacteria in pulp and paper waste-treatment systems* (Ph.D. Thesis). Dept. of Botany, University of Toronto, Toronto, Ontario, Canada. pp. 120.
2. Kirkwood, A.E. 1996. *An analysis of seasonal sestonic-mercury and the effect of biomanipulation on the phytoplankton communities of two Precambrian shield lakes* (Master's Thesis). Dept. of Biology, McMaster University, Hamilton, Ontario, Canada. pp. 108.

CONFERENCE PAPERS

1. Kirkwood, A.E. and Dunfield, K.E. Sources and dynamics of surface-water fecal contamination across an agro-urban landscape. **Canadian Society of Microbiologists**, Waterloo, ON June 20-23, 2017.
2. *Bie, J. and Kirkwood, A.E. Microbial communities in stormwater management ponds along a vegetation gradient. **Canadian Society of Microbiologists**, Waterloo, ON June 20-23, 2017.
3. *Harrow-Lyle, T. and Kirkwood, A.E. Emergence of cyanobacteria in a large macrophyte-dominant lake during a drought year. **Canadian Society of Microbiologists**, Waterloo, ON June 20-23, 2017.
4. Tiegs, S. and CELLDEx author consortium. 2017. Global-scale patterns and drivers of organic-matter decomposition in streams and riparian zones. **Society of Freshwater Science**, Raleigh, NC, USA June 4-8, 2017.
5. *Comeau, G., *Bedjara, S. and Kirkwood, A.E. Variability in multiple stressors and their impacts on water quality and periphyton communities along agriculture-urban land-use gradients. **Laurentian Society of Environmental Toxicology and Chemistry**, Waterloo, ON June 24, 2016.
6. Kirkwood, A.E. Urban microbiology – Examining the diversity and function of microbes in urban wetlands and surface waters. **Canadian Society of Microbiologists**, Toronto, ON June 12-15, 2016.
7. *MacKay, S., Scott, H. and Kirkwood, A.E. Environmental attitudes and fertilizer use of residents from the Lake Simcoe watershed. **International Association for Great Lakes Research**, Guelph, ON June 6-10, 2016
8. *Comeau, G. and Kirkwood, A.E. Periphyton community response to rural-urban land-use gradients in tributaries of Lake Ontario. **International Association for Great Lakes Research**, Guelph, ON June 6-10, 2016
9. *Narini, M. and Kirkwood, A.E. Water Quality Impacts to Phytoplankton in the Nottawasaga River and Minesing Wetland **International Association for Great Lakes Research**, Guelph, ON June 6-10, 2016
10. *Strangway, C., Bowman, M. and Kirkwood, A.E. 2016. Assessment of Land-use Impacts on Water Quality and Phytoplankton Communities in the Vermilion River. **International Association for Great Lakes Research**, Guelph, ON June 6-10, 2016
11. Kirkwood, A.E. Impacts of a Changing Landscape on Water Quality in Rural-Urban Watersheds. **Latonnell Conservation Symposium**, Alliston, ON, Nov. 17-19, 2015
12. *Strangway, C. and Kirkwood, A.E. Assessing seasonal and spatial water quality patterns as a function of land-use in the Vermilion River, Ontario. **Canadian Water Resources Association Conference**, Winnipeg, MB, June 2-4, 2015.
13. *Ibsen, M., Fernando, D. Kirkwood, A.E., Kumar, A. Prevalence of antibiotic resistance genes in urbanized near-shore zone of Lake Ontario. **CREATE H2O and Water Rights Conference**, Winnipeg, MB, June 25-26, 2014.
14. *Ibsen, M., Kumar, A., Neufeld, J., and Kirkwood, A.E. The role of *Cladophora glomerata* as a refuge for fecal bacteria and antibiotic resistance genes in an urbanized near-shore zone of Lake Ontario. **International Association for Great Lakes Research**, Hamilton, ON May 26-30, 2014.
15. Kirkwood, A.E., *Bedjara, S., *Comeau, G., *Strangway, C. and *Vincent, J. Linking water quality and contaminant fate to biological diversity and function in urban surface waters. **International Association for Great Lakes Research**, Hamilton, ON May 26-30, 2014.

