

**JEFFREY A. GEDDES, Ph.D.**

Assistant Professor  
 Department of Earth & Environment  
 Boston University  
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**EDUCATION**

- 2013      **University of Toronto**, Ph.D. Chemistry  
*Thesis Title:* "Observations of reactive nitrogen oxides: from urban ground level ozone production to biosphere-atmosphere exchange in remote forest environments"  
*Supervisor:* Jennifer G. Murphy
- 2008      **University of Toronto at Mississauga**, B.Sc. Chemistry and Geology Specialist

**RESEARCH POSITIONS**

- 2016 -      **Boston University**, Department of Earth & Environment  
 Assistant Professor
- 2013 - 2016 **Dalhousie University**, Department of Physics & Atmospheric Science  
 Postdoctoral Fellow with Randall V. Martin
- 2014 - 2015 **Massachusetts Institute of Technology**, Department of Civil & Environmental Engineering  
 Visiting Fellow with Colette L. Heald
- 2008 - 2013 **University of Toronto**, Department of Chemistry  
 Graduate Research Assistant with Jennifer G. Murphy
- 2005 - 2006 **University of Toronto**, Department of Physics  
 Undergraduate Research Assistant with G.W. Kent Moore

**SELECTED AWARDS & FELLOWSHIPS**

- 2016      Early Career Travel Grant, International Global Atmospheric Chemistry (IGAC)
- 2015      Selected Participant in the Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS XIII), Brookhaven National Laboratory
- 2013 - 2015 NSERC CREATE IACPES Postdoctoral Research Fellowship
- 2012      Outstanding Student Presentation Award, AGU, Biogeosciences Section
- 2012      Graduate Student Award, University of Toronto Centre for Global Change Science
- 2011      Best Presentation Award, University of Toronto Environmental Chemistry Colloquium
- 2009 - 2012 NSERC Canadian Graduate Scholarship (Doctoral)
- 2009      Best Student Poster, Canadian Society for Chemistry, Environment Division
- 2009      Chemistry Teaching Fellowship, University of Toronto
- 2008 - 2009 NSERC Canadian Graduate Scholarship (Masters)
- 2008      Ontario Ministry of Environment Graduate Student Endowment Fund
- 2007      Helen Sawyer Hogg Graduate Student Admission Award, University of Toronto
- 2007      Undergraduate Internship Award, University of Toronto Centre for Global Change Science
- 2006      NSERC Canadian Undergraduate Student Research Award
- 2005      NSERC Canadian Undergraduate Student Research Award
- 2005      Roger E. Dean Memorial Scholarship in Geology, University of Toronto

