

# REBECCA K. SAARI

*Curriculum Vitae*

---

Assistant Professor  
Civil and Environmental Engineering  
University of Waterloo  
E2-2324, 200 University Ave W  
Waterloo, ON N2L 3G1

[rsaari@uwaterloo.ca](mailto:rsaari@uwaterloo.ca)  
[uwaterloo.ca/scholar/rsaari](http://uwaterloo.ca/scholar/rsaari)

---

## EDUCATIONAL HISTORY

---

### **MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA, USA**

Ph.D. in Engineering Systems

June, 2015

Committee: Noelle Selin (chair), John Reilly, Ron Prinn

Title: *Air quality impacts and benefits under US policy for air pollution, climate change, and clean energy*

### **UNIVERSITY OF TORONTO, Toronto, ON, CAN**

Master of Applied Science in Mechanical and Environmental Engineering

June, 2007

Advisor: Murray Thomson

Title: *A passive infrared sensor for combustion efficiency and process control*

### **UNIVERSITY OF TORONTO, Toronto, ON, CAN**

Bachelor of Applied Science in Engineering Science – Physics Option

June, 2005

Title: *Derived tropospheric ozone over downtown Toronto*

---

## EMPLOYMENT HISTORY

---

**Assistant Professor, University of Waterloo**, Civil and Environmental Engineering, Waterloo, ON 09//2015-present

**Post-Graduate Research Assistant, Massachusetts Institute of Technology**, Leading Technology Policy, Cambridge, MA, USA, 06/2015-08/2015

**Graduate Research Assistant, Massachusetts Institute of Technology**, Engineering Systems Division, Cambridge, MA, USA, 09/2010-06/2015

**Air Quality Scientist, Environment Canada**, Vancouver, BC, Canada, 01/2010-07/2010

**Air Quality Engineer, AECOM**, Vancouver BC, Canada, 12/2008-12/2009

**Air Quality Engineer, AECOM**, Toronto, ON, Canada, 01/2007-12/2008

**Graduate Research Assistant, University of Toronto**, Mechanical Engineering, Toronto, ON, 09/2005-12/2006

---

## FUNDING, HONOURS, AND AWARDS

---

Awarded as PI:

1. MTO Highway Infrastructure Innovation Funding Program (2018-2020) \$76K
2. NSERC Canadian Foundation for Innovation JELF (\$50K), ORF-RI \$50 K and IOF (\$14K) - \$114K
3. NSERC Discovery Grant (2016-2021) \$115K
4. MTO Highway Infrastructure Innovation Funding Program (2016-2018) \$63K

Awarded as co-PI:

5. MTO Highway Infrastructure Innovation Funding Program (2018-2019) (funds to S.L. Tighe)

Honours and Awards:

6. Roos Dissertation Award, MIT (2015) - \$1,000
7. Martin Family Society of Sustainability Fellows, MIT (2012-2013) - \$38,000
8. Joseph A. Martore (MIT 1975) Award for Exceptional Contributions to Engineering Systems Education (accepted as co-President of Engineering Systems Division Student Society), MIT (2011-2012) - \$1,000
9. C3E Women in Clean Energy Poster Competition Finalist (2013)
10. Graduate Student Award for Excellence in Engineering Systems Teaching Nominee (2013)
11. Total Energy Fellowship, Massachusetts Institute of Technology (2010) - \$69,000
12. T-Holders Academic Excellence Award, University of Toronto (2005)

---

## PUBLICATIONS

---

Student advised by Saari indicated with underline.

