

# LIISA TOOSE

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## EXPERIENCE

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<b>Arnot Research and Consulting, Inc.</b> Toronto, ON (Remote) Research Associate	2012 to present
<ul style="list-style-type: none"><li>• <b>Compilation and curation</b> of data reported in literature. Assessment of reported study field and laboratory practices.</li><li>• <b>Development, coding and application</b> of Excel-based and online tools and models for the assessment of contaminant fate, exposure and bioaccumulation.</li><li>• Various contracts developing and applying fate and bioaccumulation models to aid in <b>regulatory assessment of chemicals in Canada, US and Europe</b></li><li>• <b>Presentation</b> of research and results at conferences</li><li>• <b>Preparation</b> of manuscripts for publication with co-authors</li></ul>	
<b>DMER, Ltd.</b> Research Associate	2004-2012
<b>Canadian Environmental Modelling Centre</b> , Peterborough, ON Research Scientist, Graduate Student	2001-2009

## EDUCATION

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<b>M.Sc.</b> Trent University, Watershed Ecosystems Program Thesis: A Spatially-Explicit Global Mass Balance Model of Chemical Fate	2005
<b>Hons.B.Sc.</b> Trent University, Geography and Environmental Science	1994-2001

## MODEL DEVELOPMENT AND CODING

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EAS-E Suite Ver.1.9 – 0.95 RAIDAR, Point Source, Dilution, BET and F-PEST models  
(Online, R-language) [www.eas-e-suite.com](http://www.eas-e-suite.com)  
BAT Ver.1.0 - 2.03 (Excel VBA) [www.arnotresearch.com/BAT/](http://www.arnotresearch.com/BAT/)  
RAIDAR Ver.2.00 - 3.00 (Excel VBA) [www.arnotresearch.com/RAIDAR/](http://www.arnotresearch.com/RAIDAR/)

## PROFESSIONAL AFFILIATIONS

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SETAC-North America, 2012-Present

## VOLUNTEER SERVICE

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<b>Conducting field recordings for the Forest Interior Bird Survey</b>	2023, 2024
<ul style="list-style-type: none"><li>• Maitland Valley Conservation Authority</li></ul>	
<b>Peer-reviewed scientific journal articles</b>	2006-present
<ul style="list-style-type: none"><li>• Environmental Science and Technology</li><li>• Environmental Pollution</li></ul>	
<b>Mentor for a “speed mentoring” event for high school students</b>	2017
<ul style="list-style-type: none"><li>• Inspiring Future Women in Science conference, Perimeter Institute, Waterloo, ON</li></ul>	

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## SELECT PUBLICATIONS AND PRESENTATIONS

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### **Journal Publications**

