

# PIETER AUKES

Postdoctoral Fellow, WLU

## CONTACT INFORMATION

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## EDUCATION

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### **Doctor of Philosophy – Earth Sciences (Water)** 2013 - 2019

*University of Waterloo, Waterloo, ON*

- Thesis: 'Dissolved Organic Matter in the Canadian Arctic & Sub-Arctic: Importance of DOM Quality & Quantity in a Warming Climate'
- Supervisor: Dr. Sherry Schiff, Dr. Michael English
- Part of the Collaborative Water Program

### **Master of Science – Hydrogeology & Geochemistry** 2010 - 2012

*University of Waterloo, Waterloo, ON*

- Thesis: 'Characterization of Dissolved Organic Matter Using a Liquid Chromatography – Organic Carbon Detection from a Variety of Surface and Ground Water Environments'
- Supervisor: Dr. Sherry Schiff

### **Bachelor of Science (Hons.) – Environmental Geosciences** 2006 - 2010

*University of Calgary, Calgary, AB*

- Thesis: 'Groundwater Connection between an Alpine Lake and a Spring Complex and the Transport of Copepods'
- Supervisor: Dr. Masaki Hayashi

## SCHOLARSHIPS & AWARDS

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Ontario Graduate Scholarship (\$15,000) 2011 - 2012; 2017 - 2018

*Government of Ontario*

President's Scholarship (\$10,000) 2011 - 2012; 2017 - 2018

*University of Waterloo*

W. Garfield Weston Award for Northern Research – Doctoral (\$50,000) 2015 - 2017

*W. Garfield Weston Foundation*

Golder Associates Graduate Scholarship in Water (\$5,000) 2016

*Golder Associates, Waterloo*

Queen Elizabeth II Graduate Scholarship in Science & Technology (\$15,000) 2014 - 2015

*University of Waterloo*

Provost Graduate Entrance Scholarship (\$15,000) 2013 - 2014

*University of Waterloo*

Jason Lang Scholarship (\$1,000) 2008 - 2009

*University of Waterloo*

International Association of Geochemistry – Student Research Award (\$1,000) 2013

*International Association of Geochemistry*

Best Poster: Arctic Sciences - Water Institute Research Symposium (\$500) 2015

*Water Institute, University of Waterloo*

Best Oral Presentation – Due North: Next Generation Arctic Research & Leadership (\$300) 2015

*ACUNS 2015 Student Conference, Calgary, AB*

## RESEARCH & WORK INTERESTS

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- Quantify climate-driven changes to water geochemistry
- Use of geochemical and isotopic tools to further process-based knowledge
- Open source, accessible, and reproducible workflow pathways
- Efficient and novel management of compiled databases

## RESEARCH EXPERIENCE

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### Postdoctoral Fellow

2019 - Present

*Wilfrid Laurier University, Waterloo, ON*

- Part of the Sub-Arctic Metals Mobility Study led by Dr. Brent Wolfe, Dr. Jason Venkiteswaran, & Dr. Michael English
- Assess the impact of climate change on the transport of legacy-based pollutants among the sub-arctic taiga shield
- Quantify the importance of organic matter quantity and quality and how it affects metal transport in these systems

### Field & Laboratory Research Assistant

2012 - 2019

*University of Waterloo, Waterloo, ON*

- Determine how differences in land use (agriculture & urbanization) impact river health over all seasons using geochemical and stable isotopes
- Responsible for numerous wet chemistry and stable isotopic techniques needed for analysis
- Maintained and taught use of analytical equipment to students

### Hydrogeology Summer Research Assistant

2008 – 2010

*University of Calgary, Calgary, AB*

- Supported geophysical and hydrological research projects at Lake O'Hara
- Conducted routine hydrological measurements for snow and hot spring discharge in Banff National Park
- Responsible for data collection, organization, and input into electronic databases

## TEACHING EXPERIENCE

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### Senior Instructor

*GG387: Catchment & Global Biogeochemistry, Wilfrid Laurier University*

2021

- Remote delivery of introductory biogeochemical concepts and climate change

### Guest Lecturer

*Introduction to Geology, Geography & Environmental Studies, Wilfrid Laurier University*

2020

- Provided lectures on a range of geological introductory topics

*Under-Ice Lake Sampling, Nunavut Arctic College*

2016

- Taught field-based winter limnological sampling techniques to a group of students outside of Iqaluit, NU

### Teaching Assistant

*Hydrogeology Field School, Earth & Environmental Sciences, University of Waterloo*

