Christopher Tessum

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Professional Appointments

Assistant Professor—University of Illinois at Urbana-Champaign — 2020–present
Department of Civil and Environmental Engineering

Research Scientist—University of Washington — 2016–2019
Department of Civil and Environmental Engineering

Postdoctoral Associate—University of Minnesota — 2015–2016
Department of Bioproducts and Biosystems Engineering

Education

Ph.D., Civil, Environmental, and Geo- Engineering (public health minor)—University of Minnesota — 2009–2014

B.M.E., Mechanical Engineering (*cum laude*)—University of Minnesota — 2002–2006

Peer-Reviewed Publications (*=corresponding author; self and advisees are underlined)

42. Goodkind, A.L., J.S. Coggins, C.W. Tessum, and J.D. Marshall (2025) Optimal Point Source Abatement Technology Adoption: The Impact of Uncertainty in the Benefits of Abatement. *Environmental and Resource Economics*. **88** 709–730.

41. Guo, L., X. Yang, Z. Zheng, N. Riemer, and C.W. Tessum* (2024) Uncertainty Quantification in Reduced-Order Gas-Phase Atmospheric Chemistry Modeling Using Ensemble SINDy. *Journal of Geophysical Research: Machine Learning and Computation*. **1**:4 e2024JH000358.

40. Yang, X., L. Guo, Z. Zheng, N. Riemer, and C.W. Tessum* (2024) Atmospheric Chemistry Surrogate Modeling With Sparse Identification of Nonlinear Dynamics. *Journal of Geophysical Research: Machine Learning and Computation*. **1**:2 e2024JH000132.

39. Park, M., Z. Zheng, N. Riemer, and C.W. Tessum* (2024) Learned 1D Passive Scalar Advection to Accelerate Chemical Transport Modeling: A Case Study with GEOS-FP Horizontal Wind Fields. *Artificial Intelligence for the Earth Systems*. **3**:3 e230080.

38. Giang, A., M.R. Edwards, S.M. Fletcher, R. Gardner-Frolick, R. Gryba, J. Mathias, C. Venier-Cambron, J.M. Anderies, E. Berglund, S. Carley, J.S. Erickson, E. Grubert, A. Hadjimichael, J. Hill, E. Mayfield, D. Nock, K.K. Pikok, R.K. Saari, M.S. Lezcano, A. Siddiqi, J.B. Skerker, and C.W. Tessum (2024) Equity and modeling in sustainability science: Examples and opportunities throughout the process. *Proceedings of the National Academy of Sciences*. **121**:13 e2215688121.

37. Peshin, T., S. Sengupta, S.K. Thakrar, K. Singh, J. Hill, J.S. Apte, C.W. Tessum, J.D. Marshall, and I. Azevedo (2024) Air quality, health, and equity impacts of vehicle electrification in India. *Environ. Res. Lett.* **19**:2 024015.

36. Schollaert, C.L., E. Alvarado, J. Baumgartner, T.B. Isaksen, J. Jung, M.E. Marlier, J.D. Marshall, Y.J. Masuda, C.W. Tessum, J. Wilkins, and J.T. Spector (2024) Estimated impacts of forest restoration scenarios on smoke exposures among outdoor agricultural workers in California. *Environmental Research Letters*. **19**:1 014085.

35. Schollaert, C.L., J. Jung, J. Wilkins, E. Alvarado, J. Baumgartner, J. Brun, B.I. Tania, J.M. Lydersen, M.E. Marlier, J.D. Marshall, Y.J. Masuda, C. Maxwell, C.W. Tessum, K.N. Wilson, N.H. Wolff, and J.T. Spector (2023) Quantifying the smoke-related public health trade-offs of forest management. *Nature Sustainability*. https://doi.org/10.1038/s41893-023-01253-y.

34. Wang, Y., J.S. Apte, J.D. Hill, C.E. Ivey, D. Johnson, E. Min, R. Morello-Frosch, R. Patterson, A.L. Robinson, C.W. Tessum, and J.D. Marshall (2023) Air quality policy should quantify effects on disparities. *Science*. **381**:6655 272-274.

33. Nawaz, M.O., D.K. Henze, S.C. Anenberg, D.Y. Ahn, D.L. Goldberg, C.W. Tessum, and Z.A. Chafe (2023) Sources of air pollution-related health impacts and benefits of radially applied transportation policies in 14 US cities. *Frontiers in Sustainable Cities*. **5** 1102493.

32. Gallagher, C.L., T. Holloway, C.W. Tessum, C.M. Jackson, and C. Heck (2023) Combining Satellite-Derived PM2.5 Data and a Reduced-Form Air Quality Model to Support Air Quality Analysis in US Cities. *GeoHealth*. **7**:5 e2023GH000788.

31. Jackson, C.M., T. Holloway, and C.W. Tessum (2023) City-scale analysis of annual ambient PM2.5 source contributions with the InMAP reduced-complexity air quality model: A case study of Madison, Wisconsin. *Environmental Research: Infrastructure and Sustainability*. **3** 015002.

30. Thind, M.P., C.W. Tessum, and J.D. Marshall (2023) Environmental Health, Racial/Ethnic Health Disparity, and Climate Impacts of Inter-Regional Freight Transport in the United States. *Environ. Sci. Technol*. **57**:2 884–895.

