

ELSIE M. SUNDERLAND

29 Oxford Street, Pierce Hall 127, Cambridge MA 02138 USA
Ph: +1-617-496-0858; Email: ems@seas.harvard.edu

Web: <http://bgc.seas.harvard.edu/>
ORCID: <http://orcid.org/0000-0003-0386-9548>

EDUCATION

1997 B.Sc., Environmental Science, McGill University, Canada
2003 Ph.D., Environmental Toxicology, Simon Fraser University, Canada
2003-2004 Postdoctoral Fellow, Office of Science Policy, US EPA, Washington DC, USA

ACADEMIC APPOINTMENTS & PROFESSIONAL EXPERIENCE

Harvard University, Cambridge MA, USA

2018-present Gordon McKay Professor of Environmental Chemistry,
Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS)
2018-present Professor of Environmental Science and Engineering,
Department of Environmental Health, Harvard T.H. Chan School of Public Health (HSPH)
2018-present Faculty Affiliate, Department of Earth and Planetary Sciences, Harvard University
2015-2018 Thomas D. Cabot Associate Professor of Environmental Science and Engineering, SEAS
2014-2018 Associate Professor of Environmental Science and Engineering,
Department of Environmental Health, HSPH
2014-2015 Associate Professor of Environmental Science and Engineering, SEAS
2010-2014 Mark and Catherine Winkler Assistant Professor of Aquatic Science, HSPH
2008-2010 Research Associate, SEAS & Harvard Center for Risk Analysis, HSPH

U.S. Environmental Protection Agency, Washington DC, USA

2004-2008 Worked in the Office of Science Policy; Office of the Science Advisor; National Center for Environmental Research; National Center for Environmental Economics; National Exposure Research Laboratory. *Positions and responsibilities included:*

- Led cross-Agency workgroup drafting guidance on the development, evaluation and application of environmental models used to inform regulatory decisions.
- Developed policy recommendations for nearshore water quality in the Great Lakes as the representative for the International Air Quality Planning Board (IAQAB) of the International Joint Commission (IJC).
- Developed federal regulations for atmospheric emissions of hazardous air pollutants from coal-fired utilities.

Lunenburg Municipal Government, Bridgewater NS, Canada

1994-1995 Assisted in the development of the first fully-integrated four waste stream management system in North America (large-scale recycling and composting).

PERSONAL

Citizenship: dual, Canada and United States.

ACADEMIC & PROFESSIONAL HONORS

2019, 2020 Web of Science Highly Cited Researcher (multiple highly cited papers in top 1% of field)

2017	Harvard Star Family Award for Promising Scientific Research
2013	Excellence in Reviewing Award from journal <i>Biogeochemistry</i>
2012	Smith Family Foundation Award for Excellence in Biomedical Research
2010	U.S. EPA Level II Scientific & Technological Achievement (STAA) Award
2010	Outstanding Reviewer citation by Editorial Board of <i>Estuaries and Coasts</i>
2008	U.S. EPA Level I (highest level) Scientific & Technological Achievement (STAA) Award
2005	U.S. EPA National Honor Award, Gold Medal for Exceptional Service
2003	Dean's Convocation Medal (best graduate thesis), Simon Fraser University
2002	Society of Environmental Toxicology & Chemistry best student paper presentation
1998-2002	Natural Sciences and Engineering Research Council of Canada Graduate Fellowships
1993	Greville Smith Scholarship (top-entrance scholarship), McGill University
1993	Canada Scholarship, Industry and Technology Canada

TEACHING

Undergraduate:

ESE-6	Introduction to Environmental Science and Engineering, Harvard School of Engineering and Applied Sciences, Spring 2016-2018; 2020-2021.
ESE-161	Applied Environmental Toxicology, Harvard School of Engineering and Applied Sciences, Spring 2015; Fall 2016; Fall 2019; Spring 2022.
ESE-169	Seminar on Global Pollution Issues, Harvard School of Engineering and Applied Sciences, Spring 2013; Fall 2017; Spring 2021.

Graduate:

ES-298r	Mitigating Toxicity Through Materials Design, Harvard School of Engineering and Applied Sciences, Fall 2015.
RDS-500	Risk Assessment, Department of Environmental Health, Harvard School of Public Health, Spring 2011-2014.
ENVR E-215	Environmental Science, Harvard Extension School, Fall 2011.

Other teaching activities:

2009-2021	<u>Faculty</u> , Analyzing Risk: Science, Assessment, and Management; Center for Continuing Professional Education, Harvard School of Public Health. (~60 students each year).
2008	<u>Developed curriculum</u> and instructed training course on the use of models in environmental regulatory decision-making for U.S. EPA Region 1. (~50 staff members).
2004-2008	Led nation-wide seminar series (webinar) for ten U.S. EPA Regional Offices on the use of environmental models to inform environmental management decisions.

RESEARCH MENTORING

Doctoral Theses Supervised:

2021	Rebecca Stern, Environmental Science and Engineering <i>The Microbiome of Atmospheric Particles</i>
2021	Charlotte Wagner, Environmental Science and Engineering <i>Global Modeling of Persistent Pollutants in an Era of Changing Emissions and Climate</i>
2019	Andrea K. (Weber) Tokranov, Environmental Science and Engineering

Fate, Transport and Detection of Poly- and Perfluoroalkyl Substances in Natural and Engineered Environments

- 2018 Xindi C. Hu, Environmental Health
From Source to Dose: Modeling Human Exposure to Poly- and Perfluoroalkyl Substances
- 2018 Clifton Dassuncao, Environmental Health
Modeling Exposures to Poly- and Perfluoroalkyl Substances (PFASs) in Aquatic Biota and Humans
- 2017 Ryan S.D Calder, Environmental Health
Hydroelectric Power and Indigenous Health in the Canadian North
- 2017 Hannah M. Horowitz, Earth and Planetary Sciences
The Global Biogeochemical Cycle of Mercury: Insights from Modeling Atmospheric Chemistry and All-time Emissions from Human Activity
- 2016 Miling Li, Environmental Health
Environmental Origins of Methylmercury in Aquatic Biota and Humans
- 2014 Helen M. Amos, Earth and Planetary Sciences
Toward an Improved Understanding of the Global Biogeochemical Cycle of Mercury

Postdoctoral Fellows/Research Associates

- [13] Scott Zolkos (2020-present)
- [12] Lara Schultes (2019-present)
- [11] Maxime Enrico (2019-2021), now postdoctoral fellow, Université de Pau, France.
- [10] Kyle Delwiche (2018-19), now postdoc Stanford.
- [9] Marie Perkins (2017-19), now Assistant Professor, University of Wisconsin-Stevens Point.
- [8] Linjun Yao (2017-19), now Scientist, MA DEP.
- [7] Colin Thackray (2016-present).
- [6] Xianming Zhang (2013-16), now Scientist, Ontario Ministry of the Environment.
- [5] Yanxu Zhang (2013-15), now Professor, Nanjing U.
- [4] Amina Schartup (2012-17), now Assistant Professor, Scripps Institute of Oceanography.
- [3] Anne Soerensen (2011-14), now Curator, Swedish Museum of Natural History.
- [2] Asif Qureshi (2011-2013), now Associate Professor, IIT Hyderabad, India.
- [1] Jenny Fisher (2011-12), now Senior Lecturer, U. of Wollongong, Australia.

Doctoral Students:

SEAS = School of Engineering & Applied Sciences; HSPH = School of Public Health; EPS = Earth and Planetary Sciences.

- [15] Jahred Liddie (HSPH: 2021-present, G1)
- [14] Mona Dai (SEAS: 2019-present, G3)
- [13] Heidi Pickard (SEAS: 2019-present, G3)
- [12] Jennifer Sun (SEAS: 2018-present, G4)
- [11] Ben Geyman (SEAS: 2018-present, G4)
- [10] Bridger Ruyle (SEAS: 2017-present, G5)
- [9] Charlotte Wagner (SEAS: 2015-2021), Now: Scientist, Stockholm Environment Institute
- [8] Rebecca Stern (SEAS: 2016-2021), Now: Postdoctoral Fellow, HSPH
- [7] Andrea Tokranov (SEAS: 2013-19); Now: Hydrologist, USGS
- [6] Xindi Hu (HSPH: 2014-18); Now: Data Scientist, Mathematica Policy Research
- [5] Clifton Dassuncao (HSPH: 2013-2018); Now Environmental Health Scientist, Eastern Research Group, Inc.

