

Kristin M. Eccles

Curriculum Vitae

CONTACT INFORMATION

Exposure and Biomonitoring Division
Health Canada
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HIGHLIGHTS

26 peer-reviewed publications (11 as first author)
437 citations; h index = 10 and i10 index = 15
Research interests: Mixtures, Exposome, Biomarkers, NAMs, AEP-AOP

CURRENT POSITION

Research Scientist **July 2023 - Present**
Principle Investigator, Computational Toxicology Research Group
Exposure and Biomonitoring Division, Health Canada
Ottawa, Ontario, Canada

EDUCATION

Ph.D., Biology with Specialization in Chemical and Environmental Toxicology **2019**
Department of Biology, University of Ottawa, Ottawa, Canada
Adviser: Laurie Chan, Ph.D.

M.Sc., Geography **2014**
Department of Geography, University of Calgary, Calgary, Canada
Advisers: Stefania Bertazzon, Ph.D. and Sylvia Checkley, Ph.D.

Honours B.A., Health Studies, Minors: Geography and Earth Science **2012**
McMaster University, Hamilton, Canada
Adviser: John Eyles, Ph.D.

PROFESSIONAL APPOINTMENT/ EMPLOYMENT

Postdoctoral Research Fellow **Nov 2020 - May 2023**
National Institute of Environmental Health Science, Division of Translational Toxicology,
Durham, North Carolina, USA
Advisers: Cynthia Rider, Ph.D and Kyle Messier, Ph.D.

Postdoctoral Fellowship **Aug 2019 - Oct 2020**
Department of Geography, Geomatics and Environment, University of Toronto, Mississauga, Canada
Advisers: Igor Lehnher, Ph.D. and Trevor Porter, Ph.D.

Geomatics Researcher **June 2017 - March 2019**
National Wildlife Researcher Center, Environment and Climate Change Canada, Ottawa, Canada

PEER-REVIEWED PUBLICATIONS

Eccles, K.M., Boutet, V. Branigan, M., Dyck, M., van Coeverden de Groot, P., Lougheed, S.C., Rutter A., Langlois V.S. (2024). Non-invasive biomonitoring of polar bear feces can be used to estimate concentrations of metals of concern in traditional food. *PLoS one*, 19(6), e0305398. <https://doi.org/10.1371/journal.pone.0305398>

Stalwick, J., Somers, G., **Eccles K.M.**, Thomas, P.J., Cunada, C., Gurney, K. (2024). The Influence of Environmental Factors such as Snow and Fire on Spatial and Temporal Patterns of Polycyclic Aromatic Compounds in the Mackenzie. *Environmental Pollution*, 123962. <https://doi.org/10.1016/j.envpol.2024.123962>

Cheney, C.L., **Eccles K.M.**, Lehnher, I., Blais, J. M. (2024). Mercury deposition to lake sediments near historic gold mines in northern Canada. *Environmental Pollution*, 123038. <https://doi.org/10.1016/j.envpol.2023.123038>

Vander Meulen, I. J., Schock, D. M., Akhter, F., Mundy, L. J., **Eccles K.M.**, Soos, C., Peru, K.M., McMartin, D.W., Headley, J.V. and Pauli, B.D. (2023). Site-specific spatiotemporal occurrence and molecular congener distributions of naphthenic acids in Athabasca oil sands wetlands of Alberta, Canada. *Environmental Pollution*, 122061. <https://doi.org/10.1016/j.envpol.2023.122061>

Tommasi, F., Pagano, G., Oral, R., Thomas, P.J., **Eccles K.M.**, Tez, S., Toscanesi, M., Giarra, A., Siciliano, A., Dipierro, N., Gjata, I., Guida, M., Libralato, G., Lyons, D.M., Buri, P., Ines Kovai, I., Trifuoggi, M. (2023). Topsoil pollution and multi-endpoint toxicity in the petrochemical area of Augusta-Priolo (eastern Sicily, Italy). *Chemosphere*, 333, 138802. <https://doi.org/10.1016/j.chemosphere.2023.138802>

Eccles K.M., Karmaus, A. L., Kleinstreuer, N. C., Parham, F., Rider, C. V., Wambaugh, J. F., Messier, K. P. (2023). A geospatial modeling approach to quantifying the risk of exposure to environmental chemical mixtures via a common molecular target. *Science of The Total Environment*, 855, 158905. <https://doi.org/10.1016/j.scitotenv.2022.158905>

