

## Dr. MILING LI

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### RESEARCH INTERESTS

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I study the sources, transport, fate, and bioavailability of contaminants in ecosystems and their impacts on public health, with an emphasis on linking global environmental changes to ecological and human health.

### EDUCATION

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#### **Sc.D., Harvard University, USA (2011-2016)**

Major: Environmental Health, Harvard T.H. Chan School of Public Health

Minors: Biostatistics; Exposure Sciences.

Thesis title: Environmental origins of methylmercury in aquatic biota and humans.

#### **M.Sc., University of Michigan—Ann Arbor, USA (2008-2011)**

Double majors: Environmental Health Sciences, School of Public Health

Aquatic Sciences, School of Natural Resources and Environment

Thesis title: Interactive effects of phosphorus and copper on *Hyalella azteca* and periphyton.

#### **B.Sc. (Honors), Zhejiang University of Technology, China (2004-2008)**

Major: Environmental Sciences, College of Biological and Environmental Engineering

Thesis title: Enantioselective toxicity of pyrethroids bifenthrin in zebrafish.

### ACADEMIC APPOINTMENTS

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#### **Assistant Professor, University of Delaware (2020-Present)**

School of Marine Science and Policy.

#### **Postdoctoral Fellow, University of British Columbia (2017-2019)**

Department of Earth, Ocean, and Atmospheric Sciences; Institute for the Oceans and Fisheries; Institute for Resources and Environmental Sustainability.

#### **Postdoctoral Fellow, Harvard University (2016-2017)**

Harvard John A. Paulson School of Engineering and Applied Sciences.

#### **Summer Fellow, Cooperative Institute for Limnology and Ecosystem Research (2011)**

NOAA and University of Michigan—Ann Arbor.

### RESEARCH GRANTS

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National Institutes of Health, USA (2021-2025). A comprehensive, community-engaged risk assessment of soil contamination in coastal Delaware environmental justice communities. \$2,396,355 (Pending). Role: Co-PI.

National Science Foundation, USA (2020 -2023). MRI: Acquisition of a Laser Ablation Multi-Collector Inductively Coupled Mass Spectrometer for Advancing Cross-Disciplinary Research. \$1,329,659 (Pending). Role: Co-PI.

Northern Contaminants Program, Canada (2020-2022). The influences of environmental changes on levels and trends of methylmercury in Beaufort beluga food web II. \$46,487 CAD (Pending). Role: Project leader.

Northern Contaminants Program, Canada (2019-2020). The influences of environmental changes on levels and trends of methylmercury in Beaufort beluga food web I. \$15,000 CAD Role: Project leader.

## **ACADEMIC HONORS**

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MAGNET Postdoctoral Fellowship, University of British Columbia (2017-2018)

Graduate Student Scholarship, Harvard T.H.Chan School of Public Health (2011-2016).

Gold Award poster presentation, 12<sup>th</sup> International Conference on Mercury as a Global Pollutant (ICMGP) (2015).

Summer Fellowship, Cooperative Institute for Limnology and Ecosystem Research (2011).

Honors Thesis Student, Zhejiang University of Technology (2008).

Academic Achievement Scholarships, Zhejiang University of Technology (2004-2005, 2005-2006, 2006-2007 academic years).

## **JOURNAL PUBLICATIONS**

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### *IN PREPARATION*

**M. Li**, C. Thackray, V. Lam, W. Cheung, E.M. Sunderland. Global flows of methylmercury from fisheries harvests. 90% completion.

### *ACCEPTED*

**M. Li**, A. Juang, J. Ewald, B. Mikkelsen, R. Yin, D.P. Krabbenhoft, P.H. Balcom, C. Dassuncao, E.M. Sunderland. Selenium and stable mercury isotopes provide new insights into mercury toxicokinetics in pilot whales.2020. *Science of the Total Environment*. (In press)

**M. Li**, D. Weis, K.E. Smith, A.E. Shiel, W. Smith, B.P.V. Hunt, A. Torchinsky, E.A. Pakhomov. Assessing lead contamination sources in the northeast Pacific Ocean. 2020. *Anthropocene*. (In press)

M. Yi, R. Yin, K. Cai, C. Qin, J. Wang, H. Yan, **M. Li**. Primary amino acids affect the distribution of methylmercury rather than inorganic mercury among tissues of two farmed-raised fish species. 2019. *Chemosphere*, 225, 320. <https://doi.org/10.1016/j.chemosphere.2019.03.058>

C. Dassuncao, H. Pickard, M. Pfohl, A. Tokranov, **M. Li**, B. Mikkelsen, A. Slitt, E.M. Sunderland. Phospholipid levels predict tissue distribution of poly- and perfluoroalkyl substances (PFASs) in a marine mammal. 2019. *Environmental Science and Technology Letter*, 6 (3), 119-125.