16. *Stemmler, K. and Kirkwood, A.E. Assessment of Wastewater Algae for use in Biofuel Production. **BioFuelNet Annual General Meeting**, Montreal, QC. June, 2013.
17. *Ibsen, M., Kumar, A. and Kirkwood, A.E. The role of *Cladophora glomerata* as a refuge for fecal and pathogenic bacteria in a near-shore region of Lake Ontario. **Canadian Society of Microbiologists: Environmental Dimension of Antibiotic Resistance Satellite Symposium**, Ottawa, ON, June, 2013.
18. *Breton, H., Kirkwood, A.E., and Forbes, S. Determining the impact of cadaver decomposition on soil microbial communities. **Canadian Society of Microbiologists**, Ottawa, ON. June, 2013.
19. Kirkwood, A.E., *Vincent, J. and *Strangway, C. Characterization of stormwater management ponds and their role as a land-water linkage in urban environments. **Joint Meeting of the Society of Canadian Limnologists and Society of Wetland Scientists**, Windsor, ON, Jan. 2013.
20. Kirkwood, A.E. and *Vincent, J. Characterization of urban stormwater ponds and their role as a cross-ecosystem linkage in urban environments. **Society of Freshwater Science**, Louisville, KY, USA. May, 2012.
21. *Gilbert, N. and Kirkwood, A.E. Diversity, Function and Resilience of Microbial Communities from Urban Wetlands. **Canadian Society of Microbiologists** Conference, St. John's, NFLD, June, 2011
22. Kirkwood, A.E. and *Suss, N. The Influence of Shoreline Development and Geology on Lake Water Quality in the Land Between Ecotone. **Lake Simcoe Science Forum**, Barrie, ON, May, 2011
23. *Gilbert, N. and Kirkwood, A.E. The role of urban wetland community structure and function in contaminant fate. **Aquatic Toxicity Workshop**, Toronto ON, Oct. 2010
24. Kirkwood, A.E. Water Quality Characteristics of Lakes in The Land Between. **The Land Between Science and Stewardship Symposium**, Haliburton, ON, Oct. 2010
25. Kirkwood, A.E. Aquatic biodiversity and ecosystem function across The Land Between. **The Land Between 3rd Annual Research Forum**, Bobcageon, ON, June 2009
26. Kirkwood, A.E., Buchheim, M.A., Buchheim, J.A., Henley, W.J. *Dunaliella* as a model of eukaryotic microbial dispersal, diversification and biogeography. **Ecological Genomics Symposium**, Kansas City, MO, November, 2007
27. Kirkwood, A.E., Jackson, L.J. and McCauley, E. Distribution and bloom dynamics of *D. geminata* in Alberta, Canada. **30th Congress of the Internat. Assoc. of Theoretical and Applied Limnology**, Montreal, QC, August, 2007
28. Henley, W.J., Buchheim, M.A., Buchheim, J.A., and Kirkwood, A.E. *Dunaliella* as a model of eukaryotic microbial dispersal, diversification and biogeography. **30th Congress of the Internat. Assoc. of Theoretical and Applied Limnology**, Montreal, QC, August, 2007.
29. Kirkwood, A.E., Buchheim, M.A., Buchheim, J.A., Henley, W.J. Cyanobacterial diversity and halotolerance in a variable, hypersaline environment. **60th Meeting of the Phycological Society of America**, Juneau, Alaska, July, 2006.
30. Kirkwood, A.E., Jackson, L.J., McCauley, E. Invasion of the nuisance alga *D. geminata* in Alberta rivers and the importance of flow regulation on bloom development. **3rd Annual Meeting of the Alberta Ingenuity Centre for Water Research**, Calgary, Alberta, October, 2006.
31. Kirkwood, A.E., Shea, T., Jackson, L.J. and McCauley, E. Distribution of *Didymosphenia geminata* in two Alberta head-water rivers with contrasting flow regimes. **American Fisheries Society: Current Knowledge of *Didymosphenia geminata***, Bozeman, Montana, May, 2006.
32. Kirkwood, A.E., Jackson, L.J., McCauley, E. Large-scale characterization of microbial dynamics in the Red Deer and Bow Rivers: A polyphasic approach. **2nd Annual Meeting of the Alberta Ingenuity Centre for Water Research**, Calgary, Alberta, October, 2005.