*NIEHS 2022 paper of the year

Boutet, V., Dominique, M., **Eccles, K.M.**, Branigan, M., Dyck, M., van Coeverden de Groot, P., Loughheed, S.C., Rutter A., Langlois V.S. An exploratory spatial contaminant assessment for polar bear (*Ursus maritimus*) liver, fat, and muscle from Northern Canada. (2023). *Environmental Pollution*, 316, 120663. <https://doi.org/10.1016/j.envpol.2022.120663>

Lowe, M.E., Akhtari, F., Potter, P.A., Fargo, D.C., Schmitt, C.P., Schurman, S.H., **Eccles, K.M.**, Motsinger-Reif, A., Hall, J.E., Messier, K.P. (2022). The skin is no barrier to mixtures: Air pollutant mixtures and reported psoriasis or eczema in the Personalized Environment and Genes Study (PEGS). *Journal of exposure science & environmental epidemiology*.1-8. <https://doi.org/10.1038/s41370-022-00502-0>

Cui, Y., **Eccles K.M.**, Kwok, R.K., Joubert, B., Messier, K.P., Balshaw, D. (2022). Integrating Multiscale Geospatial Environmental Data into Large Population Health Studies: Challenges and Opportunities. *Toxics*. 10(403). <https://doi.org/10.3390/toxics1007040>

Thomas, P. J., Eickmeyer, D. C., **Eccles, K.M.**, Kimpe, L. E., Felzel, E., Brouwer, A., Blais, J. M. (2022). Paleotoxicity of petrogenic and pyrogenic hydrocarbon mixtures in sediment cores from the Athabasca oil sands region, Alberta (Canada). *Environmental Pollution*, 292, 118271. <https://doi.org/10.1016/j.envpol.2021.118271>

Eccles, K.M., Thomas, P. J., Chan, H. M. (2021). Spatial patterns of the exposure-response relationship between mercury and cortisol in the fur of river otter (*Lontra canadensis*). *Chemosphere*, 263, 127992. <https://doi.org/10.1016/j.chemosphere.2020.127992>

Thomas, P. J., Newell, E. E., **Eccles, K.M.**, Holloway, A. C., Idowu, I., Xia, Z., Quenneville, C. (2021). Co-exposures to trace elements and polycyclic aromatic compounds (PACs) impacts North American river otter (*Lontra canadensis*) baculum. *Chemosphere*, 265, 128920. <https://doi.org/10.1016/j.chemosphere.2020.128920>