<https://pubs.acs.org/doi/10.1021/acs.estlett.9b00031>

J.D. Ewald, J.L. Kirk, **M. Li**\*, E.M. Sunderland\*. Organ-specific differences in mercury speciation and accumulation in juvenile and adult ringed seals (*Phoca hispida*). 2019. *Science of the Total Environment* 650: 2013-2020. \*Co-senior author. <https://doi.org/10.1016/j.scitotenv.2018.09.299>

D.J. Madigan\*, **M. Li**\*, R. Yin, H. Baumann, O.E. Snodgrass, H. Dewar, D.P. Krabbenhoft, Z. Baumann, N.S. Fisher, P.H. Balcom, E.M. Sunderland. 2018. Mercury stable isotopes reveal influence of foraging depth on mercury concentrations and growth in Pacific bluefin tuna. *Environmental Science and Technology*, 52(11), 6256-6264. \*Equal contribution of authors. <https://pubs.acs.org/doi/10.1021/acs.est.7b06429>

E.M. Sunderland, **M. Li**, K. Bullard. 2018. Global sources of methylmercury exposure from marine fish in the United States and recent changes in consumption patterns. *Environmental Health Perspectives* 17006: 1. <https://ehp.niehs.nih.gov/ehp2644/>

K. von Stackelberg, **M. Li**, E.M. Sunderland. 2017. Results of a national survey of high-frequency fish consumers. 2017. *Environmental Research*, 158: 126-136. <https://doi.org/10.1016/j.envres.2017.05.042>

**M. Li**, A.T. Schartup, A.P. Valberg, J.D. Ewald, D.P. Krabbenhoft, R. Yin, P.H. Balcom, E.M. Sunderland. 2016. Investigate environmental origins of methylmercury accumulated in subarctic estuarine fish indicated by mercury stable isotopes. *Environmental Science and Technology*, 50 (21): 11559–11568. <http://pubs.acs.org/doi/abs/10.1021/acs.est.6b03206>

R.S.D. Calder, A.T. Schartup, **M. Li**, A.P. Valberg, P.H. Balcom, E.M. Sunderland. 2016. Future impacts of hydroelectric power development on methylmercury exposures of Canadian indigenous communities. *Environmental Science and Technology*, 50 (23): 13115–13122. <http://pubs.acs.org/doi/abs/10.1021/acs.est.6b04447>

**M. Li**, K. von Stackelberg, C. Rheinberger, J.K. Hammitt, D.P. Krabbenhoft, R. Yin, E.M. Sunderland. 2016. Insights from mercury stable isotopes into factors affecting the internal body burden of methylmercury in frequent fish consumers. *Elementa: Science of the Anthropocene*, 2016, 4 (1), 000103. <https://www.elementascience.org/articles/10.12952/journal.elementa.000103/>

A.T. Schartup, R.S.D. Calder, **M. Li**, P.H. Balcom, A.P. Valberg, J. Ewald, E.M. Sunderland (2015). “Methylmercury” in Durkalec, A [Ed.], Lake Melville: Avativut, Kanuittailinnivut (Our Environment, Our Health), Scientific Report. Nain, NL, Canada: Nunatsiavut Government. <https://sites.duke.edu/calder/files/2018/06/ScienceReport-low1.pdf>

**M. Li**, L.S. Sherman, J.D. Blum, P. Grandjean, B. Mikkelsen, P. Weihe, E.M. Sunderland, J.P. Shine. 2014. Assessing sources of human methylmercury exposure using mercury stable isotopes. *Environmental Science and Technology*, 48 (15): 8800-8806. <http://pubs.acs.org/doi/abs/10.1021/es500340r>

**M. Li**, D.M. Costello, G.A. Burton Jr. 2012. Interactive effects of phosphorus and copper on *Hyalella azteca* via periphyton in aquatic ecosystems. *Ecotoxicology and Environmental Safety*, 83 (2012): 41-46. <http://www.sciencedirect.com/science/article/pii/S0147651312001856>

## RESEARCH EXPERIENCE

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**Project Leader** on “Statistical Analysis of Turbidity Dynamics in the Catskill-Delaware System”. PI: Dr. James Shine, Harvard T.H. Chan School of Public Health. 2011-2013.

