Christopher Tessum

Contact Information

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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 Minnesota, Minneapolis, Minnesota USA

Doctoral Candidate, Civil Engineering — January 2009 – December 2014 (expected)

- **GPA: 3.64/4.0**
- 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

- **G.P.A. 3.66/4.0**
- ***cum laude***
- G.R.E. verbal: 740, quantitative: 740, analytical writing: 4.5
- Thesis: *The Influence of Engine Load, Ignition Timing, and Fuel-Air Ratio on the Ultrafine Particulate Emissions from a Natural Gas Spark Ignition Engine.*

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

Peer-Reviewed Publications

[4] Christopher W. Tessum, Jason D. Hill, and Julian D. Marshall, "Life cycle air quality impacts of conventional and alternative light-duty transportation in the United States", *Proc. Natl. Acad. Sci. (In Press)* (2014).

[3] Christopher W. Tessum, Jason D. Hill, and Julian D. Marshall, "Twelve-month, 12-km resolution North American WRF-Chem air quality simulation: Performance evaluation", *Geosci. Model Dev. Discuss. (In Press)* (2014).

[2] Christopher W. Tessum, Julian D. Marshall, and Jason D. Hill, "A spatially and temporally explicit life cycle inventory of air pollutants from gasoline and ethanol in the United States", *Environ. Sci. Technol.* 46.20 (2012), 11408–11417, DOI: 10.1021/es3010514.

[1] Dylan B. Millet, Eric Apel, Daven K. Henze, Jason Hill, Julian D. Marshall, Hanwant B. Singh, and Christopher W. Tessum, "Natural and anthropogenic ethanol sources in North America and potential atmospheric impacts of ethanol fuel use", *Environ. Sci. Technol.* 46.15 (2012), 8484–92, DOI: 10.1021/es300162u.

Articles Submitted for Peer Review

[2] Lu Hu, Dylan B. Millet, Katherine R. Travis, Markus Müller, Christoper W. Tessum, Armin Wisthaler, Martin Graus, Carsten Warneke, Joost de Gouw, Julian Marshall, Munkhbayar Baasandorj, Wesley F. Reinhart, Tim J. Griffis, and Tomas Mikoviny, "Emissions of C6-C8 aromatic compounds in the United States: Constraints from tall tower and aircraft measurements" (2014).

[1] Christopher W. Tessum, Julian D. Marshall, and Jason D. Hill, "Spatially resolved life cycle assessment for production- and consumption-based accounting of climate forcing agent emissions from gasoline, ethanol, and electric motor vehicles in the United States" (2014).

Reports and Other Publications

[2] Christopher W. Tessum, Julian D. Marshall, and Jason D. Hill, *Tank-to-wheel emissions of ethanol and biodiesel powered vehicles as compared to petroleum alternatives*, tech. rep., Minneapolis, MN, USA: Center for Transportation Studies, University of Minnesota, 2010.

[1] Christopher W. Tessum, Adam M. Boies, Jason D. Hill, and Julian 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 Patricia Koshel and Kathleen McAllister, National Research Council, 2010, 117–140, URL: https://download.nap.edu/catalog.php?record%5C_id=12806.

Invited Presentations

[7] Christopher W. Tessum, Jason D. Hill, and Julian D. Marshall, "Air pollution, health, and environmental justice implications of shifting transportation fuels in the United States", in: *Lawrence Berkeley National Laboratory Environmental Energy Technologies Division Seminar Series*, Mar. 2014.

[6] Christopher Tessum, Jason Hill, and Julian Marshall, "A reduced-complexity, variable grid resolution model for air pollution transport and transformation", in: *2014 Natural Capital Annual Meeting and Training*, Stanford, CA, Mar. 2014.

[5] Christopher W. Tessum, Julian D. Marshall, and Jason D. Hill, "Life cycle air pollutant emission and impact accounting for transportation fuels", in: *Air and Waste Management Association 106th Annual Conference and Exhibition*, Chicago, IL, USA, July 2013.

[4] Christopher W. Tessum, Jason D. Hill, and Julian D. Marshall, "Public health implications of alternative transportation fuels in the United States", in: *Peking University*, Beijing, China, Mar. 2013.

[3] Christopher W. Tessum, Jason D. Hill, and Julian D. Marshall, "Public health implications of alternative transportation fuels in the United States", in: *China Center for Disease Control and Prevention*, Beijing, China, Mar. 2013.

[2] Christopher W. Tessum, Kristina Wagstrom, Jason D. Hill, and Julian D. Marshall, "Air quality and public health impacts of biofuel production and use in the United States", in: *Peking University*, Beijing, China, Aug. 2011.