- [4] Ryan Calder (HSPH: 2012-17); Now: Assistant Professor, Virginia Tech
- [3] Hannah Horowitz (EPS: 2011-17); Now: Assistant Professor, U. Illinois
- [2] Miling Li (HSPH: 2011-16); Now: Assistant Professor, U. Delaware
- [1] Helen Amos (EPS: 2010-14); Now: Senior Research Scientist, SSAI / NASA Goddard Space Flight Center

Masters Students:

- [8] Jahred Liddie (2020-21, now doctoral student HSPH)
- [7] Adela Chovancova (2017-18, now Regulatory and Compliance Specialist at Catania Oils)
- [6] Paheliya Aixilafu (2016-17, now Doctoral candidate, U. Michigan)
- [5] Amelia Valberg (2014-15, now Scientist, US EPA)
- [4] Cindy Hu (2012-2014, now Data Scientist, Mathematica Policy Research)
- [3] Clifton Dassuncao (2011-13, now Environmental Health Scientist, Eastern Research Group, Inc.)
- [2] Matthew Tumpney (2011-12, now Consultant Gradient Inc.)
- [1] Elizabeth Corbitt (2010-15, now science teacher Louisiana)

Doctoral and Oral Examination Committees – Harvard

- [15] Tianning Zhao, SEAS (2019)
- [14] Tina Liu, EPS (2019)
- [13] Colleen Goija, SEAS (2018-)
- [12] Eleni Dovrou, SEAS (2018-2020)
- [11] Tia Scarpelli, EPS (2018-2021)
- [10] Sabri Bromage, Department of Nutrition, HSPH (2016)
- [9] Carlo Alberto Amadei, SEAS (2016-2019)
- [8] Andrea Weber, SEAS (2015)
- [7] Yingjun Lui, SEAS (2014)
- [6] Yanina Barrera, SEAS (2014)
- [5] Eun-Joo Park, Environmental Health, HSPH (2013-2015)
- [4] Kathryn McKain, SEAS (2015)
- [3] Yong-Mei Shen, Environmental Health, HSPH (2011-2015)
- [2] Iny Jhun, Environmental Health, HSPH (2012-2013)
- [1] Matthieu Trudeau, Environmental Health, HSPH (2011-2013)

Doctoral and Oral Examination Committees - Other Universities

- [8] Connor Olsen, Syracuse University (Committee Member, 2021-)
- [7] Aryeh Feinberg, ETH, Switzerland (Examining Committee, 2020)
- [6] Lara Schultes, Stockholm University, Sweden (Opponent, 2019)
- [5] Amanda Giang, MIT, Institute for Data, Systems and Society (Committee Member, 2013-2017)
- [4] Michelle Mastromonaco, Chalmers University of Technology, Sweden (Opponent, 2016)
- [3] Matthew Binnington, University of Toronto, Canada (External Examiner, 2016)
- [2] Ravinder Pannu, University of Saskatchewan, Canada (External Examiner, 2012)
- [1] Adrienne Ethier, University of Ottawa, Canada (External Examiner, 2009)

Undergraduate Research Assistants, Thesis and/or Independent Study Students

[23] Jordan Daigle (2021-22), [22] Murphy Agnew (2021), [21] Elida Kocharian (2020), [20] Maya Levine (2020), [19] Jonas LaPier (2019-21), [18] Jenn Greiner (2020-21), [17] Cecil Myers (2019-20), [16] Daniel Chang (2019-20), [15] Beverly Ge (2017-19), [14] Chandler Brown (2018-19), [13] Nicole Nishizawa (2017-19), [12] Helen Kim (2018), [11] Amira Hannon (2018), [10] Bruno Moguel Gallegos (2017-18), [9] Alina McIntyre (2017), [8] Nakoa Farrant (2017-18), [7] Alicia Juang (2016-18), [6] Jessica Ewald (2015-17), [5] Harry Stone (2015-16), [4] Jahred Liddie (2014-16), [3] Sam Krabbenhoft (2015), [2] Angela Jiang (2014), [1] Kurt Bullard (2014)

Undergraduate Student Awards:

Jonas LaPier ('21), Dean's Award for Outstanding Engineering Project

Daniel Chang ('20), Honorable mention, Dean's Award for Outstanding Engineering Project

Alicia Juang ('18), Dean's Award for Outstanding Engineering Project, Harvard College Hoopes Prize

Jessica Ewald ('17), Dean's Award for Outstanding Engineering Project

Publications with Undergraduate Authors:

- X.C. Hu, **B. Ge ('20)**, B. Ruyle, J. Sun, E.M. Sunderland. 2021. A statistical approach for identifying private wells susceptible to PFAS contamination. *Environmental Science & Technology Letters*. <https://doi.org/10.1021/acs.estlett.1c00264>.
- M. Li, **A. Juang ('18)**, **J. Ewald ('17)**, R. Yin, B. Mikkelsen, D.P. Krabbenhoft, P. Balcom, C. Dassuncao, E.M. Sunderland. 2020. Selenium and stable mercury isotopic analysis provide new insights into mercury toxicokinetics in pilot whales. *Science of the Total Environment*. 710 : 136325.
- **J.D. Ewald ('17)**, J.L. Kirk, M. Li, E.M. Sunderland. 2019. Organ-specific differences in mercury speciation and accumulation in juvenile and adult ringed seals (*Phoca hispida*). *Science of the Total Environment*. 650(2): 2013-2020.
- A.K. Tokranov, **N. Nishizawa ('19)**, C.A. Amadei, J.E. Zenobio, H.M. Pickard, J.G. Allen, C.D. Vecitis, E.M. Sunderland. 2019. How do we measure the poly- and perfluoroalkyl substances (PFASs) at the surface of consumer products? *Environmental Science & Technology Letters*. 6(1): 38-43.
- X.C. Hu, A.K. Tokranov, **J. Liddie ('16)**, X. Zhang, P. Grandjean, J.E. Hart, F. Laden, Q. Sun, L.W.Y. Yeung, E.M. Sunderland. 2019. Tap water contributions to plasma concentrations of poly- and perfluoroalkyl substances (PFASs) in a nationwide prospective cohort of U.S. women. *Environmental Health Perspectives*. 127(6):067006.
- E.M. Sunderland, M. Li, **K.T. Bullard ('17)**. 2018. Decadal changes in edible supply of seafood and methylmercury exposure in the United States. *Environmental Health Perspectives*. 126(1): 017006.

PROFESSIONAL ACTIVITIES

Professional Service: International

2021	Back to Blue Expert Panel on Ocean Pollution sponsored by the Economist Group and Nippon Foundation
2020-2021	Theme co-chair, GeoHealth, Goldschmidt 2021, virtual meeting, 4-9 July, 2021.
2019	Scientific Observer/Expert for the <i>ad hoc</i> committee on Effectiveness Evaluation for the Minamata Convention on Mercury, UNEP.
2018-2019	Planning Committee and Exposure Workgroup Co-Chair, SETAC Special Topic Meeting on PFAS Risk Assessment, Durham, NC, August 12-15, 2019.
2017-2019	Scientific Steering Committee, 14 th International Conference on Mercury as a Global Pollutant, Krakow, Poland, 2019.
2017-2018	International Planning Committee, 19 th International Conference on Heavy Metals in the Environment, Georgia, USA, 2018.
2017-2018	Contributor, 2018 UNEP Global Mercury Assessment (atmospheric and biotic workgroups).
2015-2017	Scientific Steering Committee, 13 th International Conference on Mercury as a Global Pollutant, Providence, RI, 2017.
2015-2016	International Planning Committee, 18 th International Conference on Heavy Metals in the Environment, Ghent, Belgium, 12-14 September 2016.

- 2013-2015 GEOS-Chem Model International Steering Committee (Co-chair: Hg & POPs working group).
- 2014-2015 Environmental Geochemistry theme co-convener for Goldschmidt 2015, Prague, CZ.
- 2013-2015 Scientific Steering Committee, 12th International Conference on Mercury as a Global Pollutant, Jeju, Korea, June 14-19, 2015.
- 2013-2014 International Planning Committee (IPC), 17th International Conference on Heavy Metals in the Environment, Guiyang, China, September 22-26, 2014.
- 2011-2013 Planning Team, UNECE/LRTAP Hemispheric Transport of Air Pollutants (HTAP), Impacts on Health and Ecosystems
- 2011-2013 Scientific Steering Committee, 11th International Conference on Mercury as a Global Pollutant, Edinburgh, Scotland, 28 July – 2 August 2013
- 2009-2012 Steering Committee, Consortium on Mercury in the Marine Environment (C-MERC)
- 2011-2012 International Planning Committee, 16th International Conference on Heavy Metals in the Environment, Rome, Italy, 22-27 September 2012
- 2006-2011 Conference Co-Host and Technical Co-Chair for the 10th International Conference on Mercury as a Global Pollutant, Halifax, Nova Scotia, 24-29 July 2011
- 2009-2010 Chapter Lead Author for Task Force on Hemispheric Transport of Air Pollution 2010 Assessment Report
- 2008-2010 International Joint Commission Fish Consumption Priority Workgroup
- 2004-2006 Regional Planning Committee for the 8th International Conference on Mercury as a Global Pollutant, Madison, Wisconsin, 6-11 August 2006
- 2007-2008 Invited Panelist for International Joint Commission Nearshore Priority Expert Consultations

Professional Service: National

- 2020 U.S. National Academies planning committee and session chair for Federal Government Human Health PFAS Research Workshop, October 26-27, 2020.
- 2019 U.S. National Academies of Science, Engineering and Medicine: Workshop Planning Committee on Perfluoroalkyl and Polyfluoroalkyl Substances in the Environment - A Systems Approach to Exploring Exposure and Identifying Opportunities for Leadership, September 26-27, 2019.
- 2009-2019 Science Council, Biodiversity Research Institute, Gorham, ME
- 2008-2009 Steering Committee: Mercury Science and Policy Conference for the Northeast and Great Lakes Region, Chicago, Illinois, 2009
- 2007-2008 Organizing Committee for the 6th National Water Quality Monitoring Conference, Atlantic City, New Jersey, May 18-22, 2008
- 2006-2007 Co-organizer of the Lake Ontario Contaminants Modeling and Monitoring Meeting, Grand Island, NY. March 27-28, 2007
- 2005-2006 Co-organizer of the International Joint Commission Collaborative Meeting on Mercury Modeling in Freshwater Environments, Niagara Falls, NY, 19-20 January 2006
- 2003-2008 Nation-wide modeling seminar series coordinator for U.S. EPA's Regional Offices
- 2007-2008 Great Lakes Observing System Modeling Subsystem Team Member
- 2003-2008 Co-organizer of Northwest Water Quality Modelers
- 2006-2008 U.S. EPA Region 1 Regional Science Council
- 2006-2008 Workgroup on U.S. EPA Guidance Document for Calculating National Bioaccumulation Factors
- 2006-2008 Workgroup on U.S. EPA Methylmercury Fish Tissue Residue Implementation Guidance
- 2003-2008 Lead Author and workgroup coordinator for U.S. EPA Guidance on Regulatory Environmental Modeling
- 2005 U.S. EPA Reconsideration of the Clean Air Mercury Rule Workgroup and Author
- 2004-2005 U.S. EPA Clean Air Mercury Rule Regulatory Impact Assessment Workgroup and Author
- 2003-2004 U.S. EPA Office of Water Mercury in Marine Life Workgroup