**Project Leader** on “Fish Trophic Structure, Seafood Consumption, and Human Health Implications of the Deepwater Horizon Oil Spill”. PI: Dr. James Shine, Harvard T.H. Chan School of Public Health. 2011-2013.

**Research Assistant** to Prof. Allen Burton, University of Michigan. 2009-2011. Cultured aquatic macroinvertebrates and participated in field trips for in-situ sediment toxicity tests in streams.

**Team Leader** of the undergraduate research project “Chiral Separation and Enantioselective Toxicity of Pyrethroids Bifenthrin in Zebrafish”. PI: Prof. Weiping Liu, Zhejiang University of Technology. 2007-2008.

**Lab Assistant** to Prof. Weiping Liu at the Zhejiang University of Technology. 2006-2008. Job duties: Chiral separation of pesticide enantiomers by high-performance liquid chromatography (HPLC).

## TEACHING ACTIVITIES

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### TRAINING

**EOSC 516 Teaching and Learning in Earth, Ocean, and Atmospheric Sciences.** University of British Columbia, Vancouver, BC, Canada. 2017. This course taught strategies for fostering student inquiry and independent learning, and design and implement lessons.

**ELI 584 Graduate Student Instructor (GSI) Seminar and Practicum.** University of Michigan, Ann Arbor. 2011. This course focused on providing new international GSIs with practical tools to become independent and reflective teachers.

### EXPERIENCE

**Guest Lecture** in *EOSC-523 Isotope Geology* on “Heavy Stable Isotopes”. University of British Columbia. 2017, 2018, and 2019.

**Guest Lecture** in *ES-161 Applied Environmental Toxicology* on “Bioaccumulation”. Harvard John A. Paulson School of Engineering and Applied Sciences. 2016.

**Guest Lecture** in *EH-257 Water Pollution* on “Aquaculture”. Harvard T.H. Chan School of Public Health. 2014.

**Teaching Fellow** for *ES-161 Applied Environmental Toxicology*, Harvard John A. Paulson School of Engineering and Applied Sciences. 2015.

**Project Instructor** for *MIT-1.106 Terrascope* on “Affinity of BAP-E3 phage to indium in solution”. Massachusetts Institute of Technology. 2013.

**Teaching Assistant** for *RDS-500 Risk Assessment*, Harvard School of Public Health. 2012.

**Teaching Assistant** for *EH-257 Water Pollution*, Harvard School of Public Health. 2012.

**Graduate Student Instructor (GSI)** for *NRE-538 Natural Resource Statistics*, University of Michigan—Ann Arbor. 2011.

## **MENTORING ACTIVITIES**

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Four undergraduate students in Research EXperience program (REX), 2018-2019. University of British Columbia. REX is a mentorship opportunity that pairs graduate students and postdocs up with small groups of undergraduates.

Jessica Ewald, Harvard College. Undergraduate thesis on “Modeling toxicokinetics of methylmercury in ringed seal”. 2015-2017. **\*\*Dean’s Award for Outstanding Engineering Projects\*\*** at Harvard John A. Paulson School of Engineering and Applied Sciences, 2017. Current position: Ph.D. student at McGill University.

Paheliya Aixilafu, Harvard T.H.Chan School of Public Health. M.Sc. thesis on “Pilot analysis of nutritional modifiers of methylmercury uptake”. 2016-2017. Current position: Ph.D. student at University of Michigan-Ann Arbor.

Alicia Juang, Harvard College. Undergraduate independent study on “Mechanistic understanding on methylmercury metabolism in marine mammals using mercury stable isotope”. 2016-2017. **\*\*Winner of Best Use of Quantitative Methods in Conservation Research\*\*** at Student Conference on Conservation Science—New York (SCCS-NY), 2017. Current position: Civil engineer/hydrologist at Environmental Science Associates.

## **PROFESSIONAL ACTIVITIES**

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### *SERVICE*

**Primary Convener**, Session GH011-II. Geochemistry to Health: Linking Geoscience to Exposures and Health Impacts of Nutrients and Toxicants. AGU Fall meeting, 2019.

**Co-chair**, Session EA4 “Contaminants in the natural environment” at Resources for Future Generations 2018, Vancouver, BC, Canada. June 20<sup>th</sup>, 2018.

**Workshop Coordinator**, Multidisciplinary Applied Geochemistry Network (MAGNET) final workshop in Hawaii, USA. February, 2018. MAGNET is an NSERC-funded Collaborative Research and Training Experience program among five Canadian universities (nine professors, 36 graduate students, and four postdocs).