- Eccles, K.M.**, Pauli, B.D., Chan, H.M. (2020). Geospatial analysis of complex metal exposures to biota in the Athabasca Oil Sands. *PLoS one*, 15(9), e0239086. <https://doi.org/10.1371/journal.pone.0239086>
- Galen, G., **Eccles, K.M.**, MacMillian, M., Thomas, P. J., Chan, H.M., Poulain, A.J. (2020). The gut microbial community structure of the North American river otter (*Lontra canadensis*) in the Alberta Oil Sands Region in Canada: relationship with local environmental variables and metal body burden. *Environmental Toxicology and Chemistry*, 39(12), 2516-2526. <https://doi.org/10.1002/etc.4876>
- Etowa, J., Johnston, A., Jama, Z., **Eccles, K.M.**, Ashton, A. (2020). Mixed-method evaluation of a community-based postpartum support program: a study protocol. *BMJ open*, 10(10), e036749. <https://doi.org/10.1136/bmjopen-2019-036749>
- Eccles, K.M.**, Majeed, H., Lehnher, I., Porter, T. (2020). A continental and marine-influenced tree-ring mercury record in the Old Crow Flats, Yukon, Canada. *ACS Earth and Space Chemistry*, 4(8), 1281-1290. <https://doi.org/10.1021/acsearthspacechem.0c00081.s001>
- Cheney, C.L., **Eccles, K.M.**, Kimpe, L.E., Blais, J.M. (2020). Determining the effects of past gold mining using a sediment palaeotoxicity model. *Science of The Total Environment*, 718, 137308. <https://doi.org/10.1016/j.scitotenv.2020.137308>
- Eccles, K.M.**, Thomas, P. J., Chan, H. M. (2020). Relationships between mercury concentrations in fur and stomach contents of river otter (*Lontra canadensis*) and mink (*Neovison vison*) in northern Alberta Canada and their applications as proxies for environmental factors determining mercury bioavailability. *Environmental Research*, 181, 108961. <https://doi.org/10.1016/j.envres.2019.108961>
- Eccles, K. M.**, Pauli, B. D., Chan, H. M. (2019). The use of Geographic Information Systems (GIS) for spatial ecological risk assessments: An example from the Athabasca oil sands area in Canada. *Environmental toxicology and chemistry*, 38(12): 27972810. <https://doi.org/10.1002/etc.4577>
- Eccles, K. M.**, Littlewood, E. S., Thomas, P. J., Chan, H. M. (2019). Distribution of organic and inorganic mercury across the pelts of Canadian river otter (*Lontra canadensis*). *Scientific reports*, 9(1), 3237. <https://doi.org/10.1038/s41598-019-39893-w>
- Eccles, K. M.**, Thomas, P. J., Chan, H. M. (2017). Predictive meta-regressions relating mercury tissue concentrations of freshwater piscivorous mammals. *Environmental Toxicology and Chemistry*, 36(6), 23772384. <http://doi.org/10.1002/etc.3775>
- Thomas, P. J., **Eccles, K. M.**, Mundy, L. J. (2017). Spatial modelling of non-target exposure to anticoagulant rodenticides can inform mitigation options in two boreal predators inhabiting areas with intensive oil and gas development. *Biological Conservation*, 212, 111-119. <https://doi.org/10.1002/etc.3775>
- Hu, X. F., **Eccles, K. M.**, Chan, H. M. (2017). High selenium exposure lowers the odds ratios for hypertension, stroke, and myocardial infarction associated with mercury exposure among Inuit in Canada. *Environment International*, 102, 200-206. <https://doi.org/10.1016/j.envint.2017.03.002>
- Eccles, K. M.**, Checkley, S., Sjogren, D., Barkema, H. W., Bertazzon, S. (2017). Lessons learned from the 2013 Calgary flood: Assessing risk of drinking water well contamination. *Applied Geography*, 80, 78-85. <https://doi.org/10.1016/j.apgeog.2017.02.005>

Eccles, K.M., Bertazzon, S. (2015). Applications of geographic information systems in public health: A geospatial approach to analyzing MMR immunization uptake in Alberta. *Canadian Journal of Public Health*, 106(6). <https://doi.org/10.17269/cjph.106.4981>

Bertazzon, S., Johnson, M., **Eccles, K.**, Kaplan, G. G. (2015). Accounting for spatial effects in land use regression for urban air pollution modelling. *Spatial and Spatio-temporal Epidemiology*. 14-15, 921. <https://doi.org/10.1016/j.sste.2015.06.002>

TECHNICAL REPORTS

AMAP, 2021. AMAP Assessment 2021: Mercury in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Troms, Norway. 324 pp

*Contributing author to Chapter 2: Temporal trends of mercury in Arctic media

INVITED TALKS

Eccles K.M.(2024). Unraveling the Complexity: Component-based approaches to quantify the effects of exposure to PFAS Mixtures. Center for PFAS and Cancer (CPAC) Joint Virtual Symposium. Georgetown University. Washington, DC, USA.

Eccles K.M.(2024). Mapping Metal Mixtures: Using Wildlife as Sentinels for Human Health. Society of Toxicology Annual Meeting. Salt Lake City, USA.

Eccles K.M.(2024). Geospatial and Computational Approaches to Support the Risk Assessment of Chemical Mixtures within an AEP-AOP Framework. Salt Lake City, USA.

Eccles K.M.(2023). From Molecules to Maps: Assessing spatial patterns of contaminant sources, exposures, and health effects on humans and wildlife. Health Canada. Ottawa, Canada.

Eccles K.M.(2022). From Molecules to Maps: Assessing spatial patterns of contaminant sources, exposures, and health effects on humans and wildlife. Rutgers University. Newark, New Jersey, USA.

Eccles K.M.(2020). From biomarkers to biomes: Relationships between contaminant sources, exposures, and health outcomes. University of Toronto Intersectional Seminar Series. Toronto, Canada.

Eccles K.M.(2020). Humans, wildlife, and the environment: Assessing ecological health. 2nd Annual GeoHealth Network Conference. Toronto, Canada. (Cancelled due to COVID-19)

Eccles K.M., Chan H.M. (2018). Mercury in wild foods and food security: Integrating data (Presentation). Environment and Climate Change Canada (ECCC) Wildlife Division Health Division Annual Meeting. Ottawa, Canada.