### Refereed archival journal publications

1. Wang, W., R.K. Saari, C. Bachmann, “Regional Sources and Impacts of Atmospheric Emissions from On-Road Freight Using a Novel Integrated Modelling Framework”. (in progress)
2. Nasir, F., R.K. Saari, S.L. Tighe, “Environmental Life Cycle Costs of Sustainable Pavement Management Options Accounting for Atmospheric Damages” (in progress)
3. R.K. Saari, J. Caron, N. Selin, “Costs and Air Quality Co-Benefits under State and Sectoral Trading to Regulate CO<sub>2</sub> from U.S. Power Plants.” (in progress)
4. Liu, M., J. Li, G. Zhou, R.K. Saari, X. Liu, “A satellite-based theoretical method for ground-level PM<sub>2.5</sub> retrieval over China.” (submitted)
5. R.K. Saari, Y.F. Mei, E. Monier, F. Garcia-Menendez, “Future Health Burden of Air Pollution under a Changing Climate and Uncertain Co-benefits of Global Policy.” (submitted)
6. Torres-Machi, Cristina, Filzah Nasir, Jessica Achebe, R. K. Saari, Susan L. Tighe. “Sustainability Evaluation of Pavement Technologies through Multicriteria Decision Techniques”. (submitted)
7. Chang, Kelly M., Jeremy J. Hess, John M. Balbus, Jonathan J. Buonocore, David A. Cleveland, Maggie L. Grabow, Roni Neff, R.K. Saari, Christopher W. Tessum, Paul Wilkinson, Alistair Woodward, and Kristie L. Ebi. “Ancillary Health Effects of Climate Mitigation Scenarios as Drivers of Policy Uptake: A Review of Air Quality, Transportation and Diet Co-Benefits Modeling Studies.” *Environmental Research Letters* 12, no. 11 (2017): 113001. DOI: [10.1088/1748-9326/aa8f7b](https://doi.org/10.1088/1748-9326/aa8f7b).
8. R.K. Saari, T.M. Thompson, N.E. Selin, “Human Health and Economic Impacts of Ozone Reductions by Income Group.” *Environmental Science and Technology*. Online Publication January 11, 2017. DOI: [10.1021/acs.est.6b04708](https://doi.org/10.1021/acs.est.6b04708).
9. Yeung, J., Walbridge S., Haas C., R.K. Saari. 2016. “Understanding the Total Life Cycle Cost Implications of Reusing Structural Steel.” *Environment Systems and Decisions*, December, 1–20. doi:[10.1007/s10669-016-9621-6](https://doi.org/10.1007/s10669-016-9621-6).
10. T.M. Thompson, S. Rausch, R.K. Saari, N.E. Selin, “Air quality co-benefits of sub-national carbon policies.” *Journal of the Air & Waste Management Association*, doi: [10.1080/10962247.2016.1192071](https://doi.org/10.1080/10962247.2016.1192071). (2016)
11. F. Garcia-Menendez, R.K. Saari, E. Monier, N.E. Selin, “Impacts of climate change and benefits of climate policy for U.S. air quality and health.” *Environmental Science and Technology*, 49 (13) 7580-7588 doi: [10.1021/acs.est.5b01324](https://doi.org/10.1021/acs.est.5b01324). (2015)
12. R.K. Saari, N.E. Selin, S. Rausch, T. Thompson, “A self-consistent method to assess air quality co-benefits from US climate change policies.” *Journal of the Air & Waste Management Association*, 65, 74–89. doi:[10.1080/10962247.2014.959139](https://doi.org/10.1080/10962247.2014.959139) (2015)
13. T.M. Thompson, S. Rausch, R.K. Saari, N.E. Selin, “Air Quality Co-Benefits of US Carbon Policies: A Systems Approach to Evaluating Policy Outcomes and Uncertainties.” *Nature Climate Change*, doi:[10.1038/nclimate2342](https://doi.org/10.1038/nclimate2342) (2014)
14. T.M. Thompson, R.K. Saari, N.E. Selin, “Air Quality Resolution for Health Impacts Assessment: Influence of Regional Characteristics.” *Atmospheric Chemistry and Physics*, 14: 969-978, (2014).
15. S. Rego-Barcena, R. Mani, F. Yang, R. Saari, M. J. Thomson, “Real time, optical measurement of gas temperature and particle emissivity in a full-scale steelmaking furnace.” *Metallurgical and Materials Transactions B*. 40B: 158-168, (2009).
16. S. Rego-Barcena, R. Saari, R. Mani, S. El-Batroukh, M. J. Thomson, “Real time, non-intrusive measurement of particle emissivity and gas temperature in coal-fired power plants,” *Measurement Science and Technology*. 18: 3479-3488, (2007).

