

Christopher Tessum

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Seattle, WA 98195

RESEARCH AREA **Understanding and reducing air quality-related public health impacts**, with a focus on life cycle assessment and scientific model development

ACADEMIC EXPERIENCE **University of Washington, Seattle, Washington USA**
Research Scientist, Civil and Environmental Engineering March 2016 – Present

University of Minnesota, Minneapolis, Minnesota USA
Postdoctoral scholar, Bioproducts and Biosystems Engineering January 2015 – March 2016

Ph.D., Civil, Environmental, and Geo- Engineering January 2009 – December 2014

- Dissertation: *Life Cycle Air Quality and Climate Impacts of Conventional and Alternative Light-Duty Transportation in the United States*
- Minor: Public Health
- Advisor: Dr. Julian D. Marshall

B.M.E., Mechanical Engineering September 2002 – May 2006

- **cum laude**
- Thesis: *The Influence of Engine Load, Ignition Timing, and Fuel-Air Ratio on the Ultrafine Particulate Emissions from a Natural Gas Spark Ignition Engine.*

- PEER-REVIEWED PUBLICATIONS
8. C. W. Tessum, J. D. Hill, J. D. Marshall, InMAP: A model for air pollution interventions. *PLoS ONE* **12**, e0176131 (2017).
 7. B. L. Keeler, J. D. Gourevitch, S. Polasky, F. Isbell, C. W. Tessum, J. D. Hill, J. D. Marshall, The social costs of nitrogen. *Science Adv.* **2**, e1600219 (2016).
 6. A. G. Touchaei, H. Akbari, C. W. Tessum, Effect of increasing urban albedo on meteorology and air quality of Montreal (Canada) – Episodic simulation of heat wave in 2005. *Atmospheric Environment* **132**, 188–206 (2016).
 5. C. W. Tessum, J. D. Hill, J. D. Marshall, Twelve-month, 12 km resolution North American WRF-Chem v3.4 air quality simulation: performance evaluation. *Geosci. Model Dev.* **8**, 957–973 (2015).
 4. C. W. Tessum, J. D. Hill, J. D. Marshall, Life cycle air quality impacts of conventional and alternative light-duty transportation in the United States. *Proc. Natl. Acad. Sci. U.S.A.* **111**, 18490–18495 (2014).
 3. L. Hu, 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, J. D. Gouw, Emissions of C6–C8 aromatic compounds in the United States: Constraints from tall tower and aircraft measurements. *J. Geophys. Res. Atmos.* **826–842** (2014).
 2. C. W. Tessum, J. D. Marshall, J. D. Hill, A spatially and temporally explicit life cycle inventory of air pollutants from gasoline and ethanol in the United States. *Environ. Sci. Technol.* **46**, 11408–11417 (2012).
 1. D. B. Millet, E. Apel, D. K. Henze, J. Hill, J. D. Marshall, H. B. Singh, C. W. Tessum, Natural and anthropogenic ethanol sources in North America and potential atmospheric impacts of ethanol fuel use. *Environ. Sci. Technol.* **46**, 8484–92 (2012).

- REPORTS AND OTHER PUBLICATIONS
2. C. W. Tessum, J. D. Marshall, J. D. Hill, “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, 2010).
 1. C. W. Tessum, A. M. Boies, J. D. Hill, J. D. Marshall, “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 P. Koshel, K. McAllister (National Research Council, 2010), 117–140, https://download.nap.edu/catalog.php?record%7B%5C_%7Ddid=12806.