Eccles K.M., Chan H.M. (2018). Modelling the relationship between contaminant sources and exposures in wildlife (Presentation). Environment and Climate Change Canada (ECCC) National Pollution Release Inventory (NPRI) Data Users Workshop. Ottawa, Canada.

SELECTED CONFERENCE PRESENTATIONS (12/26)

Eccles K.M., Chan, H.M. (2024). The development and application of methylmercury-to-total mercury ratios for exposure assessment of methylmercury from the consumption of traditional foods (Presentation). International Conference on Mercury as a Global Pollutant, Cape Town, South Africa.

Eccles K.M., Blais, A., Zhang, G., Girgis, A., Pelletier, G., Aranda-Rodriguez, R., Tayabali, A. (2024). Putting the 3Rs into action: a coupled *in silico*, *in vitro*, and *in vivo* study to quantify immunological effects of per- and poly-fluoroalkyl substances (PFAS) (Poster). Society of Toxicology, Salt Lake City, USA.

Eccles K.M., Karmaus, A. L., Kleinstreuer, N. C., Parham, F., Rider, C. V., Messier, K. P. (2023). Mapping a Path to Disease: Quantifying the risk of exposure to environmental chemical mixtures via a common molecular target using a geospatial modeling approach (Presentation). Society of Toxicology, Nashville, USA.

*1st place winner of best postdoctoral abstract for the SOT Mixtures specialty section

Eccles K.M., Rider, C. V., Messier, K. P. (2022). Geospatial Risk Assessment Using High-Throughput Screening Assays To Quantify Potential Adverse Effects From Exposure To Chemical Mixtures (Presentation). Society of Environmental Toxicology and Chemistry, Pittsburgh, USA.

Eccles K.M., Karmaus, A. L., Kleinstreuer, N. C., Parham, F., Rider, C. V., Wambaugh, J. F., Messier, K. P. (2022). A geospatial modeling approach to quantifying the risk of exposure to environmental chemical mixtures via a common molecular target (Poster). North Carolina Society of Toxicology, Durham, USA.

*1st place winner of best postdoctoral poster and presentation

Eccles K.M., Messier, K.P. (2021). Geospatial Risk Characterization Mapping of Chemical Mixtures Through Connections to Toxicological Adverse Outcome Pathways (Presentation). American Geophysical Union, New Orleans, USA.

Eccles K.M., Kleinstreuer, N.C., Wambaugh, J.F., Messier, K.P. (2021). A geospatial modeling approach to quantifying risk of exposure to environmental chemical mixtures via a common molecular initiating event (Poster). International Society of Environmental Epidemiology, New York, USA.

Eccles K.M., Clackett A., Ghotra, A., Majeed, I., Lehnher, I., Porter, T. (2020). Developing a network of historical atmospheric mercury trends using tree-rings in northern Canada (Presentation). Society of Environmental Toxicology and Chemistry, Fort Worth, USA.

Eccles K.M., Clackett A., Ghotra, A., Majeed, I., Lehnher, I., Porter, T. (2019). Assessing variability of atmospheric mercury (Hg^0) trends using tree-rings in northern Canada (Presentation). Society of Environmental Toxicology and Chemistry. Toronto, Canada.

Eccles K.M., Thomas P.J., Chan H.M. (2019). Wildlife as a surrogate indicator for impacts of mercury on ecosystem health (Presentation). International Conference on Mercury as a Global Pollutant. Krakow, Poland.

Eccles K.M., Thomas P.J., Chan H.M. (2018). Wildlife as a surrogate indicator for impacts of mercury on ecosystem health (Presentation). Society of Environmental Toxicology and Chemistry. Sacramento, USA.

Eccles K.M., Thomas P.J., Chan H.M. (2018). Evaluating the co-dispersion of mercury sources and wildlife exposures in the Athabasca Oil Sands region (Presentation). Society of Environmental Toxicology and Chemistry. Sacramento, USA.