33. Kirkwood, A.E., Buchheim, M.A., Buchheim, J.A., Henley, W.J. Algae from the Great Salt Plains, OK, USA: Unexpected range of diversity and halotolerance. **9th International Salt Lake Research Conference**, Bentley, West Australia, September, 2005.
34. Kirkwood, A.E., Buchheim, M.A., Buchheim, J.A., Henley, W.J. Phylogenetic and physiological diversity of photosynthetic microorganisms from the Salt Plains Microbial Observatory. **International Symposia on Microbial Ecology - 10**, Cancun, Mexico, August, 2004.
35. Buchheim, J.A., Kirkwood, A.E., Henley, W.J., Buchheim, M.A. Broad Diversity of *Dunaliella* at the Salt Plains National Wildlife Refuge (OK, USA): Inferences from nuclear-encoded rDNA data. **58th Meeting of the Phycological Society of America**, Williamsburg, North Carolina, August, 2004.
36. Buchheim, J.A., Kirkwood, A.E., Henley, W.J., Buchheim, M.A. Diversity of Microalgae and Cyanobacteria at the Salt Plains National Wildlife Refuge (OK, USA). **58th Meeting of the Phycological Society of America**, Williamsburg, North Carolina, August, 2004.
37. Potter, A.T., Henley, W.J., Kirkwood, A.E. Characterization of diatoms from the Salt Plains Microbial Observatory, Oklahoma. **17th North American Diatom Symposium**, Islamorada, Florida, October, 2003.
38. Kirkwood, A.E., Buchheim, M.A., Buchheim, J.A., Henley, W.J. Characterization of photosynthetic microalgae from the Salt Plains Microbial Observatory, Oklahoma. **3rd European Phycological Congress**, Belfast, N. Ireland, July, 2003.
39. Buchheim, J.A., Kirkwood, A.E., Henley, W.J., Buchheim, M.A. Phylogeny of chlamydomonads isolated from saline habitats: inferences from 18S and 26S rDNA data. **Phycological Society of America**, Gleneden Beach, Oregon, June, 2003.
40. Kirkwood, A.E., Buchheim, M.A., Buchheim, J.A., Schneegurt, M.A., Henley, W.J. Characterization of photosynthetic algae from the Salt Plains Microbial Observatory, Oklahoma. **American Society for Microbiology**, Washington, DC, May, 2003.
41. McCarthy, P., Riebel, P., Hallihan, N., Kirkwood, A.E. Things we did to get rid of cyanobacteria. **TAPPI International Environment Conference**, Portland, Oregon, April, 2003.
42. Henley, W.J., Schneegurt, M., Buchheim, M.A., Miller, R.V., Kirkwood, A.E. Salt Plains Microbial Observatory: Isolation and characterization of halotolerant pro- and eukaryotes. **American Society for Limnology and Oceanography**, Salt Lake City, February, 2003.
43. Kirkwood, A.E., Fulthorpe, R. and Nalewajko, C. The role of cyanobacteria in pulp and paper waste-treatment systems. **TAPPI International Environment Conference**, Montreal, April, 2002.
44. Kirkwood, A.E., Fulthorpe, R. and Nalewajko, C. The role of cyanobacteria in pulp and paper waste-treatment systems. **Central-Canadian Symposium on Water Pollution Research**, Burlington, February, 2002.
45. Kirkwood, A.E., Fulthorpe, R. and Nalewajko, C. Cyanobacteria in pulp and paper waste-treatment systems. **American Society for Microbiology - Biodiversity Conference**, Chicago, IL, Aug., 1999
46. Kirkwood, A.E., Fulthorpe, R. and Nalewajko, C. The role of cyanobacteria in pulp and paper waste-treatment systems. **International Symposia on Microbial Ecology**, Halifax, August, 1998.
47. Kirkwood, A.E., Fulthorpe, R. and Nalewajko, C. The role of cyanobacteria in bleach-kraft mill effluent lagoons. **Canadian Society of Microbiologists**, Quebec City, June, 1997.
48. Kirkwood, A.E., Fulthorpe, R. and Nalewajko, C. The role of cyanobacteria in bleach-kraft mill effluent lagoons. **International Student Conference on the Environment**, Toronto, June, 1997.

49. Kirkwood, A.E., Chow-Fraser, P. and Mierle, G. Seasonal sestonic-mercury and the relationship with algal productivity in two Precambrian lakes. **American Society for Limnology and Oceanography**, Milwaukee, June, 1996.

