

Sarah Ellen Johnston, Ph.D.

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EDUCATION

Ph.D.	Florida State University Earth, Ocean, and Atmospheric Science Dept., College of Arts & Sciences	2019
M.Sc.	North Carolina State University Marine, Earth, and Atmospheric Science Dept., College of Science	2015
B.Sc. (Hons)	University of Tennessee at Chattanooga Dept. of Geology, College of Arts & Sciences	2012

RESEARCH EMPLOYMENT

Assistant Professor of Environmental Chemistry 2022-present

Department of Chemistry and Biochemistry, University of Alaska Fairbanks

Research themes:

1. Spatial and temporal changes in streams and lakes across Interior Alaska experiencing climate change
2. Lead a lab that promotes equitable practices in training students and conducting research
3. Use long term open access government datasets of water chemistry parameters to model how riverine biogeochemical cycles have changed in the past and project potential future changes

Postdoctoral Fellow

2019-2022

Department of Biological Sciences, University of Lethbridge

Supervisor: Dr. Matthew Bogard

1. Planktonic respiration and organic matter cycling using short-term *in situ* measurements
2. The sources and transformations of dissolved organic matter in the Oldman watershed, a heavily agriculturalized river basin in Alberta, Canada
3. Climate drivers of dissolved organic carbon fluxes from large grassland fluvial networks

Ph.D. Candidate - Chemical Oceanography

2015-2019

Earth, Ocean, and Atmospheric Science Dept., Florida State University

Advisor: Dr. Robert G.M. Spencer

Thesis: Drivers of dissolved organic matter composition in Arctic inland waters (within the NASA-Arctic and Boreal Vulnerability Experiment [NASA-ABoVE] project).

1. Evaluating the chemical drivers of organic matter composition and reactivity in northern high latitude rivers, streams, and lakes
2. Assessing the environmental and landscape scale controls on dissolved organic matter composition and their sensitivity to climatic and hydrologic changes over a latitudinal gradient.
3. Relating the measured dissolved organic carbon concentrations and organic matter composition to improve models of northern high latitude inland waters dissolved organic matter composition via optical measurements.

Masters Student – Marine, Earth, and Atmospheric Science Dept., North Carolina State University 2013-2015

Advisor: Dr. Christopher L. Osburn

Thesis: Fluxes of dissolved organic matter from urban catchments in the Neuse River Basin

1. Evaluated the mobilization of dissolved organic matter from urbanized stream and river catchments in response to storm events.
2. Applied fluorescence modeling, load estimates (using LOADEST), and GIS analysis to look at the impacts of urbanization on organic matter transport.

Post Baccalaureate Research Assistant – Biosciences Division, Oak Ridge National Laboratory 2013

Supervisor: Dr. Tim Tschaplinski

1. Assessed the metabolite production of plants via gas chromatography-mass spectrometry for application to next generation biofuel studies
2. Performed organic synthesis of plant biomolecules for addition to a gas chromatography- mass spectrometry database supporting
3. Provided instrument and laboratory support

Science Undergraduate Laboratory Internship – Material Sciences Division, Oak Ridge National Laboratory 2012

Supervisor: Dr. Soydan Ozcan

1. Provided laboratory support for the evaluation of the feasibility of using commodity thermoplastics for carbon fiber production
2. Performed thermal and mechanical testing of carbon fiber and carbon fiber precursor materials

SIGNIFICANT RESEARCH CONTRIBUTIONS

1. Mid-sized Arctic rivers are an underrepresented source of C to coastal Arctic systems. By refining the current flux estimates using a mid-size Arctic river we found that the residence time of terrestrial C decreased and highlighted the need for additional focus on small to mid-sized Arctic rivers (Johnston et al. 2018).
2. Hydrologic connectivity drives DOM composition in high latitude lakes (Johnston et al. 2020). Lakes hydrologically isolated from surface and groundwater inputs receive and cycle little terrestrial C. As permafrost thaws these lakes may remain C sinks (Bogard et al. 2019).
3. Freshwater zooplankton contribute biolabile DOM that is cycled rapidly and not detectable by traditional geochemical techniques. Through zooplankton incubation experiments we found that zooplankton release DOM that is not found in bulk lake DOM. Zooplankton may represent an understudied driver of DOM diversity and cycling in freshwater environments (Johnston et al. *in prep*).