2018; 2019

- Intensive 3-week field school demonstrating key introductory concepts and field techniques to students
- Responsible for organization of multiple field-based demonstrations, health and safety, and student concerns

*Sedimentology & Stratigraphy, Earth & Environmental Sciences, University of Waterloo*

2010; 2011

- Conducted tutorials to practice key introductory concepts and principles
- Aided students in conceptualizing geological maps, 3-D visualization, and creation of cross-sections

## PUBLICATIONS

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### Peer-Reviewed Articles

Aukes, P. J. K., S. L. Schiff, J. J. Venkiteswaran, R. J. Elgood, & J. Spoelstra. 2020. Size-Based Characterization of Freshwater Dissolved Organic Matter finds Similarities within a Water Body Type across Different Canadian Ecozones. *Limnology & Oceanography Letters*. In press. doi: 10.1002/lol2.10180.

- St Pierre, K. A., V. L. St. Louis, S. L. Schiff, I. Lehnherr, P. G. Dainard, A. S. Gardner, P. J. K. Aukes, & M. J. Sharp. 2019. Proglacial freshwaters are significant and previously unrecognized sinks of atmospheric CO<sub>2</sub>. *Proceedings of the National Academy of Sciences* 116(36): 17690-17695. doi: 10.1073/pnas.1904241116.
- Aukes, P. J. K., S. L. Schiff, & W. D. Robertson. 2019. Evolution of Dissolved Organic Matter Along a Septic System Plume: Evidence of Sustained Biogeochemical Activity in the Groundwater Zone. *Journal of Geophysical Research: Biogeosciences* 124. doi: 10.1029/2018JG004758.
- Hutchins, R. H. S., P. J. K. Aukes, S. L. Schiff, T. Dittmar, Y. T. Prairie, & P. A. del Giorgio. 2018. The Optical, Chemical, and Molecular Dissolved Organic Matter Succession Along a Boreal Soil-Stream-River Continuum. *Journal of Geophysical Research: Biogeosciences* 122: 289-2908. doi: 10.1002/2017JG004094.

### Submitted Publications

- Aukes, P. J. K. and S. L. Schiff. 2020. Composition Wheels: Visualizing dissolved organic matter using common composition metrics across a variety of Canadian Ecoregions. Submitted to: *PLOS ONE*.

### In-Prep. Publications

- Aukes, P. J. K., S. L. Schiff, & J. J. Venkiteswaran. Dissolved organic matter quality over quantity when assessing disinfection by-products formation from three sub-arctic sites in Northwest Territories, Canada. In-prep for *Water Research X*.
- Aukes, P. J. K., M. C. English, J. Leathers, M. Schultz, R. J. Elgood, J. J. Venkiteswaran, & S. L. Schiff. Wet and Dry Years Have Distinct Changes to DOM Concentration and Composition in Canadian Sub-Arctic Taiga Shield Lakes. In prep for *Science of the Total Environment*.

### Non-refereed Publications

- Aukes, P. J. K., S. L. Schiff, M. Palmer, & R. Staples. 2020. Trends in Water Quality from Three Rivers in the North Slave Region from 30+ Years of Monitoring. For: *NWT State of the Environment Report 2020*.

## CONFERENCES

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### Presentations (bold indicates presented)

- Aukes, P. J. K.**, English, M. C., Venkiteswaran, J. J., Schiff, S. L., & R. J. Elgood. 2019. Using DOM to understand terrestrial-aquatic linkages among sub-arctic taiga shield lakes. Cold Regions Research Center Annual Symposium. Wilfrid Laurier University, Waterloo, ON.
- Aukes, P. J. K.** 2019. Looking at Dissolved Organic Matter in the Northwest Territories. Cold Region Research Centre Invited Talk, Waterloo, ON.
- Aukes, P. J. K.**, Schiff, S. L., English, M. C., Staples, R., & M. Palmer. 2019. Water Quality Trends in Three Rivers near Yellowknife, NT, Canada. Plenary Talk at 22<sup>nd</sup> Northern Research Basin Symposia/Workshop – Partners in Learning, Yellowknife, NT.
- Aukes, P. J. K.**, Venkiteswaran, J. V., Schiff, S. L., & M. C. English. 2019. Examining the Relationship between Dissolved Organic Matter & Disinfection By-Products in the Northwest Territories. Global Water Futures Annual Scientific Meeting, Saskatoon, SK.
- Aukes, P. J. K.**, Dainard, P., Schiff, S. L., & English, M. C. 2017. How measures of dissolved organic matter quality change from Yellowknife NT to Lake Hazen NU. ArcticNet Annual Scientific Meeting, Quebec City, QC.
- Dainard, P., Schiff, S. L., Aukes, P. J. K., Elgood, R. J., St. Pierre, K., St. Louis, V. L., English, M. C. & I. Lehnherr. 2017. Dissolved organic and inorganic carbon dynamics in glacial river systems of the Canadian high arctic. ArcticNet Annual Scientific Meeting, Quebec City, QC.
- Schiff, S. L., Muir, D. C. G., Aukes, P. J. K., Dainard, P., Elgood, R. J., St. Louis, V. L., & I. Lehnherr. 2017. Are young fish 14C “old” in the northern most great lake: Lake Hazen in the high arctic?. ArcticNet Annual Scientific Meeting, Quebec City, QC.
- Aukes, P. J. K.**, Schiff, S. L., English, M. C., & R. J. Elgood. 2016. Dissolved Organic Matter, Disinfection Demand, and Northern Drinking Water. ArcticNet Annual Scientific Meeting, Winnipeg, MB.

