

Lee T. Murray

Associate Professor

Stephen Biggar '92 and Elisabeth Asaro '92 Fellow in Data Science

Dept. of Earth & Environmental Sciences (primary)

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Education

2013	Ph.D.	Engineering Sciences	Harvard University
2012	M.A.	Earth & Planetary Sciences	Harvard University
2007	B.S.	Environmental Sciences & Engineering	Harvard University

Appointments

University of Rochester, Rochester, NY

Associate Professor of Earth and Environmental Sciences (2022–); Asst. Prof. (2016–2022)

Associate Professor of Physics and Astronomy (2022–); Asst. Prof. (2018–2022)

NASA Goddard Institute for Space Studies, New York, NY

Postdoctoral Program Fellow (2014-2016)

Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY

Postdoctoral Research Scientist (2013-2014); Postdoctoral Research Fellow (2014-2016)

Honors/Awards

Stephen Biggar '92 and Elisabeth Asaro '92 Fellow in Data Science, 2023-2025

NASA Group Achievement Award to the ATom Mission, 2019

NASA Postdoctoral Program Fellowship, 2014-2016

Best Young Scientist Poster Award, 13th IGAC Science Conference, 2014

NASA Earth and Space Science Fellowship, 2009-2010

NASA Graduate Student Researchers Program Fellowship, 2008

NSF Graduate Research Fellowship Program, Honorable Mention, 2008

Howard T. Fisher Prize for Excellence in Geographic Information Science (GIS) at Harvard, 2005

Nat'l Inst. for Global Environ. Change NERC Summer Undergraduate Research Fellowship, 2004

Teaching

Rochester

EES 103 – Intro to Environmental Sciences, Guest Lecturer, Spring 2023

EES 218/418 – Atmospheric Chemistry, Fall 2016 & Spring 2019, 2023

EES 234/434 – Fundamentals of Atmospheric Modeling, Spring 2017, 2018, 2021, 2025

EES 236/436 – Physics of Climate, Fall 2017, 2018, 2020, 2021, 2022, 2023, 2024, 2025

EES 306/406 – Atmospheric Research, Fall 2021

EES 307/407 – IPCC 2021 WG1 Reading Seminar, Spring 2022

CSC 260/460 – Technology & Climate Change, Guest Lecturer, Fall 2021

Columbia & Harvard

EES W4924 – Introduction to Atmospheric Chemistry, Guest Lecturer, Spring 2014-2016

EPS 5 – Intro. to Environ. Sci.: Atmos., Ocean, and Biosph., Teaching Fellow, Spring 2010

EPS 133 – Introduction to Atmospheric Chemistry, Teaching Fellow, Fall 2008

Science A-30 – The Atmosphere, Teaching Assistant, Spring 2007

ES 6 – Environmental Science and Technology, Teaching Fellow, Spring 2005, 2006, 2009

Professional Service

[Greenhouse Gas Coalition](#), Member, 2025-present
[GISS-GC Model Scientist](#), 2021-present
[IGAC/SPARC Chemistry-Climate Modeling Initiative \(CCMI\)](#), Scientific Steering Committee, 2020-present
[IGAC Tropospheric Ozone Assessment Report \(TOAR\)-II](#), Radiative Forcing Working Group, Contributor, 2021-2025
[IPCC AR6 WG1](#), Chapter 6, Contributing Author, 2019-2021
[CMIP6/AerChemMIP](#), Tropospheric Ozone Working Group, Co-Chair, 2019-2020
[GEOS-Chem](#), Scientific Steering Committee, Chemistry-Climate Co-Chair, 2017-present
[IGAC Tropospheric Ozone Assessment Report \(TOAR\)](#), Contributing Author, 2014-2018
 Session Convener, "Air Quality Impact of Energy Production and Generation," AMS 2020
 Session Convener, "Tropospheric Chemistry-Climate Interactions," AGU 2014-2016, 2019
[GEOS-Chem Young Scientist Networking Event](#) Founder and Organizer, 2011, 2013
 Article Reviewer: *Atmos Environ*, *Atmos Chem Phys*, *Elem Sci Anth*, *Environ Sci Technol*, *Geophys Res Lett*, *J Adv Model Earth Syst*, *J Geophys Res Atmos*, *Nature*, *Nat Clim Change*, *Nat Comm*, *Nat Geosci*, *npj Clim At Sci*, *Q J R Meteorol Soc*, *Quat Sci Rev*, *Science*, *Tellus B*
 Grant Reviewer: NASA (ESD & PSD), NSF (AGS & OPP), DOE (BER)
 Extensive Model Development to [GEOS-Chem](#) CTM and NASA GISS [ModelE](#) GCM/CCM