[1] Christopher W. Tessum and Jason D. Hill, "Assessing biofuel sustainability: Lessons from growth of the U.S. industry", in: *Minnesota Academy of Science Annual Meeting*, Minneapolis, MN, USA, Apr. 2011.

Conference Presentations

[12] Christopher W. Tessum, Jason D. Hill, and Julian D. Marshall, "A reduced-complexity, variable grid resolution model for PM2.5 transport and transformation", in: *American Association for Aerosol Research Annual Conference*, Orlando, Florida, USA, Oct. 2014.

[11] Christopher W. Tessum, Jason D. Hill, and Julian D. Marshall, "Environmental justice and equality aspects of conventional and alternative light-duty transportation in the United States", in: *International Society for Environmental Epidemiology Annual Conference*, Seattle, WA, USA, Aug. 2014.

[10] Christopher W. Tessum, Jason D. Hill, and Julian D. Marshall, "Air pollution, health, and environmental justice implications of shifting transportation fuels", in: *Annual Conference of the International Society for Environmental Epidemiology, International Society for Exposure Science and International Society for Indoor Air Quality*, Basel, Switzerland, Aug. 2013.

[9] Christopher W. Tessum, Jason D. Hill, and Julian D. Marshall, "Public health implications of alternative transportation fuels: Synergies between climate and air quality policies", in: *Minnesota Supercomputing Institute Research Exhibition*, Minneapolis, MN, USA, Apr. 2013.

[8] Christopher W. Tessum, Jason D. Hill, and Julian D. Marshall, "A spatially and temporally explicit life cycle inventory of air pollutants from transportation fuels in the United States", in: *Society for Environmental Toxicology and Chemistry North America Annual Conference*, Nov. 2012.

[7] Christopher W. Tessum, Kristina Wagstrom, Jason D. Hill, and Julian D. Marshall, "Air quality and public health impacts of biofuel production and use in the United States", in: *Initiative for Renewable Energy and the Environment E3 Conference*, Minneapolis, MN, USA, Nov. 2011.

[6] Christopher W. Tessum, Kristina Wagstrom, Jason D. Hill, and Julian D. Marshall, "Air quality and public health impacts of biofuel production and use in the United States", in: *Institute on the Environment Student Sustainability Symposium*, St. Paul, MN, USA, Oct. 2011.

[5] Christopher W. Tessum, Kristina Wagstrom, Jason D. Hill, and Julian D. Marshall, "Air quality and public health impacts of biofuel production and use in the United States", in: *American Center for Life Cycle Analysis Annual Conference*, Chicago, IL, USA, Oct. 2011, 3rd place student poster award.

[4] Christopher W. Tessum, Kristina Wagstrom, Jason D. Hill, and Julian D. Marshall, "Air quality and public health impacts of biofuel production and use in the United States", in: *International Society for Environmental Epidemiology Annual Conference*, Barcelona, Spain, Aug. 2011.

[3] Christopher W. Tessum, Kristina Wagstrom, Jason D. Hill, and Julian D. Marshall, "Air quality implications of alternative fuels: A spatially and temporally explicit life cycle modeling approach", in: *Minnesota Supercomputing Institute Research Exhibition*, Minneapolis, MN, USA, Apr. 2011.

[2] Christopher W. Tessum, Kristina Wagstrom, Jason D. Hill, and Julian D. Marshall, "Air quality implications of alternative fuels: A spatially and temporally explicit life cycle modeling approach", in: *Initiative for Renewable Energy and the Environment E3 Conference*, St. Paul, MN, USA, Oct. 2010.

[1] Christopher W. Tessum, Jason D. Hill, and Julian D. Marshall, "Spatially and temporally explicit life-cycle analysis of biofuels", in: *First Annual Fulbright US-Brazil Biofuels Short Course*, São Paulo, Brazil, 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
- Designed and graded homework assignments and exams

Professional Experience

CT Consulting LLC, Minneapolis, Minnesota USA
Owner; independent contractor for EcoEngineers LLC 2012 – 2013

- Carried out life cycle assessment for California Low Carbon Fuel Standard permitting

CT Consulting LLC, Minneapolis, Minnesota USA
Owner; independent contractor for Smithfield Packing Co. May – September 2008

- Specified, justified, and arranged purchase of energy efficient equipment
- Worked with plant staff and equipment manufacturers to determine the best energy efficient products for Smithfield
- Created air flow and heat transfer model of refrigerated areas

Energy Management Solutions, Inc., Minneapolis, Minnesota USA
Engineer June 2007 – April 2008

- Performed energy efficiency audits at industrial facilities
- Worked with plant staff to implement energy efficiency improvements
- Calculated and measured predicted and real energy savings due to the installation of energy efficient equipment

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