- Arnot JA, **Toose L**, Armitage JM, Sangion A, Looky A, Brown TN, Li L, Becker RA. 2022. Developing an internal threshold of toxicological concern (iTTC). *J Expo Sci Environ Epidemiol* <https://doi.org/10.1038/s41370-022-00494-x>
- Berthiaume A, Arnot JA, **Toose L**. 2022. Risk-based prioritization of organic substances in the Canadian National Pollutant Release Inventory using an evaluative regional-scale multimedia mass balance model. *Integr Environ Assess Manag*. <https://doi.org/10.1002/ieam.4601>
- Arnot JA, **Toose L**, Armitage JM, Embry ME, Sangion A, Hughes L. 2022. A weight of evidence approach for bioaccumulation assessment. *Integr Environ Assess Manag*. <https://doi.org/10.1002/ieam.4583>
- Li L, Sangion A, Wania F, Armitage JM, **Toose L**, Hughes L, Arnot JA. 2021. Development and evaluation of a holistic and mechanistic modeling framework for chemical emissions, fate, exposure, and risk. *Environmental Health Perspectives* 129:12 <https://doi.org/10.1289/EHP9372>
- Armitage JM, **Toose L**, Camenzuli L, Redman AD, Parkerton TF, Saunders D, Wheeler J, Martin A, Vaiopoulou E, Arnot JA. 2021. A critical review and weight of evidence approach for assessing the bioaccumulation of phenanthrene in aquatic environments. *Integr Environ Assess Manag*, 17: 911-925. <https://doi.org/10.1002/ieam.4401>
- Li L, Westgate JN, Hughes L, Zhang X, Givehchi B, **Toose L**, Armitage JM, Wania F, Egeghy P, Arnot JA. 2018. A model for risk-based screening and prioritization of near-field human exposure to chemicals. *Environ Sci Technol* 52(24): 14235-14244 <http://dx.doi.org/10.1021/acs.est.8b04059>
- Toose L.**, Warren C, Mackay D, Parkerton T, Letinski D, Manning R, Connelly M, Rohde A, Fritz B, Hoffmann WC. 2015. Assessing the fate of an aromatic hydrocarbon fluid in agricultural spray applications using the three-stage ADVOCATE model framework. *Journal of Agricultural and Food Chemistry* 63(31), 6866-6875 <http://dx.doi.org/10.1021/acs.jafc.5b01076>
- Gouin T, Armitage JM, Cousins I, Muir D, Ng C, **Toose L**, Tao S. 2013. Influence of global climate change on chemical fate and bioaccumulation: The role of multimedia models. *Environmental toxicology and chemistry*. 32. <http://dx.doi.org/10.1002/etc.2044>
- Arnot JA, Armitage JM, McCarty LS, Wania F, Cousins I, **Toose-Reid L**. 2011. Toward a consistent evaluative framework for POP risk characterization. *Environ Sci Technol* 45(1): 97-103 Special Issue on Environmental Policy: Past, Present and Future – Invited <https://doi.org/10.1021/es102551d>
- Toose L**, Mackay D. 2004. Adaptation of fugacity models to treat speciating chemicals. *Environ. Sci. Technol.* 38: 4619-4626 <https://doi.org/10.1021/es049957i>
- Toose L**, Woodfine DG, MacLeod M, Mackay D, Gouin J. 2004. BETR-World: A geographically explicit model of chemical fate: Application to transport of a-HCH to the Arctic. *Environ. Poll.* 128: 223-240. <https://doi.org/10.1016/j.envpol.2003.08.037>
- As Liisa Reid:*
- Webster E, Ellis DA, **Reid LK**. 2010. Modeling the environmental fate of perfluorooctanoic acid and perfluorooctanoate: An investigation of the role of individual species partitioning. *Environ. Toxicol. Chem.* 29(7): 1466 – 1475. <https://doi.org/10.1002/etc.181>

Mackay D, **Reid LK**. 2008. Local and distant residence times of contaminants in multi-compartment models. Part I: A review of the theoretical basis. Environ. Poll. 156: 1196-1203. <https://doi.org/10.1016/j.envpol.2008.04.012>

**Reid LK**, Mackay D. 2008. Local and distant residence times of contaminants in multi-compartment models. Part II: Application to assessing environmental mobility and long-range atmospheric transport. Environ. Poll. 156: 1182-1189. <https://doi.org/10.1016/j.envpol.2008.04.011>

McMurdo C.J, Ellis DA, Webster E, Butler J, Christensen RD, **Reid LK**. 2008. Aerosol enrichment of the surfactant PFO and mediation of the water - air transport of gaseous PFOA. Environ. Sci. Technol. 42 (11), 3969–3974. <https://doi.org/10.1021/es7032026>

Ethier A, Mackay D, **Toose-Reid L**, Lean D, O'Discoll N, Scheuhammer A. 2008. The Development and Application of a Mass Balance Model for Total Mercury in a Remote Lake using Multi-species Multiplier Method. Appl. Geochem. 23: 467-481. <http://dx.doi.org/10.1016/j.apgeochem.2007.12.015>

### **Technical Reports and Non-Refereed Publications**

**Toose L**, Sangion A, Armitage, JM, Li, L, Arnot, JA. 2022. Case study and workshop for guiding the selection of appropriate exposure models for risk assessment using the EAS-E Suite platform. Final Report prepared for Health Canada, New Substances Assessment and Control Bureau.

Arnot JA, Brown T, **Toose L**, Sangion A, Armitage JM. 2021. Modernize Health Canada's Consumer and Industrial/Aquaculture release models and incorporate them into the EAS-E Suite platform. Prepared for Health Canada. Healthy Environments and Consumer Safety Branch. New Substances Assessment and Control Bureau.

**Toose L**, Armitage JM, Li L, Arnot JA. 2021. Analysis of far-field dietary exposures with food web considerations in human health assessment. Final Report prepared for Health Canada. Healthy Environments and Consumer Safety Branch. Safe Environments Directorate. Existing Substances Risk Assessment Bureau.

Arnot J., **Toose L**. 2019. Generation of a risk-ranking tool and ancillary input data for organic substances on the NPRI. Final Report prepared for Environment and Climate Change Canada.

**Toose L**, Armitage JM, Arnot JA. 2019. Phenanthrene Bioaccumulation Assessment using the Bioaccumulation Assessment Tool (BAT). Prepared for CONCAWE Ecology Group.