University Service

2020-present	Harvard FAS financial study working group
2020-present	Director of Undergraduate Studies, Environmental Science and Engineering, SEAS
2019-present	Harvard Standing Committee on Oceanography
2016-present	Standing Committee on the Concentration in Environmental Science and Public Policy
2019-2020	Presidential Committee on Sustainability, Member
2019-2021	Harvard Faculty Council, Division Representative for Natural and Applied Sciences
2017-2020	Director for Graduate Studies, Environmental Science and Engineering, SEAS
2019-2020	Docket Committee, Harvard Faculty of Arts and Science
2018-2020	Member, Faculty search committee in Risk Assessment, HSPH
2018-2020	Harvard Standing Committee on Women
2018-2019	Member, Faculty search committee in Marine Biology, Organismic and Evolutionary Biology (OEB)
2018-2019	Member, Faculty search committee in Earth History, Earth and Planetary Sciences (EPS)
2018	Harvard Campus Sustainability Innovation Fund (CSIF) Review Committee
2017-2018	Harvard University child-care vendor selection committee
2017-2018	Harvard Food Sustainability Standards Committee
2017-2018	Member, Faculty search committee in Climate Science (EPS/SEAS)
2016-2017	Harvard University Climate Change Task Force
2016-2017	Harvard Office of Sustainability Healthy Buildings Initiative
2016-2018	Harvard Alumni Association Speakers Bureau
2016-2017	Mentor, Harvard Graduate Student Women in Science and Engineering (HGWISE)
2016-2018	Board of Freshman Advisors
2016-2017	Committee on Higher Degrees, School of Engineering and Applied Sciences
2015-2016	Oceans and Health Seminar Series Coordinator, School of Engineering and Applied Sciences
2014-2016	Graduate Admissions and Scholarship, School of Engineering and Applied Sciences (Area Chair in 2015-2016)
2014-2015	Committee on Higher Degrees, School of Engineering and Applied Sciences
2010-2014	Curriculum Committee, Department of Environmental Health, HSPH

Special Session Organizer

2020	Goldschmidt 2020, Honolulu, USA, 21-26 June.
2019	Goldschmidt 2019, Barcelona, Spain, 18-23 August.
2018	Goldschmidt 2018, Boston, MA, August 12-17.
2015	2015 Joint Assembly of the American Geophysical Union and Canadian Geophysical Union, Montreal, PQ, 3-7 May.
2013	11 th International Conference on Mercury as Global Pollutant, Edinburgh, Scotland, 28 July – 2 August.
2012	American Meteorological Society, First Conference on Atmospheric Biogeosciences, 29 May – 1 June.
2010	Society of Environmental Toxicology & Chemistry, Annual Meeting, Portland OR, November 7-11.
2009	American Geophysical Union, Fall Meeting, San Francisco CA, December 14-18.
2009	9 th International Conference on Hg as a Global Pollutant, Guiyang, China, June 7-12.
2008	6 th National Water Quality Monitoring Conference, Atlantic City, New Jersey, May 18-22.

2006 8th International Conference on Hg as a Global Pollutant, Madison, WI, August 6-11.

University Affiliations and Professional Societies

Member, American Geophysical Union (AGU)
Member, American Chemical Society (ACS)
Member, European Association of Geochemistry (EAG)
Member, Society of Environmental Toxicology and Chemistry (SETAC)
Faculty Associate, Harvard University Center for the Environment (HUCE)
Faculty Associate, Harvard Center for Risk Analysis (HCRA)
Co-leader, Harvard Atmospheric Chemistry Modeling Group (2011-2014)

Reviews/Panels/Editorial

2018-present Editorial Advisory Board Member, *Environmental Science & Technology*
2017-present Editorial Advisory Board Member, *Environmental Science Processes and Impacts*
2018-2020 Editorial Board Member, *International Journal of Environmental Research and Public Health (IJERPH)*
2018 Guest Editor, *ACS Earth and Space Science*, 2018, Special Issue on Global Mercury Cycling
2012-2019 U.S. National Science Foundation (peer-reviewer)
2009-2016 Canadian Northern Contaminants Program (panel reviewer)
2013, 2016 U.S. National Science Foundation (panel reviewer)
2014 Netherlands Organization for Scientific Research (peer-reviewer)
2014 Gulf of Mexico Research Initiative (panel reviewer)
2013 Reviewer, Penobscot Bay scientific panel report on impacts of a chlor-alkali plant on estuarine water quality and mercury bioaccumulation.
2012 Guest Editor, *Environmental Research*, Volume 119, Pages 1-142 (November 2012): Mercury in Marine Ecosystems: Sources to Seafood Consumers
2012 Natural Sciences and Engineering Research Council of Canada (NSERC)
2012 Canadian Assessment of Mercury in the Marine Environment, Environment Canada
2010, 2015 Swiss National Science Foundation (peer-reviewer)
2011 Nunatsiavut Government, Expert review of potential impacts of hydroelectric power development on the Lower Churchill River in Labrador, Canada on methylmercury dynamics and risks to Inuit health.
2011 Panelist for blueprint review of research and monitoring priorities for the Northern Contaminants Program, Indian and Northern Affairs Canada.
2010 Arctic Monitoring and Assessment Report, Arctic Monitoring and Assessment Program
2009 New Hampshire Sea Grant, Virginia Sea Grant (peer-reviewer)
2009 UNEP Mercury Fate and Transport Partnership Assessment Report
2008 Minnesota Sea Grant (peer-reviewer)
2007 Natural Sciences and Engineering Research Council of Canada (NSERC) Strategic Grants Program (peer-reviewer)

PUBLICATIONS

Students and postdocs mentored are underlined. Senior author indicated by the last position.

2021

102. X.C. Hu, B. Ge, B. Ruyle, J. Sun, **E.M. Sunderland**. 2021. A statistical approach for identifying private wells susceptible to PFAS contamination. *Environmental Science & Technology Letters*. <https://doi.org/10.1021/acs.estlett.1c00264>.
101. M. Alcalá-Orozco, P. Balcom, **E.M. Sunderland**, J. Olivero-Verbel, K. Caballero-Gallardo. 2021. Occurrence of Essential and Toxic Elements in Canned Fish (sardines and tuna) Commercialized in the Latin American market: Public Health at Stake. *Food Additives and Contaminants: Part B*. Accepted.
100. M. Enrico, P. Balcom, D.T. Johnston, J. Foriel, **E.M. Sunderland**. 2021. Simultaneous combustion preparation for mercury isotope analysis and detection of total mercury using a direct mercury analyzer. *Analytica Chimica Acta*. 1154, 338327.
99. B. Ruyle, H. Pickard, D. LeBlanc, A. Tokranov, C. Thackray, X.C. Hu, C.D. Vecitis, **E.M. Sunderland**. 2021. Isolating the AFFF signature in coastal watersheds using oxidizable PFAS precursors and unexplained organofluorine. *Environmental Science & Technology*. 55(6): 3686-3695.
98. R.A. Stern, P. Koutrakis, M. Martins, B. Lemos, S.E. Dowd, **E. Sunderland**, E. Garshick. 2021. Characterization of Hospital Airborne SARS-CoV-2. *Respiratory Research*. 22:73.
97. Y. Zhang, S. Dutkiewicz, **E.M. Sunderland**. 2021. Impacts of climate change on methylmercury formation and bioaccumulation in the 21st century ocean. *One Earth*. 4(2): 279–288.
96. A. Young, E. Sparer, H. Pickard, **E.M. Sunderland**, G. Peaslee, J.G. Allen. 2021. Per- and polyfluoroalkyl substances (PFAS) and total fluorine in fire station dust. *Journal of Exposure Science and Environmental Epidemiology*. Accepted. <https://doi.org/10.1038/s41370-021-00288-7>.
95. R. Stern, N. Mahmoudi, C. Buckee, A. Schartup, P. Koutrakis, S. Ferguson, J. Wolfson, S. Wofsy, B. Daube, **E.M. Sunderland**. 2021. The microbiome of size fractionated airborne particles from the Sahara source region. *Environmental Science & Technology*. 55(3): 1487-1496.
94. A.O. De Silva, J.M. Armitage, T.A. Bruton, C. Dassuncao, W. Heiger-Bernays, X.C. Hu, A. Karrman, C. Ng, A. Robuck, M. Sun, T.F. Webster, **E.M. Sunderland**. 2021. PFAS exposure pathways for humans and wildlife: A synthesis of current knowledge and key gaps in understanding. *Environmental Toxicology and Chemistry*. 40(3): 631-657.
93. R. Lohmann, E. Markham, J. Klanova, P. Kukucka, P. Pribylova, X. Gong, T. Yanisheswki, C. Wagner, **E. Sunderland**. 2021. Trends of diverse POPs in air and water across the Western Atlantic Ocean: Strong gradients in the ocean, but not in the air. *Environmental Science & Technology*. <https://doi.org/10.1021/acs.est.0c04611>.
92. B.J. Ruyle, C.P. Thackray, J.P. McCord, M.J. Strynar, K.A. Mauge-Lewis, S.E. Fenton, **E.M. Sunderland**. 2021. Reconstructing the composition of poly- and perfluoroalkyl substances (PFAS) in contemporary aqueous film forming foams. *Environmental Science & Technology Letters*. 8(1): 59-65.

