

RYAN S.D. CALDER

Curriculum vitae

205 Duck Pond Dr.
Room 389
Blacksburg, VA 24061

☎ (540) 231-2430
☎ (540) 231-7007
✉ rsdc@vt.edu

EDUCATION

- 2017 **ScD** Environmental Health (Exposure, Epidemiology and Risk), Harvard T.H. Chan School of Public Health, Boston, MA
- 2012 **MASc** Civil Engineering (Hydraulic Engineering), Concordia University, Montreal, Canada
- 2010 **BEng** Civil Engineering (Environmental Engineering), Concordia University, Montreal, Canada

ACADEMIC APPOINTMENTS

Virginia Polytechnic Institute and State University, Blacksburg, VA

- Since 2020 Assistant Professor of Environmental Health and Policy, Dept. of Population Health Sciences
Assistant Professor of Health Sciences, Faculty of Health Sciences
Faculty Affiliate, Global Change Center
Faculty Affiliate, Center for Coastal Studies

Duke University, Durham, NC

- Since 2020 Adjunct Assistant Professor, Dept. of Civil and Environmental Engineering
- Since 2020 Nonresident Affiliate, Center on Risk
- 2017–20 Postdoctoral Associate, Dept. of Civil and Environmental Engineering

Harvard University, Cambridge, MA

- 2017 Postdoctoral Fellow, Harvard John A. Paulson School of Engineering and Applied Sciences
- 2014–17 Fellow in Environmental Science and Engineering, Harvard John A. Paulson School of Engineering and Applied Sciences

PROFESSIONAL POSITIONS

GHD, Montreal, Canada

- 2008–12 Engineer (2012), Junior Engineer (2010–2012), Engineering Technician (2008–2010)

Quebec Ministry of Environment, Sherbrooke, Canada

- 2007 Analyst, Environmental Hydraulics

REFEREED JOURNAL PAPERS

- 2020 [RSD Calder](#), A Alatorre, R Marx, V Mallampalli, SA Mason, LP Olander, M Jeuland & ME Borsuk. ‘Graphical models and the challenge of evidence-based practice in development and sustainability’ in *Environ Modell Softw*, vol. 130: 104734. [↗](#)
- 2019 [RSD Calder](#), C Shi, SA Mason, LP Olander & ME Borsuk. ‘Forecasting ecosystem services to guide coastal wetland rehabilitation decisions’ in *Ecosyst Serv*, vol. 39: 101007. [↗](#)
- 2019 H Tallis, [...] [RSD Calder](#), [...] & S Zobrist. ‘Aligning evidence generation and use across health, development and environment’ in *Curr Opin Env Sust*, vol. 39, pp. 81–93. [↗](#)

- 2018 [RSD Calder](#), S Bromage & EM Sunderland. ‘Risk tradeoffs associated with traditional food advisories for Labrador Inuit’ in *Environ Res*, vol. 168, pp. 496–506. [↗](#)
- 2016 [RSD Calder](#), AT Schartup, M Li, AP Valberg, PH Balcom & EM Sunderland. ‘Future impacts of hydroelectric power development on methylmercury exposures of Canadian indigenous communities’ in *Environ Sci Technol*, vol. 50 (23), pp. 13115–22. [↗](#)
- 2015 AT Schartup, PH Balcom, AL Soerensen, KJ Gosnell, [RSD Calder](#), RP Mason & EM Sunderland. ‘Freshwater discharges drive high levels of methylmercury in Arctic marine biota’ in *Proc Natl Acad Sci USA*, vol. 112 (38), pp. 11789–94. [↗](#)
- 2015 [RSD Calder](#) & KA Schmitt. ‘Decentralised drinking water regulation: risks, benefits and the hunt for equality in the Canadian context’ in *Int J Water*, vol. 9 (2), pp. 178–93. [↗](#)
- 2013 [RSD Calder](#), L Yerushalmi & SS Li. ‘Computational fluid dynamics model of a BioCAST multi environment air-lift bioreactor’ in *J Environ Eng*, vol. 139 (6), pp. 849–63. [↗](#)
- 2010 [RSD Calder](#) & KA Schmitt. ‘The Role of detection limits in drinking water regulation’ in *Environ Sci Technol*, vol. 44 (21), pp. 8008–14. [↗](#)