GRANTS & AWARDS (in USD)

Total: \$228,827

NSF Earth Sciences	Postdoctoral Fellowship	\$174,000	2021
National High Magnetic Field Lab	New PI International travel grant	\$1,000	2019
Delta Stewardship Council	Delta Postdoctoral Fellowship	\$50,000	2019

Association for the Sciences of Limnology and Oceanography	Travel grant	\$860	2019
Winchester Fund	Travel grant	\$500	2019
Winchester Fund	Travel grant	\$1,467	2017
Hoover-Nofsinger Scholarship	Undergraduate scholarship	\$1,000	2012
University of Tennessee Chattanooga	Outstanding Senior in Geology	-	2012

PUBLICATIONS:

Peer Review (*denotes mentee):

13. **Johnston, S. E.**, Gunawardana, P. V. S. L. *, Rood, S. B., & Bogard, M. J. (2022). Multidecadal Trends in Organic Carbon Flux Through a Grassland River Network Shaped by Human Controls and Climatic Cycles. *Geophysical Research Letters*, 49(4), e2021GL096885. <https://doi.org/10.1029/2021GL096885>
12. **Johnston, S. E.**, Finlay, K., Spencer, R. G. M., Butman, D. E., Metz, M. *, Striegl, R., & Bogard, M. J. (2021). Zooplankton release complex dissolved organic matter to aquatic environments. *Biogeochemistry*. <https://doi.org/10.1007/s10533-021-00876-7>
11. **Johnston, S. E.**, Carey, J. C., Kellerman, A., Podgorski, D. C., Gewirtzman, J., & Spencer, R. G. M. (2021). Controls on Riverine Dissolved Organic Matter Composition Across an Arctic-Boreal Latitudinal Gradient. *Journal of Geophysical Research: Biogeosciences*, 126(9), e2020JG005988. <https://doi.org/10.1029/2020JG005988>
10. Kellerman, A. M.; Vonk, J.; McColaugh, S.; Podgorski, D. C.; van Winden, E.; Hawkings, J. R.; **Johnston, S. E.**; Humayun, M.; Spencer, R. G. M. Molecular Signatures of Glacial Dissolved Organic Matter From Svalbard and Greenland. *Global Biogeochemical Cycles* 2021, 35 (3), e2020GB006709. <https://doi.org/10.1029/2020GB006709>.
9. Kuhn, C. D., M. Bogard, **S. E. Johnston**, and others. 2020. Satellite and airborne remote sensing of gross primary productivity in boreal Alaskan lakes. *Environ. Res. Lett.* doi:10.1088/1748-9326/aba46f
8. **Johnston, S. E.**, R. G. Striegl, M. J. Bogard, and others. 2020. Hydrologic connectivity determines dissolved organic matter biogeochemistry in northern high-latitude lakes. *Limnol Oceanogr* Ino.11417. doi:10.1002/lno.11417
7. Carey, J. C., J. Gewirtzman, **S. E. Johnston**, A. Kurtz, J. Tang, A. M. Vieillard, and R. G. M. Spencer. 2020. Arctic River Dissolved and Biogenic Silicon Exports—Current Conditions and Future Changes With Warming. *Global Biogeochemical Cycles* 34: e2019GB006308. doi:10.1029/2019GB006308
6. **Johnston, S. E.**, M. J. Bogard, J. A. Rogers*, D. Butman, R. G. Striegl, M. Dornblaser, and R. G. M. Spencer. 2019. Constraining dissolved organic matter sources and temporal variability in a model sub-Arctic lake. *Biogeochemistry* 146: 271–292. doi:10.1007/s10533-019-00619-9
5. Textor, S. R.*, K. P. Wickland, D. C. Podgorski, S. E. Johnston, and R. G. M. Spencer. 2019. Dissolved Organic Carbon Turnover in Permafrost-Influenced Watersheds of Interior Alaska: Molecular Insights and the Priming Effect. *Front. Earth Sci.* 7: 275. doi:10.3389/feart.2019.00275
4. Bogard, M. J., **S. E. Johnston**, Mark. M. Dornblaser, R. G. M. Spencer, R. G. Striegl, and D. E. Butman. 2019. Extreme rates and diel variability of planktonic respiration in a shallow sub-arctic lake. *Aquatic Sciences* 81: 60. doi:10.1007/s00027-019-0657-9
3. Bogard, M. J., Kuhn, C.D., **Johnston, S.E.**, and others. 2019. Negligible cycling of terrestrial carbon in many lakes of the arid circumpolar landscape. *Nature Geoscience*. doi:10.1038/s41561-019-0299-5
2. **Johnston, S. E.**, Shorina, N., Bulygina, and others. 2018. Flux and Seasonality of Dissolved Organic Matter From the Northern Dvina (Severnaya Dvina) River, Russia. *Journal of Geophysical Research: Biogeosciences* 123: 1041–1056.