Professional Society Memberships

American Geophysical Union (AGU)	2005–present
American Meteorological Society (AMS)	2008–present
American Association for the Advancement of Science (AAAS)	2018–present
American Chemical Society (ACS)	2022–present

Graduate Student Mentoring

Mayanja, Salima	Geosciences	Ph.D. student	2025–present
Loman, Matthew	Geosciences	Ph.D. candidate	2018–present
Tie, Xin	Geosciences	Ph.D. candidate	2018–present
Shi, Mingjian	Geosciences	Ph.D. candidate	2017–present

Undergraduate Research Mentoring

†Thesis Advisee (with ‡High Honors)

Thomson, Elizabeth†	2025–	Env. Sci.	B.S. '26	
Stempien, Joseph†	2025–	Env. Sci.	B.S. '26	
Loy, April	2024–2025	Comp. Sci.	B.S. '25	
Schaefer, Peter	2021–2022	Mech. Eng.	B.S. '22	
Piao, Haoran	2021–2022	Env. Sci./Stat.	B.S. '22	
Li, En Yuan‡	2019–2021	Env. Sci.	B.S. '21	Ph.D. Candidate @ CSU
Tatem, Amanda	2018–2019	Chem. Eng.	B.S. '20	Chem. Engineer @ ERG

Publications

h-index: ISI/Publons: [33](#); Scopus: [35](#); Google Scholar: [38](#)
 ORCID: [0000-0002-3447-3952](#)

°Graduate student mentee

ⓂUndergraduate student mentee

- Fiedler, S., F. M. O'Connor, D. Watson-Parris, R. J. Allen, W. J. Collins, P. T. Griffiths, M. Kasoar, J. Kikstra, J. F. Kok, **L. T. Murray**, F. Paulot, E. Robertson, M. Sand, S. Turnock, J. Weber, L. J. Wilcox, and V. Naik (2025), AerChemMIP2 - Unraveling the role of reactive gases, aerosol particles, and land use for air quality and climate change in CMIP7, *Atmos Chem Phys*, *submitted*
- McDuffie, E., **L. T. Murray**, S. Eastham, M. Jackson, M. Sarofim, W. Raich, R. Burnett, J. Ander-