2020

91. K. Schaefer, Y. Elshorbany, E. Jafarov, P.F. Schuster, R.G. Striegl, K.P. Wickland, **E.M. Sunderland**. 2020. Potential impacts of mercury released from thawing permafrost. *Nature Communications*. 11(1): 1-6.
90. H. Joerss, Z. Xie, C.C. Wagner, W-J von Appen, **E.M. Sunderland**, R. Ebinghaus. 2020. Transport of legacy perfluoroalkyl substances and the replacement compound HFPO-DA through the Atlantic gateway to the Arctic Ocean – Is the Arctic a sink or a source? *Environmental Science & Technology*. 54(16): 9958-9967.
89. X. Zhang, X. Sun, R. Jiang, E. Zeng, **E.M. Sunderland**, D.C.G. Muir. 2020. Screening new persistent and bioaccumulative organics in China's inventory of industrial chemicals. *Environmental Science & Technology*. 54(12): 7398-7408.
88. D. Bitounis, D. Parviz, X. Cao, C.A. Amadei, C.D. Vecitis, **E.M. Sunderland**, B.D. Thrall, M. Fang, M.S. Strano, P. Demokritou. 2020. Synthesis and physicochemical transformations of size-sorted graphene oxide during

simulated digestion and its toxicological assessment against an *in vitro* model of the human intestinal epithelium. *Small*. 16(21): 1907640.

87. Y. Zhang, A.L. Soerensen, A.T. Schartup, **E.M. Sunderland**. 2020. A global model for methylmercury formation and uptake at the base of marine food webs. *Global Biogeochemical Cycles*. 34 (2), e2019GB006348.
86. M. Li, A. Juang, J. Ewald, R. Yin, B. Mikkelsen, D.P. Krabbenhoft, P. Balcom, C. Dassuncao, **E.M. Sunderland**. 2020. Selenium and stable mercury isotopic analysis provide new insights into mercury toxicokinetics in pilot whales. *Science of the Total Environment*. 710: 136325.
85. M. Perkins, O.P. Lane, D.C. Evers, A. Sauer, N.J. O'Driscoll, S.T. Edmunds, J.C. Haelin, J. Trimble, **E.M. Sunderland**. 2020. Historical patterns of mercury exposure for North American songbirds. *Ecotoxicology*. 29(8):1161-1173.

2019

84. D.H. Fourie, I.M. Hedgecock, F. DeSimone, **E.M. Sunderland**, N. Pirrone. 2019. Are mercury emissions from satellite electric propulsion an environmental concern? *Environmental Research Letters*. 14: 124021. <https://doi.org/10.1088/1748-9326/ab4b75>.
83. S. Cinnirella, D. Evelina Bruno, N. Pirrone, M. Horvat, I. Živković, D. Evers, S. Johnson, and **E.M. Sunderland**. 2019. Mercury concentrations in biota in the Mediterranean Sea, a compilation of 40 years of surveys. *Scientific Data*. 6: 205. <https://doi.org/10.1038/s41597-019-0219-y>.
82. X. Zhang, R. Lohmann, **E.M. Sunderland**. 2019. Poly- and perfluoroalkyl substances (PFASs) in seawater and plankton from the Northwestern Atlantic Margin. *Environmental Science & Technology*. 53 (21), 12348-12356.
81. W. Xue, S.Y. Kwon, S. Grasby, **E. Sunderland**, X. Pan, Z. Puiyang, T. Zhou, H. Yan, R. Yin. 2019. Anthropogenic influences on mercury in Chinese soil and sediment revealed by relationships with total organic carbon. *Environmental Pollution*. 255(1): 113186.
80. A.T. Schartup, C.P. Thackray, A. Qureshi, C. Dassuncao, K. Gillespie, A. Hanke, **E.M. Sunderland**. 2019. Climate change and overfishing increase neurotoxicant in marine predators. *Nature*. 572 (7771): 648-650.
79. V. St. Louis, J. Graydon, I. Lehnerr, H. Amos, **E. Sunderland**, K. St. Pierre, C. Emmerton, K. Sandilands, M. Tate, A. Steffen, E. Humphreys. 2019. Atmospheric concentrations and wet/dry loadings of mercury at the remote Experimental Lakes Area, northwestern Ontario, Canada. *Environmental Science & Technology*. 53, 8017-8026.
78. D.G. Streets, H.M. Horowitz, Z. Lu, L. Levin, C.P. Thackray, **E.M. Sunderland**. 2019. Five hundred years of anthropogenic mercury: Spatial and temporal release profiles. *Environmental Research Letters*. 14: 084004.
77. B. Eryasa, P. Grandjean, F. Nielsen, D. Valvi, D. Zmirou-Navier, **E. Sunderland**, P. Weihe, Y. Oulhote. 2019. Physico-chemical properties and gestational diabetes predict transplacental transfer and partitioning of perfluoroalkyl substances. *Environment International*. 130: 104874.
76. X.C. Hu, A.K. Tokranov, J. Liddie, X. Zhang, P. Grandjean, J.E. Hart, F. Laden, Q. Sun, L.W.Y. Yeung, **E.M. Sunderland**. 2019. Tap water contributions to plasma concentrations of poly- and perfluoroalkyl substances (PFASs) in a nationwide prospective cohort of U.S. women. *Environmental Health Perspectives*. 127(6):067006.
75. C. Dassuncao, H. Pickard, M. Pfohl, A.K. Tokranov, M. Li, B. Mikkelsen, A. Slitt, **E.M. Sunderland**. 2019. Phospholipid levels predict tissue distribution of long-chained poly- and perfluoroalkyl substances (PFASs) in a marine mammal. *Environmental Science & Technology Letters*. 6(3): 119-125.
74. C.C. Wagner, H.M. Amos, C.P. Thackray, Y. Zhang, E.W. Lundgren, G. Forget, C.L. Friedman, N.E. Selin, R. Lohmann, **E.M. Sunderland**. 2019. A global 3-D ocean model for polychlorinated biphenyls (PCBs): Benchmark compounds for understanding the impacts of global change on neutral persistent organic pollutants. *Global Biogeochemical Cycles*. 33, 469-481.
73. A.K. Tokranov, N. Nishizawa, C.A. Amadei, J.E. Zenobio, H.M. Pickard, J.G. Allen, C.D. Vecitis, **E.M. Sunderland**. 2019. How do we measure the poly- and perfluoroalkyl substances (PFASs) at the surface of consumer products? *Environmental Science & Technology Letters*. 6(1): 38-43.

72. R. Sun, M. Jiskra, H.M. Amos, Y. Zhang, **E.M. Sunderland**, J.E. Sonke. 2019. Modelling the mercury stable isotope distribution of Earth surface reservoirs: implications for global Hg cycling. *Geochimica et Cosmochimica Acta*. 246: 156-173.
71. D.G. Streets, H.M. Horowitz, Z. Lu, L. Levin, C.P. Thackray, **E.M. Sunderland**. 2019. Global and regional trends in mercury emissions and concentrations, 2010-2015. *Atmospheric Environment*. 201 : 417-427.
70. **E.M. Sunderland**, X.C. Hu, C. Dassuncao, C.C. Wagner, A.K. Tokranov, J.G. Allen. 2019. A Review of the Pathways of Human Exposure to Poly- and Perfluoroalkyl Substances (PFASs) and Present Understanding of Health Effects. *Journal of Exposure Science and Environmental Epidemiology (JESEE)*. 29, 131–147.
69. J.D. Ewald, J.L. Kirk, M. Li, **E.M. Sunderland**. 2019. Organ-specific differences in mercury speciation and accumulation in juvenile and adult ringed seals (*Phoca hispida*). *Science of the Total Environment*. 650(2): 2013-2020.
68. R.S.D. Calder, S. Bromage, **E.M. Sunderland**. 2019. Risk tradeoffs associated with methylmercury exposures from traditional foods and food consumption advisories for Labrador Inuit. *Environmental Research*. 168: 496-506.

2018

67. Y. Ma, D.A. Adelman, E. Bauerfeind, A. Cabrerizo, C.A. McDonough, D. Muir, T. Soltwedel, C. Sun, C. Wagner, **E.M. Sunderland**, R. Lohmann. 2018. Using passive samplers to determine concentrations and water mass transport of legacy POPs in the Arctic Ocean. *Geophysical Research Letters*. 45(23): 12972-12981.
66. J.E. Sonke, R. Teisserenc, L-E. Heimbürger, M.V. Petrova, N. Maruszczak, T. Le Dantec, A.V. Chupakov, C. Li, C.P. Thackray, **E.M. Sunderland**, N. Tananaev, O.S. Pokrovsky. 2018. Eurasian river spring flood observations support net Arctic Ocean mercury export to the atmosphere and Atlantic Ocean. *PNAS*. 115 (50), E11586-E11594.
65. A. Saiz-Lopez, S.P. Sitkiewicz, D. Roca-Sanjuán, J.M. Oliva-Enrich, J.Z Dávalos, R. Notario, M. Jiskra, Y. Xu, F. Wang, C.P. Thackray, **E.M. Sunderland**, D.J. Jacob, O. Travnikov, C.A. Cuevas, A.U. Acuña, D. Rivero, J. Plane, D.E. Kinnison, J.E. Sonke. 2018. Photoreduction of gaseous oxidized mercury changes global atmospheric mercury speciation, transport and deposition. *Nature Communications*. 9, 4796.
64. 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 & Technology*. 52(11): 6256-6264.
63. C. Dassuncao, X. Hu, F. Nielsen, P. Weihe, P. Grandjean, **E.M. Sunderland**. 2018. Shifting global exposures to poly- and perfluoroalkyl substances (PFASs) evident in longitudinal birth cohorts from a seafood consuming population. *Environmental Science & Technology*. 52(6): 3738-3748.
62. X.C. Hu, C. Dassuncao, X. Zhang, P. Grandjean, P. Weihe, G.M. Webster, F. Nielsen, **E.M. Sunderland**. 2018. Do profiles of poly- and perfluoroalkyl substances (PFASs) in human serum provide information on major exposure sources? *Environmental Health*. 17:11 DOI: 10.1186/s12940-018-0355-4.
61. D. Obrist, J. Kirk, L. Zhang, **E. Sunderland**, M. Jiskra, N.E. Selin. 2018. A review of global environmental mercury processes in response to human and natural perturbations: Changes of emissions, climate and land use. *Ambio*. 47(2): 116-140.
60. A.T. Schartup, A. Qureshi, C. Dassuncao, C.P. Thackray, G. Harding, **E.M. Sunderland**. 2018. A model for uptake and trophic transfer of methylmercury by marine plankton. *Environmental Science & Technology*. 52(2):654-662.
59. **E.M. Sunderland**, M. Li, K.T. Bullard. 2018. Decadal changes in edible supply of seafood and methylmercury exposure in the United States. *Environmental Health Perspectives*. 126(1): 017006.
58. D.G. Streets, Z. Lu, L. Levin, A.F.H. ter Schure, **E.M. Sunderland**. 2018. Historical releases of mercury to air, land and water from coal combustion. *Science of the Total Environment*. 615 : 131-140.