Arnot J, **Toose L**, Armitage J. 2018. Generation of physical-chemical property data and the application of models for estimating fate and transport and exposure and risk potential for organic substances on the Canadian DSL. Technical Report prepared for Environment and Climate Change Canada.

Arnot JA, McCarty LS, Armitage J, **Toose-Reid L**, Wania F, Cousins I. 2009. An evaluation of hexabromocyclododecane (HBCD) for persistent organic pollutant (POP) properties and the potential for adverse effects in the environment. Technical Report for European Brominated Flame Retardant Industry Panel (EBFRIP).

**Toose L**, Arnot J (in prep) Pilot project to parameterize and apply the RAIDAR model to assess chemical contaminants in the Great Lakes.

## PRESENTATIONS

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### **Platform Presentations**

**Toose, L.**, Sangion, A, Armitage, JM, Embry, M, Arnot, JA. 2022. Tiered methods for bioaccumulation assessment to reduce animal testing. *Platform*. SETAC NA, November 13-17, 2022. Pittsburgh, Pennsylvania, USA.

**Toose, L.**, Berthiaume, A., Arnot, J. Integrating mass balance multi-media models to link NPRI data with chemical fate and exposure in the environment and the potential for adverse effects. NPRI Expert Data Users Workshop. Montreal, QC. February 25-26, 2020. (Invited)

**Toose, L.**, Arnot, J., Armitage, J., Foster, K., Embry, M. "The Bioaccumulation Assessment Tool (BAT)" SETAC NA, November 12-16, 2018

### **Poster Presentations**

**Toose L.**, Arnot, JA. Sangion, A, Armitage, JM. 2023 "Using in silico bioaccumulation models: review and comparison of the EPISuite BCFBAF and EAS-E Suite BET. *Poster*, SETAC EU Annual Meeting, April 30-May 4, 2023. Dublin, Ireland.

**Toose L.**, Arnot, JA, Gouin, T, Sangion, A, Armitage, JM, Li, L. 2023. "Tiered methods for screening-level ecological hazard and risk assessment: Case study application of octamethylcyclotetrasiloxane, D4. *Poster*, SETAC EU Annual Meeting, April 30-May 4, 2023. Dublin, Ireland.

**Toose L.**, Armitage, JM, Embry ME, Hughes L, Arnot JA. 2022. "Introducing BAT Ver.2.02: A Weight-of-Evidence Framework for Bioaccumulation (B) Assessment". SETAC EU Annual Meeting, May 15-19, 2022, Copenhagen, Denmark.

**Toose L.**, Armitage, JM, Embry ME, Hughes L, Arnot JA. 2021. "Introducing BAT Ver.2.02: A Weight-of-Evidence Framework for Bioaccumulation (B) Assessment". SETAC NA Meeting, November 14-18, 2021, Portland, OR USA. (SciCon4 Online presentation)

**Toose, L.**, Armitage, J., Foster, K.L., Embry, M., Hughes, L., Arnot, J.A. 2019. "The Bioaccumulation Assessment Tool (BAT): Case studies for the assessment of bioaccumulation of chemicals in both air-breathing and aquatic organisms." SETAC NA Meeting, Nov 3-7, Toronto, Canada.

**Toose, L.**, Backus, S., Arnot, J.A. 2019. "Applying the RAIDAR model to assess chemical contaminants in the Great Lakes." SETAC NA Meeting, Nov 3-7, Toronto, Canada.

**Toose L.**, Armitage JM, Foster KL, Embry M, Hughes L, Arnot JA. 2019. The Bioaccumulation Assessment Tool (BAT): Case studies for assessing "data rich" and "data poor" chemicals for regulatory purposes and informing integrated testing strategies. SETAC Europe Meeting, May 26-30, Helsinki, Finland.

Arnot JA, Armitage JM, **Toose L.**, Bonnell M. 2019. Application of the RAIDAR model to aid chemical prioritization in Canada. SETAC Europe Meeting, May 26-30, Helsinki, Finland

Arnot JA, Armitage JM, Papa E, Embry M, Sangion A, Foster K, Looky A, Wyatt J, Ramos E, **Toose L.** 2019. Developing and testing models to integrate toxicokinetic data for assessing bioaccumulation in mammals. SETAC Europe Meeting, May 26-30, Helsinki, Finland

Sangion A, Bertato L, Casartelli I, Foster K, Arnot JA, Armitage JM, Looky A, **Toose L.**, Embry M, Papa E. 2019. Integrated alternative approaches for bioaccumulation and toxicokinetics: from in vitro data to in silico models. SETAC Europe Meeting, May 26-30, Helsinki, Finland.