## PUBLICATIONS

- 2017 **Geddes JA**, and Martin RV. Global deposition of total reactive nitrogen oxides from 1996 to 2014 constrained with satellite observations of NO<sub>2</sub> columns. *Atmospheric Chemistry and Physics Discussions*, doi:10.5194/acp-2016-1100. Under review for publication in *Atmospheric Chemistry and Physics*.
- 2017 Zheng T, Chen J, He L, Arain MA, Thomas SC, Murphy JG, **Geddes JA**, Black TA. Inverting the maximum carboxylation rate (V<sub>cmax</sub>) from the sunlit leaf photosynthesis rate derived from measured light response curves at tower flux sites. *Agricultural and Forest Meteorology*, 236, 48-666.
- 2016 Heald CL, and **Geddes JA**. The Impact of Historical Land Use Change From 1850 to 2000 on Particulate Matter and Ozone. *Atmospheric Chemistry and Physics*, 16, 14997-15010, doi:10.5194/acp-16-14997-2016.
- 2016 Silva SJ, Heald CL, **Geddes JA**, Austin KG, Kasibhatla PS, and Marlier ME. Impacts of current and projected oil palm plantation expansion on air quality over Southeast Asia. *Atmospheric Chemistry and Physics*, 16, 10621-10635, doi:10.5194/acp-16-10621-2016.
- 2016 **Geddes JA**, Heald CL, Silva SJ, and Martin RV. Land cover change impacts on atmospheric chemistry: simulating projected large-scale tree mortality in the United States. *Atmospheric Chemistry and Physics*, 16, 2323-2340, doi:10.5194/acp-16-2323-2016.
- 2016 Larkin A, van Donkelaar A, **Geddes JA**, Martin RV, and Hystad P. Typologies of urban expansion and associated air pollution changes in East Asia from 2000 to 2010. *Environmental Science and Technology*, doi:10.1021/acs.est.6b02549
- 2016 **Geddes JA**, Martin RV, Boys BL and van Donkelaar A. Long-term trends worldwide in ambient NO<sub>2</sub> concentrations inferred from satellite observations. *Environmental Health Perspectives*, doi: 10.1289/ehp.1409567.
- 2014 **Geddes JA**, Murphy JG, Schurman J, Petroff A, and Thomas SC. Net ecosystem exchange of an uneven-aged managed forest in central Ontario, and the impact of a spring heat wave event. *Agricultural and Forest Meteorology*, 198-199: 105-115.
- 2014 Pugliese SC, Murphy JG, **Geddes JA**, and Wang JM. The impacts of precursor reduction and meteorology on ground-level ozone in the Greater Toronto Area. *Atmospheric Chemistry and Physics*, 14: 8197-8207.
- 2014 **Geddes JA**, and Murphy JG. Observations of reactive nitrogen oxide fluxes by eddy covariance above two mid-latitude North American mixed hardwood forests. *Atmospheric Chemistry and Physics*, 14: 2939-2957.
- 2013 Wang JM, Murphy JG, **Geddes JA**, Winsborough CL, Basiliko N, and Thomas SC. Methane fluxes measured by eddy covariance and static chamber techniques at a temperate forest in central Ontario, Canada. *Biogeosciences*. 10: 4371-4382.
- 2012 **Geddes JA**, and Murphy JG. The Science of Smog: Chemical concepts in ground level ozone and particulate matter. Chapter 10 in *The Handbook of Metropolitan Sustainability* (Ed. Frank Zeman). Woodhead Publishing Ltd. Philadelphia PA.
- 2012 **Geddes JA**, Murphy JG, Celarier EA, and O'Brien J. Biases in long-term NO<sub>2</sub> averages inferred from satellite observations due to cloud selection criteria. *Remote Sensing of Environment*. 124: 210-216.
- 2009 **Geddes JA**, Murphy JG, and Wang DW. Long term changes in nitrogen oxides and volatile organic compounds in Toronto and the challenges facing local ozone control. *Atmospheric Environment*. 43: 3407-3414.
- 2007 **Geddes JA**, and Moore GWK. A climatology of sea ice embayments in the Cosmonaut Sea, Antarctica. *Geophysical Research Letters*. 34: doi:10.1029/2006GRL027910.