OTHER PUBLICATIONS (magazine articles, technical reports, manuals etc.)

1. Kirkwood, A.E. 2016. Assessment of Water Quality in Oshawa Creek and Tributaries (2013-2015). A report prepared for the City of Oshawa.
2. Kirkwood, A.E. 2014. Assessment of Water Quality in Oshawa Creek and Tributaries (2013). A report prepared for the City of Oshawa.
3. Kirkwood, A.E. 2012. The Land Between: A Unique Region of Cultural and Ecological Diversity. *Lakeline Magazine* 32(3):42-45.
4. Kirkwood, A.E. 2012. *Cladophora* in the Laurentian Great Lakes: A Scientific Review of the Causes and Consequences of Nuisance Growth. A report prepared for the Town of Ajax, Ajax, Ontario.
5. Kirkwood, A.E. 2011. The Influence of Shoreline Development and Geology on Lake Water Quality in the Land Between Ecotone. Proceedings of the Lake Simcoe Science Forum, Ontario Ministry of the Environment.
6. RBC Bluewater Final Report on Lakes in the Land Between. Couchiching Conservancy, March, 2011. (*co-author*)
7. Canadian Taxonomy: Exploring Biodiversity, Creating Opportunity. Council of Canadian Academies, Nov. 2010. (*contributor*)
8. Kirkwood, A.E. Aquatic Biodiversity and Function in The Land Between. *The Skink*, Vol. 2, 2009.
9. Water for Life Healthy Aquatic Ecosystems - Information Synthesis and Initial Assessment of the Status and Health of Aquatic Ecosystems in Alberta: Surface Water Quality, Sediment Quality and Non-Fish Biota. Alberta Environment Technical Report #278/279-01, October, 2007. (*contributor*)
10. 2007 Alberta Guide to Sportfishing Regulations (D. geminata section of the Aquatic Invasive Species insert). Alberta Sustainable Resource Development. (*contributor*)
11. 2007 Aquatic Invasive Species Field Guide (D. geminata section). Ontario Ministry of Natural Resources. (*contributor*)
12. Brand, J. (Curator). University of Texas Culture Collection (Deposited 50 strains of algae and cyanobacteria in 2004). (*contributor*)
13. Canadian Water Quality Guidelines for the Protection of Aquatic Life: Inorganic mercury and methylmercury. Report No. 1-7. Environment Canada, Ottawa, 2003. (*contributor*)
14. Acreman J. (Curator). University of Toronto Culture Collection (Deposited 22 strains of cyanobacteria in 2002). (*contributor*)
15. Kirkwood, A.E. and Konduru, R.R. 1999. Recalcitrant organics and colour: its production and removal during pulping and bleaching. Pulp and Paper Centre, University of Toronto, Toronto, ON.
16. Chow-Fraser, P., Campbell, L., Sebalj, K. and Kirkwood, A. 1995. A comparative study of the flux rate of algae and mercury into zooplankton in two lakes with contrasting food webs. Proc. Tech. Transf. Conf. of the Ontario Ministry of the Environment, Toronto, ON.

ACADEMIC APPOINTMENTS

- 2014-Present **Associate Professor**
Faculty of Science, University of Ontario Institute of Technology, Oshawa, ON
- 2008-2014 **Assistant Professor**
Faculty of Science, University of Ontario Institute of Technology, Oshawa, ON
- 2009-present **Adjunct Faculty**
University of Toronto graduate program in *Environmental Science*
- 2005-08 **Post-Doctoral Fellow/Research Associate**
Alberta Ingenuity Centre for Water Research, University of Calgary, Calgary, AB
- 2002-04 **Post-Doctoral Fellow**
Oklahoma State University, Stillwater, OK, USA

TEACHING APPOINTMENTS

- 2008-present **Course Instructor**
University of Ontario Institute of Technology, Oshawa, ON
- 2008 **Sessional Instructor**
University of Calgary, Calgary, AB
- 2003 **Sessional Instructor**
Oklahoma State University, Stillwater, OK, USA

