

Amy (Tianyuan) Li, Ph.D.
Assistant Professor, Department of Civil and Environmental Engineering
The University of Waterloo, 200 University Avenue West, Waterloo ON
Tianyuan.li@uwaterloo.ca

EDUCATION

The University of Toronto	Department of Civil and Mineral Engineering	Ph.D.	2021
		BASc	2016

PEER-REVIEWED JOURNAL PUBLICATIONS (submitted or published)

12. **Li T**, Wan Y, Diamond ML, Siegel JA. 2023. Quantitative filter forensics for allergens and SVOCs in residential buildings. Submitted to *Building and Environment*.
11. Sparks M, Farahbakhsh I, Anand M, Bauch CT, Conlon KC, East JD, **Li T**, Lickley MJ, Garcia-Menendez F, Monier E, Saari RK. 2023. Interactions of short-term adaptation, climate change mitigation, and climate variability in protecting human health from air pollution. Submitted to *Proceedings of the National Academy of Sciences*.
10. Katz A, **Li T**, James L, Siegel JA, O'Campo P. 2023. Systematically omitting indoor air quality: substandard guidance for shelters, group homes and long-term care during the COVID-19 pandemic. *Critical Public Health*. DOI: [10.1080/09581596.2023.2262736](https://doi.org/10.1080/09581596.2023.2262736)
9. **Li T**, Siegel JA. 2021. The impact of control strategies on filtration performance. *Energy & Buildings*, **251**, 111378. DOI: [10.1016/j.enbuild.2021.111378](https://doi.org/10.1016/j.enbuild.2021.111378)
8. **Li T**, Siegel JA. 2021. Assessing the impact of filtration systems in indoor environments with effectiveness. *Building and Environment*, **87**, 107389. DOI: [10.1016/j.buildenv.2020.107389](https://doi.org/10.1016/j.buildenv.2020.107389)
7. Matava C, Collard V, Siegel J, Denning S, **Li T**, Du B, Fiadjoe J, Fiset P, Engelhardt T. 2020. Use of a high-flow extractor to reduce aerosol exposure in tracheal intubation. *British Journal of Anaesthesia*, **125**, E363-366. DOI: [10.1016/j.bja.2020.07.014](https://doi.org/10.1016/j.bja.2020.07.014)
6. Zhang Y, **Li T**, Siegel JA. 2020. Investigating the impact of filters on long-term particle concentration measurements in residences (RP-1649). *Science and Technology for the Built Environment*, **26(8)**, 1037-1047. DOI: [10.1080/23744731.2020.1778402](https://doi.org/10.1080/23744731.2020.1778402)
5. **Li T**, Siegel JA. 2020. Laboratory performance of new and used residential HVAC filters: Comparison to field results (RP-1649). *Science and Technology for the Built Environment*, **26(6)**, 844-855. DOI: [10.1080/23744731.2020.1738871](https://doi.org/10.1080/23744731.2020.1738871) (**Featured in ASHRAE Journal Newsletter**)
4. **Li T**, Siegel JA. 2020. In-situ efficiency of filters in residential central HVAC systems. *Indoor Air*, **30(2)**, 315-325. DOI: [10.1111/ina.12633](https://doi.org/10.1111/ina.12633)
3. Alavy M, **Li T**, Siegel JA. 2020. Energy use in residential buildings: Analyses of high-efficiency filters and HVAC fans. *Energy & Buildings*, **209**, Article 109697. DOI: [10.1016/j.enbuild.2019.109697](https://doi.org/10.1016/j.enbuild.2019.109697)
2. **Li T**, Alavy M, Siegel JA. 2019. Measurement of residential HVAC runtime. *Building and Environment*, **150**, 99-107. DOI: [10.1016/j.buildenv.2019.01.004](https://doi.org/10.1016/j.buildenv.2019.01.004)
1. Alavy M, **Li T**, Siegel JA. 2018. Exploration of a long-term measurement approach for air exchange rate. *Building and Environment*, **144**, 474-481. DOI: [10.1016/j.buildenv.2018.08.051](https://doi.org/10.1016/j.buildenv.2018.08.051)

REPORTS

2. **Li T**, Katz A, Siegel JA. (2022). *Reducing transmission of COVID-19 through improvements to indoor air quality: a checklist for community spaces*. Unity Health Toronto, University of Toronto, University of Waterloo, Queen's University and Toronto Metropolitan University, Toronto, ON. Oct 2022. Available at: <http://maphealth.ca/ventilation>
1. **Li T**, Alavy M, Zhang Y, Siegel JA. *IAQ and Energy Implications of High-Efficiency Filters in Residential Buildings (1649-RP)*. American Society of Heating, Refrigerating and Air-conditioning Engineers, Atlanta, GA. Dec 2019.