- ton, H. Roman, J. E. Neumann, S. Tilmes, K. A. Quagraine, and N. Fann (2025), Meteorologically Driven Changes in Future Global Air Quality: Physical and Monetized Impacts, *Environ Sci Technol*, *in review*
74. Chen, A., Z. Zhang, B. Poulter, L. Feng, H. Liu, **L. T. Murray**, X. Yu, Z. Huang, D. C. Gaeta, K. L. Morgan, Q. Zhu, and S. M. Miller (2025), Spatial and temporal distribution of global wetland methane emissions during 2019-2020 estimated from satellite observations, *J Geophys Res Atmos*, *in review*
73. Catena, A., **L. T. Murray**, J. Zhang, E. Leibensperger, R. Commane, M. L. Smith, M. J. Schwab, A. Hallward-Driemeier, M. L. Loman, and J. J. Schwab (2025a), Intercomparison of Methane Emission Rate Methods using Aerial and Ground-level Mobile Monitoring at New York State Landfills, *Environ Sci Technol Air*, *accepted*
72. Catena, A. M., M. L. Smith, **L. T. Murray**, E. M. Leibensperger, J. Zhang, M. J. Schwab, and J. J. Schwab (2025b), Aerial estimates of methane and carbon dioxide emission rates using a mass balance approach in New York State, *Earth System Science Data*, *17*(9), 4555–4568, doi:[10.5194/essd-17-4555-2025](https://doi.org/10.5194/essd-17-4555-2025)
71. Collins, W. J., F. M. O'Connor, R. E. Byrom, Ø. Hodnebrog, P. Jöckel, M. Mertens, G. Myhre, M. Nützel, D. Olivie, R. B. Skeie, L. Stecher, L. W. Horowitz, V. Naik, G. Faluvegi, U. Im, **L. T. Murray**, D. Shindell, K. Tsigaridis, N. L. Abraham, and J. Keeble (2025), Climate forcing due to future ozone changes: an intercomparison of metrics and methods, *Atmospheric Chemistry and Physics*, *25*(16), 9031–9060, doi:[10.5194/acp-25-9031-2025](https://doi.org/10.5194/acp-25-9031-2025)
70. Loman, M. L., **L. T. Murray**, E. M. Leibensperger, and J. D. Maasackers (2025), A High-Resolution Inventory of Anthropogenic Methane Emissions in New York State, *Environmental Science & Technology*, *59*(32), 16,933–16,946, doi:[10.1021/acs.est.5c07245](https://doi.org/10.1021/acs.est.5c07245)
69. Griffiths, P. T., L. J. Wilcox, R. J. Allen, V. Naik, F. M. O'Connor, M. Prather, A. Archibald, F. Brown, M. Deushi, W. Collins, S. Fiedler, N. Oshima, **L. T. Murray**, B. H. Samset, C. Smith, S. Turnock, D. Watson-Parris, and P. J. Young (2025), Opinion: The role of AerChemMIP in advancing climate and air quality research, *Atmospheric Chemistry and Physics*, *25*(14), 8289–8328, doi:[10.5194/acp-25-8289-2025](https://doi.org/10.5194/acp-25-8289-2025)
68. Yang, L. H., D. J. Jacob, H. Lin, R. Dang, K. H. Bates, J. D. East, K. R. Travis, D. C. Pendergrass, and **L. T. Murray** (2025), Assessment of Hydrogen's Climate Impact Is Affected by Model OH Biases, *Geophysical Research Letters*, *52*(5), doi:[10.1029/2024gl112445](https://doi.org/10.1029/2024gl112445)
67. **Murray, L. T.**, E. M. Leibensperger, L. J. Mickley, and A. P. K. Tai (2024), Estimating future climate change impacts on human mortality and crop yields via air pollution, *Proc Natl Acad Sci USA*, *121*(39), e2400117,121, doi:[10.1073/pnas.2400117121](https://doi.org/10.1073/pnas.2400117121)
66. Hmiel, B., V. V. Petrenko, C. Buizert, A. M. Smith, M. N. Dyonisius, P. Place, B. Yang, Q. Hua, R. Beaudette, J. P. Severinghaus, C. Harth, R. F. Weiss, L. Davidge, M. Diaz, M. Pacicco, J. A. Menking, M. Kalk, X. Faïn, A. Adolph, I. Vimont, and **L. T. Murray** (2024), Characterization of *in situ* cosmogenic ¹⁴C production, retention and loss in firn and shallow ice at Summit, Greenland, *The Cryosphere*, *18*, 3363–3382, doi:[10.5194/tc-18-3363-2024](https://doi.org/10.5194/tc-18-3363-2024)
65. Baublitz, C. B., A. M. Fiore, S. M. Ludwig, J. M. Nicely, G. M. Wolfe, **L. T. Murray**, R. Commane, M. J. Prather, D. C. Anderson, G. C. Correa, B. N. Duncan, M. Follette-Cook, D. M. Westervelt, I. Bourgeois, W. H. Brune, T. P. Bui, J. P. DiGangi, G. S. Diskin, S. R. Hall, K. McKain, D. O. Miller, J. Peischl, A. Thames, C. Thompson, K. Ullmann, and S. C. Wofsy (2023), An observation-based, reduced-form model for oxidation in the remote marine troposphere, *Proc Natl Acad Sci USA*, *120*(34), e2209735,120, doi:[10.1073/pnas.2209735120](https://doi.org/10.1073/pnas.2209735120)
64. Kim, H., W. W. Walters, C. Bekker, **L. T. Murray**, and M. G. Hastings (2023), Nitrate chemistry in the Northeast US Part II: Oxygen isotopes reveal differences in particulate and gas phase formation, *Atmos Chem Phys*, *23*, 4203–4219, doi:[10.5194/acp-23-4203-2023](https://doi.org/10.5194/acp-23-4203-2023)
63. Bekker, C., W. W. Walters, **L. T. Murray**, and M. G. Hastings (2023), Nitrate chemistry in the Northeast US Part I: Nitrogen isotope seasonality tracks nitrate formation chemistry, *Atmos Chem Phys*, *23*, 4185–4201, doi:[10.5194/acp-23-4185-2023](https://doi.org/10.5194/acp-23-4185-2023)