**CONFERENCE PRESENTATIONS: Lead Author**

- 2016 **Geddes JA**, Cunningham D, Martin RV, “Strategies for Stratosphere-Troposphere Separation of Nitrogen Dioxide Columns from the TEMPO Geostationary Instrument”, Fall Meeting of the American Geophysical Union, San Francisco, CA (Poster).
- 2016 **Geddes JA**, Martin RV, Heald CL, Silva JS, “Rapidly changing interactions between forests and atmospheric chemistry: Contemporary changes in land use and anthropogenic emissions”, International Global Atmospheric Chemistry Science Conference, Breckenridge, CO (Poster).
- 2016 **Geddes JA** and Martin RV, “Development of Methods for Retrieval and Interpretation of TEMPO NO<sub>2</sub> columns for Top-down Constraints on NO<sub>x</sub> Emissions and NO<sub>y</sub> Deposition”, TEMPO Science Team Meeting, Washington, DC (Talk).
- 2015 **Geddes JA**, Heald CL, Silva SJ and Martin RV, “Simulating the impacts of large scale insect- and disease-driven tree mortality on atmospheric chemistry”, Fall Meeting of the American Geophysical Union, San Francisco, CA (Talk).
- 2015 **Geddes JA**, Martin RV and Heald CL, “Simulating insect-driven tree mortality impacts on atmospheric chemistry”, Gordon Research Conference in Atmospheric Chemistry, Waterville Valley, NH (Poster).
- 2015 **Geddes JA**, Martin RV, and Heald CL, “A new land use module for GEOS-Chem”, 7th International GEOS-Chem Meeting, Harvard University, Cambridge, MA (Talk).
- 2014 **Geddes JA**, Martin RV, and Boys BL, “Integrating satellite observations, chemical transport modeling, and population data to estimate decadal trends in ground-level NO<sub>2</sub> exposure worldwide”, Fall Meeting of the American Geophysical Union, San Francisco, CA (Poster).
- 2014 **Geddes JA**, Martin RV, and Boys BL, “Deriving long-term spatially averaged surface NO<sub>2</sub> concentrations across multiple satellite instruments, IACPES Symposium, Toronto, ON (Talk).
- 2013 **Geddes JA**, and Murphy JG, “Reactive nitrogen oxides fluxes above two mid-latitude North American mixed hardwood forests”, National Atmospheric Deposition Program Annual Meeting and Scientific Symposium, Park City, UT (Talk).
- 2012 **Geddes JA**, and Murphy JG, “Observations of reactive nitrogen oxide fluxes by eddy covariance above a mid-latitude mixed hardwood forest”, Fall Meeting of the American Geophysical Union, San Francisco, CA (Talk).
- 2012 **Geddes JA**, and Murphy JG, “Observations of mixing ratios and fluxes of reactive nitrogen oxides above a mixed hardwood forest in central Ontario during the summer and fall of 2011”, First Conference on Atmospheric Biogeosciences, Boston, MA (Talk).
- 2012 **Geddes JA**, Murphy JG, Thomas SC, Schurman J, Filewod B, and Petroff A, “Observations of canopy-scale carbon fluxes at a mid-latitude mixed hardwood forest and decreased growing season productivity due to record high temperatures during leaf emergence”, First Conference on Atmospheric Biogeoscience, Boston, MA (Talk).
- 2011 **Geddes JA**, Murphy JG, Winsborough W, Basiliko N, Thomas S, Petroff A, and Desousa A, “Biosphere-atmosphere exchange at a mixed hardwood forest in Central Ontario subject to high nitrogen deposition”, Annual Meeting of the Canadian Meteorological and Oceanographic Society, Victoria, ON (Talk).
- 2010 **Geddes JA**, Murphy JG, O’Brien J, and Celarier EA, “Potential selection biases in satellite observations of NO<sub>2</sub> and SO<sub>2</sub> due to clouds”, Joint Meeting of the Canadian Geophysical Union and Canadian Meteorological and Oceanographic Society, Ottawa, ON (Talk).
- 2009 **Geddes JA**, and Murphy JG, “Investigation of the role of Ox partitioning and particle load on nocturnal O<sub>x</sub> loss”, Canadian Society of Chemistry Annual Meeting, Hamilton, ON (Poster).
- 2008 **Geddes JA**, and Murphy JG, “Investigating long term changes in nitrogen oxides and volatile organic compounds in the city of Toronto and their effect on local ozone production”, Fall Meeting of the American Geophysical Union, San Francisco, CA (Poster).