INVITED
PRESENTATIONS

11. C. W. Tessum, J. D. Hill, J. D. Marshall, "Spatially and chemically explicit life cycle assessment for conventional and alternative vehicles", presented at the Coordinating Research Council (CRC) Mobile Source Air Toxics workshop, (Feb. 2017).
10. C. Tessum, J. Marshall, J. Hill, A. Goodkind, "Reduced form modeling of health impacts of air pollution", presented at the University of Washington Center for Health & the Global Environment Conference on Health Benefits of Climate Change Mitigation Policies and Technologies, (Sept. 2016).
9. C. W. Tessum, J. D. Hill, J. D. Marshall, "Air Pollution, Health, and Environmental Justice Implications of Shifting Transportation Fuels in the United States", presented at the Minnesota Environmental Health Association Annual Conference, (May 2015).
8. C. W. Tessum, J. D. Marshall, J. D. Hill, "Renewable Fuel Standard: Impacts on American Consumers", presented at the U.S. House of Representatives, (Feb. 2015).
7. C. W. Tessum, J. D. Hill, Julian D. Marshall, "Air pollution, health, and environmental justice implications of shifting transportation fuels in the United States", presented at the Lawrence Berkeley National Laboratory Environmental Energy Technologies Division Seminar Series, (Mar. 2014).
6. C. Tessum, J. Hill, J. Marshall, "A reduced-complexity, variable grid resolution model for air pollution transport and transformation", presented at the 2014 Natural Capital Annual Meeting and Training, (Mar. 2014).
5. C. W. Tessum, J. D. Marshall, J. D. Hill, "Life cycle air pollutant emission and impact accounting for transportation fuels", presented at the Air and Waste Management Association 106th Annual Conference and Exhibition, (July 2013).
4. C. W. Tessum, J. D. Hill, J. D. Marshall, "Public health implications of alternative transportation fuels in the United States", presented at the Peking University, (Mar. 2013).
3. C. W. Tessum, J. D. Hill, J. D. Marshall, "Public health implications of alternative transportation fuels in the United States", presented at the China Center for Disease Control and Prevention, (Mar. 2013).
2. C. W. Tessum, K. Wagstrom, J. D. Hill, J. D. Marshall, "Air quality and public health impacts of biofuel production and use in the United States", presented at the Peking University, (Aug. 2011).
1. C. W. Tessum, J. D. Hill, "Assessing biofuel sustainability: Lessons from growth of the U.S. industry", presented at the Minnesota Academy of Science Annual Meeting, (Apr. 2011).

CONFERENCE
PRESENTATIONS

17. C. Tessum, K. Mullins, N. Springer, J. Marshall, J. Hill, "Air pollution-related health damages and environmental justice impacts by economic sector in the United States", presented at the International Society for Environmental Epidemiology Annual Conference, (Sept. 2016).
16. C. W. Tessum, J. D. Hill, J. D. Marshall, "InMAP: A new model for air pollution health impact assessments", presented at the International Society for Environmental Epidemiology Annual Conference, (Sept. 2016).
15. J. Marshall, L. Clark, M. Bechle, N. Nguyen, K. Swor, C. Tessum, J. Hill, D. Millet., "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 the Health Effects Institute Annual Conference, Denver, Colorado, (May 2016).
14. C. W. Tessum, K. Mullins, J. D. Marshall, J. D. Hill, "Economic input-output life cycle assessment of PM2.5 health impacts and environmental injustice", presented at the American Association for Aerosol Research Annual Conference, (Oct. 2015).
13. C. W. Tessum, J. D. Hill, J. D. Marshall, "Environmental Justice and Equality Aspects of Conventional and Alternative Light-Duty Transportation in the United States", presented at the Minnesota Supercomputing Institute Research Exhibition, (Apr. 2015).
12. C. W. Tessum, J. D. Hill, J. D. Marshall, "A reduced-complexity, variable grid resolution model for PM2.5 transport and transformation", presented at the American Association for Aerosol Research Annual Conference, (Oct. 2014).
11. C. W. Tessum, J. D. Hill, J. D. Marshall, "Environmental justice and equality aspects of conventional and alternative light-duty transportation in the United States", presented at the International Society for Environmental Epidemiology Annual Conference, (Aug. 2014).