17. A. Wiacek, J. Taylor, K. Strong, **R. Saari**, T. Kerzenmacher, “Ground-based solar absorption FTIR spectroscopy: a novel optical design instrument at a new NDSC Complementary Station, characterization of retrievals and first results,” *Journal of Atmospheric and Oceanic Technology*. [24 432-448](#), (2007).

#### Book chapters

1. C.L. Magee, **R.K. Saari**, G.T. Heaps-Nelson, S.M. Zoepf, “The Historical Roots of the Field of Engineering Systems: Results from an In-Class Assignment”, in *Infronomics Sustainability, Engineering Design and Governance*, 24: 353-376 (2014).

#### Government report chapters

1. Saari, R.K., et al. Multiple chapters in “Georgia Basin - Puget Sound Airshed Characterization Report, 2014.” - Vingarzan R., So R., Kotchenruther R., editors. Environment Canada, Pacific and Yukon Region, Vancouver (BC). U.S. Environmental Protection Agency, Region 10, Seattle (WA). ISBN 978-1-100 22695-8. Cat. No.: En84-3/2013E-PDF. EPA 910-R-14-002. (2014)

---

### CONFERENCE PRESENTATIONS

---

1. **R.K. Saari**, F. Garcia-Menendez, *Applying large ensembles to filter out natural variability in air quality health impacts of climate change and climate policy*, 2018 Canadian Meteorological and Oceanographic Society Conference, Halifax, NS, June 9-14, 2018.
2. **R. K. Saari**, Y. Mei, F. Garcia-Menendez, E. Monier, *Quantifying the effect of natural variability on the assessment of climate policies' health benefits compared to costs*, 2016 CMAS Conference, Chapel Hill, NC, October 24-26, 2016.
3. **R. K. Saari**, Y. Mei, F. Garcia-Menendez, *Influence of health response uncertainty and natural variability on assessments of air quality benefits under climate policy*, 99<sup>th</sup> Canadian Chemistry Conference and Exhibition, Halifax, NS, June 5-9, 2016.
4. **R. Saari**, N.E. Selin, *Air quality under state-level limits or regional trading to regulate CO<sub>2</sub> from existing power plants*, Air & Waste Management Association Annual Conference and Exhibition, Raleigh, NC, June 22-25, 2015.
5. **R. Saari**, N.E. Selin, T. M. Thompson, *Quantifying Economic Impacts of US Ozone Policies for Low-Income Households through Integrated Modeling*, Community Modeling and Analysis System (CMAS) Conference, Chapel Hill, NC, October 27-29, 2014.
6. **R. Saari**, N.E. Selin, S. Rausch, T. M. Thompson, *Integrated Assessment of the Co-Benefits of Fine Particulate Matter Reduction Under US Climate Change Policies*, Air & Waste Management Association Conference on Climate Change: Impacts, Policy, and Regulation, Herndon, VA, September 10-11, 2013.
7. **R. Saari**, S. Rausch, T. Thompson, N.E. Selin, *Income, inequality, and the health-related economic impacts of ozone pollution in the United States*, Technology Management Policy Consortium, Cambridge, MA, June 16-18, 2013.
8. **R. Saari**, S. Rausch, T. Thompson, N.E. Selin, *Mapping the Air Quality Co-Benefits of Climate Change Policy*, Massachusetts Confronts Climate Change: Student Showcase on Climate Adaptation and Mitigation Research, Cambridge, MA, January 29, 2013.
9. **R. Saari**, S. Rausch, N. Selin. *Income-Differentiated Air Pollution Health Benefits from a Newly Enhanced US Economic Model*, Council of Engineering Systems Universities Third International Engineering Systems Symposium – Technology Management Policy Doctoral Consortium, Delft, Netherlands, June 18-20, 2012.
10. **R. Saari**, R. Vingarzan, P. Schwarzhoff, R. Kotchenruther, *Update of GBPS Airshed Characterization: Report on Progress*, Invited Presentation, May 2010 Georgia Basin Puget Sound International Airshed Strategy Coordinating Committee Meeting, Whistler, Canada, May 11-14, 2010.
11. **R. Saari**, J.-Y. Urbain, *Targeted Odor Control at Wastewater Treatment Plants*, Odor Modeling and Monitoring, Air & Waste Management Association Annual Conference and Exhibition, Calgary, Canada, June 2010.
12. **R. Saari**, R. Mani, S. El Batroukh, S. Rego-Barcena, M. Thomson, *Combustion Diagnostics with a Mid-infrared Pyroelectric Sensor at a Coal-fired Power Plant*, CI/CS Spring Technical Meeting, Waterloo, Canada, May 2006.
13. **R. Saari**, S. Rego-Barcena, M. Thomson, *A Smart Sensor for Furnace Pollution Control and Energy Efficiency*, APPrO 2005: 17<sup>th</sup> Annual Canadian Power Conference and Trade Show, Toronto, Canada, November 21-22, 2005.