**CONFERENCE PRESENTATIONS: Contributing Author**

- 2016 Wong YH, Tai APK, **Geddes JA**, “Effects of land use and land cover change on global ozone air quality in the mid-21st century”, Fall Meeting of the American Geophysical Union, San Francisco, CA (Poster).
- 2016 Pusede S, **Geddes JA**, Kent K, Decesare W, “Drought impacts on high ozone in California”, International Global Atmospheric Chemistry Science Conference, Breckenridge, CO (Talk).
- 2015 Silva SJ, Heald CL, **Geddes JA**, Marlier ME, Austin K, Kasibhatla PS, “Oil Palm expansion over Southeast Asia: land use change and air quality” Fall Meeting of the American Geophysical Union, San Francisco, CA (Poster).
- 2014 Martin RV, van Donkelaar A, Boys BL, **Geddes JA**, Kharol S, Lee CL, Nowlan RC, Snider G, Weagle C, Xu J, “Advances in studies of air quality and health informed with satellite remote sensing”, Fall Meeting of the American Geophysical Union, San Francisco, CA (Talk).
- 2014 Pugliese SC, Murphy JG, **Geddes JA**, Wang JM, “The impacts of precursor reduction and meteorology on ground-level ozone in the Greater Toronto area”, Urban Environmental Pollution 2014, Toronto, Canada, (Talk).
- 2012 Wang JM, Murphy JG, Winsborough CL, Basiliko N, **Geddes JA**, Thomas S, “Methane fluxes measured by eddy covariance at a temperate upland forest”, Fall Meeting of the American Geophysical Union, San Francisco, CA (Poster).
- 2012 Petroff A, Murphy JG, Thomas SC, **Geddes JA**, “Dry deposition of particulate nitrogen in a broadleaf forest: The importance of the coarse mode”, First Conference on Atmospheric Biogeosciences, Boston, MA (Talk).
- 2012 Murphy JG, Wang J, Winsborough C, Basiliko N, **Geddes JA**, Whomas SC, “Methane fluxes measured by eddy covariance at a temperate upland forest in central Ontario”, First Conference on Atmospheric Biogeosciences, Boston, MA (Talk).
- 2010 Murphy JG, **Geddes JA**, Petroff A, Desousa A, Ellis R, Thomas SC, “Monitoring carbon, nitrogen, and particulate matter exchange in a northern hardwood forest subject to high N deposition”, 29th Conference on Agricultural and Forest Meteorology, Keystone CO (Poster).
- 2009 Celarier EA, Murphy JG, **Geddes JA**, Gleason JF, “Satellite retrieval and ground based measurements of NO<sub>2</sub>”, American Geophysical Union Joint Assembly, Toronto, Canada (Talk).
- 2008 Celarier EA, Gleason JF, Murphy JG, **Geddes JA**, “OMI measurements of NO<sub>2</sub> in the greater Toronto area: Consistency with in situ measurements”, Air and Waste Management Association Symposium on Air Quality Measurements Methods and Technology, Chapel Hill, NC (Talk).
- 2008 Celarier EA, Kurosu TP, Murphy JG, **Geddes JA**, Bucsela EJ, Bojkov BR, Retscher C, “Properties of urban NO<sub>2</sub> fields from OMI measurements”, American Geophysical Union Joint Assembly, Fort Lauderdale, FL (Talk).
- 2008 McGillen M, Percival C, Ghalaieny M, Booth AM, Murphy JG, Popescu R, **Geddes JA**, “Field measurements of ammonia in Edinburgh, Scotland between August-September 2008: a comparison between CIMS and QCL techniques”, Fall Meeting of the American Geophysical Union, San Francisco, CA (Poster).

**SELECTED INVITED TALKS**

- 2017 **World Meteorological Organization**, Global Atmospheric Watch Programme and Scientific Advisory Group on Total Atmospheric Deposition (Geneva Switzerland), “Incorporating satellite observations for surface concentrations and total deposition”
- 2016 **Harvard University**, School of Engineering and Applied Sciences (Wofsy Research Group), “Satellite observations and global modeling of air quality and biosphere interactions”
- 2016 **University of Toronto**, Department of Chemistry, “Air quality and biosphere interactions: Measuring and modeling global change”