62. Commane, R., A. Hallward-Driemeier[®], and **L. T. Murray** (2023), Intercomparison of commercial analyzers for atmospheric ethane and methane observations, *Atmos Meas Tech*, 2022, 1431–1441, doi:[10.5194/amt-16-1431-2023](https://doi.org/10.5194/amt-16-1431-2023)
61. Guo, H., C. M. Flynn, M. J. Prather, S. A. Strode, S. D. Steenrod, L. Emmons, F. Lacey, J.-F. Lamarque, A. M. Fiore, G. Correa, **L. T. Murray**, G. M. Wolfe, J. M. St. Clair, M. Kim, J. Crouse, G. Diskin, J. DiGangi, B. C. Daube, R. Commane, K. McKain, J. Peischl, T. B. Ryerson, C. Thompson, T. F. Hanisco, D. Blake, N. J. Blake, E. C. Apel, R. S. Hornbrook, J. W. Elkins, E. J. Hints, F. L. Moore, and S. C. Wofsy (2023), Heterogeneity and chemical reactivity of the remote troposphere defined by aircraft measurements – corrected, *Atmos Chem Phys*, 23(1), 99–117, doi:[10.5194/acp-23-99-2023](https://doi.org/10.5194/acp-23-99-2023)
60. Yan, Y., A. Banerjee[®], **L. T. Murray**, X. Tie[®], and L. Y. Yeung (2022), Tropospheric ozone during the Last Interglacial, *Geophys Res Lett*, 49(23), doi:[10.1029/2022gl101113](https://doi.org/10.1029/2022gl101113)
59. [®]Banerjee, A., L. Y. Yeung, **L. T. Murray**, X. Tie[®], J. E. Tierney, and A. N. Legrande (2022), Clumped-isotope constraint on upper-tropospheric cooling during the Last Glacial Maximum, *AGU Advances*, 3(4), e2022AV000688, doi:[10.1029/2022av000688](https://doi.org/10.1029/2022av000688)
58. [®]Catena, A. M., J. Zhang, R. Commane, **L. T. Murray**, M. J. Schwab, E. M. Leibensperger, J. Marto[®], M. L. Smith, and J. J. Schwab (2022), Hydrogen sulfide emission properties from two large landfills in New York State, *Atmosphere*, 13(8), 1251, doi:[10.3390/atmos13081251](https://doi.org/10.3390/atmos13081251)
57. Zeng, G., O. Morgenstern, J. H. T. Williams, F. M. O'Connor, P. T. Griffiths, J. Keeble, M. Deushi, L. W. Horowitz, V. Naik, L. K. Emmons, N. L. Abraham, A. T. Archibald, S. E. Bauer, B. Hassler, M. Michou, M. J. Mills, **L. T. Murray**, N. Oshima, L. T. Sentman, S. Tilmes, K. Tsigaridis, and P. J. Young (2022), Attribution of stratospheric and tropospheric ozone changes between 1850 and 2014 in CMIP6 models, *J Geophys Res Atmos*, 127(16), e2022JD036452, doi:[10.1029/2022JD036452](https://doi.org/10.1029/2022JD036452)
56. Nazarenko, L. S., N. Tausnev, G. L. Russell, D. Rind, R. L. Miller, G. A. Schmidt, S. E. Bauer, M. Kelley, R. Ruedy, A. S. Ackerman, I. Aleinov, M. Bauer, R. Bleck, V. Canuto, G. Cesana, Y. Cheng, T. L. Clune, B. I. Cook, C. A. Cruz, A. D. Del Genio, G. S. Elsaesser, G. Faluvegi, N. Y. Kiang, D. Kim, A. A. Lacis, A. Leboissetier, A. N. LeGrande, K. K. Lo, J. Marshall, E. E. Matthews, S. McDermid, K. Mezuman, **L. T. Murray**, V. Oinas, C. Orbe, C. Pérez García-Pando, J. P. Perlwitz, M. J. Puma, A. Romanou, D. T. Shindell, S. Sun, K. Tsigaridis, G. Tselioudis, E. Weng, J. Wu, and M.-S. Yao (2022), Future Climate Change under SSP Emission Scenarios with GISS-E2.1, *J Adv Model Earth Syst*, p. e2021MS002871, doi:[10.1029/2021MS002871](https://doi.org/10.1029/2021MS002871)