2017

57. X. Zhang, Y. Zhang, C. Dassuncao, R. Lohmann, **E.M. Sunderland**. 2017. North Atlantic deep water formation inhibits high Arctic contamination by continental perfluorooctane sulfonate (PFOS) discharges. *Global Biogeochemical Cycles*. 31(8): 1332-1343.
56. K. von Stackelberg, M. Li, **E.M. Sunderland**. 2017. Results of a national survey of high-frequency fish consumers. *Environmental Research*. 158: 126-136.
55. L. Yeung, C. Dassuncao, S. Mabury, **E.M. Sunderland**, X. Zhang, R. Lohmann. 2017. Vertical profiles, sources and transport of PFASs in the Arctic Ocean. *Environmental Science & Technology*. 51(12): 6735-6744.
54. D.G. Streets, H.M. Horowitz, D.J. Jacob, Z. Lu, L. Levin, A.T. Shure, **E.M. Sunderland**. 2017. Total mercury released to the environment by human activities. *Environmental Science & Technology*. 51: 5969-5977.
53. H.M. Horowitz, D.J. Jacob, Y. Zhang, T. S. Dibble, F. Slemr, H.M. Amos, J.A. Schmidt, E.S. Corbitt, E.A. Marais, **E.M. Sunderland**. 2017. A new mechanism for atmospheric mercury redox chemistry: Implications for the global mercury budget. *Atmospheric Chemistry and Physics*, 17, 6353-6371.
52. C. Dassuncao, X. Hu, X. Zhang, R. Bossi, M. Dam, B. Mikkelsen, **E.M. Sunderland**. 2017. Temporal shifts in poly- and perfluoroalkyl substances (PFASs) in North Atlantic pilot whales indicate large contribution of atmospheric precursors. *Environmental Science & Technology*. 51(8) : 4512-4521.
51. A. Weber, L. Barber, D. LeBlanc, **E.M. Sunderland**, C.D. Vecitis. 2017. Geochemical and hydrologic factors controlling subsurface transport of poly- and perfluoroalkyl substances, Cape Cod, Massachusetts. *Environmental Science & Technology*. 51(8) : 4269-4279.
50. D. Kocman, S.J. Wilson, H.M. Amos, K.H. Telmer, F. Steenhuisen, **E.M. Sunderland**, R.P. Mason, P. Outridge, M. Horvat. 2017. Towards an assessment of the global inventory of present-day mercury releases to freshwater environments. *International Journal of Environmental Research and Public Health*. 14(2):138-154.

2016

49. R.S.D. Calder, A.T. Schartup, M. Li, A.P. Valberg, P.H. Balcom, **E.M. Sunderland**. 2016. Future impacts of hydroelectric power expansion on methylmercury exposures of Canadian indigenous communities. *Environmental Science & Technology*. 50 (23): 13115–13122.
48. M. Li, A.T. Schartup, A.P. Valberg, *J. Ewald, D.P. Krabbenhoft, R. Yin, P. Balcom, **E.M. Sunderland**. 2016. Environmental origins of methylmercury accumulated in subarctic estuarine fish indicated by Hg stable isotopes. *Environmental Science & Technology*. 50(21): 11559-11568.
47. X.C. Hu, D. Andrews, A.B. Lindstrom, T.A. Bruton, L.A. Schaider, P. Grandjean, R. Lohmann, C.C. Carignan, A. Blum, S.A. Balan, C. Higgins, **E.M. Sunderland**. 2016. Detection of poly- and perfluoroalkyl Substances (PFASs) in U.S. drinking water linked to industrial sites, military fire training areas and wastewater treatment plants. *Environmental Science & Technology Letters*. 3(10): 344-350.
46. X. Zhang, R. Lohmann, C. Dassuncao, X.C. Hu, A. Weber, C.D. Vecitis, **E.M. Sunderland**. 2016. Source attribution of poly- and perfluoroalkyl substances (PFASs) in surface waters from Rhode Island and the New York metropolitan region. *Environmental Science & Technology Letters*. 3(9): 316-321.
45. M. Li, K. von Stackelberg, C. Rheinberger, J. K. Hammitt, D.P. Krabbenhoft, Y. Runsheng, **E.M. Sunderland**. 2016. Insights from mercury stable isotopes into factors affecting the internal body burden of methylmercury in frequent fish consumers. *Elementa*. 4(1): 000103.
44. A.L. Soerensen, D.J. Jacob, A.T. Schartup, J.A. Fisher, I Lehnerr, V.L. St. Louis, L-E. Heimberger, J. Sonke, D. P. Krabbenhoft, **E.M. Sunderland**. 2016. A mass budget for mercury and methylmercury in the Arctic Ocean. *Global Biogeochemical Cycles*. 30(4), 560-575.
43. R. Sun, D.G. Streets, H.M. Horowitz, H.M. Amos, G. Liu, V. Perrot, J-P Toutain, H. Hintelmann, **E.M. Sunderland**, J.E. Sonke. 2016. Historical (1850-2010) mercury stable isotope emissions from anthropogenic sources to the atmosphere. *Elementa*. 4(1): 000091.
42. Y. Zhang, D.J. Jacob, H.M. Horowitz, L. Chen H.M. Amos, D.P. Krabbenhoft, F. Slemr, M.S. Landis, V. St. Louis, **E.M. Sunderland**. 2016. Observed decrease in atmospheric mercury explained by global decline in anthropogenic emissions. *Proceedings of the National Academy of Sciences of the United States of America*. 113(3), 526-531.

2015

41. A.T. Schartup, P.H. Balcom, A.L. Soerensen, K. Gosnell, R. Calder, R.P. Mason, **E.M. Sunderland**. 2015. Freshwater discharges drive high levels of methylmercury in Arctic marine biota. *Proceedings of the National Academy of Sciences of the United States of America*. 112(38): 11789-11794.
40. Y. Zhang, D.J. Jacob, S. Dutkiewicz, H.M. Amos, M.S. Long, **E.M. Sunderland**. 2015. Biogeochemical drivers of the fate of riverine mercury discharged to the global and Arctic oceans. *Global Biogeochemical Cycles*. 29, 854-864.
39. A.T. Schartup, U.C. Ndu, P.H. Balcom, R.P. Mason, **E.M. Sunderland**. 2015. Contrasting effects of marine and terrestrially derived dissolved organic matter on mercury speciation and bioavailability in seawater. *Environmental Science & Technology*. 49(10) : 5965-5972.
38. H.M. Amos, J.E. Sonke, D. Obrist, N. Robins, N. Hagan, H.M. Horowitz, R.P. Mason, M. Witt, I. Hedgecock, E.S. Corbitt, **E.M. Sunderland**. 2015. Observational and modeling constraints on global anthropogenic enrichment of mercury. *Environmental Science & Technology*. 49(7) : 4036-4047.

2014

37. A.L. Soerensen, R.P. Mason, P. Balcom, D.J. Jacob, Y. Zhang, Y. Kuss, **E.M. Sunderland**. 2014. Elemental mercury concentrations and fluxes in the tropical atmosphere and ocean. *Environmental Science & Technology*. 48(19) : 11312-11319.
36. H.M. Horowitz, D.J. Jacob, H.M. Amos, D.G. Streets, **E.M. Sunderland**. 2014. Historical mercury releases from commercial products: Global environmental implications. *Environmental Science & Technology*. 48(17) : 10242-10250.
35. M.B. Trudeau, **E.M. Sunderland**, D.L. Jindrich, J.T. Dennerlein. 2014. A data-driven design evaluation tool for handheld device soft keyboards. *PLoS ONE*. DOI: 10.1371/journal.pone.0107070.
34. H.M. Amos, D.J. Jacob, D. Kocman, H.M. Horowitz, Y. Zhang, S. Dutkiewicz, M. Horvat, E.S. Corbitt, D.P. Krabbenhoft, **E.M. Sunderland**. 2014. Global biogeochemical implications of mercury discharges from rivers and sediment burial. *Environmental Science & Technology*, 48(16) : 9514-9522.
33. 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 & Technology*. 48(15) : 8800-8806.