1. Brock-Hon, A., and **Johnston, S.E.** 2014. Separation and characterization of pedogenic barite crystals from petrocalcic horizon materials for future isotopic and geochronological applications, *Geoderma*, 217–218, 129–134

Publications in Preparation or Submitted (*denotes student mentee):

3. **Johnston, S. E.**, Gunawardana, P. V. S. L. *, Rood, S. B., & Bogard, M. J. Changing aromaticity in rivers across a temporal and spatial gradient. *Geophysical Research Letters*. *Under review*.
2. Xingzi Zhou *, **S.E. Johnston**, Matthew J. Bogard. Organic matter cycling in a model restored wetland receiving complex effluent. *Biogeochemistry*. *Under Review*.
1. Starr, S. *, **S.E. Johnston**, Sobolev, N., Perminova, I., Kellerman, A., Bulygina, E., Shiklomanov, A., McKenna, A., Spencer, R.G.M. Dissolved Organic Matter Molecular Level Insights and Flux from the Onega River, Russia: Implications for Arctic Land-Ocean Fluxes. *Journal of Geophysical Research: Biogeosciences*. *Under Review*.

SCIENTIFIC PRESENTATIONS:

Oral Presentation:

- Johnston, S.E.**, Bogard, M.J., Striegl, R.G., Dornblaser, M.M., Podgorski, D.C., Butman, D.E., Spencer, R.G.M. 2019. Drivers of dissolved organic matter composition in northern high-latitude lakes. Association for the Sciences of Limnology and Oceanography Aquatic Sciences Meeting.
- Bogard, M., Dornblaser, M., Holtgrieve, G., James, J., **Johnston, S.E.**, Koch, J., Kuhn, C., Spencer, R.G.M., Striegl, R., Wickland, K., Butman, D. 2018. Exploring permafrost soil carbon transfer along hydrologic gradients across interior Alaska. Association for the Sciences of Limnology and Oceanography Summer Meeting.
- Codden, C., Edwards, C., Bittar, T., Wagner, S., Spencer, R.G.M., **Johnston, S.E.**, Stubbins, A. 2018. Temporally resolved dissolved organic carbon dynamics in a Georgia saltmarsh. Geological Society of America, Northeastern Section.
- Tschaplinski, T.J., Martin, M.Z., **Johnston, S.E.**, Rottmann, W., Hinchee, M. 2017. Metabolomic Responses of Down-Regulated p-Coumaroyl Quinate/Shikimate 3'-Hydroxylase (C3'H) and Cinnamate 4-Hydroxylase (C4H) Genes in the Lignin Biosynthetic Pathway of *Eucalyptus urophylla* X *E. grandis* with Reduced Recalcitrance, Abstract W349, presented at Plant and Animal Genome Conference XXIV, San Diego, CA, 14-18 Jan.

Posters (*denotes mentee):

- Johnston, S.E.**, Collins, J., Boysen, A., Soued, C., Butman, D.E., Wickland, K., Sadros, S., Ingalls, A.E., Bergamaschi, B., Windham-Myers, L., Bogard, M.J. 2019. Planktonic respiration and organic matter cycling using short-term in situ measurements. American Geophysical Union Fall Meeting.
- Textor, S. *, Wickland, K., **Johnston, S.E.**, Podgorski, D., Spencer, R.G.M. 2018. Turnover and priming of terrigenous dissolved organic carbon in permafrost-influenced streams of central Alaska. Association for the Sciences of Limnology and Oceanography Summer Meeting.
- Rogers, J.A. *, **Johnston, S.E.**, Spencer, R.G.M. 2018. The biogeochemistry of Canvasback Lake. Southeastern Biogeochemistry Symposium.
- Johnston, S.E.**, Shorina, N., Podgorski, D., Bulygina, E., Spencer, R.G.M. 2017. Fluxes and seasonality of dissolved organic matter from the Severnaya Dvina River, Russia. Association for the Sciences of Limnology and Oceanography Mountains to Sea Meeting.