---

### CONFERENCE PAPERS/OTHER PRESENTATIONS

---

1. Filzah Nasir, **Rebecca Saari**, Susan Tighe. *Quantifying Environmental Damages for Sustainable Pavement Management*. CMOS, Toronto, ON, June 2017.
2. **R. Saari**, N.E. Selin, *Air quality co-benefits and costs under state, regional, or national cooperation to regulate CO<sub>2</sub> from existing power plants*, American Geophysical Union Fall Meeting, San Francisco, USA, December 14-18, 2015.
3. **R. Saari**, S. Rausch, T. M. Thompson, N.E. Selin, *The US market for cool, clear skies: exploring key drivers of air quality impacts under climate change policy*, Graduate Climate Conference, Falmouth, MA, November 1-3, 2013.
4. **R. Saari**, S. Rausch, T. M. Thompson, N.E. Selin, *The air quality co-benefits of US clean energy and climate change policies*, C3E Women in Clean Energy Symposium, Cambridge, MA, September 27-28, 2013
5. **R. Saari**, S. Rausch, N.E. Selin, *Integrated Assessment of Health-related Economic Impacts of U.S. Air Pollution Policy*, MIT Center for Environmental Health Studies 2013 Annual Poster Session, Cambridge, MA, May 10, 2013.
6. T.M. Thompson, S. Rausch, **R. K. Saari** and N.E. Selin, *Air Quality Impacts of Three Carbon Policies: National vs Regional Implementation*, NESCAUM Directors' Meeting, National Association of Clean Air Agencies (NACAA) Global Warming Committee, Bi-Monthly Meeting, NESCAUM Attainment Planning Committee Meeting, New Jersey Clean Air Council Public Hearing, May-June, 2013.
7. Selin, N, et al. *Mercury Science Bulletin – Recent Findings from Scientific Research*, United Nations Environmental Program Intergovernmental Negotiating Committee Fifth Session on Mercury, Geneva, Switzerland, January, 2013.
8. C. Magee, **R. Saari**, T. Heaps-Nelson, S. Zoepf, J. Sussman, *The Historical Roots of the Field of Engineering Systems: Results from an In-class Assignment*, CESUN Third International Engineering Systems Symposium, Delft, Netherlands, June 18-20, 2012. (Also an ESD Working Paper, ESD-WP-2012-05, available at: <http://esd.mit.edu/wps/2012/esd-wp-2012-05.pdf>)
9. **R. Saari**, S. Rausch, N.E. Selin. *Integrated Assessment of Health-related Economic Impacts of U.S. Air Pollution Policy*, American Geophysical Union Fall Meeting, San Francisco, USA, December 3-7, 2012.
10. **R. Saari**, N.E. Selin, S. Rausch, *Income-differentiated Effects of the EPA Cross-State Rule Using an Economic Model of the U.S.*, MIT Energy Initiative Energy Fellows Poster Session 2011, Cambridge, MA, October 27, 2011.
11. S. Hanna, **R. Saari**, R. Vingarzan, P. Schwarzhoff, R. Kotchenruther, *Characterization of the Georgia Basin Puget Sound International Airshed*, Regional Air Quality Issues, 15<sup>th</sup> IUAPPA World Clean Air Congress, Vancouver, Canada, September 12-16, 2010.
12. S. Rego, R. Mani, **R. Saari**, M. Thomson, *Combustion diagnostics at a coal-fired power plant with a mid-infrared pyroelectric sensor*, Combustion Symposium, Heidelberg, Germany, August 2006.
13. S. Rego, **R. Saari**, R. Mani, S. El Batroukh, M. Thomson, *Combustion Diagnostics at a Coal-Fired Power Plant with a Mid-Infrared Pyroelectric Sensor*, Invited presentation, EPRI Infrared Thermography Utility Group (IRUG) Meeting, Toronto, Canada, July 2006.
14. S. Rego, R. Mani, **R. Saari**, M. Thomson, *A Smart Sensor for Furnace Pollution Control and Energy Efficiency*, 2006 OCE Discovery Conference and Exhibition, Toronto, Canada, May 2006.
15. J. Taylor, A. Wiacek, **R. Saari**, C. Avis, T. Kerzenmacher, K. Strong, *Ozone Observations over Toronto: A Comparison between a Ground-Based Fourier Transform InfraRed (FTIR) Spectrometer and the Optical Spectrograph and InfraRed Imager System (OSIRIS)*, 2004 AGU fall meeting, San Francisco, December 13-17, 2004.
16. J. Taylor, A. Wiacek, **R. Saari**, C. Avis, T. Kerzenmacher, K. Strong, *The Toronto Atmospheric Observatory: Ground-based Observations of the Atmosphere using a newly re-designed Fourier Transform InfraRed (FITR) Spectrometer*, 2004 CRESTech Innovation Network Annual Meeting, Mississauga, Ontario, October 14, 2004 .
17. J. Taylor, A. Wiacek, **R. Saari**, C. Avis, T. Kerzenmacher, K. Strong, *Current Observations at the Toronto Atmospheric Observatory: A Site Report to the NDSC Infrared Working Group*, Network for the Detection of Stratospheric Change's Infrared Working Group Annual Conference, Queenstown, New Zealand, August 2004.
18. S. Melo, C. McLandress, H. Wu, E. Farahani, K. Strong, T. Shepherd, C. Nowlan, **R. Saari**, *NO<sub>2</sub> Measurements During the Mantra 2002 Balloon Campaign*, 35<sup>th</sup> COSPAR Scientific Assembly, Paris, France, July 18-25, 2004.
19. J. Taylor, **R. Saari**, A. Wiacek, C. Avis, T. Kerzenmacher, K. Strong, *OSIRIS Validation at the Toronto Atmospheric Observatory*, 2004 OSIRIS Team Meeting, North York, Ontario, May 2004.

