JEFFREY A. GEDDES, Ph.D.

Assistant Professor
Department of Earth & Environment
Boston University
685 Commonwealth Ave., Boston, MA 02215

jgeddes@bu.edu
http://sites.bu.edu/jged/

RESEARCH INTERESTS:

Atmospheric chemistry, including: urban air quality; satellite remote sensing of air pollution; global and regional chemical transport modeling; interactions between air quality and the biosphere; impacts of land use and land cover changes on atmospheric reactivity

ACADEMIC APPOINTMENTS:

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)

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

HONORS & AWARDS:

2018	NASA New Investigator Program in Earth Science Award
2018	National Science Foundation CAREER Award
2016	Early Career Travel Grant, International Global Atmospheric Chemistry (IGAC)
2013-2015	NSERC CREATE IACPES Postdoctoral Research Fellowship
2009-2012	NSERC Canadian Graduate Scholarship (Doctoral)

GRANT ACTIVITY:

2018-	Remote Sensing of Surface Air Quality: New Insight into Intra-Urban Variability in Tropospheric NO_2 and HCHO **(PI)**; NASA 4/2018-3/2021
2018-	CAREER: Air Quality Impacts of Dynamic Forest-Atmosphere-Chemistry Interactions **(PI)**; NSF 3/2018-2/2023

PEER-REVIEWED PUBLICATIONS:

2018	**Geddes JA**, Martin RV, Bucsela EJ, McLinden C, and Cunningham DJM. Stratosphere-troposphere separation of nitrogen dioxide columns from the TEMPO geostationary satellite instrument. *Atmospheric Measurement Techniques*, 11, doi:10.5194/amt-11-6271-2018.

2018 Petroff A, Murphy JG, Thomas SC, and **Geddes JA**. Size-resolved aerosol flux above a temperate broadleaf forest: Measurements and modelling. *Atmospheric Environment*, 190: 359-375.

2018 Zhou S, Tai A, Sun S, Sadiq M, Heald CL, and **Geddes JA**. Coupling between surface ozone and leaf area index in a chemical transport model: Strength of feedback and implications for ozone air quality and vegetation health. *Atmospheric Chemistry and Physics*, 18, doi:10.5194/acp-18-14133-2018.

2017 **Geddes JA**, and Martin RV. Global deposition of total reactive nitrogen oxides from 1996 to 2014 constrained with satellite observations of NO_2 columns. *Atmospheric Chemistry and Physics*, 17, 10071-10091, doi:10.5194/acp-17-10071-2017.

2017 Larkin A, **Geddes JA**, Martin RV, Xiao Q, Liu Y, Marshall DJ, Bruaer M, and Hystad P. A global land use regression model for nitrogen dioxide air pollution. *Environmental Science and Technology*, doi:10.1021/acs.est.7b01148.

2017 Zheng T, Chen J, He L, Arain MA, Thomas SC, Murphy JG, **Geddes JA**, and Black TA. Inverting the maximum carboxylation rate (Vcmax) from the sunlit leaf photosynthesis rate derived from measured light response curves at tower flux sites. *Agricultural and Forest Meteorology*, 236, 48-666.

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 **Geddes JA**, Martin RV, Boys BL and van Donkelaar A. Long-term trends worldwide in ambient NO_2 concentrations inferred from satellite observations. *Environmental Health Perspectives*, doi: 10.1289/ehp.1409567.

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 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

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 **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.

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.

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**, Murphy JG, Celarier EA, and O'Brien J. Biases in long-term NO_2 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.

OTHER PUBLICATIONS:

2017 Carou S and Vet R (Eds) (**Geddes JA**, contributing author). Global Atmospheric Watch Report No. 234, "Measurement-Model Fusion for Global Total Atmospheric Deposition". World Meteorological Organization, Geneva, Switzerland.

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.

CONFERENCE & MEETING PRESENTATIONS: Lead Author

2018 **Geddes JA**, "Characterizing Sea Breeze Effects on Surface Ozone Concentrations in the Boston Region, and Implications for Remote Sensing of Local Air Quality", Fall Meeting of the American Geophysical Union, Washington, DC (Talk).