2013

32. J.A. Fisher, D.J. Jacob, A.L. Soerensen, H.M. Amos, E.S. Corbitt, D.G. Streets, Q. Wang, R.M. Yantosca, **E.M. Sunderland**. 2013. Factors driving mercury variability in the Arctic atmosphere and ocean over the past 30-years. *Global Biogeochemical Cycles*. 27(4) : 1226-1235.
31. N. Pirrone, W. Aas, S. Cinnirella, R. Ebinghaus, I. M. Hedgecock, J. Pacyna, F. Sprovieri, **E.M. Sunderland**. 2013. Toward the next generation of air quality monitoring: Mercury. *Atmospheric Environment*. 80: 599-612.
30. A.L. Soerensen, R.P. Mason, P.H. Balcom, **E.M. Sunderland**. 2013. Drivers of surface ocean mercury concentrations and air-sea exchange in the West Atlantic Ocean. *Environmental Science & Technology*. 47(14), 7757-7765.
29. H.M. Amos, D.J. Jacob, D.G. Streets, **E.M. Sunderland**. 2013. Legacy impacts of all-time anthropogenic emissions on the global mercury cycle. *Global Biogeochemical Cycles*. 27, 410-421.
28. **E.M. Sunderland** and N.E. Selin. 2013. Future trends in environmental mercury concentrations: Implications for prevention strategies. *Environmental Health*. 12:2, doi:10.1186/1476-069X-12-2.

2012

27. A.L. Soerensen, D.J. Jacob, D. Streets, M. Witt, R. Ebinghaus, R.P. Mason, M. Andersson, **E.M. Sunderland**. 2012. Multi-decadal decline of mercury in the North Atlantic atmosphere explained by changing subsurface seawater concentrations. *Geophysical Research Letters*. 39, L21810.

26. R. Harris, C. Pollman, C., Landing, W., Axelrad, D., Morey, S.L., Dukhovskoy, D., Evans, D., D. Rumbold, D. Adams, **E.M. Sunderland**. 2012. Mercury in the Gulf of Mexico: Sources to receptors. *Environmental Research*, 119, 42-52.
25. C.T. Driscoll, C.Y. Chen, C.R. Hammerschmidt, R.P. Mason, C.C. Gilmour, **E.M. Sunderland**, B. Greenfield, K. Buckman, C.H. Lamborg, 2012. Nutrient supply and mercury dynamics in marine ecosystems: A conceptual model. *Environmental Research*, 119, 118-131.
24. R.P. Mason, W.F. Fitzgerald, C. Lamborg, C. Hammerschmidt, A. Choi, A.L. Soerensen, **E.M. Sunderland**. 2012. Mercury biogeochemical cycling in the ocean and policy implications. *Environmental Research*. 119, 101-117.
23. **E.M. Sunderland**, N. Burgess, A. Amirbahman, G. Harding, E. Kamai, M. Karagas, S. Jones, J. Dalziel, X. Shi, C.Y. Chen. 2012. Mercury sources and fate in the Gulf of Maine. *Environmental Research*. 119, 27-41.
22. J.A. Fisher, D.J. Jacob, A.L. Soerensen, H.M. Amos, A. Steffen, **E.M. Sunderland**. 2012. Riverine source of Arctic Ocean mercury inferred from atmospheric observations. *Nature Geoscience*, 5: 499-504.
21. E. Oken, A. Choi, M. Karagas, R. Schoeny, K. Marien, C. Rheinberger, **E. Sunderland**, S. Korrick. 2012. Which fish should I eat? Challenges to developing clear, unified fish consumption advice. *Environmental Health Perspectives*. 120: 790-798.
20. H. M. Amos, D. J. Jacob, C. D. Holmes, J. A. Fisher, Q. Wang, R. M. Yantosca, E. S. Corbitt, E. Galarneau, A. P. Rutter, M. S. Gustin, A. Steffen, J. J. Schauer, J. A. Graydon, V. L. St. Louis, R. W. Talbot, E. S. Edgerton, **E. M. Sunderland**. 2012. Gas-particle partitioning of atmospheric Hg(II) and its effect on global mercury deposition. *Atmospheric Chemistry and Physics*, 12, 591-603.

2011

19. D.G. Streets, M.K. Devane, Z. Lu, T.C. Bond., **E.M. Sunderland**, D.J. Jacob. 2011. All-time releases of mercury to the atmosphere from human activities. *Environmental Science & Technology*, 45(24), 10485-10491.
18. E.S. Corbitt, D.J. Jacob, C.D. Holmes, D.G. Streets, **E.M. Sunderland**. 2011. Global source-receptor relationships for mercury deposition under present-day and 2050 emissions scenarios. *Environmental Science & Technology*, 45(24), 10477-10484.
17. K.R. Mahaffey, **E.M. Sunderland**, H.M. Chan, A.L. Choi, P. Grandjean, K. Marien, E. Oken, M. Sakamoto, R. Schoeny, P. Weihe, C.-H. Yan, A. Yasutake. 2011. Balancing benefits of n-3 polyunsaturated fatty acids and the risk of methylmercury exposure from fish consumption. *Nutrition Reviews*. 69(9): 493-508.

2010

16. A.L. Soerensen, **E.M. Sunderland**, C.D. Holmes, D.J. Jacob, B. Yantosca, S.A. Strode, H. Skov, J. Christensen, R.P. Mason. 2010. An improved global simulation of mercury air-sea exchange: High concentrations in the North Atlantic. *Environmental Science & Technology*. 44(22): 8574-8580.
15. **E.M. Sunderland**, J. Dalziel, A. Heyes, B.A. Branfireun, D.P. Krabbenhoft, F.A.P.C. Gobas. 2010. Response of a macrotidal estuary to changes in anthropogenic mercury loading between 1850 and 2000. *Environmental Science & Technology*. 44(5): 1698-1704.
14. N.V. Smith-Downey, **E.M. Sunderland**, D.J. Jacob. 2010. Anthropogenic impacts on global storage and emissions of mercury from terrestrial soils: Insights from a new global model. *Journal of Geophysical Research - Biogeosciences*. 115, G03008.
13. N.E. Selin, **E.M. Sunderland**, C.D. Knightes, and R.P. Mason. 2010. Sources of mercury exposure for U.S. seafood consumers: Implications for policy. *Environmental Health Perspectives*. 118(1): 137-143.

Prior to 2010

12. **E.M. Sunderland**, D.P. Krabbenhoft, J.M. Moreau, S. Strode, W.M. Landing. 2009. Mercury sources, distribution and bioavailability in the North Pacific Ocean: Insights from data and models. *Global Biogeochemical Cycles*. 23, GB2010.

11. C.D. Knightes, **E.M. Sunderland**, M. Craig Barber, J.J. Johnston, R.B. Ambrose Jr. 2009. Application of ecosystem scale fate and bioaccumulation models to predict fish mercury response times to changes in atmospheric deposition. *Environmental Toxicology and Chemistry*. 29(4): 881-893.
10. **E.M. Sunderland**, M. Cohen, N.E. Selin, G.L. Chmura. 2008. Reconciling models and measurements to assess trends in atmospheric mercury deposition. *Environmental Pollution*. 156, 526-535.
9. N.E. Selin, D.J. Jacob, R.M. Yantosca, L. Jaegle, S. Strode, **E.M. Sunderland**. 2008. Land-ocean-atmosphere cycling in a global 3-D model for atmospheric mercury: pre-industrial and present-day biogeochemical budgets, and anthropogenic enhancement factors for deposition. *Global Biogeochemical Cycles*. Vol. 22, GB2011.
8. **E.M. Sunderland** and R.P. Mason. 2007. Human impacts on open ocean mercury concentrations. *Global Biogeochemical Cycles*. Vol. 21, GB4022.
7. **E.M. Sunderland**. 2007. Mercury exposure from domestic and imported estuarine and marine fish and shellfish in U.S. seafood markets. *Environmental Health Perspectives*. 115: 235-242.
6. **E.M. Sunderland**, F.A.P.C. Gobas, A. Heyes, B. Branfireun. 2006. Environmental controls on the speciation and distribution of mercury in coastal sediments. *Marine Chemistry*. 102: 111-123.
5. Heyes, R.P. Mason, E-H. Kim, and **E. Sunderland**. 2006. Mercury methylation in estuaries. *Marine Chemistry*. 102: 134-147.
4. **E.M. Sunderland**, F.A.P.C. Gobas, A. Heyes, B. Branfireun, A. Bayer, R. Cranston, and M. Parsons. 2004. Speciation and bioavailability of mercury in well-mixed estuarine sediments. *Marine Chemistry*. 90: 91-105.
3. G.L. Chmura, L.L. Helmer, C.B. Beecher, and **E.M. Sunderland**. 2001. Historical rates of salt marsh accretion in the outer Bay of Fundy. *Canadian Journal of Earth Sciences*. 31: 1081-1092.
2. **E.M. Sunderland** and G.L. Chmura. 2000. An inventory of historical mercury emissions in Maritime Canada: Implications for present and future contamination. *The Science of the Total Environment*. 256(1): 39-57.
1. **E.M. Sunderland** and G.L. Chmura. 2000. The history of mercury emissions from fuel combustion in Maritime Canada. *Environmental Pollution*. 110(2): 297-306.