## TEACHING

---

### UNIVERSITY OF WATERLOO

Date	Type	Course	Name
F2016	UG	CIVE497	Air Quality Engineering
S2016	UG	ENVE321	Advanced Math
S2018	GRAD	CIVE770	Modelling for Sustainable Policy

### Undergraduate Supervision

Type	Dates
1. Coop	S2018
2. Coop	W2016
1. URA	S2018
2. URA	W2017
3. URA	F2015

Type	Dates
1. BAsc Thesis	F2016
1. FYDP	F2016-W2017
2. FYDP	F2015-W2016

### Graduate Supervision

Type	Dates
1. PHD	W2018-present
1. MASc	F2016-present
2. MASc	F2016-present

### Teaching Assistant

#### MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Engineering Systems Division Doctoral Seminar (Engineering Systems Division, Fall 2011)

Sustainability Science and Engineering (Engineering Systems Division, Fall 2012)

Modeling and Assessment for Policy (Engineering Systems Division, Spring 2013)

### UNIVERSITY OF TORONTO

Design for the Environment (Mechanical & Industrial Engineering, Spring 2006)

Atmospheric Pollution (Mechanical & Industrial Engineering, Spring 2006)

### Guest Lectures

Water Quality (Civil and Environmental Engineering, Winter, 2018)