- 2015 **University of Virginia**, Department of Environmental Sciences Seminar Series, "Air quality and biosphere-atmosphere interactions: Observations from space and in the field"
- 2015 **University of California Riverside**, Bourns College of Engineering, "Telling the Whole Story: Studying the Impacts of Atmospheric Nitrogen Oxides at Global, Regional, and Local Scales"
- 2015 **Harvard-Smithsonian Center for Astrophysics**, Atomic and Molecular Physics Seminar, "Trends in ambient NO<sub>2</sub> using satellite data and chemical transport modeling"
- 2014 **Harvard University**, School of Engineering and Applied Sciences (Jacob Research Group), "The impacts of nitrogen oxides in the atmosphere from the ground up"
- 2014 **York University**, Center for Atmospheric Chemistry Summer Course in Atmospheric Chemistry and Physics, "Satellite Observations of Chemical Composition"
- 2013 **Cornell University**, Department of Earth and Atmospheric Sciences (Hess Research Group), "Urban Ozone Production and Biosphere-Atmosphere Exchange"

## TEACHING

### *Course Instructor:*

- 2017 **Boston University**, Department of Earth and Environment  
ES 540 Air Pollution and Global Change

### *Guest Lectures:*

- 2015 **Dalhousie University**, Department of Physics and Atmospheric Science  
PHYC 4520 Introduction to Atmospheric Science, "Radiative Transfer"
- 2014 **Dalhousie University**, Department of Physics and Atmospheric Science  
PHYC 4595 Atmospheric Chemistry, "Atmospheric Transport"
- 2012 **University of Toronto**, Department of Chemistry  
CHM210 Chemistry of Environmental Change, "Health Impacts of Air Pollution"

### *Teaching Assistantships:*

#### **University of Toronto**

- 2011, 2012 CHM210 Chemistry of Environmental Change (Tutorial Leader)
- 2009 CHM415 Atmospheric Chemistry (Chemistry Teaching Fellow)
- 2008 CHM410 Advanced Analytical Environmental Chemistry (Lab Demonstrator)
- 2008 CHM139 Introduction to Physical Chemistry (Lab Demonstrator)
- 2006 PHY237 Physics of the Climate (Teaching Assistant)

## FIELD CAMPAIGNS & EXPERIENCE

- 2012 Nitrogen oxide fluxes by eddy covariance  
PROPHET Tower at the University of Michigan Biological Station, Pellston MI
- 2009-2013 Greenhouse gas and nitrogen oxide fluxes by eddy covariance  
Haliburton Forest and Wildlife Reserve Research Tower, Haliburton ON
- 2009 Flux Measurements and Modelling Summer Course  
University of Colorado Research Station, Nederland CO
- 2008 NitroEurope Ammonia Intercomparison Study  
Centre for Ecology and Hydrology, Penicuik Scotland

## EXPERT CONTRIBUTIONS

2016            Expert Contributor, Environmental Performance Index Global Metrics for the Environment  
                  Yale Center for Environmental Law & Policy Station, Pellston MI

## REVIEW EXPERIENCE

### *Peer Review Articles in:*

Atmospheric Chemistry and Physics  
Atmospheric Environment  
Atmospheric Measurement Techniques  
Journal of Geophysical Research-Atmospheres  
Nature Communications  
Nature Scientific Reports  
Remote Sensing of Environment  
Urban Climate

### *Grant Proposals to:*

NASA, Panelist  
NOAA, Ad hoc reviewer  
NSF, Ad hoc reviewer

## OTHER OUTREACH & SERVICE

2016            Volunteer Judge, American Geophysical Union Outstanding Student Presentation Awards  
2015            Volunteer Judge, American Geophysical Union Outstanding Student Presentation Awards  
2012            Curriculum Committee Member, University of Toronto Environmental Science Program  
2009-2010     Graduate Student Mentor, University of Toronto Environmental Chemistry Division  
2005-2006     Board of Directors, University of Toronto Environmental Resource Network