BOOK CHAPTERS

- 2020 [RSD Calder](#), AT Schartup, T Bell & EM Sunderland. ‘Muskrat Falls, methylmercury and Canadian hydroelectric development’ in forthcoming volume by S. Crocker & L. Crocker (Eds.), St. John's, Canada: ISER Books, Memorial University of Newfoundland. [↗](#)
- 2019 [RSD Calder](#). ‘Coupled human-natural modeling for hydroelectric development: understanding the health impacts of America's renewable energy imports’ in M. Valerino (Ed.). *Case Studies on Energy Access Transitions in the Developing World*. Durham, NC: Duke University. [↗](#)

POLICY ENGAGEMENT AND OUTREACH

Major policy reports

- 2020 [RSD Calder](#), ME Borsuk & CS Robinson. ‘Analysis of environmental and economic impacts of hydropower imports for New York City through 2050’. Report to the Quebec Ministry of International Relations and La Francophonie, Quebec City, Canada. [↗](#)
- 2019 [RSD Calder](#), ME Borsuk, SA Mason, LP Olander, A Plantinga & CS Robinson. ‘Assessing ecosystem service benefits from military installations’. Report to the Strategic Environmental Research and Development Program, Dept. of Defense, Washington, D.C. [↗](#)
- 2016 AT Schartup, [RSD Calder](#), M Li, PH Balcom, AP Valberg, J Ewald & EM Sunderland. ‘Methylmercury’ in A Durkalec, T Sheldon & T Bell (Eds.), *Lake Melville: Avativut, Kanuittailinnivut: Scientific Report*, pp. 49–61. Nain, Canada: Nunatsiavut Government. [↗](#)

Other reports and communications

- 2019 KA Schmitt, [RSD Calder](#), M Del Pino & N Cosgrove. ‘Stemming disinformation online: a rapid review of effectiveness, feasibility, risks and benefits of alternative policies for Canada’. Report to the Dept. of Foreign Affairs, Trade and Development, Ottawa, Canada. [↗](#)
- 2015 [RSD Calder](#), J Liddie, EM Sunderland, S Shankar, K Tian, G Touloumes & C Wagner. ‘Re: US EPA Science Advisory Board review of the Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources’. Letter to U.S. EPA Hydraulic Fracturing Review Advisory Panel. Docket ID EPA-HQ-OA-2015-0245. [↗](#)

- 2011 KA Schmitt & RSD Calder. Response to Comment on ‘Role of detection limits in drinking water regulations’ in *Environ Sci Technol*, vol. 45 (2), p. 836. ➔

Oral testimony and presentations (invited)

- 2020 ‘Analysis of environmental and economic impacts of hydropower imports for New York City through 2050’; briefings to leadership of Hydro-Québec, the Quebec Ministry of International Relations and La Francophonie, the New York City Mayor’s Office and the New York State Energy Research and Development Authority (NYSERDA)
- 2017–18 ‘Methylmercury risk analysis at Muskrat Falls’; multiple briefings and research presentations to the Independent Expert Advisory Committee on the Muskrat Falls hydroelectric project

Public writing

- 2019 RSD Calder. « Une mauvaise publicité pour l’hydroélectricité québécoise » (‘Bad advertising for Quebec’s hydropower’). La Presse, Montreal, Canada. ➔
- 2019 RSD Calder. ‘Canada ignore Muskrat Falls at its own peril’. The Telegram (via The Conversation), Montreal, Canada. ➔
- 2011 KA Schmitt & RSD Calder. ‘Keeping drinking water safe and economically sustainable: understanding the drivers of regulatory change to create anticipatory drinking water policy’ in *Engineering Dimensions*, Jan/Feb 2011, pp. 27–30. ➔