2018 **Geddes JA**, Martin RV, Buscela E, McLinden C, "NO_2 Stratosphere-Troposphere Separation Strategy for TEMPO (and possible lessons for GEMS)", 9th GEMS Science Team Meeting, Seoul, Korea (Invited Talk).

2018 **Geddes JA**, Martin RV, Buscela E, McLinden C, "Stratosphere-Troposphere Separation of NO_2", TEMPO Science Team Meeting, UCAR Center Green Campus, Boulder, CO (Talk).

2018 **Geddes JA**, "Investigating Rapid Contemporary Changes in Biosphere-Atmosphere-Chemistry Interactions with a Chemical Transport Model", Canadian Society for Chemistry Conference, Edmonton, Canada (Invited Talk).

2017 **Geddes JA**, "Impacts of Interannual Variability in Biogenic VOC Emissions near Transitional Ozone Production Regimes", Fall Meeting of the American Geophysical Union, New Orleans, LA (Talk).

2017 **Geddes JA**, "Interannual Variability of Biogenic Isoprene Emissions: Tipping the Scales Near Transitional Ozone Production Regimes?", Gordon Research Conference on Atmospheric Chemistry, Newry, ME (Poster).

2017 **Geddes JA**, Martin RV, "Stratosphere-Troposphere Separation (STS) for TEMPO NO_2", TEMPO Science Team Meeting, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA (Talk).

2017 **Geddes JA**, Martin RV, "Global Deposition of Reactive Nitogen Oxides Constrained with Satellite Obserations of NO2", 8th International GEOS-Chem Meeting, Harvard University, Cambridge, MA (Talk).

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**, 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_2 columns for Top-down Constraints on NOx Emissions and NOy 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 NO2 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_2 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_2 and SO_2 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_x 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 & MEETING PRESENTATIONS: Contributing Author (Trainees in Underline)

2018 Wong AYH, **Geddes JA**, Tai APK, "Long-term Global Multi-physical Modelling of Ozone Dry Deposition Velocity - with Focus on Process Uncertainty and Implication on Air Quality Modelling", Fall Meeting of the American Geophysical Union, Washington DC (Poster).

2018 Demetillo MAG, Knowles K, Navarro A, Geddes JA, Nowlan CR, Judd LM, Al-Saadi JA, Pusede SA, "Assessing Air Pollutant Exposure Inequities Using High-Resolution Nitrogen Dioxide Datasets", Fall Meeting of the American Geophysical Union, Washington DC (Poster).

2017 Pusede S, **Geddes JA**, Buysse CE, Esperanza A, Najacht E, Anderson JF, Baily CB, Munyan J, "On the effects of NOx emission control and drought on an ozone-polluted ecosystem" Fall Meeting of the American Geophysical Union, New Orleans, LA (Talk).

2017 Wong AYH, Tai APK, **Geddes JA**,"Effects of rising CO_2 levels on surface ozone through various biogeochemcial pathways under different land use scenarios in 21st century", Workshop on Ozone Dry Deposition: Constraints from Multiplatform Observations and Multiscale Modeling, Lamont-Doherty Earth Observatory, NY (Poster).

2016 Wong AYH, 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 NO2", American Geophysical Union Joint Assembly, Toronto, Canada (Talk).

2008 Celarier EA, Gleason JF, Murphy JG, **Geddes JA**, "OMI measurements of NO2 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 NO2 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).