TEACHING EXPERIENCE

Teaching assistant Introductory Geology Lab (MEA 110)

2014

Teaching assistant	Earth Systems Chemistry- Lab portion (MEA 323)	2015
Teaching assistant	Introduction to Environmental Science (EVR 1001)	2018
Teaching assistant	Environmental Science Capstone (EVR 4922)	2019
Group leader	ULeth Biology and Environmental Science Writing Community Cohort	2021

MENTORING/TRAINING EXPERIENCE

University of Lethbridge:

Academic mentor	Joshua King (BSc. student)	2021-2022
Academic mentor	Xingzi Zhou (MSc. student)	2020-present
Academic mentor	Peka Mueller (BSc. student Hons- U. British Columbia)	2020-2022
Academic mentor	Alix King (BSc. student)	2020
Academic mentor	Armi Amerila (BSc. student)	2020-present
Academic mentor	Sasindu Gunawardana (PhD student)	2019-present
Academic mentor	Lauren Zink (PhD student)	2019-present
Laboratory training	Holly Kalyn Bogard (Laboratory manager)	2019-2022

Florida State University

Academic mentor	Brooke Barber (MSc. student, EOAS)	2017-2020
Academic mentor	Megan Behnke (PhD student, EOAS)	2017-2021
Academic mentor	Wenbo Li (MSc. student, EOAS)	2017-2019
Academic mentor	Sadie Textor (MSc. student, EOAS)	2016-2018
Academic mentor	Jennifer Rogers (MSc. student, EOAS)	2016-2019
Academic mentor	Chanda (Local high school student)	2017-2018
Laboratory supervisor	Holly Smith (BSc. student, EOAS)	2017-2018
Laboratory supervisor	Natasha De La Cruz (BSc. student, EOAS)	2017-2018

North Carolina State University:

Laboratory training	Emily Barnett (MSc. student)	2014-2015
Laboratory training	Lauren Lindsay (BSc. student, Wake Technical Community College)	2014

Oak Ridge National

Laboratory training	Ryan Agh (Summer intern) Supervisor: T. Tschaplinski	2010
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PROFESSIONAL AFFILIATIONS

American Geophysical Union (2013-present)

Association for the Sciences of Limnology and Oceanography (ASLO, 2016-present)

PEER REVIEW

Journal of Hydrology, Geochimica et Cosmochimica Acta, Organic Geochemistry, Journal of Geophysical Research- Biogeosciences, Scientific Reports, Biogeochemistry, Frontiers Marine Science

SCIENTIFIC LEADERSHIP & SERVICE

Volunteering and Outreach:

Mentor	High school student mentor and lab experience program	2017-2018
Volunteer	Science Olympiad, Rickards High School, Tallahassee, FL	2017-2018
Volunteer	Public school science lessons, Oak Ridge, TN	2011-2017
Volunteer	Summer school teacher, Barahona, Dominican Republic	2010

INVITED TALKS/SEMINARS:

Water Institute for Sustainable Environments (WISE) Seminar Series, University of Lethbridge	The Chemical Composition of Freshwater Zooplankton Dissolved Organic Matter Cycling	2020
Butman Lab Group, University of Washington	Drivers of dissolved organic matter in northern high latitude inland waters	2018
Biology Capstone Course, University of Tennessee at Chattanooga	Tracing organic matter source through the changing Arctic	2017
Geology Seminar, University of Tennessee at Chattanooga	What drives dissolved organic matter sources in Arctic inland waters	2017
Kellner Lab Group, Brown University	Drivers of colored dissolved organic matter in Arctic inland waters	2017
Geology Seminar, University of Tennessee at Chattanooga	Fluxes of dissolved organic matter from urban catchments in the Neuse River Basin	2015

ADDITIONAL RELEVANT EXPERIENCE

Lignin biomarker method consulting	North Carolina State University, Florida State University, University of New Orleans	2017-Present
International sample collection and research project coordination	Arkhangelsk, Russia	2016-2019
3 field campaigns with the USGS	Yukon Flats National Wildlife Refuge, Alaska	2016-2017
Extensive local field work and sample collection	Central and Eastern North Carolina	2013-2015

MEDIA INTEREST/PRESS

For work on the Northern Dvina River
(Johnston et al. 2018 *JGR-B*):

FSU News Release - From FSU to Arctic Russia: Research leads grad student on a unique trip. July 29, 2016