29. Wang, Y., J.S. Apte, J.D. Hill, C.E. Ivey, R.F. Patterson, A.L. Robinson, C.W. Tessum, and J.D. Marshall (2022) Location-specific strategies for eliminating US national racial-ethnic PM2.5 exposure inequality. *Proc. Natl. Acad. Sci. U.S.A.* **119**:44 e2205548119.

28. Kleiman, G., S.C. Anenberg, Z.A. Chafe, D.C. Appiah, T. Assefa, A. Bizberg, T. Coombes, D. Cuestas, D.K. Henze, A. Kessler, I. Kheirbek, P. Kinney, M. Mahlatji, J.D. Marshall, S. Naidoo, N. Potwana, A. Rodriguez, C.W. Tessum, and C. Thomas (2022) Enhanced Integration of Health, Climate, and Air Quality Management Planning at the Urban Scale. *Fron. Sustain. Cities*. **4** 934672.

27. Tessum, M.W., S.C. Anenberg, Z.A. Chafe, D.K. Henze, G. Kleiman, I. Kheirbek, J.D. Marshall, and C.W. Tessum* (2022) Sources of ambient PM2.5 exposure in 96 global cities. *Atmos. Environ*. **286** 119234.

26. Thakrar, S.K., C.W. Tessum, J.S. Apte, S. Balasubramanian, D.B. Millet, S.N. Pandis, J.D. Marshall, and J.D. Hill (2022) Global, high-resolution, reduced-complexity air quality modeling for PM2.5 using InMAP (Intervention Model for Air Pollution). *PLOS ONE*. **17**:5 e0268714.

25. D'Evelyn, S.M., J. Jung, E. Alvarado, J. Baumgartner, P. Caligiuri, R.K. Hagmann, S.B. Henderson, P.F. Hessburg, S. Hopkins, E.J. Kasner, M.A. Krawchuk, J.E. Krenz, J.M. Lydersen, M.E. Marlier, Y.J. Masuda, K. Metlen, G. Mittelstaedt, S.J. Prichard, C.L. Schollaert, E.B. Smith, J.T. Stevens, C.W. Tessum, C. Reeb-Whitaker, J.L. Wilkins, N.H. Wolff, L.M. Wood, R.D. Haugo, and J.T. Spector (2022) Wildfire, Smoke Exposure, Human Health, and Environmental Justice Need to be Integrated into Forest Restoration and Management. *Curr. Envir. Health Rpt*. **9** 366–385.

24. Wu, R., C.W. Tessum, Y. Zhang, C. Hong, Y. Zheng, X. Qin, S. Liu, and Q. Zhang (2021) Reduced-complexity air quality intervention modeling over China: the development of InMAPv1.6.1-China and a comparison with CMAQv5. 2. *Geosci. Model Dev*. **14**:12 7621–7638.

23. Balasubramanian, S., N.D. Hunt, N.G. Domingo, M. Gittlin, K. Colgan, J.D. Marshall, A.L. Robinson, I.M. Azevedo, S. Thakrar, M.A. Clark, C.W. Tessum, P.J. Adams, S.N. Pandis, and J.D. Hill (2021) The food we eat, the air we breathe: A review of the fine particulate matter-induced air quality health impacts of the global food system. *Environ. Res. Lett*. **16**:10 103004.

22. Domingo, N., S. Thakrar, S. Balasubramanian, K. Colgan, M. Clark, P. Adams, S. Pandis, D. Tilman, J. Marshall, C.W. Tessum, A.L. Goodkind, I.L. Azevedo, and J.D. Hill (2021) Air quality-related health damages of food.

Proc. Natl. Acad. Sci. U.S.A. **118**:20 e2013637118.

21. Tessum, C.W.*, D.A. Paolella, S.E. Chambliss, J.S. Apte, J.D. Hill, and J.D. Marshall (2021) PM2.5 Polluters Disproportionately and Systemically Affect People of Color in the United States. *Science Adv*. **7**:18 eabf4491.

20. Kelp, M.M., D.J. Jacob, J.N. Kutz, J.D. Marshall, and C.W. Tessum* (2020) Toward stable, general machine-learned models of the atmospheric chemical system. *J. Geophys. Res. Atmos*. **125** e2020JD032759.

19. Thakrar, S.K., S. Balasubramanian, P.J. Adams, I. Azevedo, N.Z. Muller, S.N. Pandis, S. Polasky, P. Arden, A.L. Robinson, J.S. Apte, C.W. Tessum, J.D. Marshall, and J.D. Hill (2020) Reducing Mortality from Air Pollution in the United States by Targeting Specific Emission Sources. *Environ. Sci. Technol. Lett*. **7**:9 639–645.

18. Thind, M.P., C.W. Tessum, I.L. Azevedo, and J.D. Marshall (2019) Fine Particulate Air Pollution from Electricity Generation in the US: Health Impacts by Race, Income, and Geography. *Environ. Sci. Technol*. **53**:23 14010–14019.

17. Dimanchev, E.G., S. Paltsev, M. Yuan, D. Rothenberg, C.W. Tessum, J.D. Marshall, and N.E. Selin (2019) Health co-benefits of sub-national renewable energy policy in the US. *Environ. Res. Lett*. **14**:8 085012.