Arnot JA, Armitage J, Foster K, Looky A, Sangion A, Bertato L, Casartelli I, Embry M, **Toose L**, Papa E. 2019. Developing databases and models to integrate toxicokinetic data for human health assessment. Society of Toxicology (SOT), March 10-14, Baltimore, MD.

**Toose L**, Armitage JM, Hughes L, Foster KL, Embry M, Arnot JA. 2018. The Bioaccumulation Assessment Tool (BAT): A quantitative weight of evidence approach for bioaccumulation assessment. SETAC North America Meeting, November 4–8, Sacramento, CA.

Arnot JA, Armitage JM, **Toose L**, Bonnell M. 2018. Application of the RAIDAR model to aid chemical prioritization in Canada. SETAC North America Meeting, November 4–8, Sacramento, CA

**Toose L**, Armitage, J., Foster, K., Embry, M., Hughes, L., Arnot, J. "The Bioaccumulation Assessment Tool (BAT): A quantitative weight of evidence approach for bioaccumulation assessment" SETAC Europe Meeting, Rome, Italy, May 13-17, 2018

Gouin T, Falls A, Armitage JM, **Toose L**, Bonnell M, Arnot JA. 2017. Applying the RAIDAR model for ecological risk assessment: A case study for 10 organic flame retardants. SETAC North America Meeting, November 12-16, Minneapolis, MN.

Arnot J, **Toose L**, Armitage J, Gouin T, Falls A, Bonnell M. 2017. Case study applications of the RAIDAR model for chemical risk assessment. 254 th American Chemical Society National Meeting; Exposition, August 20-24, Washington, DC

Arnot J, Armitage J, Foster KL, **Toose L**, Embry M. 2017. The bioaccumulation assessment tool: An organizational framework for bioaccumulation assessment. SETAC Europe Meeting, May 7-11, Brussels, BE.

Arnot J, Armitage J, Foster KL, **Toose L**, 2016. The bioaccumulation assessment tool: An organizational framework for bioaccumulation assessment. SETAC North America Annual Meeting, November 6-10, Orlando, FL.

Arnot JA, Falls A, Armitage JM, Gouin T, **Toose L**, Bonnell M; Applying the RAIDAR model and the chemical activity approach for ecological risk assessment: A case study for select organic flame retardants. 2016. SETAC Conference, May 22-26, Nantes, France.

Arnot JA, Armitage JM, Gouin T, **Toose L**, Bonnell M, Hughes D, Romano M, Wania F, Mackay D. 2014. Exploring the exposure and hazard potential of ionogenic organic chemicals released to the environment. SETAC Conference, November 9-13, Vancouver, BC.

Arnot JA, Mackay D, **Toose-Reid L**, Macleod M. 2005. Modelling the long-range transport of contaminants to the arctic: a contribution to international negotiations on POPs. Northern Contaminants Program Results Workshop, September 27-29, Victoria, BC.

Arnot JA, Mackay D, **Toose-Reid L**, Ponce-Hernandez R. 2005. Towards a BETR-Africa: fate and risk assessment of persistent organic pollutants originating in Africa at local, regional and global scales. Dioxin Conference, August 21-26, Toronto, ON.

**Toose L**, Woodfine D, MacLeod M, Mackay D. 2002. The integration of global and local scale geographically explicit modelling of Toxaphene transport to the Laurentian Great Lakes. IAGLR, Chicago, IL

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## ***Workshops and Webinars***

"Introduction & Practical Guide to BAT Ver.2.02" Training Course for Environment and Climate Change Canada. Online. February 8, 2022.

"Integrating Bioaccumulation Assessment Tools for Mammals (iBAT-Mam)". HESI Spring 2021 Webinars: Advances in toxicokinetics and bioaccumulation science in mammals to aid human and ecological assessments. April 8, 2021.

"Bioaccumulation 101: Focus on importance of bioaccumulation". Fish Biotransformation in Bioaccumulation: Outreach Session. HESI. Washington, DC October 4, 2019

"Mechanistic Process-Based Fate and Exposure Models: Tools for Researchers and Regulators". SETAC Short Course, SETAC-Europe. Helsinki, Finland May 29, 2019

"The Bioaccumulation Assessment Tool (BAT)". Environment and Climate Change Canada Gatineau, QC December 4, 2018

"The Application of Emerging Tools for Bioaccumulation Assessment: Integration of Biotransformation", Rome, Italy May 13 2018.

"Mass Balance Models for Assessing Chemical Fate and Exposure" SETAC-Laurentian 17<sup>th</sup> AGM, Peterborough, ON June 22, 2012