PEER-REVIEWED CONFERENCE ABSTRACTS/EXTENDED ABSTRACTS

12. Al Humidi S, Li T. 2023. Assessing the impact of poor-performing homes on indoor air quality pre- and post-energy retrofits in low-income populations. Submitted to *ASHRAE Transactions for the 2024 Winter Conference*, Paper 35702.
11. Li T. 2023. Quantifying ultrafine particle exposure and the effectiveness of mitigation strategies for 3D printers in various operating environments. *Proceedings of the American Association for Aerosol Research 41st Annual Conference*, Paper 12.CM.2.
10. Li T, Wan Y, Du, B, Diamond M, Siegel JA. Qualitative Filter Forensics for Allergens and SVOCs. *Indoor Air 2022: Proceedings of the 16th International Conference on Indoor Air and Climate*.
9. Li T, Siegel JA. Novel Control Strategies for Indoor Filtration. *Proceedings of the American Association for Aerosol Research 39th Annual Conference*, Paper 4.IA.3.
8. Du B, Li T, Matava C, Collard V, Denning S, Fiadjoe J, Fiset P, Engelhardt T, Siegel JA. Using a High-Flow Extractor to Reduce Aerosol Exposure in Medical Environments. *Proceedings of the American Association for Aerosol Research 39th Annual Conference*, Paper 3.IA.9.
7. Li T, Siegel JA. The in-situ and laboratory efficiency of new and used residential HVAC filters. *Indoor Air 2020: Proceedings of the 16th International Conference on Indoor Air and Climate*, Paper 0128.
6. Li T, Siegel JA. Indoor air quality and energy implications of high-efficiency filters in residential buildings. *Indoor Air 2020: Proceedings of the 16th International Conference on Indoor Air and Climate*, Paper 0130.
5. Li T, Alavy M, Zhang Y, Siegel JA. 2020. Does residential HVAC filtration work? *Proceedings of the American Association for Aerosol Research 38th Annual Conference*, Paper 11.IA.3.
4. Li T, Siegel JA. Impacts of HVAC sequencing on runtime. *Indoor Air 2018: Proceedings of the 15th International Conference on Indoor Air and Climate*, Paper 645.
3. Alavy M, Li T, Siegel JA. Long-term air exchange rates in a residence. *Indoor Air 2018: Proceedings of the 15th International Conference on Indoor Air and Climate*, Paper 751.
2. Alavy M, Li T, Mahdavi A, Siegel JA. In-situ integrated filter efficiency measurement. *Proceedings of ASHRAE Houston 2018*.
1. Diaz Lozano Patiño E, Li T, Vantresca M, Vera Zambrano M, Xie H. 2017. Characterizing particulate matter emissions from an ultrasonic essential oil diffuser. *Proceedings of Healthy Buildings 2017 Asia*, 329-331.

EXTERNAL COMMITTEES AND PROFESSIONAL SERVICES

- Member of the Indoor Air Quality Advisory Group of the Ontario Society of Professional Engineers
- Member of American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Technical Committee 2.4

REVIEW PANELS AND EDITORIAL ROLES

- Member of the International Scientific Committee for Indoor Air 2020 and 2022
- Proposal review for NSERC Alliance Grant
- Journal review for Building and Environment, Indoor Air, Building Simulations, Journal of Exposure Science and Environmental Epidemiology

MEMBERSHIP

- | | |
|-------------------------|----------------|
| - ASHRAE YEA member | 2021 - present |
| - ASHRAE Student member | 2017 - 2021 |
| - ISIAQ student member | 2017 - 2021 |

Jeffrey A. Siegel, Ph.D.