16. Gilmore, E.A., J. Heo, N.Z. Muller, C.W. Tessum, J.D. Hill, J.D. Marshall, and P.J. Adams (2019) An inter-comparison of air quality social cost estimates from reduced-complexity models. *Environ. Res. Lett*. **14** 074016.

15. Goodkind, A.L., C.W. Tessum, J.S. Coggins, J.D. Hill, and J.D. Marshall (2019) Fine-scale damage estimates of particulate matter air pollution reveal opportunities for location-specific mitigation of emissions. *Proc. Natl. Acad. Sci. U.S.A.* **116**:18 8775–8780.

14. Hill, J.D., A.L. Goodkind, C.W. Tessum, S. Thakrar, D. Tilman, S. Polasky, T. Smith, N. Hunt, K. Mullins, M. Clark, and J.D. Marshall (2019) Air-quality-related health damages of maize. *Nat. Sustain*. **2** 397–403.

13. Tessum, C.W., J.S. Apte, A.L. Goodkind, N.Z. Muller, K.A. Mullins, D.A. Paolella, S. Polasky, N.P. Springer, S.K. Thakrar, J.D. Marshall, and J.D. Hill (2019) Inequity in consumption of goods and services adds to racial-ethnic disparities in air pollution exposure. *Proc. Natl. Acad. Sci. U.S.A.* **116**:13 6001–6006 (featured article).

12. Liu, L., T. Hwang, S. Lee, Y. Ouyang, B. Lee, S.J. Smith, C.W. Tessum, J.D. Marshall, F. Yan, K. Daenzer, and T.C. Bond (2019) Health and climate impacts of future United States land freight modelled with global-to-urban models. *Nat. Sustain*. **2** 105–112 (cover article).

11. Paolella, D., C.W. Tessum*, P. Adams, J.S. Apte, S. Chambliss, J.D. Hill, N. Muller, and J.D. Marshall (2018) Effect of Model Spatial Resolution on Estimates of Fine Particulate Matter Exposure and Exposure Disparities in the United States. *Environ. Sci. Technol. Lett*. **5**:7 436–441.

10. Thakrar, S.K., A.L. Goodkind, C.W. Tessum, J.D. Marshall, and J.D. Hill (2018) Life cycle air quality impacts on human health from potential switchgrass production in the United States. *Biomass Bioenergy*. **114** 73–82.

9. Chang, K.M., J.J. Hess, J.M. Balbus, J. Buonocore, D.A. Cleveland, M.L. Grabow, R. Neff, R.K. Saari, C.W. Tessum, P. Wilkinson, A. Woodward, and K.L. Ebi (2017) Ancillary health effects of climate mitigation scenarios as drivers of policy uptake: a review of air quality, transportation and diet co-benefits modeling studies. *Environ. Res. Lett*. **12** 113001.

8. Tessum, C.W.*, J.D. Hill, and J.D. Marshall (2017) InMAP: A model for air pollution interventions. *PLoS ONE*. **12**:4 e0176131.

7. Keeler, B.L., J.D. Gourevitch, S. Polasky, F. Isbell, C.W. Tessum, J.D. Hill, and J.D. Marshall (2016) The social costs of nitrogen. *Science Adv*. **2**:10 e1600219.

6. Touchaei, A.G., H. Akbari, and C.W. Tessum (2016) Effect of increasing urban albedo on meteorology and air quality of Montreal (Canada) – Episodic simulation of heat wave in 2005. *Atmos. Environ*. **132** 188–206.

5. Tessum, C.W., J.D. Hill, and J.D. Marshall (2015) Twelve-month, 12 km resolution North American WRF-Chem v3.4 air quality simulation: performance evaluation. *Geosci. Model Dev*. **8**:4 957–973.

4. Tessum, C.W., J.D. Hill, and J.D. Marshall (2014) Life cycle air quality impacts of conventional and alternative light-duty transportation in the United States. *Proc. Natl. Acad. Sci. U.S.A.* **111**:52 18490–18495.

3. Hu, L., D.B. Millet, M. Baasandorj, T.J. Grif, K.R. Travis, C.W. Tessum, J.D. Marshall, W.F. Reinhart, T. Mikoviny, M. Müller, A. Wisthaler, M. Graus, C. Warneke, and J.D. Gouw (2014) Emissions of C6-C8 aromatic compounds in the United States: Constraints from tall tower and aircraft measurements. *J. Geophys. Res. Atmos*. 826–842.

2. Tessum, C.W., J.D. Marshall, and J.D. Hill (2012) A spatially and temporally explicit life cycle inventory of air pollutants from gasoline and ethanol in the United States. *Environ. Sci. Technol*. **46**:20 11408–11417.

1. Millet, D.B., E. Apel, D.K. Henze, J. Hill, J.D. Marshall, H.B. Singh, and C.W. Tessum (2012) Natural and anthropogenic ethanol sources in North America and potential atmospheric impacts of ethanol fuel use. *Environ. Sci. Technol*. **46**:15 8484–92.

Preprints and Manuscripts Submitted for Review (*=corresponding author; self and advisees are underlined)

5. Koolik, L., S. Speizer, C. Rong, S. Chambliss, J.D. Marshall, R. Morello-Frosch, C.W. Tessum, and J.S. Apte (2025) Methodological Design Choices Can Affect Air Pollution Exposure Disparity Estimates: A Case Study on California's Agricultural Sector. *ChemRxiv*. https://doi.org/10.26434/chemrxiv-2025-jcdnz.