PERSPECTIVES, BOOK CHAPTERS & REPORTS

22. R.S.D. Calder, A.T. Schartup, T. Bell, **E.M. Sunderland**. 2021. Muskrat Falls, methylmercury and Canadian hydroelectric development. In: Crocker, S and Crocker, L (Eds). ISER Books, Memorial University of Newfoundland, St. John's, NL.
21. **E.M. Sunderland** and C.C. Wagner. 2020. "[The global chemical experiment](#)." In Earth 2020 - An insider's guide to a rapidly changing planet., 1st ed., Pp. 185-193. Cambridge, UK: Open Book Publishers.
20. X.C. Hu, **E.M. Sunderland**, P. Grandjean. 2020. "Mercury" in *Environmental Toxicants – Human Exposures and Their Health Effects*, Eds. M. Lippmann, G.D. Leikuaf, 4th Edition. Wiley. 1024 pp. ISBN: 978-1-119-43880-9.
19. **E.M. Sunderland**, H.M. Chan, W.L. Cheung. 2019. Fisheries and seafood security under changing oceans. In: *Predicting Future Oceans: Sustainability of Ocean and Human Systems Amidst Global Environmental Change*. Eds: A.M. Cisneros-Montemayor, W.L. Cheung, Y. Ota. Pp. 61- 68. Elsevier, Oxford, UK. ISBN: 978-0-12-817-945-1.
18. C.P. Thackray, **E.M. Sunderland**. 2019. Seafood methylmercury in a changing ocean. In: *Predicting Future Oceans: Sustainability of Ocean and Human Systems Amidst Global Environmental Change*. Eds: A.M. Cisneros-Montemayor, W.L. Cheung, Y. Ota. Pp. 61- 68. Elsevier, Oxford, UK. ISBN: 978-0-12-817-945-1.
17. C.A. Stock, William WL Cheung, J.L. Sarmiento, **E.M. Sunderland**. 2019. Changing Oceans: A Short Synthesis. In: *Predicting Future Oceans: Sustainability of Ocean and Human Systems Amidst Global Environmental Change*. Eds: A.M. Cisneros-Montemayor, W.L. Cheung, Y. Ota. Pp. 19- 34. Elsevier, Oxford, UK. ISBN: 978-0-12-817-945-1.
16. **E.M. Sunderland**, A.T Schartup. 2016. Biogeochemistry : Mercury Methylation on ice. *Nature Microbiology*. 1, 16165. DOI: 10.1038/nmicrobiol.2016.165.

15. **E.M. Sunderland**, C.T. Driscoll, Jr., J.K. Hammitt, P. Grandjean, J.S. Evans, J.D. Blum, C.Y. Chen, D.C. Evers, D.A. Jaffe, R.P. Mason, S. Goho, W. Jacobs. 2016. Benefits of regulating hazardous air pollutants from coal and oil-fired utilities in the United States (Perspective). *Environmental Science & Technology*. 50, 2117-2120.
14. A. Schartup, R. Calder, M. Li, P. Balcom, A. Valberg, J. Ewald, **E. Sunderland**. 2016. "Methylmercury" in Lake Melville: Avativut, Kanuittailinnivut (Our Environment, Our Health). Scientific Report, Nunatsiavut Government. Nain, Labrador.
13. **E.M. Sunderland**, J.G. Wiener, M.E. Brigham. 2014. Why is mercury in fish a concern? Chapter 2 in USGS Circular, The Quality of Our Nation's Waters: Mercury in the Nation's Streams – Levels, Trends, and Implications. Circular 1395. D.A. Wentz, M.E. Brigham, M.A. Lutz, D.P. Krabbenhoft (Eds.). 100 pp. Available: <http://pubs.usgs.gov/circ/1395/>.
12. D.P. Krabbenhoft, **E.M. Sunderland**. 2013. Global change and mercury (Perspective). *Science*. 341 (6153), 1457-1458.
11. **E.M. Sunderland** and M. Tumpney. 2013. "Mercury in Foods." In: M. Rose, A. Fernandes. Persistent Organic Pollutants and Toxic Metals in Foods. Woodhead Publishing Series in Food Science, Technology and Nutrition No. 247. FERA, UK, pp. 392-413. ISBN-13: 978 0 85709 245 8.
10. Chen, C.Y., C.T. Driscoll, K.F. Lambert, R.P. Mason, L. Rardin, C.V. Schmitt, N.S. Serrell, and **E.M. Sunderland**. 2012. Sources to Seafood: Mercury Pollution in the Marine Environment. Hanover, NH: Toxic Metals Superfund Research Program, Dartmouth College.
9. A. Qureshi, M. MacLeod, **E. Sunderland**, and Hungerbühler, K. 2012. "Exchange of mercury between the oceans and atmosphere." In: G. Liu, Y. Cai, N. O'Driscoll. Environmental Chemistry and Toxicology of Mercury. John Wiley & Sons, Inc. Hoboken, New Jersey, USA, pp. 389-422. ISBN 978-0-470-57872-8.
8. International Joint Commission (**Workgroup contributor**), 2011. Risks and Benefits of Fish Consumption. Great Lakes Water Quality Agreement 2009-2011 Priority Cycle Report. International Joint Commission, Windsor, Ontario. ISBN: 978-1-927336-0308.
7. Hedgecock, N. Pirrone, A. Dastoor, L. Levin, C-J. Lin, R.P. Mason, **E. Sunderland**, O. Travnikov. 2010. Chapter 6: Summary. In: Hemispheric Transport of Air Pollution 2010, Part B: Mercury. N. Pirrone and T. Keating (Eds.) Air Pollution Studies No. 18. United Nations Economic Commission for Europe. United Nations, New York and Geneva.
6. **E.M. Sunderland**, E. Corbitt, D. Cossa, D. Evers, H. Friedli, D. Krabbenhoft, L. Levin, N. Pirrone, G. Rice. 2010. Impacts of Intercontinental Mercury Pollution on Human and Ecological Health. In: Hemispheric Transport of Air Pollution 2010, Part B: Mercury. N. Pirrone and T. Keating (Eds.) Air Pollution Studies No. 18. United Nations Economic Commission for Europe. United Nations, New York and Geneva.
5. **E.M. Sunderland**, C.D. Knightes, K. von Stackelberg, and N. Stiber. 2010. "Environmental Fate and Bioaccumulation Modeling at EPA: Application to Environmental Decision Making." In: G. Hanrahan (Ed.), Modelling of Pollutants in Complex Environmental Systems, Vol. II, ILM, UK, pp. 3-42.
4. U.S. EPA. 2009. *Final EPA Guidance on the Development, Evaluation and Application of Environmental Models*. (Principal authors: N. Gaber, P. Pascual, N. Stiber, **E. Sunderland**). EPA/100/K-09/003, EPA Council for Regulatory Environmental Modeling, Washington D.C, March 2009.
3. International Joint Commission. 2006. **Contributing author** to chapter: Development of a Multi-compartment Mercury Model for Lake Ontario: Tracking Mercury from Sources, Deposition and Dispersion to Fish and Accumulation in Humans. In: *Priorities 2003-2005. Priorities and Progress Under the Great Lakes Water Quality Agreement*. Chapter 2: 37-69.
2. U.S. EPA. 2005. **Lead author** for chapter: "Ecosystem Scale Modeling for Mercury Benefits Assessment." Chapter 3, Regulatory Impact Analysis of the Clean Air Mercury Rule, Final Report. EPA-452/R-05-003, Office of Air Quality Planning and Standards, Research Triangle Park, NC.

1. EPA Council for Regulatory Environmental Modeling. 2003. *Interim EPA Guidance for the Development, Evaluation and Application of Regulatory Environmental Models*. (Principal authors: P. Pascual, N. Stiber, **E. Sunderland**). Washington DC.

INVITED PRESENTATIONS

2021

104. Invited panel, Environmental Working Group Symposium on PFAS, July 14.
103. Invited talk, National Academies of Science, Engineering, and Medicine Consensus Study on “Guidance on PFAS Testing and Health Outcomes,” July 13.
102. Invited talk. Massachusetts Interagency PFAS Task Force, Virtual, June 15.
101. Invited talk. Physical Geography Seminar Series, University College London, Virtual seminar, May 20.
100. Invited talk. Environmental Metrology and Policy Program, Georgetown University. Virtual seminar, April 29.
99. Invited talk. Hemispheric Transport of Air Pollution (HTAP) Fate and Transport Partnership meeting, April 13.
98. Invited panelist for “Dark Waters” film discussion on the business and societal impacts of drinking water contamination. Harvard Business School Food, Agriculture and Water Club. March 24.
97. Invited panelist for 2021 PFAS Workshop. Institute for Journalism and Natural Resources. Virtual panel, Jan 27.

2020

96. Invited panelist. Minamata Online: Multimedia modelling. United Nations Environment Programme. Nov. 17.
95. Invited talk. University of Michigan Lifestage Environmental Exposures and Disease Center. Oct. 7.
94. Invited seminar. NOAA Chemical Sciences Laboratory Seminar Series. September 9.
93. Keynote talk. Emerging Contaminants Summit. Denver, Colorado, March 11.
92. Invited seminar, Doctoral Seminar Series, College of Pharmacy and Health Sciences, St John’s University, Queens, New York, February 24.

2019

92. Invited plenary talk, North American Deposition Program (NADP) Meeting, Boulder, Colorado, November 6.
91. Invited seminar, University of Pittsburgh, Civil and Environmental Engineering Seminar, Pittsburgh, PA, Oct. 11.
90. Invited seminar, Gijs van Seventer Lectureship in Environmental Health, Boston University, Boston, MA, Oct. 4.
89. Invited talk, Symposium on Faroese Research on Health and Environment, Tórshavn, Faroe Islands, August 30.
88. Invited seminar, Institute of Coastal Research, Helmholtz-Zentrum Geesthacht, Hamburg, Germany, August 26.
87. Invited seminar, New Insights in Atmospheric Science Seminar Series, US EPA, Research Triangle Park, NC, August 15.
86. Invited talk, ESTCP and SERDP PFAS Project Meeting, San Diego, CA, July 31.
85. Invited seminar, Department of Estuarine and Ocean Sciences, University of Massachusetts, Dartmouth, MA, March 20.
84. Invited seminar, University of Toronto, Center for Global Change Science Distinguished Lecturer Series. Toronto, Canada, January 8.

2018

83. Invited talk, Harvard Club of Portland, Portland, OR, June 20.
82. Invited seminar, University of Rhode Island Superfund Center Trainees, Kingston, RI, May 21.
81. Invited seminar, Agency for Toxic Substances and Disease Research (ATSDR), Atlanta, GA, May 10.

