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Curriculum vitæ

EDUCATION

- 2017 **ScD** Environmental Health, Harvard University, Cambridge, MA
2012 **MASc** Civil Engineering, Concordia University, Montreal, Canada
2010 **BEng** Civil Engineering, Concordia University, Montreal, Canada

ACADEMIC APPOINTMENTS

Virginia Tech, 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
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

- 2021 T Allen, J Behr, A Bukvic, [RSD Calder](#), [...] & JC Zinnert. ‘Anticipating and adapting to the future impacts of climate change on the health, security and welfare of low elevation coastal zone communities in Southeastern USA’ in *J Mar Sci Eng*, vol. 9 (11): 1196. [➔](#)
2021 [RSD Calder](#), C Grady, M Jeuland, CJ Kirchhoff, RL Hale & RL Muenich. ‘COVID-19 reveals vulnerabilities of the food-energy-water nexus to viral pandemics’ in *Environ Sci Technol Lett*, vol. 8 (8), pp. 606-615. [➔](#)
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

- 2021 RSD Calder, AT Schartup, T Bell & EM Sunderland. 'Muskrat Falls, methylmercury and Canadian hydroelectric development' in Muskrat Falls: How a Mega Dam Became a Predatory Formation by S. Crocker & L. Crocker (Eds.), St. John's, Canada: Memorial University Press. [➔](#)
- 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 J Kagan, ME Borsuk, RSD Calder, M Creutzburg, 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), St. John’s, 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. ➔

RESEARCH GRANTS

- 2021 N Ruktanonchai (PI), RSD Calder (PI) & O Saucedo (PI). ‘Understanding food worker decisions during COVID-19 to minimize worker disease and food system disruption from future pandemics’. Virginia Tech Center for Emerging, Zoonotic and Arthropod-borne Diseases. **\$19,989**.
- 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

- 2021 RSD Calder, C Grady, M Jeuland, CJ Kirchhoff, RL Hale, S Rodgers & RL Muenich. 'Increasing resiliency of integrated food-energy-water systems to viral pandemics: lessons from COVID-19', American Geophysical Union, New Orleans, LA. ➔
- 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-presenter), 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 presentations at research conference

- 2021 RSD Calder, CS Robinson & ME Borsuk. 'Decarbonization via long-distance transmission of hydropower is cost-effective'. American Geophysical Union, New Orleans, LA. →
- 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

- 2021 SciArt Collaboration Incubator, Virginia Tech, Blacksburg, VA.
- 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

Virginia Tech, Blacksburg, VA

Environmental Health (graduate-level, in-person and online): instructor (2021)

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

Community engagement

Since 2021 Faculty advisor, Virginia Scientist-Community Interface (V-SCI)

Institutional committees at Virginia Tech, Blacksburg, VA

Since 2020 National Security Institute Planning Committee (College representative)
Public Interest Technology University Network (College representative)
Virginia-Maryland College of Veterinary Medicine Library and Instructional Technology
Committee (chair and departmental representative)
Virginia Tech University Library 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 Research (Elsevier), Environmental Research Communications (IOP Science), 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); Journal of Environmental Management (Elsevier), Nature Communications (Nature Portfolio), 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 and committee service

Hawaii International Conference on System Sciences (University of Hawaii at Manoa, reviewer), IEEE International Symposium on Technology and Society ('21, University of Windsor, Canada, technical committee member)

Mentorship and supervision

Virginia Tech, Blacksburg VA

2021– Amir Mortazavigazar, Ph.D. '26: primary advisor

2021– Ali Nakhli: postdoctoral mentor

Duke University, Durham NC

2019– Celine Robinson, Ph.D. '23: supervision of thesis chapter

2017– Kimberly Bourne, Ph.D. '22: 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

2020–21 Judge, One Health Case Competition, Virginia-Maryland College of Veterinary Medicine

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

INDEPENDENT CONSULTING

2020 Department of Fisheries and Oceans, Moncton, NB, Canada. Aquatic food web modeling

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); American Geophysical Union (member since 2021).

PERSONAL

Nationality: Canada

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