4. Wang, S., S. Thakrar, J. Johnson, and C.W. Tessum* (2025) International (Fair) Trade in Air-Quality-Related Mortality. *In Review*.

3. Yang, X., L. Guo, and C.W. Tessum* (2025) Atmospheric chemistry surrogate modeling with sparse identification of mass action dynamics. *ESS Open Archive*. https://doi.org/10.22541/essoar.174534373.33273911/v1.

2. Kazemi, A., Q. Fatima, V. Kindratenko, and C.W. Tessum* (2024) AIDOVECL: AI-generated Dataset of Outpainted Vehicles for Eye-level Classification and Localization. *arXiv preprint*. https://arxiv.org/abs/2410.24116.

1. Kelp, M., C.W. Tessum*, and J.D. Marshall (2018) Orders-of-magnitude speedup in atmospheric chemistry modeling through neural network-based emulation. *arXiv Preprint*. https://arxiv.org/abs/1808.03874.

Reports and Other Publications

3. Shindell, D., E. Neptune, K. Pullen-Fedinick, P. Adams, J.E. Aldy, D. Bael, J. Buonocore, M. Dickie, D. Henze, L. Jin, M. Kleeman, N. Kuminoff, R. McConnell, M. Neidell, S. Newbold, J. Patz, L. Robinson, A. Russell, S. Spak, and C.W. Tessum (2024) "Review of BenMAP and Benefits Methods", tech. rep.: US EPA Scientific Advisory Board, Washington, DC, USA, EPA-SAB-24-003.

2. Tessum, C.W., J.D. Marshall, and J.D. Hill (2010) "Tank-to-wheel emissions of ethanol and biodiesel powered vehicles as compared to petroleum alternatives", tech. rep.: Center for Transportation Studies, University of Minnesota, Minneapolis, MN, USA.

1. Tessum, C.W., A.M. Boies, J.D. Hill, and J.D. Marshall (2010) "Assessing the sustainability of biofuels: Metrics, models, and tools for evaluating the impact of biofuels", in *Expanding Biofuel Production: Sustainability and the Transition to Advanced Biofuels: Summary of a Workshop*, ed. by Koshel, Patricia and McAllister, Kathleen, National Research Council, 117–140, https://download.nap.edu/catalog.php?record_id=12806.

Conference Papers

2. Park, M., Z. Zheng, N. Riemer, and C.W. Tessum* (2022) Learned 1-D advection solver to accelerate air quality modeling. *arXiv preprint*. arXiv:2211.03906.

1. Koloutsou-Vakakis, S., C.W. Tessum, E. Kontou, H. Meidani, and L. Zhao (2022) Cloud technologies for scalable engagement and learning in flipped classrooms. Presented at 2022 ASEE Annual Conference & Exposition, Minneapolis, MN.

Invited Presentations

31. Tessum, C.W. (2025) International (Fair) Trade in Air-Quality-Related Mortality. Presented at Supply Chain Management Conference: Sustainability and Social Responsibility in Supply Chains, University of Illinois Urbana-Champaign.

30. Tessum, C.W. (2024) International (Fair) Trade in Air-Quality-Related Mortality. Presented at Geo Hub for Climate and Health in the Middle East and North Africa Seminar Series, Virtual.

29. Tessum, C.W. (2024) Air Quality Model Reduction Using Scientific Machine Learning. Presented at Community Modeling and Analysis System (CMAS) Annual Conference, Chapel Hill, North Carolina.

28. Tessum, C.W. (2024) Machine-learned surrogate modeling for atmospheric chemical transport. Presented at NASA Center of AI Excellence Seminar Series, Virtual.

27. Tessum, C.W. (2023) Model development and reduction for interdisciplinary science. Presented at American Geophysical Union Annual Meeting (Invited Presentation), San Francisco, CA.

26. Tessum, C.W. (2023) Reduced-form air quality modeling for improved public health. Presented at University of Victoria Civil Engineering Seminar Series (Invited Presentation), Virtual.

25. Tessum, C.W. (2023) Interpretable machine learning for atmospheric model reduction. Presented at NASA Atmospheric Chemistry and Dynamics Laboratory Seminar Series (Invited Presentation), Virtual.

24. Tessum, C.W. (2022) Reduced complexity chemical transport modeling for environmental justice applications. Presented at NASA Health and Air Quality Applied Science Team (HAQAST) bi-annual meeting (Invited Presentation), Madison, WI.

23. Tessum, C.W. (2022) Machine-learned atmospheric chemical mechanisms. Presented at NASA GMAO Seminar Series on Earth System Science (Invited Presentation), Virtual due to COVID-19.

22. Tessum, C.W. (2022) Machine-learned atmospheric chemical mechanisms. Presented at American Meteorological Society 24th Conference on Atmospheric Chemistry (Invited Presentation), Virtual due to COVID-19.

21. Tessum, C.W. (2021) Sources of inequity in exposure to fine particulate air pollution (Invited Presentation). Presented at AGU Fall Meeting, Virtual due to COVID-19.

20. Tessum, C.W. (2021) Sources of inequity in exposure to fine particulate air pollution. Presented at University of Wisconsin Center for Sustainability and the Global Environment Weston Roundtable, Madison, Wisconsin.