10. C. W. Tessum, J. D. Hill, Julian D. Marshall, "Air pollution, health, and environmental justice implications of shifting transportation fuels", presented at the Annual Conference of the International Society for Environmental Epidemiology, International Society for Exposure Science and International Society for Indoor Air Quality, (Aug. 2013).
9. C. W. Tessum, J. D. Hill, J. D. Marshall, "Public health implications of alternative transportation fuels: Synergies between climate and air quality policies", presented at the Minnesota Supercomputing Institute Research Exhibition, (Apr. 2013).
8. C. W. Tessum, J. D. Hill, J. D. Marshall, "A spatially and temporally explicit life cycle inventory of air pollutants from transportation fuels in the United States", presented at the Society for Environmental Toxicology and Chemistry North America Annual Conference, (Nov. 2012).
7. C. W. Tessum, K. Wagstrom, J. D. Hill, J. D. Marshall, "Air quality and public health impacts of biofuel production and use in the United States", presented at the Initiative for Renewable Energy and the Environment E3 Conference, (Nov. 2011).
6. C. W. Tessum, K. Wagstrom, J. D. Hill, J. D. Marshall, "Air quality and public health impacts of biofuel production and use in the United States", presented at the Institute on the Environment Student Sustainability Symposium, (Oct. 2011).
5. C. W. Tessum, K. Wagstrom, J. D. Hill, J. D. Marshall, "Air quality and public health impacts of biofuel production and use in the United States", presented at the American Center for Life Cycle Analysis Annual Conference, 3rd place student poster award, (Oct. 2011).
4. C. W. Tessum, K. Wagstrom, J. D. Hill, J. D. Marshall, "Air quality and public health impacts of biofuel production and use in the United States", presented at the International Society for Environmental Epidemiology Annual Conference, (Aug. 2011).
3. C. W. Tessum, K. Wagstrom, J. D. Hill, J. D. Marshall, "Air quality implications of alternative fuels: A spatially and temporally explicit life cycle modeling approach", presented at the Minnesota Supercomputing Institute Research Exhibition, (Apr. 2011).
2. C. W. Tessum, K. Wagstrom, J. D. Hill, J. D. Marshall, "Air quality implications of alternative fuels: A spatially and temporally explicit life cycle modeling approach", presented at the Initiative for Renewable Energy and the Environment E3 Conference, (Oct. 2010).
1. C. W. Tessum, J. D. Hill, J. D. Marshall, "Spatially and temporally explicit life-cycle analysis of biofuels", presented at the First Annual Fulbright US-Brazil Biofuels Short Course, (Aug. 2009).

TEACHING
EXPERIENCE

Civil Engineering 5561: Air Quality Engineering, University of Minnesota

Teaching Assistant

Spring 2013

Instructor: Dr. Julian Marshall

- Graded homework questions and exams
- Answered student questions

Instituto Cultural Peruano Norteamericano, Chiclayo, Perú

English Teacher

October – December 2008

- Taught classes of 20-30 students aged 10-20
- Planned curriculum and designed and graded homework assignments and exams

PROFESSIONAL
EXPERIENCE

Independent Contracting, Minneapolis, Minnesota USA

2008 – 2015

- Performed air quality modeling for an administrative law hearing
- Carried out life cycle assessment for California Low Carbon Fuel Standard permitting
- Created an air flow and heat transfer model of a meat packing plant

Energy Management Solutions, Inc., Minneapolis, Minnesota USA

Engineer

June 2007 – April 2008

- Performed energy efficiency audits at industrial facilities

Volvo Car Corporation, Gothenburg, Sweden

Aerodynamics Intern

August – December 2006

- Operated wind tunnel to perform aerodynamic research on scale models
- Assisted staff engineers in the setup of project tests

- Wrote LabVIEW programs for wind tunnel data acquisition

Voith Paper AG, Heidenheim an der Brenz, Germany

Automation Intern

May – August 2006

- Wrote LabVIEW programs for sensor control

HONORS AND
AWARDS

- Third place student poster award: American Center for Life Cycle Analysis Annual Conference 2011
- Admission to First Annual Fulbright US–Brazil Biofuels Short Course 2009
- National Merit Scholarship 2002 – 2006