55. Thompson, C. R., S. C. Wofsy, M. J. Prather, P. A. Newman, T. F. Hanisco, T. B. Ryerson, D. W. Fahey, E. C. Apel, C. A. Brock, W. H. Brune, K. Froyd, J. M. Katich, J. M. Nicely, J. Peischl, E. Ray, P. R. Veres, S. Wang, H. M. Allen, E. Asher, H. Bian, D. Blake, I. Bourgeois, J. Budney, T. P. Bui, A. Butler, P. Campuzano-Jost, C. Chang, M. Chin, R. Commane, G. Correa, J. D. Crouse, B. Daube, J. E. Dibb, J. P. DiGangi, G. S. Diskin, M. Dollner, J. W. Elkins, A. M. Fiore, C. M. Flynn, H. Guo, S. R. Hall, R. A. Hannun, A. Hills, E. J. Hints, A. Hodzic, R. S. Hornbrook, L. G. Huey, J. L. Jimenez, R. F. Keeling, M. J. Kim, A. Kupc, F. Lacey, L. R. Lait, J.-F. Lamarque, J. Liu, K. McKain, S. Meinardi, D. O. Miller, S. A. Montzka, F. L. Moore, E. J. Morgan, D. M. Murphy, **L. T. Murray**, B. A. Nault, J. A. Neuman, L. Nguyen, Y. Gonzalez, A. Rollins, K. Rosenlof, M. Sargent, G. Schill, J. P. Schwarz, J. M. St. Clair, S. D. Steenrod, B. B. Stephens, S. E. Strahan, S. A. Strode, C. Sweeney, A. B. Thames, K. Ullmann, N. Wagner, R. Weber, B. Weinzierl, P. O. Wennberg, C. J. Williamson, G. M. Wolfe, and L. Zeng (2022), The NASA Atmospheric Tomography (ATom) Mission: Imaging the Chemistry of the Global Atmosphere, *Bull Am Meteorol Soc*, 103(3), E761–E790, doi:[10.1175/bams-d-20-0315.1](https://doi.org/10.1175/bams-d-20-0315.1)
54. Plant, G., E. A. Kort, **L. T. Murray**, J. D. Maasackers, and I. Aben (2022), Evaluating urban methane emissions from space using TROPOMI methane and carbon monoxide observations, *Remote Sens Environ*, 268, 112,756, doi:[10.1016/j.rse.2021.112756](https://doi.org/10.1016/j.rse.2021.112756)
53. Bourgeois, I., J. Peischl, J. A. Neuman, S. S. Brown, C. R. Thompson, K. C. Aikin, H. M. Allen, H. Angot, E. C. Apel, C. B. Baublitz, J. F. Brewer, P. Campuzano-Jost, R. Commane, J. D. Crouse, B. C. Daube, J. P. DiGangi, G. S. Diskin, L. K. Emmons, A. M. Fiore, G. I. Gkatzelis, A. Hills, R. S. Hornbrook, L. G. Huey, J. L. Jimenez, M. Kim, F. Lacey, K. McKain, **L. T. Murray**, B. A. Nault, D. D. Parrish, E. Ray, C. Sweeney, D. Tanner, S. C. Wofsy, and T. B. Ryerson (2021), Large contribution of biomass burning emissions to ozone throughout the global remote troposphere., *Proc Natl Acad Sci USA*, 118(52), e2109628,118, doi:[10.1073/pnas.2109628118](https://doi.org/10.1073/pnas.2109628118)