TEACHING & CURRICULUM DEVELOPMENT

COURSES DEVELOPED AND TAUGHT

UOIT Undergraduate

- BIOL 1020U *Diversity of Life and Principles of Ecology*
- BIOL 3630U *Plant and Soil Interactions*
- BIOL 3620U *Conservation Biology*
- BIOL 3620U *Conservation Biology* (hybrid)
- BIOL 3660U *Ecology*
- BIOL 4010U *Introduction to Environmental Research Methods*
- BIOL 4660 *Aquatic Ecology*
- BIOL4430U *Directed Studies in Biology*
- BIOL4430U/APBS *Special Topics in Aquatic Ecosystem Health*
- BIOL 4410U/BIOL4420U *Biology Thesis Project I/II*

University of Calgary Undergraduate

- BIO 307 *Ecology and Human Affairs*

Oklahoma State University Undergraduate

- BOT4400 *Special course offering for the NSF Microbial Observatory Program*

UOIT Graduate

- APBS 6010G *Research in Applied Bioscience* (Review and Assessment)
- APBS 6030G *Seminar in Applied Bioscience* (Review and Assessment)
- APBS 6020G *MSc Thesis in Applied Bioscience* (Graduate Supervisor)

OTHER TEACHING ACTIVITIES (UOIT Undergraduate and Graduate)

- Statistics training/consultation (4th year undergraduate and graduate students) (2010-present)

- Inter-lab Journal Club (2012-13)
- Advisor on 4th year FEAS and FBIT student Capstone projects (2012-13)

COURSE CONTRIBUTIONS (Guest Lecturer)

UOIT Undergraduate

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|---|---|
| ▪ BIOL 2060U <i>Introduction to Microbiology and Immunology</i> (2011-2014) | ▪ HLSC 4710U <i>Relations of Natural Systems</i> (2010) |
| ▪ BIOL 3032 <i>Advanced Microbiology</i> (2011-2016) | ▪ FSCI 4410U <i>Forensic Science Thesis Project I</i> (Statistics Workshop) (2011-2013) |

UOIT Graduate

- APBS 6010G *Research in Applied Bioscience* (Review and Assessment)
- APBS 6030G *Seminar in Applied Bioscience* (Review and Assessment)
- APBS 6020G *MSc Research in Applied Bioscience* (Graduate Supervisor)
- APBS 7060G *PhD Research in Applied Bioscience* (Graduate Supervisor)

OTHER PROFESSIONAL DEVELOPMENT & EXPERIENCE (Last 5 years)

- The Land Between Annual General Meeting: Healthy Aquatic Ecosystems, Buckhorn, ON (Sept. 2016)
- Bioindicators of Aquatic Ecosystem Health Symposium, University of Toronto (May, 2016)
- Full suite of AODA training (2014-15)
- Health and Safety Orientation for Supervisors (2015)
- Geographic Information Systems (GIS) tools for training and education workshop (2013)
- Quartz Lab Management System (2012)
- YSI Multiparameter Probe Workshop, Hoskin Scientific (2012)
- UOIT Content Management System and Web Training (2011-12)
- Blackboard drop-in consultations (2012-14)
- Teaching and Learning Seminars (active learning, sticky lectures, Camtasia, WebCT) (2008-11)

SERVICE

INVITED SPEAKER (*seminar unless stated otherwise*)

- Ryerson University, Toronto, ON (2017)
- Scugog Lake Stewards Annual General Meeting (2016)
- University of Guelph, Guelph, ON (2016)
- University of Toronto, Toronto, ON (2015)
- Wilfred Laurier University, Waterloo, ON (2015)
- Trent University, Peterborough, ON (2013)
- Queens University Biological Station Field Course (2013)
- Lakehead University *Summer of Sustainability Speaker Series* (2013)
- Joint City of Oshawa and Rizhao, China Delegation presentation at UOIT (2012)
- UOIT Board of Governors research presentation (2011)
- UOIT Graduate Student Conference, Oshawa, ON (2011)
- University of Toronto, Toronto, ON (2010)
- Ontario Society of Environmental Educators Conference, Oshawa, ON (2009)

- Canadian Water Network: Communication and Networking Workshop, Calgary, AB (2007)
- Spring Naturalists Workshop, Biogeosciences Institute, Kananaskis Field Station, AB (2007)
- Biogeosciences Institute, Kananaskis, AB (2006-07)
- Canadian Water Network, Calgary, AB (2007)
- Dept. of Biological Sciences, University of Calgary, Calgary, AB (2005)
- Dept. of Biological Sciences, University of Tulsa, Tulsa, OK (2004, 2007)
- Dept. of Botany, Oklahoma State University, Stillwater, OK (2004)
- Dept. of Biological Sciences, Wichita State University, Wichita, KS (2003)
- Dept. of Microbiology and Immunology, University of British Columbia, Vancouver, BC (1999)
- Forest Research Institute, Rotorua, New Zealand (1999)