- Dainard, P., Schiff, S. L., Aukes, P. J. K., English, M. C., St. Louis, V., Lehnherr, I., Elgood, R. J., & K. St. Pierre. 2016. Cycling of Dissolved Organic Matter in Permafrost and Glacial Melt Water Impacted Freshwater Systems of the Canadian Arctic. ArcticNet Annual Scientific Meeting, Winnipeg, MB.
- Aukes, P. J. K.**, Schiff, S. L., English, M. C., & R. J. Elgood. 2015. Using Photolytic and Microbial Degradation Experiments to Understand the Quality of Dissolved Organic Matter around Yellowknife, Northwest Territories. ArcticNet Annual Scientific Meeting, Vancouver, BC.
- Hickman, J., English, M. C., Aukes, P. J. K., & S. L. Schiff. 2015. Seasonal Evolution of active layer formation in subarctic peat plateaux and implications for dissolved organic matter composition and transfer. ArcticNet Annual Scientific Meeting, Vancouver, BC.
- Schiff, S. L., Aukes, P. J. K., English, M. C., St. Louis, V. L., Lehnherr, I., Elgood, R. J., & K. A. St. Pierre. 2015. Lake Hazen Watershed: A surrogate for assessing changes in terrestrial inputs to the nearshore marine coastal zone in the high arctic. ArcticNet Annual Scientific Meeting, Vancouver, BC.
- Aukes, P. J. K.**, Schiff, S. L., English, M. C., & R. J. Elgood. 2015. Comparing Dissolved Organic Matter Quality from a High Arctic (Lake Hazen, NU) and Subarctic (Yellowknife, NWT) Environment. ACUNS Student Conference, Calgary, AB.
- Aukes, P. J. K.**, Schiff, S. L., English, M. C., & R. J. Elgood. 2015. Dissolved Organic Matter and the Warming North – DOM quality from an area with discontinuous permafrost. AGU-CGU Joint Assembly, Montreal, QC.
- Aukes, P. J. K.**, Schiff, S. L., & M. English. 2014. How Different is Dissolved Organic Matter in a Discontinuous Permafrost Area around Yellowknife, NWT?. Arctic Change 2014 Conference, Ottawa, ON.
- Refereed Poster**
- Aukes, P. J. K., English, M. C., Leathers, J., Schultz, M., Elgood, R. J., Venkiteswaran, J. J., & S. L. Schiff. 2020. Wet and Dry Years Have Distinct Changes to DOM Concentration and Composition in Canadian Sub-Arctic Taiga Shield Lakes. Global Water Futures 3<sup>rd</sup> Annual Open Science Meeting.
- Aukes, P. J. K., Schiff, S. L., English, M. C., & I. Lehnherr. 2017. Can water isotopes be used to determine photolytic history of dissolved organic matter in high arctic ponds?. ArcticNet Annual Scientific Meeting, Quebec City, QC.
- Wisniewski, V., Lehnherr, I., Schiff, S. L., Aukes, P. J. K., & J. L. Kirk. 2017. Impacts of a warming arctic on freshwater ecosystem productivity, processes, and resources. ArcticNet Annual Scientific Meeting, Quebec City, QC.
- Aukes, P. J. K., Schiff, S. L., English, M. C., & R. J. Elgood. 2016. Geochemical Trends over 30 Years in Three Rivers near Yellowknife, NWT. ArcticNet Annual Scientific Meeting, Winnipeg, MB.
- Lehnherr, I., St. Louis, V., Schiff, S. L., Venkiteswaran, J. J., St. Pierre, K., Emmerton, C., Aukes, P. J. K., & V. Wisniewski. 2016. Comparative Limnology of Lakes and Ponds in the Lake Hazen Watershed during Ice-covered and Ice-free Seasons: What are the implications of climate change for the carbon and nutrient cycles in freshwater ecosystems? ArcticNet Annual Scientific Meeting, Winnipeg, MB.
- Schiff, S. L., Aukes, P. J. K., Dainard, P., English, M. C., Elgood, R. J., Zheng, X., St. Louis, V., Lehnherr, I., & K. St. Pierre. 2016. Lake Hazen Watershed in the high arctic: Using tritium and natural abundance stable isotopes of sulfate to partition changing inputs from glacial rivers. ArcticNet Annual Scientific Meeting, Winnipeg, MB.
- Wisniewski, V., Lehnherr, I., Schiff, S. L., Aukes, P. J. K., & J. Kirk. 2016. The metabolism of Skeleton Lake, Northern Ellesmere Island, Nunavut: Understanding the effects of climate change in the Canadian high arctic by quantifying biological processes. ArcticNet Annual Scientific Meeting, Winnipeg, MB.
- Aukes, P. J. K., Schiff, S. L., English, M. C., & R. J. Elgood. 2015. High Arctic Experiments: Photolytic and Microbial Degradation of Dissolved Organic Matter. ArcticNet Annual Scientific Meeting, Vancouver, BC.
- Lehnherr, I., Venkiteswaran, J. J., St. Louis, V., Schiff, S. L., Emmerton, C., St. Pierre, K., Wong, C., Aukes, P. J. K., & R. J. Elgood. 2015. Ecosystem metabolism in high arctic ponds in the Lake Hazen Watershed, Quttinirpaaq National Park (Nunavut). ArcticNet Annual Scientific Meeting, Vancouver, BC.
- Aukes, P. J. K., Hutchins, R. S., Elgood, R. J., & S. L. Schiff. 2014. Characterization of Dissolved Organic Matter Composition and Quality along the Grand River. International Association for Great Lakes Research (IAGLR).
- Aukes, P. J. K., Schiff, S. L., & M. C. English. 2014. Characterization of Dissolved Organic Matter from Discontinuous Permafrost Areas. Canadian Conference for Fisheries Research – Society of Canadian Limnologists.