MEDIA	SOT TV 2024	
	Innovation Uncaged: from lab to screen in chemical hazard assessment [YouTube Link]	
	The Next Frontier in Toxicology: Computational and Geospatial Methods in Toxicology Research [YouTube Link to full video] [YouTube Link to segment]	
TEACHING EXPERIENCE	Primary Instructor	
	Lecture and lab: High-throughput screening (ToxCast and Tox21 program) and high-content data sources (3 hours)	Winter 2024
	BIM4103 Selected Topics in Biomedical Science, University of Ottawa	
	Teaching Material: https://github.com/kristineccles/BIM4103-HTS-Dose-Response	
	Graduate Level Short Course: Introduction to R in Open-Source Methods (6 hours)	Winter 2020
	Department of Geography, Geomatics and Environment, University of Toronto	Fall 2020
	Teaching Material: https://github.com/kristineccles/Introduction_to_R	
	Geographic Information Systems	Spring 2020
	Department of Geography, Geomatics and Environment, University of Toronto	
	Introduction to Quantitative Methods	Winter 2018
	Department of Geography and Environmental Studies, Carleton University	
	Teaching Material: https://github.com/kristineccles/introduction_to_stats	
	Mapping and Modelling the Real World: Introduction to GIS	May 2017
	Enrichment Mini-Course, University of Ottawa	
	Introduction to Geomatics	Fall 2016
	Department of Geography, Environment and Geomatics, University of Ottawa	
	Teaching Assistant	
	University of Ottawa, Ottawa, ON	2014 - 2017
	Spatial Ecology, Biostatistics, Environmental Science	
COMPETITIVE AWARDS	Society of Toxicology (SOT) Mixtures Specialty Section	
	Best Postdoctoral Abstract (2023)	\$1000
	Society of Toxicology (SOT) Biological Modeling Specialty Section	
	Andersen-Clewell Trainee Award - 2nd Place (2023)	Recognition
	NIEHS Paper of the Year (2022)	Recognition
	North Carolina Society of Toxicology (NCSOT)	
	Best Postdoctoral Poster and Presentation (2022)	\$300
	SETAC Travel Award (2022)	\$1050
	University of Toronto Postdoctoral Award (2019-2020)	\$45,000
	NSERC CREATE-REACT (2016 - 2018)	\$20,000
	NSERC CREATE-REACT Travel Award (2018)	\$5,000
	University of Ottawa Excellence Scholarship (2016 - 2017)	\$8,200
	Queen Elizabeth II Graduate Scholarship in Science and Technology (2016 - 2017)	\$15,000
	University of Ottawa Entrance Scholarship (2014 - 2018)	\$38,000

LEADERSHIP AND SERVICE	Board Member	
	Society of Toxicology Lake Ontario Regional Chapter	2024 - Present
	Ann Manor Board	2023 - Present
	Society of Toxicology Mixtures Specialty Section	2023 - 2024
Conference Sessions/Workshops Organized		
	International Conference on Mercury as a Global Pollutant, Cape Town, South Africa	July 2024
	Workshop: Bio-monitoring to achieve goals in Minamata Convention	
	Society of Toxicology, Salt Lake City, USA	March 2024
	Workshop Session: Integrating Aggregate Exposure Pathways and Adverse Outcome Pathways for Comprehensive Risk Assessment of Chemical Mixtures	
	Society of Environmental Toxicology and Chemistry, Fort Worth, USA	Nov 2020
	On Demand Session: Mercury emissions, transport, and transformation in a changing environment	
	Live Discussion: Pathways between Hg sources and exposures in a changing world	
	Workshop: Introduction to R Course Material: https://github.com/kristineccles/setac_intro_to_r	
	2020	
	International Conference on Mercury as a Global Pollutant, Krakow, Poland	Sept 2019
	Workshop: Latest Advances in Wildlife Biomonitoring	
	Expert Working Group Member	
	Arctic Monitoring Assessment Program (AMAP)	June 2019- Sept 2020
	Mercury Expert Working Group	
	Oil Sands Monitoring Integration Workshop Series	Jan 2019
	External Expert for Geospatial Analysis and Mercury	
ADDITIONAL TRAINING	Training in the Responsible Conduct of Research, National Institutes of Health	Fall 2021
	Teaching Fundamentals Certificate, University of Toronto	Winter 2020
	Machine Learning, University of Toronto	Fall 2019
LANGUAGES	English - Native Language, French - Good	
	R - Advanced, Python - Intermediate, LaTeX- Intermediate	
PROFESSIONAL MEMBERSHIPS	Society of Toxicology (SOT) 2021 - Present	
	Data Visualization Society 2019 - Present	