INVITED REVIEWS

Journal manuscripts (Last 5 years)

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| ▪ Algal Research | ▪ Freshwater Biology |
| ▪ BioInvasions | ▪ The ISME Journal |
| ▪ Bioresource Technology | ▪ Hydrobiologia |
| ▪ Canadian Journal of Fisheries and Aquatic Sciences | ▪ Journal of Applied Phycology |
| ▪ Canadian Journal of Microbiology | ▪ Journal of Geophysical Research – Biogeosciences |
| ▪ Diatom Research | ▪ Lake and Reservoir Management |
| ▪ Environmental Monitoring & Assessment | ▪ Marine and Freshwater Research |
| ▪ Environmental Science & Technology | ▪ Microbial Ecology |
| ▪ FEMS Microbiology Ecology | ▪ PLOS One |
| | ▪ Science of the Total Environment |

External thesis examiner

- Master's Thesis (Spring 2014) (Lakehead University)

Programs and grant proposals

- NSERC Discovery Grant Proposal Review (2014)
- NSERC Postdoctoral Fellowship Program (2011)
- NSERC Discovery Grant Proposal Review (2010)
- The Oklahoma Water Resources Research Institute Proposal Review (OWRRI) (2010)
- Doctoral program in Environmental Science at University of Toronto-Scarborough (2009)
- Canadian Aquatic Invasive Species Network Proposal Review (2006, 2007)
- Fundação para a Ciência e a Tecnologia (Microbial Ecology Section) Proposal Review (2007)
- United States Department of Agriculture (Managed Ecosystems Group 23.1) Proposal Review (2003)

EXTERNAL BOARD/COMMITTEE MEMBERSHIP

- Friends of Second Marsh Advisory Council (2017-current)
- Editorial Board of the Canadian Journal of Microbiology (2017-current)
- Laurentian SETAC Conference Organizing Committee/Local Organizing Committee (2017)
- Kawartha Conservation Science & Technical Advisory Committee (Co-Chair)(2016-present)
- International Joint Commission Science Advisory Board – Science Priority Committee (2016-present)

- *Canadian Society of Microbiologists*, Chair, Applied and Environmental Microbiology Committee (2016-present)
- *Canadian Society of Microbiologists*, Vice-Chair, Applied and Environmental Microbiology Committee (2014-2015)
- *Friends of Second Marsh* Board of Directors (2012-2015)
- *IAGLR 2014* Local Organizing Committee (2013-2014)
- *Engineered Algae* Advisory Board (2012-2013)
- *City of Oshawa* Environmental Advisory Committee (2011-2013)
- *Canadian Phycological Culture Centre* Scientific Advisory Board (2009-present)
- *Alberta Lake Management Society* Board of Directors (2007-2008)
- *Women in Science and Engineering Steering Committee*, University of Calgary (2007-2008)

UNIVERSITY COMMITTEES AND ADMINISTRATION

- Faculty of Science Faculty Review Committee (2016-present)
- UOIT Academic Council Executive (2017-present)
- UOIT Academic Council (2016-present)
- Faculty of Science ad-hoc Academic Integrity Committee (2016/17)
- DC-UOIT Sustainability Committee (2012-2014)
- OAPR External Review Faculty Session (2012)
- Faculty of Science transfer credit reviews (2009-present)
- Faculty of Science Biology Committee (2008-present)
- Faculty of Science Web Presence Committee (2008-present)
- Faculty of Science Awards Committee (2010-12)
- Faculty of Science NSERC/OGS Review Committee (2010)
- Graduate Program for Applied Bioscience (2008-present)
- Animal Care Course Assessment Sub-committee (2009)