Schiff, S. L., Venkiteswaran, J. J., Aukes, P. J. K., & R. J. Elgood. 2013. Dissolved Organic Matter at ELA: Effects of Photolysis on DOM and CO<sub>2</sub> Isotopes and DOM Quality. Canadian Conference for Fisheries Research – Society of Canadian Limnologists.

### Non-Refereed Talks

Aukes, P. J. K., Dainard, P., Schiff, S. L., & English, M. C. 2016. "Wekweètì & Dissolved Organic Carbon". Talk given to the community of Wekweètì on updates and progress of research in their community. Wekweètì, NT.

Aukes, P. J. K. 2016. "It Snows or Rains; Then what? – Looking at Water Quality in the Arctic". Talk given to Grades 6 – 9 at the Alexis Arrowmaker School, Wekweètì, NT.

### Non-Refereed Poster

Aukes, P. J. K., Schiff, S. L., & M. C. English. 2014. Dissolved Organic Matter and Water Quality in the North – What is the Quality of DOM around Yellowknife, NWT?. World Water Day Symposium – Water Institute. University of Waterloo, Waterloo, ON.

Hickman, J., Aukes, P., English, M. C., Schiff, S., Kokelj, S. V., & C. Spence. 2013. Seasonal Evolution of Active Layer Formation in Peat Plateaus and Implications for Shallow Groundwater Chemistry. Northwest Territories Cumulative Impact Monitoring Program Annual Meeting.

## PROFESSIONAL AFFILIATIONS & DEVELOPMENT

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### Affiliations

Society of Canadian Limnologists (SCL)

Association of the Sciences of Limnology & Oceanography (ASLO)

### Development

Fundamentals of University Teaching – *Centre for Teaching Excellence, University of Waterloo*

## SERVICE EXPERIENCE

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### Academic

Student Co-Supervisor <i>Wilfrid Laurier University / University of Waterloo</i>	2019 - Present
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President, Earth Science Graduate Association (ESGA) <i>University of Waterloo</i>	2011 - 2012
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Executive, Environmental Science Students Association (ESSA) <i>University of Calgary</i>	2009 - 2010
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## LANGUAGES

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- English, Dutch