

# Emily Seelen

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## Professional Preparation

**University of Alaska Fairbanks**, Fairbanks, AK, USA

Assistant Professor of Oceanography, Current

**University of Southern California**, Los Angeles, CA, USA

Postdoctoral Scholar, 2019-2024

**University of Connecticut**, Groton, CT, USA

Doctor of Philosophy, Graduated December 2018

Major: Oceanography

*NSF Graduate Research Fellow*

**Gustavus Adolphus College**, St. Peter, MN, USA

Bachelor of Arts, Graduated May 2013

Majors: Environmental Studies and Biology, Summa Cum Laude

*EPA Undergraduate Research Opportunities Fellow*

**Study Abroad**, Round River Conservation Studies, Kunene Region, Namibia, Spring 2012

NSF GRFP GROW, Umeå, Sweden, Fall 2016 - Summer 2017

## Work Experience

Jan. 2019- Apr. 2024: **University of Southern California**, Postdoc/ Associate Researcher

Supervisor: Prof. Seth John

*Investigated marine microbial response to altered nutrient landscapes using meso- and microcosm incubations.*

July 2013- Dec. 2018: **University of Connecticut**, Graduate Student Assistant

Advisor: Prof. Robert Mason

*Incorporated field, laboratory, and statistical approaches to improve our understanding of inorganic and methylmercury cycling in contaminated and uncontaminated estuarine landscapes.*

Oct. 2016- June 2017: **Umeå University**, Visiting Researcher

Advisors: Prof. Erik Björn and Prof. Ulf Skjllburg

*Evaluated the role of dissolved organic matter in dictating methylmercury bioavailability.*

Summer 2012: **EPA: Atlantic Ecology Division**, Intern

Advisor: Dr. Autumn Oczkowski

*Analyzed the hydrology of isolated wetlands and assisted in various ongoing oceanographic projects at the facility.*

Sept. 2010- May 2013: **Gustavus Environmental Studies Department**, Research Assistant

Advisor: Dr. Jeffrey Jeremiason

*Monitored metal fluxes through an ombrotrophic peatland with a focus on mercury and lead.*

Sept. 2010-May 2013: **Gustavus Geology Department**, Research Assistant

Advisor: Dr. Laura Triplett

*Helped develop a method for analyzing the silica content of plant frustules and various geochemical sample analysis.*

## Teaching Experience

Fall 2022: **University of Southern California**

Oceanography, Teaching Assistant

Fall 2017: **University of Connecticut**

General Chemistry, Teaching Assistant

Fall 2011: **Gustavus Adolphus College**

Cell and Molecular Biology, Teaching Assistant

Fall 2010: **Gustavus Adolphus College**

Principles of Geology, Teaching Assistant

## Publications

Seelen, E.A., Townsend, E., Gleich, S.J., Caron, D.A., Dugenne, M., White, A.E., Karl, D.M., John, S.G. 2024. Pelagic Ecosystem Research Incubators (PERIcosms): Optimized incubation tanks to investigate natural communities under long term, low nutrient and low metal conditions. *Limnology & Oceanography: Methods*.

Seelen, E.A., Gleich, S., Kumler, W., Anderson, H., Bian, X., Bjorkman, K., Caron, D.A., Dyhrman, S., Ferron, S., Finkel, Z., Haley, S., Hu, Y., Ingalls, A., Irwin, A., Karl, D.M., Kong, K.P., Lowenstein, D., Salazar Estrada, A., Townsend, E., Tracey, J., Turk-Kubo, K., Van Mooy, B., John, S.G. Preprint. A tale of two nutrients: how nitrogen and phosphorus differentially control marine biomass production and stoichiometry. *In Review at Nature Communications*.

Smith, I.M., Ke, Y., Geyman, E.C., Reahl, J.N., Douglas, M.M., Seelen, E.A., Magyar, J.S., Dunne, K.B.J., Mutter, E.A., Fischer, W.W., Lamb, M.P., West, A.J. 2024. Mercury stocks in discontinuous permafrost and their mobilization by river migration in the Yukon River Basin. *Env. Research Letters*.

