

## Dr. Miling Li

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### RESEARCH INTERESTS

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I study the links between aquatic ecosystem and human health, focusing on how anthropogenic environmental changes could affect the biogeochemical cycling of contaminants and nutrients and the associated impacts on 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; Aquatic Biogeochemistry

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

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

Double major: Aquatic Sciences, School of Natural Resources and Environment

Environmental Health Sciences, School of Public Health

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 Science, College of Biological Engineering and Environmental Engineering

Thesis title: *Enantioselective Toxicity of Pyrethroids Bifenthrin in Zebrafish.*

### ACADEMIC APPOINTMENTS

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

Multidisciplinary Applied Geochemistry Network (MAGNET),

Department of Earth, Ocean, & Atmospheric Sciences, Vancouver, BC, Canada.

*I apply both traditional isotopes (carbon, nitrogen, sulfur) and non-traditional isotopes (lead, mercury, strontium) to study diverse research topics including*

- *reconstructing the migration history of different pacific salmon stocks;*
- *elucidating the factors resulting in the collapse of the salmon populations;*
- *investigating how climate change affects the Arctic food web structure and dynamics.*

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

Harvard John A. Paulson School of Engineering and Applied Sciences, Cambridge, MA, USA.

*I focused on developing mercury stable isotopes as a tool for tracing sources and chemical transformations of mercury in the environment. I led projects including*

- *characterizing methylmercury metabolism in marine mammals using mercury isotopes and pharmacokinetic model;*
- *quantifying global flows of methylmercury from fisheries harvests using spatial and statistical modeling.*

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

NOAA and University of Michigan's Ann Arbor, MI, USA.

- *Studying the impacts of hypoxia on the bioaccumulation of methylmercury through the food web in Lake Erie using Ecotracer in Ecopath modeling software.*

**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).

**Honours Thesis Student**, Zhejiang University of Technology (2008).

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

**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. *85% completion.*

J. Ewald, J. Kirk, D. Muir, N. Basu, **M. Li\***, E.M. Sunderland\*. Organ-Specific Differences in Mercury Speciation and Accumulation in Juvenile and Adult Ringed Seals (*Phoca hispida*). *90% completion. \*Co-Senior author.*

**M. Li**, A. Juang, J. Ewald, B. Mikkelsen, E.M. Sunderland. Improved understanding of methylmercury metabolism in marine mammals from mercury stable isotopes. *70% completion.*

*SUBMITTED*

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. 2017. Mercury stable isotopes reveal influence of foraging depth on mercury concentrations and growth in Pacific bluefin tuna. *Submitted to Proceedings to National Academy of Sciences. \*Equal contribution of authors.*

*ACCEPTED*

E.M. Sunderland, **M. Li**, K. Bullard. 2017. Global sources of methylmercury exposure from marine fish in the United States and recent changes in consumption patterns. *Environmental Health Perspectives*. In Press.

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.elementalscience.org/articles/10.12952/journal.elementa.000103/>

**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.

**Summer Fellow**, project “Impacts of seasonal hypoxia on the bioaccumulation of methylmercury through the food web in the central basin, Lake Erie”. PI: Drs. Jessica Head and Hongyan Zhang. NOAA and University of Michigan’s Cooperative Institute for Limnology and Ecosystem Research. 2011.

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

**Team Leader** of 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 Zhejiang University of Technology. 2006-2008.  
Job duties: Chiral separation of pesticide enantiomers by high-performance liquid chromatography (HPLC).

## TEACHING

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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, reflective teachers.*

### EXPERIENCE

**Guest Lecture** EOSC 523 Isotope Geology on “Heavy Stable Isotopes”. University of British Columbia, Vancouver, BC, Canada. 2017.

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

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

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

**Project Instructor** of MIT1.106 Terrascope course on “Affinity of BAP-E3 phage to indium in solution”. Massachusetts Institute of Technology. 2013.

**Teaching Assistant** for Risk and Decision Sciences (RDS-500): *Risk Assessment*, Harvard T.H. Chan School of Public Health. 2012.

**Teaching Assistant** for Environmental Health (EH257): *Water Pollution*, Harvard T.H. Chan School of Public Health. 2012.

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

## MENTORING

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### MASTERS

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.

### UNDERGRADUATES

Jessica Ewald, Harvard College. Undergraduate thesis on “Modeling toxicokinetics of

methylmercury in ringed seal". 2015-2017. **\*\*Dean's Award for Outstanding Engineering Projects\*\*** of Harvard John A. Paulson School of Engineering and Applied Sciences. Current position: M.Sc. student at McGill University.

Alicia Juang, Harvard College Undergraduate independent study on "Mechanistic understanding on methylmercury metabolism in marine mammals by 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.

### *HIGH SCHOOL STUDENTS*

Kate Sotir, Saint Mark's School. High-School research project on "Safe to drink: A biofiltration system for copper-contaminated water". 2016.

## **PROFESSIONAL ACTIVITIES**

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### *PROFESSIONAL SERVICE*

**Workshop Coordinator**, 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- Present.

**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 application of geology and geochemistry in Environmental health related research.

### *PEER REVIEW*

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

Environmental Science & Technology; 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; Environmental Science and Pollution Research.

### Grant reviews:

External Reviewer, French National Research Agency, 2017

External Reviewer, Canadian Northern Contaminants Program, 2017

### PRESENTATIONS

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

Applying Geochemical Tools In Environmental Health Studies. Oral presentation at EOAS Department colloquium, University of British Columbia, Vancouver, BC, Canada. September 21, 2017.

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

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

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

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

Use of mercury stable isotopes to track environmental methylmercury production sources in fish. Oral Presentation at Society of Environmental Toxicology and Chemistry (SETAC) North America 36<sup>th</sup> Annual Meeting. Salt Lake City, Utah, USA. November 1-5, 2015.

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

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

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

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

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

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

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

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

## **TECHNICAL SKILLS**

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### *ANALYTICAL SKILLS*

Multi-Collector Inductively Coupled Plasma Mass Spectrometry (MC-ICP-MS)

Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-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*

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.

In-situ stream sediment toxicity tests using macroinvertebrates.