19. Tessum, C.W. (2021) Sources of inequity in exposure to fine particulate matter. Presented at Electric Power Research Institute Generation Virtual Advisory Meeting, Virtual.

18. Tessum, C.W. (2021) Sources of inequity in exposure to fine particulate air pollution. Presented at EPA Air, Climate, and Energy Centers Bimonthly Webinar Series, Virtual.

17. Tessum, C.W. (2021) Sources of inequity in exposure to fine particulate air pollution. Presented at University of Chicago Center for Health and Environment Seminar Series, Virtual.

16. Tessum, C.W. (2021) Sources of inequity in exposure to fine particulate air pollution. Presented at Lawrence Berkeley National Laboratory Energy Analysis and Environmental Impacts Division Seminar Series, Virtual.

15. Tessum, C.W., and J.D. Marshall (2021) Modelling air pollution sources: Using InMAP to prioritise actions. Presented at c40 Air Quality Webinar, Virtual.

14. Tessum, C.W. (2021) Kinetic neural networks for atmospheric chemistry surrogate modeling. Presented at American Meteorological Society's 23rd Conference on Atmospheric Chemistry, Virtual due to COVID-19.

13. Tessum, C.W. (2020) Kinetic neural networks for atmospheric chemistry surrogate modeling. Presented at Atmospheric Chemical Mechanisms Conference, Virtual.

12. Tessum, C., J. Hill, and J. Marshall (2017) Spatially explicit life cycle assessment for air pollution health impacts. Presented at International Emissions Inventory Conference, Baltimore, Maryland, USA.

11. Tessum, C.W., J.D. Hill, and J.D. Marshall (2017) Spatially and chemically explicit life cycle assessment for conventional and alternative vehicles. Presented at Coordinating Research Council (CRC) Mobile Source Air Toxics Workshop, Sacramento, California, USA.

10. Tessum, C.W., J.D. Marshall, and J.D. Hill (2015) Renewable Fuel Standard: Impacts on American Consumers. Presented at U.S. House of Representatives, Washington, D.C..

9. Tessum, C.W., J.D. Hill, and J.D. Marshall (2015) Air Pollution, Health, and Environmental Justice Implications of Shifting Transportation Fuels in the United States. Presented at Minnesota Environmental Health Association Annual Conference, Alexandria, MN.

8. Tessum, C.W., J.D. Hill, and J.D. Marshall (2014) Air pollution, health, and environmental justice implications of shifting transportation fuels in the United States. Presented at Lawrence Berkeley National Laboratory Environmental Energy Technologies Division Seminar Series, Berkeley, CA, USA.

7. Tessum, C., J. Hill, and J. Marshall (2014) A reduced-complexity, variable grid resolution model for air pollution transport and transformation. Presented at 2014 Natural Capital Annual Meeting and Training, Stanford, CA.

6. Tessum, C.W., J.D. Hill, and J.D. Marshall (2013) Public health implications of alternative transportation fuels in the United States. Presented at Peking University, Beijing, China.

5. Tessum, C.W., J.D. Hill, and J.D. Marshall (2013) Public health implications of alternative transportation fuels in the United States. Presented at China Center for Disease Control and Prevention, Beijing, China.

4. Tessum, C.W., J.D. Marshall, and J.D. Hill (2013) Life cycle air pollutant emission and impact accounting for transportation fuels. Presented at Air and Waste Management Association 106th Annual Conference and Exhibition, Chicago, IL, USA.

3. Tessum, C.W., J.D. Hill, and J.D. Marshall (2012) A spatially and temporally explicit life cycle inventory of air pollutants from transportation fuels in the United States. Presented at Society for Environmental Toxicology and Chemistry North America Annual Conference, Long Beach, CA, USA.

2. Tessum, C.W., K. Wagstrom, J.D. Hill, and J.D. Marshall (2011) Air quality and public health impacts of biofuel production and use in the United States. Presented at Peking University, Beijing, China.

1. Tessum, C.W., and J.D. Hill (2011) Assessing biofuel sustainability: Lessons from growth of the U.S. industry. Presented at Minnesota Academy of Science Annual Meeting, Minneapolis, MN, USA.

Conference Presentations

53. Kim, Y.M., Q. Fatima, C. Ni, W. Yao, C.W. Tessum, M.W. Tessum, and V. Kindratenko (2024) Air pollution-relevant characterization of vehicles from roadside stereo video using computer vision. Presented at American

Geophysical Union Annual Meeting (Abstract and Poster), Washington, D.C..

52. Yang, X., L. Guo, and C.W. Tessum (2024) Atmospheric chemistry surrogate modeling with sparse identification of mass action dynamics. Presented at American Geophysical Union Annual Meeting (Abstract and Poster), Washington, D.C..

51. Wang, S., S. Thakrar, J. Johnson, and C.W. Tessum (2024) International (Fair) Trade in Air-Quality-Related Mortality. Presented at American Geophysical Union Annual Meeting (Abstract and Presentation), Washington, D.C..

50. Park, M., and C.W. Tessum (2024) Stable machine-learned acceleration of advection in chemical transport modeling. Presented at American Geophysical Union Annual Meeting (Abstract and Presentation), Washington, D.C..