Seelen, E., Liem-Nguyen, V., Wunsch, U., Baumann, Z., Mason, R., Skjellberg, U., Bjorn, E. 2023. Dissolved organic matter thiol concentrations determine methylmercury bioavailability across the terrestrial-marine aquatic continuum. *Nature Communications*: 14, 6728

Mason, R.P., Buckman, K.L., Seelen, E.A., Taylor, V.F., Chen, C.Y. 2023. An examination of the factors influencing the bioaccumulation of methylmercury at the base of the estuarine food web. *Science of the Total Environment*: 886, 163996

John, S.G., Kelly, R.L., Bian, X., Fu, F., Smith, M.I., Lanning, N.T., Liang, H., Pasquier, B., Seelen, E.A., Holzer, M., Wasylenki, L., Conway, T.M., Fitzsimmons, J.N., Hutchins, D.A., Yang, S-C. 2022. The biogeochemical balance of oceanic nickel cycling. *Nature Geoscience*: 15, 906–912

Seelen, E., Chen, C., Balcom, P., Buckman, K., Taylor, V., Mason, R. 2021. Historic contamination alters mercury sources and cycling in temperate estuaries relative to uncontaminated sites. *Water Research*. 190: 1116684

Buckman, K., Mason, R., Seelen, E., Taylor, V., Balcom, P., Chipman, J., Chen, C. 2021. Patterns in forage fish mercury concentrations across Northeast US estuaries. *Environmental Research*. Vol. 194. 110629

Huy, D.H., Seelen, E., Liem-Nguyen, V. 2020. Removal mechanisms of cadmium and lead ions in contaminated water by stainless steel slag obtained from scrap metal recycling. *Journal of Water Process Engineering*: 36, 101369

- Buckman, K., Seelen, E., Mason, R., Balcom, P., Taylor, V., Ward, J.E., Chen, C. 2019. Sediment organic carbon and temperature effects on methylmercury concentration: A mesocosm experiment. *Science of the Total Environment*: 1316:1326.
- Wang, X., Seelen, E.A., Mazrui, N.M., Kerns, P., Suib, S.L., Zhao, J., Mason, R.P. 2019. The interaction of mercury and methylmercury with chalcogenide nanoparticles. *Environmental Pollution*: 255, 113346
- Taylor, V., Chen, C., Seelen, E., Buckman, K., Mazrui, N., Balcom, P., Mason, R.. 2018. Organic carbon content drives methylmercury levels in the water column and in estuarine food webs across latitudes in the Northeast United States. *Environmental Pollution*: 639-649.
- Seelen, E., Massey, G., Mason, R.. 2018. The role of sediment resuspension on estuarine suspended particulate mercury dynamics. *Environ. Sci. Technol.*: 52(14): 7736–7744. DOI: 10.1021/acs.est.8b01920.
- Mazrui, N., Seelen, E., King'ondou, C.K., Awino, J., Thota, S., Zhao, J., Rouge, J., Mason, R.P. 2018. The precipitation, growth and stability of mercury sulfide nanoparticles formed in presence of marine dissolved organic matter. *Environmental Science: Processes & Impacts*: 642-656. DOI: 10.1039/c7em00593h.
- Jeremiason, J., Baumann, E., Sebestyen, S., Agather, A., Seelen, E., Carlson-Stehlin, B., Funke, M., Cotner, J. 2018. Contemporary mobilization of legacy Pb stores by DOM in a Boreal Peatland. *Environ. Sci. Technol.*: 52 (6): 3375–3383. DOI: 10.1021/acs.est.7b06577

## First Author Presentations

- Phosphate supply deficits to marine phytoplankton communities are managed by physiological adaptation while changes in nitrogen supply drive whole community shifts. Ocean Sciences Meeting. February 2024. Oral Presentation.
- The influence of nutrient supply (N, P, Fe) on marine particle stoichiometry. Marine and Environmental Biology Seminar. November 2022. Invited Oral Seminar.
- The influence of nutrient supply (N, P, Fe) on marine particle stoichiometry: a 30 day mesocosm study. Goldschmidt Conference. July 2022. Oral Presentation.
- Community succession and nitrogen fixation under altered N/P/Fe nutrient availability. Caltech Geoclub Seminar. March 2022. Invited Oral Seminar.
- Diazotroph succession and nitrogen fixation under altered N/P/Fe nutrient availability. Ocean Sciences Meeting. March 2022. Oral Presentation.
- An introduction to PERI-SCOPE and initial findings from PERI-FIX. SCOPE Annual Meeting. January 2022. Invited Oral Presentation.
- Iron deposition to the surface ocean. SCOPE Annual Meeting. November 2020. Oral Presentation.
- Mercury and Trace Metal Cycling in the Surface North Pacific Ocean. Ocean Sciences Meeting. February 2020. Oral Presentation.
- Testing a Trace Metal Clean, 120L Mesocosm Design. SCOPE Annual Meeting. December 2019. Poster Presentation.
- A molecular approach to understand bioavailability of MeHg associated with variable sources of natural dissolved organic matter. International Conference on Heavy Metals in the Environment. July 2018. Oral Presentation.
- A multi-estuary approach to understanding sediments as a source of methylmercury to the pelagic ecosystem. ASLO Summer Meeting. June 12, 2018. Oral Presentation.