**Member**, Admission and Management Committee, UBC Department of Earth, Ocean, and Atmospheric Sciences. September 2017- September 2018.

**Co-chair**, Session 13g “Understanding the role of organic matter in the fate and behavior of trace metals, rare earth elements, and radionuclides” at Goldschmidt 2017, Paris, France. August 13-18, 2017.

**Co-chair**, Session 3f “Methylmercury toxicokinetics and toxicodynamics: human and animal models” at 13<sup>th</sup> International Conference on Mercury as a Global Pollutant, Providence, RI, USA. July 16-21, 2017.

**Postdoctoral-coordinator**, Harvard Atmospheric and Environmental Chemistry Seminar Series. Harvard University, Cambridge, MA, USA. 2016-2017.

**Co-founder**, GeoHealth focus group. Harvard School of Public Health, Boston, MA, USA. 2014-2015. This group focused on the application of geology and geochemistry in environmental health related research.

#### *PEER REVIEW*

**Review Editor** in the Marine Pollution section of *Frontiers in Marine Science*, 2018-Present

#### **Grant reviews**

External Reviewer, Canadian Northern Contaminants Program, 2017.

External Reviewer, French National Research Agency, 2017.

**Peer-review** for > 10 different journals:

*Proceedings of the National Academy of Sciences; Environmental Science & Technology (letters); Global Change Biology; Science of the Total Environment; Environmental Pollution; ACS Earth and Space Chemistry; Environmental Toxicology and Chemistry; Archives of Environmental Contamination and Toxicology; Toxics; Nutrients; Marine Pollution Bulletin; Environmental Health.*

#### **PRESENTATIONS**

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Deciphering Changes in Foraging Habitats of Beluga Using lead Isotopes. AGU Fall Meeting. December 12, 2019. *Poster presentation.*

The Influences of Environmental Changes on Mercury Burden of Beaufort Beluga Food Web. Inuvialuit Game Council - Regular Members Meeting. September 24-26, 2019, Whitehorse, YT, Canada. *Oral presentation.*

Changing Ocean Systems. Nippon Foundation Nereus Ocean Science Conference. September 14-15, 2019, Princeton University, USA. *Invited panelist.*

Assessing Lead Sources in Fish of Northeast Pacific Ocean. Goldschmidt 2019, Barcelona, Spain. August 22, 2019. *Oral presentation (Delivered by Dominique Weis).*

Investigating Environmental Origins and Bioaccumulation of Methylmercury in a Subarctic Estuary. September 9, 2019. 14th International Conference on Mercury as a Global Pollutant (ICMGP), Krakow, Poland. *Oral presentation (Delivered by Maxime Enrico).*

Updating Environmental Chemistry and Toxicology in the Context of Global Change. School of Marine Sciences and Policy, University of Delaware, Newark, DL, USA. May 22, 2019. *Invited talk.*

GeoHealth – Applying Geochemical Tools in Environmental and Health Studies. University of Delaware, Newark, DL, USA. March 27, 2019. *Invited talk.*

Mercury Pollution – A Lasting and Pressing Environmental Issue. Boston College, Chestnut Hill, MA, USA. January 31, 2019. *Invited talk.*

Mercury Isotopes—Tools for Tracking Mercury Sources and a Lot More. Harvard University, Cambridge, MA, USA. January 30, 2019. *Invited talk.*

Assessing Lead Contamination Sources of the Northeast Pacific Ocean. Goldschmidt 2018, Boston, MA, USA. August 16, 2018. *Oral presentation.*

Application of Isotope Geochemistry to Source and Quantify Anthropogenic Impacts on Pacific Salmon Populations, Resources for Future Generations 2018, Vancouver, BC, Canada. June 20th, 2018. *Oral presentation.*

Environmental Origins and Exposure Pathways of Methylmercury in Aquatic Biota and Humans. Clarkson University, Potsdam, NY, USA. April 19th, 2018. *Invited talk.*

GeoHealth—Applying Geochemical Tools in Environmental Health Studies. Queens College, City University of New York, New York, NY, USA. March 20th, 2018. *Invited talk.*

Mercury Isotopes and Climate Change Impacts on Food Webs. Fisheries Joint Management Committee meeting, Fisheries and Oceans Canada. Winnipeg, MB, Canada. January 16-17th. *Invited talk.*

Insights from metal stable isotopes into fish life history. IsoNose Metal Stable Isotope Geochemistry Workshop, Soreze, France. January 8-11th, 2018. *Poster presentation.*