49. Liu, J., C.V. Rackauckas, and C.W. Tessum (2024) Development and Application of Symbolic Equation-Based Atmospheric Chemical Transport Models. Presented at American Geophysical Union Annual Meeting (Abstract and Poster), Washington, D.C..

48. Guo, L., X. Yang, and C.W. Tessum (2024) Application of Stable Sparse Identification of Nonlinear Dynamical Systems to the Calculation of Gas-phase Chemistry within the GEOS-Chem Chemistry Model. Presented at American Geophysical Union Annual Meeting (Abstract and Poster), Washington, D.C..

47. Fatima, Q., A. Kazemi, Y. Kim, D. Liu, V. Kindratenko, M.W. Tessum, and C.W. Tessum (2024) Hyperlocal air pollution prediction using traffic camera footage and computer vision techniques: Comparisons between three locations. Presented at American Geophysical Union Annual Meeting (Abstract and Poster), Washington, D.C..

46. Yang, X., L. Guo, Z. Zheng, N. Riemer, and C.W. Tessum (2023) Atmospheric chemistry surrogate modeling with sparse identification of nonlinear dynamics. Presented at American Geophysical Union Annual Meeting (Abstract and Poster), San Francisco, CA.

45. Wang, S., S. Thakrar, J. Johnson, and C.W. Tessum (2023) Disparities in PM2.5 Exposure Caused by International Trade. Presented at American Geophysical Union Annual Meeting (Abstract and Poster), San Francisco, CA.

44. Ran, X., L. Kysela, H. Emamipour, Y. Jiang, T. Holloway, and C.W. Tessum (2023) A Community-Centric, GIS-Enabled Community Air Pollution Modeling Web Tool for Non-Technical Users. Presented at American Geophysical Union Annual Meeting (Abstract and Presentation), San Francisco, CA.

43. Park, M., Z. Zheng, N. Riemer, and C.W. Tessum (2023) Machine-learned Advection Operator to Accelerate Air Quality Modeling. Presented at American Geophysical Union Annual Meeting (Abstract and Presentation), San Francisco, CA.

42. Liu, J., C.V. Rackauckas, and C.W. Tessum (2023) Developing a standard library of symbolic equation-based geoscience algorithms. Presented at American Geophysical Union Annual Meeting (Abstract and Presentation), San Francisco, CA.

41. Fatima, Q., A. Kazemi, Y. Kim, D. Liu, V. Kindratenko, M.W. Tessum, and C.W. Tessum (2023) Hyperlocal air pollution prediction using traffic camera footage and computer vision techniques. Presented at American Geophysical Union Annual Meeting (Abstract and Poster), San Francisco, CA.

40. Guo, L., X. Yang, Z. Zheng, N. Riemer, and C.W. Tessum (2023) Chemical Surrogate Modeling with Uncertainty Quantification Using Ensemble SINDy. Presented at American Geophysical Union Annual Meeting (Abstract and Poster), San Francisco, CA.

39. Park, M., Z. Zheng, N. Riemer, and C.W. Tessum (2023) Reducing the computational expense of aerosol transport modeling using a machine-learned advection operator. Presented at International Aerosol Modeling Algorithms

Conference (Abstract and Poster), Davis, CA.

38. Park, M., Z. Zheng, N. Riemer, and C.W. Tessum (2023) Toward machine-learned acceleration of passive scalar advection: model description and verification (Abstract and Poster). Presented at American Meteorological Society 24th Conference on Atmospheric Chemistry, Denver, CO.

37. Gallagher, C., T. Holloway, C. Tessum, C.M. Jackson, and C. Heck (2022) Scaling InMAP with Satellite-Derived Data for Environmental Justice Applications. Presented at American Geophysical Union Fall Meeting 2022, Chicago, IL.

36. Singh, M., C.W. Tessum, J. Marshall, and I. Azevedo (2022) Distributional effects in health damages from air pollution from using fossil fuel and electrified vehicles in the United States. Presented at American Geophysical Union Fall Meeting 2022, Chicago, IL.

35. Park, M., Z. Zheng, N. Riemer, and C.W. Tessum (2022) Learned 1-D advection solver to accelerate air quality modeling (Abstract, Paper, and Poster). Presented at The Symbiosis of Deep Learning and Differential Equations Workshop II at the Neural Information Processing Systems Annual Conference, Denver, CO.

34. Guo, L., X. Yang, Z. Zheng, N. Riemer, and C.W. Tessum (2022) Chemical surrogate modeling with uncertainty quantification using a Bayesian Neural ODE (Abstract and Poster). Presented at Atmospheric Chemical Mechanisms Annual Conference, Davis, CA.

33. Yang, X., L. Guo, Z. Zheng, N. Riemer, and C.W. Tessum (2022) Multi-phase chemistry surrogate modeling with a recurrent neural network (Abstract and Presentation). Presented at Atmospheric Chemical Mechanisms Annual Conference, Davis, CA.

32. Wang, S., and C.W. Tessum (2022) Global disparities in PM2.5 exposure caused by consumption of goods and services (Abstract and Poster). Presented at The workshop in Environmental Economics and Data Science, Eugene, OR.

31. Wang, Y., J. Apte, J. Hill, C. Ivey, R. Patterson, A. Robinson, C.W. Tessum, and J. Marshall (2022) Addressing US racial-ethnic inequality in air pollution exposure. Presented at International Society for Environmental Epidemiology 2022 Annual Meeting, Athens, Greece.