Mercury methylation and demethylation dynamics at and near the sediment water interface of contaminated estuaries. International Conference on Mercury as a Global Pollutant. July 19, 2017. Oral presentation.

Methylmercury at the sediment-water interface: insights from a unique sampling regime. International Conference on Mercury as a Global Pollutant. July 18, 2017. Poster presentation.

A molecular approach to understand bioavailability of methylmercury associated with variable sources of natural dissolved organic matter. International Conference on Mercury as a Global Pollutant. July 20, 2017. Poster presentation.

Particulate methylmercury dynamics in estuarine water columns of varying historic mercury contamination. International Conference on Mercury as a Global Pollutant. July 19, 2017. Oral presentation.

Methylmercury at the sediment-water interface: Insights from a unique sampling regime. 11<sup>th</sup> Biennial SY Feng Graduate Research Colloquium, University of Connecticut, Groton, CT. May 12, 2016. Poster Presentation.

Sources of methylmercury to NE US coastal systems under variable environmental parameters. International Conference on Mercury as a Global Pollutant. June 18th, 2015. Poster Presentation.

Evaluating the importance of sediment resuspension as a source of particulate methylmercury to coastal ecosystems. Geological Society of America. Nov. 2nd, 2015. Oral Presentation.

Lead and mercury export from a peatland related to dissolved organic carbon cycling. 10<sup>th</sup> Biennial SY Feng Graduate Research Colloquium, University of Connecticut, Groton, CT. May 15, 2014. Poster Presentation.

Spatial distributions and yields of Hg and trace elements from an ombrotrophic peatland. GSA Annual Meeting in Charlotte, NC. Nov. 5, 2012. Poster Presentation.

Analyzing the role of urban and isolated wetlands in maintaining watershed water quality and ecosystem integrity. Fall Student Research Symposium on Summer Research. Gustavus Adolphus College, St. Peter, MN. Sept. 21, 2012. Oral Presentation.

Mercury and metal cycling in an ombrotrophic peatland. Undergraduate Research Symposium in the Physical Sciences, Mathematics and Computer Science at the University of Chicago, Chicago, IL. Nov. 5, 2011. Oral Presentation.

Metals and organic carbon cycling in an ombrotrophic peatland. 2011 Chemistry Homecoming Research Symposium, Gustavus Adolphus College, St. Peter, MN. Oct. 1, 2011. Poster Presentation.

Mercury and metal cycling in an ombrotrophic peatland. 2011 Fall Student Research Symposium on Summer Research, Gustavus Adolphus College, St. Peter, MN. Sept. 16, 2011. Oral Presentation.

## Awards and Honors

USC Wrigley Institute Susan and Philip Hagenah Endowed Post-Doctorate Fellow. *2020-21*

U.S. National Science Foundation Graduate Research Fellow. *Sept. 2014- June 2017*

U.S. National Science Foundation/ Swedish Research Council Greater Research Opportunities Worldwide Fellow. *October 2016- June 2017*

University of Connecticut Outstanding Scholar award. *Sept. 2013- June 2018*

University of Connecticut Pre-Doctoral Fellowship Awardee. *2014, 2015, 2016, 2017*

Graduated Summa Cum Laude from Gustavus. *June 2013*

Sigma Xi Scientific Research Society. *Inducted Spring 2013*

U.S. EPA Greater Research Opportunities Fellow. *Sept. 2011- May 2013*

Gustavus Presidential Scholarship (academic). *Fall 2009- May 2013*

Gustavus Arts Scholarship. *Fall 2009- May 2013*

J.A. Edquist Award in Biology, Gustavus Adolphus College, *May 2013*

*"Named after an early professor of biology and botany at Gustavus (1889–1930), the award recognizes outstanding academic achievement in biology."*

Robert Moline Environmental Studies Program "Cherish the Earth" Award, Gustavus Adolphus College, *May 2013*

*"Awarded annually for excellence in environmental studies, and for awareness of and commitment to environmental issues"*

## **Leadership and Service**

University of Southern California student mentor. *2019, Stephanie Briones. 2020, Robert Raad and Janine Zhu. 2022, Wila Mannella.*

Department of Marine Science Student Senate Secretary, UConn, *2013-2015, 2017- 2018*

International Conference on Mercury as a Global Pollutant Social Media Committee, *2017*

Feng Graduate Research Colloquium Student Coordinator, UConn, *2014, 2016*

Taste, Touch and Smell of Science Leader, UConn, *2014, 2015*

Department Academic Assistant, Biology, Gustavus Adolphus College, *Sept. 2012- May 2013*