UOIT SERVICE & PROMOTIONAL ACTIVITIES

- Invited Table Host at the Royal Canadian Institute for Science Gala Dinner (2017)
- Invited mentor at Sister 2 Sister Event, Toronto District School Board (2014)
- Invited speaker for site visit of the entire grade 10 class of Lester B. Pearson Collegiate, UOIT (2014)
- Judge at the 3 Minute Thesis competition, UOIT (2013)
- UOIT Open Houses (2008-2013)
- Canadian Biology Olympiad module development and research seminar (2009-13)
- Reader for UOIT Convocation (2012)
- UOIT Scholarship reception (2012)
- Teaching and Learning Virtual Speakers Series (2012)
- Judge for the Applied Bioscience Graduate Student Travel Award (2012)
- Biological Sciences webpage (2009-12)
- Personal UOIT webpage (2009-present)
- Second Marsh Fundraising Dinner on behalf of UOIT (2009-12)
- UOIT site visit for Courtice Secondary School Advanced Placement Students (2011)
- Forensic Science UPR Site Visit Luncheon (2011)
- UOIT event for Iris Evans, AB Minister of International and Intergovernmental Relations (2011)
- Science Rendezvous (2011)

- Applied Biosciences webpage (2009-10)
- Ontario University Fair (2010)
- Scholars Dinners (2009)
- Science Teachers Evening (2009)
- UOIT conference liaison for the OSEE Environmental Education Conference (2009)

ACADEMIC OUTREACH

- Student Poster Judge for the Canadian Society of Microbiologists Conference (2015-16)
- Featured profile in Canadian Science Publishing's Women in Science Series (2014)
- Invited profile on the Canadian Water Network website (2013)
- Engage academics and the public on Twitter (@KirkwoodLab) (2012-present)
- Judge at the Society of Freshwater Sciences Student Poster Competition (2012)
- "Meet the Microbiologist" profile on the Canadian Society of Microbiologists website (2011-present)
- Academic mentor with *MentorNet* (2010-11)

PUBLIC OUTREACH AND EDUCATION

- Featured in a Global News Durham story on the Oak Ridges Moraine (2017)
- Featured in a Global News Durham story on World Water Day (2017)
- Member of *ExpertWomen.ca* science media database (2017-present)
- Science Media Centre of Canada experts database (2009-present)
- Virtual Researcher on Call (VROC) (2009-present)
- Interviewed by *Cottage Life* magazine to provide insight on algal blooms near Sudbury (2013)
- VROC Expert "Science Scoop" video: Episode 12 – Aquatic Ecology (2013)
- Lead a public Earth Day urban creek walk sponsored by the City of Oshawa (2012 & 2013)
- Interviewed by Durham College journalism students for the Chronicle (2011-13)
- Volunteer and Moderator at the *Community Gardens - Growing the Future* conference, Durham College, November, 2012
- Wrote an article about the Land Between for Lakeline Magazine (2012)
- Virtual Researcher on Call: Aquatic invasive species podcast (2011)
- Interviewed for an article on virtual co-op for the TDSB news release (2011)
- Provincial Environmental Advisory Committee Symposium (2011)
- Academic mentor and advisor with Canadian Young Scientist Journal and Specialist High Skills Majors at the Toronto District School Board (2010-11)
- Module development for the Crime Scene Science Camp UOIT (2011)
- Guest-scientist for the Crime Scene Science Camp at UOIT (2011)
- Wrote an article on biodiversity and ecosystem health for "The Skink" newsletter (2009)
- Interviewed for the *Living on Earth* Series, NPR (2009)
- Primary source for a series of articles on "rock snot" published by the Edmonton Journal, Calgary Herald, Vancouver Sun, National Post (2008)
- Guest-scientist workshop leader for the provincial Envirothon competition (2009)
- Guest speaker at the Youth Science and Technology Outreach Program (YSTOP) (2008)
- Guest-scientist lecturer on Invasion Biology at the Kananaskis Field School, AB (2006-2007)
- Guest-scientist speaker at local Calgary schools (2005-2006)
- Guest-scientist on NPR (2007)
- Group-leader for *Alberta Water Quality Assessment Day* (2007)

- Guest-scientist on CBC radio's *Wildrose Country* (2007)

CURRENT MEMBERSHIPS

- Canadian Society for Ecology and Evolution
- Canadian Society of Microbiologists
- Ecological Society of America
- International Association for Great Lakes Research
- Phycological Society of America
- Society of Canadian Limnologists
- Association for Sciences of Limnology and Oceanography (ASLO)
- North American Lake Management Society