80. Invited seminar, Department of Earth, Ocean and Atmospheric Sciences Seminar Series, University of British Columbia, Vancouver, Canada, May 3.
79. Invited presentation at the "Six Classes" Toxics Retreat IV, Sequoia Retreat Center, Ben Lomond, CA, May 1.
78. Invited talk, Harvard Club of Cape Cod, Falmouth, MA, April 27.
77. Invited presentation, Northeast Regional Superfund Program Meeting, Woods Hole Oceanographic Institute, Woods Hole, MA, March 26.
76. Invited presentation, Nereus Symposium on Health of the Oceans, Nippon Foundation, Tokyo, Japan, Dec. 22.

2017

75. Invited talk, Hertz Foundation Fellows East Coast Retreat, Woods Hole, MA, September 24.
74. Invited keynote talk, Goldschmidt 2017, Paris, France, August 13-18.
73. Invited talk and plenary panel, 13th International Conference on Mercury as a Global Pollutant, Providence, RI, July 16-21.
72. Invited talk, Highly Fluorinated Compounds – Social and Scientific Discovery, Northeastern University, Boston MA, June 14.
71. Invited seminar, Washington Harvard Alumni Special Interest Group, Washington DC, May 22.
70. Invited seminar, Science, Technology and Environmental Policy Seminar, Princeton University, Princeton NJ, April 10.
69. Invited seminar, Climate Change and Global Health Seminar, Harvard Global Health Institute, Cambridge MA, February 28.
68. Invited talk, Harvard Standing Committee on Women Mini-Symposium, Cambridge MA, February 27.
67. Invited talk, Global Food+ 2017 Symposium, Cambridge MA, February 24.

2016

66. Invited seminar, Saturday of Symposia, Harvard Club of Boston, Boston MA, December 5.
65. Invited seminar, U.S. Environmental Protection Agency, Washington DC, November 28.
64. Invited seminar, Nereus Program, University of British Columbia: Adapting to Global Changes in Oceans and Fisheries, Vancouver BC, Canada, November 17.
63. Invited talk, UNEP Global Mercury Partnership consultation meeting, Portland, ME, October 13.
62. Plenary talk, 18th International Conference on Heavy Metals in the Environment, Ghent, Belgium, September 12.
61. Invited presentation, Methylmercury mitigation and Muskrat Falls workshop, Happy Valley - Goose Bay, Labrador, Canada, August 4.
60. Invited talk, Gordon Research Conference: Organic Geochemistry, Holderness School NH, July 28.
59. Invited seminar, NOAA Geophysical Fluid Dynamics Laboratory (GFDL) Seminar Series, Princeton NJ, April 28.
58. Technical lead, Nunatsiavut Government press conference on risks to Inuit health of Muskrat Falls development, St. John's NL, Canada, April 18.
57. Invited panelist, Center for Public Leadership, Belfer Center, Harvard Kennedy School, Cambridge MA, Panel on Women and Climate Change, Cambridge MA, March 29.

2015

56. Invited talk, Transatlantic Science Week 2015 speaker, Boston MA, November 5.
55. Invited speaker, Faculty Forum, Harvard Alumni Association, Cambridge MA, October 23.
54. Invited plenary speaker, Arctic Circle Assembly 2015 plenary talk, Reykjavík, Iceland, October 17.

53. Invited speaker, ScienceWriters2015.org, Cambridge, MA, October 12.
52. Invited seminar, Metals research core seminar, Harvard NIEHS Center, Harvard School of Public Health, Boston MA, October 1.
51. Invited speaker, Faculty Forum, Harvard Alumni Association, Cambridge MA, May 29.
50. Invited seminar, Environmental Geology & Geochemistry Seminar, Princeton University, Princeton NJ, May 14.
49. Invited talk, Goldschmidt2015, Prague, CZ, August 17.

2014

48. Invited keynote talk, Goldschmidt2014, Sacramento, CA, June 8.
47. Invited seminar, Environmental Science and Engineering Seminar Series, Harvard School of Engineering and Applied Sciences, Cambridge MA, March 14.
46. Discussion lead, Harvard University Center for the Environment, Cambridge MA, January 28.
45. Invited seminar, Department of Chemistry Seminar Series, University of British Columbia, Vancouver BC, Canada, January 21.

2013

44. Plenary speaker, 11th International Conference on Mercury as a Global Pollutant, Edinburgh, Scotland (presented for medical reasons by D.P. Krabbenhoft), August 1.
43. Invited seminar, Graduate School of Oceanography Seminar Series, University of Rhode Island, Narragansett RI, April 26.

2012

42. Invited seminar, Dartmouth College Superfund Program Seminar Series, Hanover NH, October 16.
41. Plenary speaker, 16th International Conference on Heavy Metals in the Environment (ICHMET), Rome, Italy, September 24.
40. Invited talk, Mercury Science in the Great Lakes Workshop, Chicago IL. May 30-31.
39. Invited seminar, School of Marine and Atmospheric Sciences Seminar Series, Stony Brook University, Stony Brook NY, February 3.

2011

38. Invited talk, Gulf of Mexico Alliance Mercury Meeting, Gulf Breeze FL, October 18.
37. Invited seminar, Interdisciplinary Seminar Series, Lafayette College, Easton PA, September 26.
36. Invited seminar, Superfund Research Program Seminar Series, Harvard School of Public Health, Boston MA, March 7.

2010

35. Invited talk, Gordon Research Conference – Environmental Sciences: Water, Holderness NH, June 20-25.
34. Invited meeting lead, U.S. EPA Meeting on Global Mercury Emissions and U.S. Exposures, Washington, DC. Jan. 14.

Prior to 2010

33. Invited talk, Northeast and Great Lakes Region Mercury Science & Policy Conference, Chicago IL, November 18.
32. Invited talk, 10th National Forum on Contaminants in Fish, Portland OR, November 2-5.
31. Invited presentation, Session hosted by the National Institute for Minamata Disease (NIMD), 9th International Conference on Mercury as a Global Pollutant, Guiyang, China. June 7-12.
30. Invited presentation, UNECE/CLRTAP Task Force on Hemispheric Transport of Air Pollution, St. Petersburg, Russia, April 1-3.

29. Invited presentation, International Air Quality Advisory Board, Washington DC. April 15.
28. Invited talk, Gulf of Mexico Mercury Workshop, Gulfport MS, December 2-4.
27. Invited talk, 5th Annual Northwest Water Quality Modelers Meeting, Hood River OR, May 2-3.
26. Invited roundtable panelist, International Joint Commission Nearshore Priority Expert Consultation Part II, Dearborn MI, March 12-13.
25. Invited talk, Joint ASLO and AGU Ocean Sciences Meeting, Orlando FL. March 2-7.
24. Invited seminar, New England Tribal Council, Boston MA, December 11.
23. Invited seminar, US EPA Region 1 Science Council Seminar Series, Boston MA, August 29.
22. Invited seminar, New England Interstate Water Pollution Control Commission Fish Consumption Workgroup, Lowell MA, April 3.
21. Invited talks, Lake Ontario Contaminant Monitoring, Modeling and Research Workshop, Grand Island NY, March 27-28.
20. Invited seminar, Harvard Center for Risk Analysis Seminar Series, Harvard School of Public Health, Boston MA, March 5.
19. Invited talk, US EPA's Mercury Coordination Workgroup, Washington DC, February 28.
18. Invited seminar, Dartmouth Toxic Metals Research Program and Sea Grant Sponsored Workshop, Durham NH, November 15-16.
17. Invited seminar, Marine Science Program Seminar Series, University of Connecticut, Groton CT, October 13.
16. Invited seminar, NOAA Great Lakes Environmental Research Laboratory Seminar Series, Ann Arbor MI, September 14.
15. Invited talk, USGS/US EPA Roundtable on Mercury in the Environment, Washington DC, April 13.
14. Invited seminar, US EPA Region 1 Regional Science Council Seminar Series, Boston MA, March 1.
13. Invited seminar, University of British Columbia, School of Occupational and Environmental Hygiene Seminar Series, Vancouver BC, Canada, February 3.
12. Invited talk, US Army Corps of Engineers Committee on Water Quality, San Francisco CA, August 30.
11. Invited plenary talk, Shared Air Summit sponsored by the Premier of Ontario, Toronto ON, Canada, June 20.
10. Invited talks, Biennial Meeting of the International Joint Commission, Kingston ON, Canada. Two Invited talks. June 9-11.
9. Invited talk, NOAA- US EPA Scientist-to-Scientist Meeting on Multi-Media Aspects of Environmental Pollution in Coastal and Marine Environments. Laurel MD, June 2.
8. Invited seminars, Ontario Ministry of the Environment, Toronto/Dorset ON, Canada, April 20&22.
7. Invited talk, US EPA's Scientific Advisory Board, Panel on Regulatory Environmental Modeling, Washington DC, February 7-9.
6. Invited seminar, International Air Quality Advisory Board of the International Joint Commission, Vancouver BC, Canada, January 26.
5. Invited seminars, Department of Fisheries and Oceans Canada, Bedford Institute of Oceanography, Halifax NS, Canada, January 13&15.
4. Invited talk, USGS/US EPA Mercury Roundtable on Tools for Modeling Fish Bioaccumulation and Potential Health Effects, Washington DC, June 4.
3. Invited talk, Woodrow Wilson International Center for Scholars, Washington DC, June 20.
2. Invited seminar, US EPA Mercury in Marine Life Workgroup, Office of Water. Washington DC, July 10, 2003.

1. Invited talk, 4th International Conference on Air Quality: Mercury, Trace Elements and Particulate Matter, Arlington VA, September 22-24.