*Professor, Department of Civil and Mineral Engineering
Bahen/Tanenbaum Chair in Civil Engineering
The University of Toronto*

EDUCATION

University of California, Berkeley	Mechanical Engineering	Ph.D.	2002
University of California, Berkeley	Mechanical Engineering	M.S.	1999
Swarthmore College	Engineering	B.S.	1995

ACADEMIC EXPERIENCE

The University of Toronto, Department of Civil and Mineral Engineering

Professor – 7/2015 - present

Associate Professor – 1/2013 to 6/2015

The University of Toronto, School of Public Health (non-budgetary cross appointment)

Professor – 9/2014 to present

The University of Toronto Department of Physical and Environmental Sciences (non-budgetary cross appointment)

Professor – 9/2015 to present

The University of Texas at Austin, Department of Civil, Architectural, and Environmental Engineering

Associate Professor – 9/2008 to 12/2012

Assistant Professor – 8/2002 to 8/2008

COURSES TAUGHT (*University of Toronto*)

CIV 1320: Indoor Air Quality, CIV 576 Sustainable Buildings, CIV 380 Sustainable Energy Systems CIV 375/575 Building Science

COURSES TAUGHT (*University of Texas*)

ARE389T: Indoor Air Quality: Transport and Control, ARE370: Design of Energy Efficient and Healthy Buildings, ARE346N Building Environmental Systems, ARE346P: HVAC Design, ARE383 Advanced Sustainable Buildings, CE383 Indoor Environmental Quality Measurements

GRADUATED STUDENTS (*University of Toronto*) 6 PhD, 8 MASc/MPH, 2 PDF, 4 in progress

GRADUATED STUDENTS (*University of Texas*) 13 PhD, 17 MS

SELECTED AWARDS

- UTFA Academic Citizen Award (2022)
- Bahen/Tanenbaum Chair in Civil Engineering (2021-)
- ASHRAE Fellow (2017-)
- Member of International Society of Indoor Air Quality and Climate Academy of Fellows (2016-)
- 2010 ASHRAE Transactions Paper Award, with Michael Waring (2011)
- J. Neils Thompson Centennial Teaching Fellow in Civil Engineering (2010-2012)
- Student Engineering Council Departmental Favorite Professor Award (2008)
- College of Engineering Outstanding Teaching by an Assistant Professor (2007)
- ASHRAE New Investigator Award (2006, 2007)
- International Society for Exposure Assessment Early Career Award (2004-2007)

CURRENT AND RECENT EXTERNALLY FUNDED RESEARCH PROJECTS

CIHR, NSERC (4), NFRF, Sloan Foundation, MITACS, CFI/ORF

SELECTED JOURNAL ARTICLES FROM PAST SIX YEARS (121 Career Total)