GRANTS

- 2020 ME Borsuk (PI), SM Wilson (PI), MD Hendricks & RSD Calder. ‘Building community resilience to natural-disaster-driven contaminant exposures through system-level risk analysis, management, and readiness’. United States Environmental Protection Agency (grant no. R840041, solicitation no. EPA-G2019-STAR-E1). Funding through 2023 (expected). **\$799,736.**
- 2020 RSD Calder & ME Borsuk (PI). ‘Analysis of environmental and economic impacts of hydropower imports for New York City through 2050’. Quebec Ministry of International Affairs and La Francophonie (grant no. SP1903210-2020-003). **\$61,352.**
- 2019 R Muenich (PI), R Hale (PI), RSD Calder, B Hannibal, C Prasse, A Stillwell & B Thiede. ‘Characterizing FEW system typologies across the continental U.S. for informed FEW research’, National Socio-Socio-Environmental Synthesis Center (pursuit funded through NSF grant no. DBI-1639145). Funding through 2021 (expected).
- 2018–19 MA Jeuland (PI), ME Borsuk, K Bradbury, JM Malof, LP Olander, RSD Calder, TR Fetter & J Phillips. ‘Practice Imperfect? Comparing expert and data-supported perspectives on the effect of energy access on social and economic development.’ Catalyst Program, Duke University Nicholas Institute for Environmental Policy Solutions (grant no. 451-1592). **\$19,840.**

SELECT AWARDS AND FELLOWSHIPS

- 2014–16 Canada Graduate Scholarship (CGS-D), Natural Sciences and Engineering Research Council of Canada (declined and accepted PGS-D for tenure outside Canada)
- 2014 Postgraduate Scholarship (B1), Fonds de recherche du Québec – nature et technologies (ranked first in earth, atmosphere and water sciences; declined to accept PGS-D award)
- 2012–14 Horace W. Goldsmith Fellowship, Harvard University

- 2011–12 Power Corporation of Canada Graduate Fellowship, Concordia University
- 2011 Student Merit Award, Society for Risk Analysis Ecological Risk Assessment Specialty Group (sole winner)
- 2010–12 Graduate Scholarship, Fondation Universitaire Pierre Arbour
- 2009 Steve Bonk Scholarship, Canadian Water & Wastewater Association (sole winner, national)

CONFERENCE, SEMINAR AND WORKSHOP PARTICIPATION

Oral presentations at research conferences

- 2019 RSD Calder, K Bradbury, JM Malof, LP Olander, M Jeuland & ME Borsuk. ‘Integrated modeling of food-energy-water systems: challenges and opportunities of quantitative graphical networks’, Food-Energy-Water Nexus, American Institute of Chemical Engineers, New York, NY. ➔
- 2019 J Kagan, ME Borsuk (co-presenter), RSD Calder, M Creutzburg, SA Mason, LP Olander & A Plantinga. ‘Assessing ecosystem service benefits from military installations’, Strategic Environmental Research and Development Program Symposium, Washington, D.C. ➔
- 2018 C Shi, RSD Calder, SA Mason, LP Olander & ME Borsuk. ‘Forecasting ecosystem services to guide coastal wetland rehabilitation decisions’, International Congress on Environmental Modelling and Software’, Fort Collins CO. ➔
- 2018 RSD Calder, AT Schartup, M Li, AP Valberg, PH Balcom, S Bromage & EM Sunderland. ‘Forecasting human health impacts of reservoir creation and food consumption advisories: an integrated model to guide hydroelectric development’, Association for the Sciences of Limnology and Oceanography, Victoria, Canada. ➔
- 2016 RSD Calder, AT Schartup, M Li, AP Valberg, PH Balcom & EM Sunderland. ‘Future impacts of hydroelectric power development on methylmercury exposures of Canadian Indigenous communities’, *Society of Environmental Toxicology and Chemistry*, Orlando FL. ➔
- 2011 RSD Calder & KA Schmitt, ‘Decision model for management of sewage plumes in a tidal environment’, *Society for Risk Analysis*, Charleston SC.
- 2011 RSD Calder & KA Schmitt, ‘Probabilistic risk assessment for management of sewage plumes in a tidal environment, *Canadian Association on Water Quality*, Quebec City, Canada.

