

# Colin Pike Thackray

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## Research Interests

Mercury biogeochemistry; fisheries sustainability; food web bioaccumulation of mercury; atmospheric chemistry of mercury, perfluoroalkyl substances, polycyclic aromatic hydrocarbons; toxic pollutant emissions and transport;

## Education

**Ph.D.** Atmospheric Science, **Massachusetts Institute of Technology**, 9/2016

**M.Sc.** Physics and Atmospheric Science, **Dalhousie University**, 8/2011

**B.Sc. (Hon.)** Physics, **Memorial University**, 5/2009

## Academic Research

**2019-Present** – **Harvard University** – Research Associate

**2016-2019** – **Harvard University** – Nereus Program Senior Fellow

**2012-2016** – **Massachusetts Institute of Technology** – Ph.D. Dissertation: Atmospheric Chemistry Modeling of polycyclic aromatic hydrocarbons and perfluoroalkyl substances  
**Advisor: Noelle Selin**

**Fall 2011** – **Massachusetts Institute of Technology** – Research Assistant

**2009-2011** – **Dalhousie University** – M.Sc. Dissertation: Reconstruction of High Arctic winter surface energy fluxes  
**Advisor: Tom Duck**

**Summer 2009** – **Memorial University** – Research Assistant

**2008-2009** – **Memorial University** – B.Sc. Honours dissertation: Assessment of the predictive skills of the Labrador Sea ocean circulation model  
**Advisor: Entcho Demirov**

## Honours and Awards

- 2013-16 **NSERC PGS-D Scholarship**
- 2012-13 **Klein Fellowship**, Massachusetts Institute of Technology
- 2008-09 **Faculty of Science Dean's List**, Memorial University
- 2007-08 **Faculty of Science Dean's List**, Memorial University
- 2006-07 **Canadian Interuniversity Sport (CIS) Academic All-Canadian**
- 2005-06 **CIS Academic All-Canadian**

## **Peer-Reviewed Publications**

- 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.
- 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 (8), 084004.
- 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*.
- 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, 15, 417-427.
- 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. Eurasian river spring flood observations support net Arctic Ocean mercury export to the atmosphere and Atlantic Ocean. *PNAS*.
- 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.
- Angot, H; Hoffman, N; Giang, A; Thackray, CP; Hendricks, AN; Urban, N; Selin, NE; 2018. Global and local impacts of delayed mercury mitigation efforts, *Environ. Sci. Technol.*, 52, 22, 12968-12977
- Schartup, AT; Qureshi A; Dassuncao, C; Thackray, CP; Harding, G; Sunderland, EM; 2018. A Model for Methylmercury Uptake and Trophic Transfer by Marine Plankton, *Environ. Sci. Technol.*, 52 : 654–662
- McCullough, E.M.; Sica, R.J.; Drummond, J.R.; Nott, G.J.; Perro, C.; Thackray, C.P.; Hopper, J.; Doyle, J.G.; Duck, T.J.; Walker, K.A.; (2017), *Depolarization calibration and measurements using the CANDAC Rayleigh-Mie-Raman Lidar at Eureka, Canada*, *Atmos. Meas. Tech.*, 10, 4253-4277
- Thackray, C.P.; Selin, N. E.; (2017), *Uncertainty and variability in atmospheric formation of PFCA<sub>s</sub> from fluorotelomer precursors*, *Atmos. Chem. Phys.*, 17, 4585-4597
- Thackray, C. P.; C. L. Friedman; Y. Zhang; N. E. Selin; (2015), *Quantitative Assessment of Parametric Uncertainty in Northern Hemisphere PAH Concentrations*, *Environ. Sci. Technol.*, 49, 9185-9193
- Doyle, J. G.; G. Lesins; C. P. Thackray; C. Perro; G. J. Nott; T. J. Duck; R. Damoah; J. R.

Drummond; (2011), *Water vapor intrusions into the High Arctic during winter*, Geophys. Res. Lett., 38, L12806, doi:10.1029/2011GL047493.

Nott, G.J.; Duck, T.J.; Doyle, J.G.; Coffin, M.E.W.; Perro, C.; Thackray, C.P.; Drummond, J.R.; Fogal, P.F.; McCullough, E.; Sica, R.J.; (2011) *A remotely-operated lidar for aerosol, temperature, and water vapor profiling in the High Arctic*, Journal of Atmospheric and Ocean Technology, **29**, 221–234

### **Other Publications**

*Oceans and the Sustainable Development Goals: Co-benefits, Climate Change & Social Equity*, (Technical Report), The Oceans Conference, United Nations (2017)

Thackray CP, Sunderland EM. “Seafood methylmercury in a changing ocean”. (Book Chapter) *Predicting Future Oceans: Sustainability of Ocean and Human Systems Amidst Global Environmental Change*. (2019) p61.

### **Selected Conference Presentations**

Thackray, CP; Saiz-Lopez, A; Dibble, T; Horowitz, HM; Sonke, J; Sunderland, EM; Jacob DJ; “Mechanistic oxidation and reduction of atmospheric Hg: implications for speciation, deposition patterns and budget in a global chemistry model”, International Conference on Mercury as a Global Pollutant, 9/2019

Thackray, CP; Geyman, B.; “Modeling the Global Mercury Cycle for Beginners” (Workshop), International Conference on Mercury as a Global Pollutant, 9/2019

Thackray, C.P.; Schartup, A.; Zhang, Y.; Cheung, W.; Sunderland, E.; “Impacts of methylmercury bioaccumulation in marine food webs on the health and sustainability of tuna fisheries in the Pacific Ocean” International Conference on Mercury as a Global Pollutant, 7/2017

Thackray, CP; Selin, NE; “Perfluorocarboxylic acid atmospheric formation and transport to the Arctic” AGU Fall Meeting, 12/2015

Thackray, CP; Selin, NE; “Uncertainty and variability in the atmospheric formation of long-chain PFCAs” Society of Environmental Toxicology And Chemistry North America 36th Annual Meeting, 11/2014

Thackray, CP; Friedman, CL; Selin, NE; “Parametric uncertainty analysis of PAH simulations using the GEOS-Chem chemical transport model” International Symposium on Polycyclic Aromatic Compounds, 9/2013

Thackray, C.P., Lesins, G., et al., “Longwave radiation observations, modeling and reconstruction in the winter High Arctic” Canadian Meteorological and Oceanographic Society (CMOS) Congress, Victoria, Canada, 6/2011

Thackray, C.P., Lesins, G., et al., “Radiative effects of winter water vapour intrusions at Eureka”.

The Canadian Network for the Detection of Atmospheric Change (CANDAC) workshop and CREATE symposium, Halifax, Canada, 11/2010

Thackray, C.P., Demirov, E., “Assessment of predictive skills of the Labrador Sea eddy permitting circulation model”. Canadian Meteorological and Oceanographic Society (CMOS) Congress, Halifax, Canada, 6/2009

### **Teaching Experience**

Harvard University:

-Seminar on Global Pollution Issues: Case Study of Lead Biogeochemistry (Co-lecturer)

Massachusetts Institute of Technology:

-Introduction to Weather Forecasting (Teaching Assistant)

Dalhousie University:

-Introduction to Atmospheric Science (Guest Lecturer)

-Physics In and Around You, Climate Change (Teaching Assistant)

-Understanding Weather (Teaching Assistant, Also developed assignments for this course)

### **Programming Skills**

- Linux/Unix
- Python
- Fortran
- Matlab