- 118 Persily AK, Siegel JA. 2022. Improving Ventilation Performance in Response to the Pandemic. *The Bridge* 52(3). <https://www.nae.edu/281056/Microbiomes-of-the-Built-Environment->
- 114 Wan Y, Diamond ML, Siegel JA. 2022. Quantitative Filter Forensics for Semi-volatile Organic Compounds (SVOCs) in Social Housing Apartments. *Indoor Air*, **32(2)**, e12994. DOI: <https://doi.org/10.1111/ina.12994>
- 113 Mendell A, Mahdavi A, Siegel JA. 2022. Particulate matter concentrations in social housing. *Sustainable Cities & Society*, **76**, 103503. DOI: [10.1016/j.scs.2021.103503](https://doi.org/10.1016/j.scs.2021.103503)
- 110 Schwartz-Narbonne H, Abbatt J, DeCarlo PF, Farmer DK, Mattila J, Wang C, Donaldson DJ, Siegel JA. 2021. Modelling the removal of water-soluble trace gases from indoor air via air conditioner condensate. *Environmental Science and Technology*, **55**, 10987-10993. DOI: [10.1021/acs.est.1c02053](https://doi.org/10.1021/acs.est.1c02053)
- 107 Maestre JP, Jarma D, Yu J-R F, Siegel JA, Horner S, Kinney KA. 2021. Distribution of SARS-CoV-2 RNA signal in a home with COVID-19 positive occupants. *Science of the Total Environment*, **778**, 106201. DOI: [10.1016/j.scitotenv.2021.146201](https://doi.org/10.1016/j.scitotenv.2021.146201)
- 104 Mahdavi A, Dingle J, Chan AWH, Siegel JA. 2021. HVAC filtration of particles and trace metals: Airborne measurements and the evaluation of quantitative filter forensics. *Environmental Pollution*, **271**, 116388. DOI: [10.1016/j.envpol.2020.116388](https://doi.org/10.1016/j.envpol.2020.116388)
- 103 Mahdavi A, Siegel JA. 2021. Quantitative filter forensics: Size distribution and particulate matter concentrations in residential buildings. *Indoor Air*, **31(4)**, 1050-1060. DOI: [10.1111/ina.12782](https://doi.org/10.1111/ina.12782)
- 101 Vakalis D, Lepine C, MacLean HL, Siegel JA. 2021. Can green schools influence academic performance? *Critical Reviews in Environmental Science and Technology*, **51(13)**, 1354–1396. DOI: [10.1080/10643389.2020.1753631](https://doi.org/10.1080/10643389.2020.1753631)
- 100 Rajagopalan S, Brauer B, Bhatnagar A, Bhatt DL, Brook JR, Huang W, Münzel T, Newby D, Siegel JA, Brook RD. 2020. Personal-level protective actions against particulate matter air pollution exposure: A scientific statement from the American heart association. *Circulation*, **142(23)**, e411-431. DOI: [10.1161/CIR.0000000000000931](https://doi.org/10.1161/CIR.0000000000000931)
- 99 Newman et al. (23 authors). 2020. Cardiopulmonary impact of particulate air pollution in high-risk populations. *Journal of the American College of Cardiology*, **26**, 2878-2894. DOI: [10.1016/j.jacc.2020.10.020](https://doi.org/10.1016/j.jacc.2020.10.020)
- 96 Du B, Tandoc M, Mack M, Siegel JA. 2020. Indoor CO₂ concentrations and cognitive function: A critical review. *Indoor Air*, **30(6)**, 1067-1082. DOI: [10.1111/ina.12706](https://doi.org/10.1111/ina.12706)
- 95 Mahdavi A, Siegel JA. 2020. Extraction of dust collected in HVAC filters for quantitative filter forensics. *Aerosol Science and Technology*, **54(11)**, 1282-1292. DOI: [10.1111/ina.12782](https://doi.org/10.1111/ina.12782)
- 89 Li T, Siegel JA. 2020. In-situ efficiency of filters in residential central HVAC systems. *Indoor Air*, **30(2)**, 315-325. DOI: [10.1111/ina.12633](https://doi.org/10.1111/ina.12633)
- 84 Li T, Alavy M, Siegel JA. 2019. Measurement of residential HVAC runtime. *Building and Environment*, **150**, 99-107. DOI: [10.1016/j.buildenv.2019.01.004](https://doi.org/10.1016/j.buildenv.2019.01.004)
- 82 Givchchi R, Maestre JP, Bi C, Wylie G, Xu Y, Kinney K, Siegel JA. 2019. Quantitative filter forensics with residential HVAC filters to assess indoor concentrations. *Indoor Air*, **29(3)**, 390-402. DOI: [10.1111/ina.12536](https://doi.org/10.1111/ina.12536)
- 76 Touchie M, Siegel JA. 2018. Residential HVAC runtime from smart thermostats: Characterization, comparison, and impacts. *Indoor Air*, **28(6)**, 905-915. DOI: [10.1111/ina.12496](https://doi.org/10.1111/ina.12496)
- 73 Maestre JP, Jennings W, Wylie G, Horner S, Siegel JA, Kinney K. 2018. Filter forensics: Microbiome recovery from residential HVAC filters. *Microbiome*, **6**, 22. DOI: [10.1186/s40168-018-0407-6](https://doi.org/10.1186/s40168-018-0407-6)
- 70 Haaland D, Siegel JA. 2017. Quantitative filter forensics for indoor particle sampling. *Indoor Air*, **27(2)**, 364-376. DOI: [10.1111/ina.12319](https://doi.org/10.1111/ina.12319)
- 66 Siegel JA. 2016. Keynote: Primary and secondary consequences of indoor air cleaners. *Indoor Air*, **26(1)**, 88-96. DOI: [10.1111/ina.12194](https://doi.org/10.1111/ina.12194)