Oral presentations at research workshops

- 2019 ME Borsuk, K Bourne, RSD Calder, CY Chen, RB Howarth (co-presnter), G Mavrommati, SH Rogers & S Zuidema. ‘Deliberative valuation of watershed ecosystem services’, Water Quality Benefits Research Meeting, U.S. EPA, Ithaca, NY.
- 2017 ME Borsuk, RSD Calder, C Shi, SA Mason & LP Olander (co-presenter). ‘Ecosystem services conceptual models’, San Francisco Bay National Estuarine Research Reserve, Tiburon, CA.

Oral presentations at departmental seminars

- 2019 RSD Calder, ‘Health impacts forecasting to guide hydropower design and policy’, Jones Seminar Series, Thayer School of Engineering, Dartmouth College, Hanover, NH. ➔
- 2017 RSD Calder ‘Forecasting human health risks of hydroelectric development’, Department of Civil and Environmental Engineering, Carnegie Mellon University, Pittsburgh, PA.

- 2011 RSD Calder, 'Drinking water: studies in risk, technology and society', Centre for Engineering in Society, Concordia University, Montreal, Canada.

Oral presentation for industry

- 2019 RSD Calder, 'Integrated health endpoint forecasting to support hydropower design and risk mitigation decisions', Lumina Decision Systems, Campbell, CA.

Poster presentation at research conference

- 2017 RSD Calder, S Bromage & EM Sunderland. 'Quantifying the health impacts of dietary fish consumption advisories for methylmercury among Inuit in Labrador', International Conference on Mercury as a Global Pollutant, Providence, RI.

Other workshop participation

- 2019 'Building Effective Strategies for Co-production of Sustainability Science', NAS Keck Futures Initiative, organized by the University of Minnesota, held in Durham, NC. (Invited participation.)
- 2018 'Long Run Sustainability of US Agriculture', organized by Purdue University, held in Washington, D.C.
- 2018 'Data to Motivate Synthesis', National Socio-Environmental Synthesis Center, Annapolis, MD. (Invited participation.)
- 2018 'Powering Rural Transformation', International Food Policy Research Institute, Washington, D.C.
- 2017 Bridge Collaborative Launch, The Nature Conservancy, London, UK. (Invited participation.)
- 2013 'ComSciCon' (Communication of Science Conference), Harvard University/Massachusetts Institute of Technology, Cambridge, MA.

TEACHING EXPERIENCE

Duke University, Durham NC

DeCIPHER – Decisions on Complex Interdisciplinary Problems of Health and Environmental Risk (undergraduate/graduate Bass Connections class): curriculum development and select lectures (2017-19)

Harvard T.H. Chan School of Public Health, Boston MA

Water Pollution (graduate-level): primary instructor (2017); teaching assistant (2014); guest lecturer (2018)

Introduction to Environmental Health (graduate-level): teaching assistant (2013–14)

Concordia University, Montreal, Canada

Risk Analysis for Information Systems Engineering (graduate-level): teaching assistant (2011)

Mechanics of Materials (undergraduate): teaching assistant (2010)

Departmental tutor on duty for core undergraduate civil engineering curriculum (2009–10)

SERVICE AND OUTREACH

Committees at Virginia Tech, Blacksburg, VA

Since 2020 Public Interest Technology University Network (College representative)

Since 2020 Virginia-Maryland College of Veterinary Medicine Library Committee (Department representative)

2020 National Security Institute Planning Committee (College representative)

Journal reviews

Energy Systems

Renewable and Sustainable Energy Reviews (Elsevier)

Environmental Science

Ecological Economics (Elsevier); Ecosystem Services (Elsevier); Environmental Modelling & Software (Elsevier); Environmental Science and Pollution Research (Springer); Environmental Science & Technology (American Chemical Society); Integrated Environmental Assessment and Management (Wiley); International Journal of Environmental Research and Public Health (MDPI); Science of the Total Environment (Elsevier); Sustainability (MDPI); Water (MDPI); Water Research (Elsevier)

Public Health

Journal of Exposure Science & Environmental Epidemiology (Springer); Public Health Nutrition (Cambridge University Press); Risk Analysis (Wiley)