INVITED SEMINARS:

2018 **Boston University**, Department of Chemistry Physical Chemistry Seminar Series, "Keeping an Eye on the Atmosphere: Modeling and Remote Sensing of Atmospheric Chemistry"

2017	**Harvard University**, Atmospheric and Environmental Chemistry Seminar Series, "Air Quality and the Biosphere: What is the view from space?"
2017	**Boston University**, Biogeosciences Seminar Series, "Air Quality and the Biosphere: What is the view from space"
2017	**World Meteorological Organization**, Global Atmospheric Watch Programme and Scientific Advisory Group on Total Atmospheric Deposition (Geneva Switzerland), "Satellite Measurement-Model Fusion for Applications in Health and Atmospheric Deposition"
2016	**University of Toronto**, Department of Chemistry, "Air quality and biosphere interactions: Measuring and modeling global change"
2016	**Colorado State University**, Department of Civil and Environmental Engineering, "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_2 using satellite data and chemical transport modeling"
2014	**York University**, Center for Atmospheric Chemistry Summer Course in Atmospheric Chemisty and Physics, "Satellite Observations of Chemical Composition"
2013	**Cornell University**, Department of Earth and Atmospheric Sciences, "Urban Ozone Production and Biosphere-Atmosphere Exchange"
2013	**Dalhousie University**, Atmospheric Science Seminar Series, "Observations of Reactive Nitrogen Oxides: From Ground Level Ozone Production to Biosphere-Atmosphere Exchange in Downwind Forest Environments"

TEACHING:

Boston University, Department of Earth & Environment:

2019 Spring	ES540: Atmospheric Chemistry and Global Change (4 undergraduates, 9 graduate students)
2018 Fall	GE446/646: Remote Sensing of the Atmosphere (3 undergraduates, 12 graduate students)
2018 Spring	ES540: Atmospheric Chemistry and Global Change (5 undergraduates, 5 graduate students)
2017 Fall	GE302: Remote Sensing of the Environment (25 undergraduates)
2017 Spring	ES540: Atmospheric Chemistry and Global Change (5 udergraduates, 1 graduate student)

ADVISING:

Ph.D. Advisees:

Taylor J. Adams, Earth & Environment (2018-present)
Anthony Y.H. Wong, Earth & Environment (2017-present)

Undergraduate Advisees:

Marissa Lee, Earth and Environmental Science (Work-Study Student, 2018)
Sarah Yasenka, Earth and Environmental Science (UROP Student, 2017)
Shane Devlin, Earth and Environmental Science (Lab Volunteer, 2017)

Visiting Scholars:

Lei Liu, Nanjing University (2017-present)

Ph.D. Dissertation Committees:

Jon Wang, Earth & Environment (2017-present)

REVIEW ACTIVITIES:

Grant Review Panelist:

2017	NASA Atmospheric Composition, Laboratory Research
2016	NASA Atmospheric Composition, Modeling and Analysis

Ad Hoc Grant Reviewer:

2018	NERC UK Research & Innovation (UKRI)
2018	NSF Atmospheric Chemistry
2016	NSF Atmospheric Chemistry
2015	NOAA Atmospheric Chemistry, Carbon Cycle, and Climate

Journal Peer Reviewer:

Atmospheric Chemistry & Physics; Atmospheric Environment; Atmospheric Measurement Techniques; Environmental Science & Technology; Geophysical Research Letters; Journal of Advances in Modeling Earth Systems; Journal of Geophysical Research-Atmospheres; Nature Communications; Nature Geoscience; Remote Sensing of Environment; Scientific Reports; Urban Climate

INSTITUTIONAL SERVICE (BOSTON UNIVERSITY):

2018-	Natural Science Curriculum Committee Member
2018	Biogeocience Student Award Committee Member
2018	Graduate Student Admissions Committee Member, Department of Earth & Environment

OTHER PROFESSIONAL SERVICE:

2018	Volunteer Judge, American Geophysical Union Outstanding Student Presentation Awards
2017-	Co-Chair, GEOS-Chem Working Group on Chemistry-Ecosystems-Climate
2016-	Science Team Member, TEMPO (Tropospheric Emissions: Monitoring of Pollution) Geostationary Satellite Instrument
2016	Volunteer Judge, American Geophysical Union Outstanding Student Presentation Awards
2015	Volunteer Judge, American Geophysical Union Outstanding Student Presentation Awards

FIELD CAMPAIGNS & TRAINING:

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

OTHER OUTREACH:

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

OTHER RECOGNITION:

2015	Selected Participant in the Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS XIII), Brookhaven National Laboratory
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	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