30. Tessum, M.W., S.C. Anenberg, Z.A. Chafe, D.K. Henze, G. Kleiman, I. Kheirbek, J.D. Marshall, and C.W. Tessum (2022) Source-specific Intake Fractions for Ambient Primary and Seconday PM2.5 in 96 Global Cities (Abstract and Poster). Presented at The International Society for Exposure Science (ISES) 2022 Annual Meeting, Lisbon, Portugal.

29. Tessum, C.W. (2022) Sources of inequity in exposure to fine particulate air pollution. Presented at Society for Industrial and Applied Mathematics Conference on Mathematics of Planet Earth (Abstract and Presentation), Virtual.

28. Yang, X., N. Riemer, Z. Zheng, and C.W. Tessum (2021) Multi-Phase Chemistry Surrogate Modeling with Elemental Mass Conservation Using a Neural ODE. Presented at International Aerosol Modeling Algorithms Conference (Abstract and Presentation), Virtual due to COVID-19.

27. Tessum, M.W., S.C. Anenberg, Z. Chafe, G. Kleiman, I. Kheirbek, J.D. Marshall, and C.W. Tessum (2021) Sources of fine particulate matter in global cities (Abstract, Poster). Presented at AGU Fall Meeting, Virtual due to COVID-19.

26. Wang, S., and C.W. Tessum (2021) Global Disparities in PM2.5 Exposure Caused by Consumption of Goods and Services (Abstract, Poster). Presented at AGU Fall Meeting, Virtual due to COVID-19.

25. Tessum, C.W., M.W. Tessum, and M. Mehra (2020) Predicting atmospheric particle number concentration from roadway surveillance video (Abstract, Poster). Presented at AGU Fall Meeting 2020, Virtual due to COVID-19.

24. Anenberg, S., V. Southerland, A. Mohegh, D. Malashock, M. Castillo, D.L. Goldberg, A. Roy, M. Harris, D.K. Henze, O. Nawaz, P. Kinney, J.C. Kuylenstierna, C. Malley, C. Heaps, M. Brauer, I. Kheirbek, Z. Chafe, J.D. Marshall, C.W. Tessum, G. Kleiman, and C. Thomas (2020) Recent advances in integrating climate change, air quality, and public health into urban decision-making (Abstract, Presentation). Presented at AGU Fall Meeting 2020, Virtual due to COVID-19.

23. Stylianou, K.S., C.W. Tessum, J. Marshall, P. Fantke, and O. Jolliet (2019) Spatially-explicit characterization of the exposure and health burden of fine particulate matter in the US (Abstract, Poster). Presented at Joint Meeting of the International Society of Exposure Science and the International Society of Indoor Air Quality and Climate, Kaunas, Lithuania.

22. Kelp, M., N. Kutz, J.D. Marshall, and C. Tessum (2019) Deep Learning Emulation and Compression of an Atmospheric Chemical System using a Chained Training Regime (Abstract, Poster). Presented at AGU Fall Meeting, San Francisco, California, USA.

21. Tessum, C.W., J.S. Apte, A.L. Goodkind, N.Z. Muller, K.A. Mullins, D.A. Paolella, S. Polasky, N.P. Springer, S.K. Thakrar, J.D. Marshall, and J.D. Hill (2018) Inequity in consumption widens racial-ethnic disparities in air pollution exposure. Presented at Community Modeling and Analysis System (CMAS) Annual Conference, Chapel Hill, North Carolina.

20. Tessum, C.W., J.D. Hill, and J.D. Marshall (2018) Modeling air pollution health impacts with InMAP. Presented at Community Modeling and Analysis System (CMAS) Annual Conference, Chapel Hill, North Carolina.

19. Tessum, C.W., M. Kelp, and J.D. Marshall (2018) Orders-of-Magnitude Speedup in Atmospheric Chemistry Modeling with a Neural Network-Based Surrogate Model. Presented at Community Modeling and Analysis System (CMAS) Annual Conference, Chapel Hill, North Carolina.

18. Tessum, C.W., J.S. Apte, A.L. Goodkind, N.Z. Muller, K.A. Mullins, D.A. Paolella, S. Polasky, N.P. Springer, S.K. Thakrar, J.D. Marshall, and J.D. Hill (2018) Inequity in consumption compounds racial-ethnic disparities in air pollution exposure. Presented at International Society for Environmental Epidemiology Annual Conference, Ottawa, Canada.

17. Tessum, C., J. Marshall, J. Hill, and A. Goodkind (2016) Reduced form modeling of health impacts of air pollution. Presented at University of Washington Center for Health & the Global Environment Conference on Health Benefits of Climate Change Mitigation Policies and Technologies, Seattle, WA, USA.

16. Tessum, C., K. Mullins, N. Springer, J. Marshall, and J. Hill (2016) Air pollution-related health damages and environmental justice impacts by economic sector in the United States. Presented at International Society for Environmental Epidemiology Annual Conference, Rome, Italy.

15. Tessum, C.W., J.D. Hill, and J.D. Marshall (2016) InMAP: A new model for air pollution health impact assessments. Presented at International Society for Environmental Epidemiology Annual Conference, Rome, Italy.