Conference proceedings reviews

Hawaii International Conference on System Sciences (University of Hawaii at Manoa)

Mentorship

Duke University, Durham NC

- 2019– Celine Robinson, Ph.D. '22: supervision of thesis chapter
- 2017– Kimberly Bourne, Ph.D. '20: supervision of thesis chapter
- 2017–19 Andrea Alatorre, M.E.M. '19: supervision of research assistantship
- 2017–19 Rebecca Marx, M.E.M. '19: supervision of research assistantship
- 2017–18 Congjie Shi, M.S. '18: supervision of research assistantship

Harvard College, Cambridge MA

- 2015–16 Harry Stone, S.B. '16: primary supervision of senior thesis
- 2013–14 Angela Jiang, S.B. '17: primary supervision of research assistantship
- 2013 Harvard College Global Health Review: graduate mentor

Harvard T.H. Chan School of Public Health, Boston MA

- 2015 Madeleine Bartzak, M.P.H. 2016: primary supervision of master's thesis

Recent volunteer activities

- 2018 Physics and mathematics judge, North Carolina Science and Engineering Fair

INDEPENDENT CONSULTING

- 2017–18 Independent Expert Advisory Committee, Province of Newfoundland and Labrador, Canada. Forecasting methylmercury exposures from hydroelectric development and the health benefits of remediation (application of doctoral research) ➔

- 2017 Charles River Analytics for the United States Army. Development of fate and transport model for unexploded munitions in unsaturated soils within the scope of the 'Contamination and Lasting Effects Analysis for Negative Substance and Elements' effort →

MEDIA INTERVIEWS AND COVERAGE OF WORK

Radio interviews

- 2016–19 CBC Radio One: Multiple appearances on programs in Newfoundland & Labrador, British Columbia and Northern Canada markets
- 2015 Radio-Canada Première : Le 6-a-9, Jul. 2.

Television appearance

- 2016 CBC TV Newfoundland & Labrador. Here and Now, Nov. 9.

Print and online publications (select)

- 2019 B White, 'Weighing the methylmercury risk: What researchers say about country food', *CBC News*, Jul. 26. →
- 2019 S Cox, 'Mercury rising: how the Muskrat Falls dam threatens Inuit way of life', *The Narwhal*, May 22. →
- 2016 I Austen, 'Canada's Big Dams Produce Clean Energy, and High Levels of Mercury', *New York Times*, Nov. 10. →
- 2016 J Sokol, 'How Dams Risk Poisoning Indigenous Diets', *The Atlantic*, Nov. 9. →
- 2016 M Boone, 'Not Just Muskrat Falls: Harvard Study Identifies Higher Health Risk in 11 Other Hydro Projects', *CBC News*, Nov. 9. →
- 2010 R Renner, 'Debunking the Detection Limit Myth', *Chemical & Engineering News*, Oct. 14. →

SKILLS

Computer languages and software

Expert: Analytica, R, MATLAB, MS Excel. *Advanced:* Stata, ArcGIS, QGIS; *Intermediate:* C++, Fortran, HTML, MPI, NetCDF, Python

Languages

Native fluency (written, read, spoken): English and French. *Conversational:* German, Czech

PROFESSIONAL MEMBERSHIPS AND LICENSES

Professional engineering licensure

Nevada Board of Professional Engineers and Land Surveyors, Reno, NV

Since 2020 Professional Engineer, Nevada, USA (license no. 027969)

Ordre des ingénieurs du Québec, Montreal, Canada

Since 2012 Professional Engineer, Quebec, Canada (license no. 5017602)

Engineers Canada, Ottawa, Canada

Since 2020 International Professional Engineer, Canada (license no. MR-00336)

Since 2020 APEC Engineer (license no. MR-00336)

Professional associations

Scholars Strategy Network, Boston, MA (member of North Carolina chapter since 2019); International Environmental Modelling & Software Society, Manno, Switzerland (member since 2018)

PERSONAL

Nationality: Canada

Work authorization: United States (Lawful Permanent Resident), Canada