Insights from stable isotopes into the life history of aquatic biota. Postdoc Research Day, University of British Columbia, Vancouver, BC, Canada. December 4, 2017. *Oral presentation.*

Applying geochemical tools in environmental health studies. EOAS Department colloquium, University of British Columbia, Vancouver, BC, Canada. September 21, 2017. *Oral presentation.*

An analysis of variability in the methylmercury burden of marine mammals using stable mercury isotopes. Goldschmidt2017, Paris, France. August 13-18, 2017. *Oral presentation.*

Global flows of methylmercury from fisheries harvests. 13<sup>th</sup> International Conference on Mercury as a Global Pollutant (ICMGP), Providence, RI, USA. July 16-21, 2017. *Oral presentation.*

Toxicokinetics of methylmercury in North Atlantic pilot whales (*Globicephala melas*). 13<sup>th</sup> International Conference on Mercury as a Global Pollutant (ICMGP), Providence, RI, USA. July 16-21, 2017. *Oral presentation.*

Investigating methylmercury exposure in North Atlantic cetaceans using hg stable isotopes. 13<sup>th</sup> International Conference on Mercury as a Global Pollutant (ICMGP), Providence, RI, USA. July 16-21, 2017. *Poster presentation.*

Use of mercury stable isotopes to track environmental methylmercury production sources in fish. Society of Environmental Toxicology and Chemistry (SETAC) North America 36<sup>th</sup> Annual Meeting.

Salt Lake City, Utah, USA. November 1-5, 2015. *Oral Presentation.*

Use of mercury stable isotopes to track environmental methylmercury sources of estuarine fish. 12<sup>th</sup> International Conference on Mercury as a Global Pollutant (ICMGP). Jeju, South Korea. June 14-19, 2015. *Poster Presentation.* **\*\*Gold Award Poster Presentation\*\***

Assessing sources of human mercury exposure using stable mercury isotopes. Gordon Research Conference—Environmental Sciences: Water. Holderness, New Hampshire, USA. June 22-27, 2014. *Poster presentation.*

Mercury exposure assessment for high-end fish consumers in the US. Society of Environmental Toxicology and Chemistry (SETAC) North America 34<sup>th</sup> Annual Meeting. Nashville, TN, USA. November 17-21, 2013. *Poster Presentation.*

Source-receptor assessment of mercury exposure in humans using mercury stable isotopes. 11<sup>th</sup> International Conference on Mercury as a Global Pollutant (ICMGP). Edinburgh, Scotland, UK. July 28-August 02, 2013. *Oral presentation.*

A survey of high-end fish consumers in the united states and resulting mercury exposures. 11<sup>th</sup> International Conference on Mercury as a Global Pollutant (ICMGP). Edinburgh, Scotland, UK. July 28-August 02, 2013. *Poster presentation.*

Regional impacts of the Deepwater Horizon oil spill on the Gulf of Mexico ecosystem. Society of Environmental Toxicology and Chemistry (SETAC) North America 33<sup>rd</sup> Annual Meeting. Long Beach, California, November 11-15, 2012. *Poster Presentation.*

Regional impacts of the Deepwater Horizon oil spill on the Gulf of Mexico ecosystem. Gordon Research Conference—Environmental Sciences: Water. Holderness, New Hampshire, USA. June 24-29, 2012. *Poster presentation.*

Interactive effects of phosphorus and copper on *Hyalella azteca* and periphyton. Society of Environmental Toxicology and Chemistry (SETAC) North America 32<sup>nd</sup> Annual Meeting. Boston, MA, USA. November 13-27, 2011. *Poster presentation.*

## **TECHNICAL SKILLS**

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### *ANALYTICAL SKILLS*

Multi-Collector Inductively Coupled Plasma Mass Spectrometry (MC-ICP-MS)  
Inductively Coupled Plasma Mass Spectrometry (ICP-MS)  
Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES)  
Cold Vapor Atomic Fluorescence Spectroscopy (CV-AFS)  
Direct Mercury Analyzer (DMA)

### *COMPUTATIONAL EXPERIENCE*

Python & R: statistical computing including stochasticity simulation and data graphics.  
ArcGIS: spatial analysis for environmental studies.  
C program: basic programming skills.

*FIELD EXPERIENCE*

CTD, plankton tow, and in-situ water sampling and filtration on R/V Endeavor (Morehead City, NC to Fort Lauderdale, FL).

Sediment, macroinvertebrates, and fish sampling in streams and lakes.