14. Marshall, J., L. Clark, M. Bechle, N. Nguyen, K. Swor, C. Tessum, J. Hill, and D. Millet. (2016) Environmental justice aspects of transportation-related air pollution in the U.S.: evidence from national-scale longitudinal analyses, case studies, and life cycle assessment. Presented at Health Effects Institute Annual Conference, Denver, Colorado, USA.

13. Tessum, C.W., K. Mullins, J.D. Marshall, and J.D. Hill (2015) Economic input-output life cycle assessment of PM2.5 health impacts and environmental injustice. Presented at American Association for Aerosol Research

Annual Conference, Minneapolis, MN, USA.

12. Tessum, C.W., J.D. Hill, and J.D. Marshall (2015) Environmental Justice and Equality Aspects of Conventional and Alternative Light-Duty Transportation in the United States. Presented at Minnesota Supercomputing Institute Research Exhibition, Minneapolis, MN.

11. Tessum, C.W., J.D. Hill, and J.D. Marshall (2014) A reduced-complexity, variable grid resolution model for PM2.5 transport and transformation. Presented at American Association for Aerosol Research Annual Conference, Orlando, Florida, USA.

10. Tessum, C.W., J.D. Hill, and J.D. Marshall (2014) Environmental justice and equality aspects of conventional and alternative light-duty transportation in the United States. Presented at International Society for Environmental Epidemiology Annual Conference, Seattle, WA, USA.

9. Tessum, C.W., J.D. Hill, and J.D. Marshall (2013) Air pollution, health, and environmental justice implications of shifting transportation fuels. Presented at Annual Conference of the International Society for Environmental Epidemiology, International Society for Exposure Science and International Society for Indoor Air Quality, Basel, Switzerland.

8. Tessum, C.W., J.D. Hill, and J.D. Marshall (2013) Public health implications of alternative transportation fuels: Synergies between climate and air quality policies. Presented at Minnesota Supercomputing Institute Research Exhibition, Minneapolis, MN, USA.

7. Tessum, C.W., K. Wagstrom, J.D. Hill, and J.D. Marshall (2011) Air quality and public health impacts of biofuel production and use in the United States. Presented at Initiative for Renewable Energy and the Environment E3 Conference, Minneapolis, MN, USA.

6. Tessum, C.W., K. Wagstrom, J.D. Hill, and J.D. Marshall (2011) Air quality and public health impacts of biofuel production and use in the United States. Presented at Institute on the Environment Student Sustainability Symposium, St. Paul, MN, USA.

5. Tessum, C.W., K. Wagstrom, J.D. Hill, and J.D. Marshall (2011) Air quality and public health impacts of biofuel production and use in the United States. Presented at American Center for Life Cycle Analysis Annual Conference, Chicago, IL, USA.

4. Tessum, C.W., K. Wagstrom, J.D. Hill, and J.D. Marshall (2011) Air quality and public health impacts of biofuel production and use in the United States. Presented at International Society for Environmental Epidemiology Annual Conference, Barcelona, Spain.

3. Tessum, C.W., K. Wagstrom, J.D. Hill, and J.D. Marshall (2011) Air quality implications of alternative fuels: A spatially and temporally explicit life cycle modeling approach. Presented at Minnesota Supercomputing Institute Research Exhibition, Minneapolis, MN, USA.

2. Tessum, C.W., K. Wagstrom, J.D. Hill, and J.D. Marshall (2010) Air quality implications of alternative fuels: A spatially and temporally explicit life cycle modeling approach. Presented at Initiative for Renewable Energy and the Environment E3 Conference, St. Paul, MN, USA.

1. Tessum, C.W., J.D. Hill, and J.D. Marshall (2009) Spatially and temporally explicit life-cycle analysis of biofuels. Presented at First Annual Fulbright US-Brazil Biofuels Short Course, São Paulo, Brazil.

Teaching Experience

Developed and taught 'CEE 492: Data Science for Civil and Environmental Engineering' — Fall 2020–Present

Taught 'CEE 202: Engineering Risk and Uncertainty'	Spring 2021–Present
Guest lectures in life cycle assessment, air pollution, and health to undergraduate and graduate students	2015–Present
Teaching Assistant: Civil Engineering 5561: Air Quality Engineering, University of Minnesota	2013
English Teacher: Instituto Cultural Peruano Norteamericano, Chiclayo, Peru	2008

Professional Experience

Owner/Partner: CT Consulting LLC, Enviromind LLC	2008–2023
Energy Auditor: Energy Management Solutions, Inc.	2007–2008
Aerodynamics Intern: Volvo Car Corporation	2006
Automation Intern: Voith Paper AG	2006

Synergistic Activities

Developer of the InMAP air quality model (https://inmap.run), which has been downloaded 6,600 times and has a user forum with 191 members	2012–present
Member of US EPA Science Advisory Committee for 'Review of Air Pollution Benefits Methods and Environmental Benefits Mapping and Analysis Program (BenMAP) Tool'	2023
Facilitator for the UIUC Grainger College of Engineering 2023 summer workshop series on 'Incorporating Computing into Engineering Curriculum'	2023
Member of Health Effects Institute (HEI) panel of experts to commission a study and write a report about of diesel fleet renewal in the US	2023–present
Member of *GeoHealth* Early Career Editorial Board	2024–present