Modeling and Assessment for Policy (Engineering Systems Division, Spring 2014)

Doctoral Seminar in Engineering Systems Recitation (Engineering Systems Division, Fall 2012, Fall 2013, Fall 2014)

Air Pollution: Formation and Control (Mechanical & Industrial Engineering, Fall 2005)

---

## SERVICE

---

### Service within University of Waterloo

Graduate Committee Faculty representative (2018-present)

Computing Committee Faculty representative (2017-present)

Health and Safety Committee Faculty representative (2017-present)

Engineering Faculty Council representative (2015-2017)

Academic Working Group of the President's Advisory Committee on Sustainability (2015-present)

PhD exam committees (6); MASc theses 2<sup>nd</sup> reader (2); MASc 3<sup>rd</sup> reader (3); PhD exam chair (3) MASc thesis internal external examiner (1)

### Service within MIT Engineering Systems Division

Co-President, Engineering Systems Division Student Society (2012-2013)

Co-Chair of Research & Education Committee, ESD Student Society (2010-2012)

### **Service within Discipline**

Committee member, Atmospheric Related Research at Canadian Universities (Special Interest Group in the Canadian Meteorological and Oceanographic Society) (2017-present)  
Ad hoc reviewer for Nature Climate Change, Nature Communications, Environmental Science and Technology, Atmospheric Chemistry and Physics, Atmospheric Environment, Journal of the Air and Waste Management Association, Energy Policy, National Science and Engineering Council of Canada, Canadian Space Agency  
Co-Leader of AECOM Air Quality Technical Practices Network (2007 – 2009)  
Co-Leader of AECOM Greenhouse Gas Working Group (2007 – 2009)

---

## INVITED TALKS

---

Saari, R., “Health Impacts of Climate Change and Climate Policy.” WISE Public Lecture, University of Waterloo, Waterloo, ON, June 26, 2018.

Saari, R., “Human Health Impacts of Climate Change and Climate Policy.” Daniel and Eva Roos Engineering Systems Dissertation Prize Talk, Massachusetts Institute of Technology, Cambridge, MA, September 25, 2017.

Saari, R. T.M. Thompson, N.E Selin, “Human Health and Economic Impacts of Ozone Reductions by Income Group.” BenMAP-CE Quarterly Webinar, U.S. Environmental Protection Agency Risk and Benefits Group, September 5, 2017.

Saari, R., “Policy to Air Quality Impacts”, Environmental Engineering Seminar Series, North Carolina State University, Raleigh, NC, October 28, 2016.

Saari, R., “Modeling the health-related air quality co-benefits of climate policy.” Invited panelist. Health Benefits of Climate Change Mitigation Policies and Technologies, University of Washington, Seattle, WA, September 19-20, 2016.

Saari, R., “Health Benefits of Climate Policy from Reducing the Climate Penalty.” Invited webinar for the United States Environmental Protection Agency Climate Research Division. July 25, 2016.

Saari, R., “Air quality co-benefits of climate policy.” Southern Ontario Centre for Atmospheric Aerosol Research (SOCAAR), University of Toronto, Toronto, ON, March 2, 2015.

Saari, R., “Air impacts under policy for clean air, clean energy, and climate change.” Carleton Atmospheric Modeling Group, Carleton University, Ottawa, ON, November 16, 2015.

Saari, R., N. Selin, S. Rausch, T. Thompson, “Air quality impacts and co-benefits under policy.” MIT/Harvard Working Group on Evaluating Technology and Policy for Sustainable Development, Harvard University, Cambridge MA, November 18, 2014.

---

## MEMBERSHIPS

---

Professional Engineers of Ontario, 2007-2010, 2016-present  
Canadian Meteorological and Oceanographic Society, 2018-present  
International Society of Exposure Scientists, 2018-present  
Canadian Society of Chemistry and Society of Chemical Engineers, 2016-present  
American Geophysical Union, 2004-2005, 2012-2016  
Air and Waste Management Association, 2007-2010, 2013-present  
United States Association of Energy Economists, 2012-2013  
Association of Professional Engineers and Geoscientists of British Columbia, 2009-2010