52. **Murray, L. T.**, A. M. Fiore, D. T. Shindell, V. Naik, and L. W. Horowitz (2021a), Large uncertainties in global hydroxyl projections tied to fate of reactive nitrogen and carbon, *Proc Natl Acad Sci USA*, 118(43), doi:[10.1073/pnas.2115204118](https://doi.org/10.1073/pnas.2115204118)
51. Bindle, L., R. V. Martin, M. J. Cooper, E. W. Lundgren, S. D. Eastham, B. M. Auer, T. L. Clune, H. Weng, J. Lin, **L. T. Murray**, J. Meng, C. A. Keller, S. Pawson, and D. J. Jacob (2021), Grid-Stretching Capability for the GEOS-Chem 13.0.0 Atmospheric Chemistry Model, *Geosci Model Dev*, 14, 5977–5997, doi:[10.5194/gmd-14-5977-2021](https://doi.org/10.5194/gmd-14-5977-2021)
50. **Murray, L. T.**, E. M. Leibensperger, C. Orbe, L. J. Mickley, and M. Sulprizio (2021b), GCAP 2.0: A global 3-D chemical-transport model framework for past, present, and future climate scenarios, *Geosci Model Dev*, 14, 5789–5823, doi:[10.5194/gmd-14-5789-2021](https://doi.org/10.5194/gmd-14-5789-2021)
49. Szopa, S., V. Naik, B. Adhikary, P. E. Artaxo Netto, T. Berntsen, W. D. Collins, S. Fuzzi, L. Gallardo, A. Kiendler-Scharr, Z. Klimont, H. Liao, N. Unger, and P. Zanis (2021), Short-Lived Climate Forcers. In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, p. 817–922, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, doi:[10.1017/9781009157896.008](https://doi.org/10.1017/9781009157896.008), (**L. T. Murray** Contributing Author)
48. Yeung, L. Y., **L. T. Murray**, A. Banerjee[®], X. Tie[®], Y. Yan, E. L. Atlas, S. M. Schauffler, and K. A. Boering (2021), Effects of ozone isotopologue formation on the clumped-isotope composition of atmospheric O₂, *J Geophys Res Atmos*, doi:[10.1029/2021jd034770](https://doi.org/10.1029/2021jd034770)
47. [®]Zhai, S., X. Wang, J. R. McConnell, L. Geng, J. Cole-Dai, M. Sigl, N. Chellman, T. Sherwen, R. Pound, K. Fujita, S. Hattori, J. M. Moch, L. Zhu, M. Evans, M. Legrand, P. Liu, D. Pasteris, Y.-C. Chan, **L. T. Murray**, and B. Alexander (2021), Anthropogenic Impacts on Tropospheric Reactive Chlorine Since the Preindustrial, *Geophys Res Lett*, 48(14), doi:[10.1029/2021gl093808](https://doi.org/10.1029/2021gl093808)
46. [®]Kazemi, R., W. Schlageter[®], B. Hmiel, T. S. Weber, **L. T. Murray**, and V. V. Petrenko (2021), Investigating methane emissions from geologic microseepage in Western New York State, United States, *Elem Sci Anth*, 9(1), doi:[10.1525/elementa.2020.00066](https://doi.org/10.1525/elementa.2020.00066)
45. Qu, Z., D. J. Jacob, R. F. Silvern, V. Shah, P. C. Campbell, L. C. Valin, and **L. T. Murray** (2021), US COVID-19 Shutdown Demonstrates Importance of Background NO₂ in Inferring NO_x Emissions From Satellite NO₂ Observations, *Geophys Res Lett*, 48(10), doi:[10.1029/2021GL092783](https://doi.org/10.1029/2021GL092783)
44. Griffiths*, P. T., **L. T. Murray***, G. Zeng, A. T. Archibald, L. K. Emmons, I. Galbally, B. Hassler, L. W. Horowitz, J. Keeble, J. J. Liu, O. Moeini, V. Naik, F. M. O'Connor, Y. M. Shin, D. Tarasick, S. Tilmes, S. T. Turnock, O. Wild, P. J. Young, and P. Zanis (2021), Tropospheric ozone in CMIP6 Simulations, *Atmos Chem Phys*, 21, 4187–4218, doi:[10.5194/acp-21-4187-2021](https://doi.org/10.5194/acp-21-4187-2021), ***Equal author contribution**
43. Petrenko, V. V., A. M. Smith, E. M. Crosier, R. Kazemi[®], P. Place[®], A. Colton, B. Yang, Q. Hua, and **L. T. Murray** (2021), An improved method for atmospheric ¹⁴CO measurements, *Atmos Meas Tech*, 14(3), 2055–2063, doi:[10.5194/amt-14-2055-2021](https://doi.org/10.5194/amt-14-2055-2021)
42. Miller, R. L., G. A. Schmidt, L. S. Nazarenko, S. E. Bauer, M. Kelley, R. Ruedy, G. L. Russell, A. S. Ackerman, I. Aleinov, M. Bauer, R. Bleck, V. Canuto, G. Cesana, Y. Cheng, T. L. Clune, B. I. Cook, C. A. Cruz, A. D. Del Genio, G. S. Elsaesser, G. Faluvegi, N. Y. Kiang, D. Kim, A. A. Lacis, A. Leboissetier, A. N. LeGrande, K. K. Lo, J. Marshall, E. E. Matthews, S. McDermid, K. Mezuman, **L. T. Murray**, V. Oinas, C. Orbe, C. Pérez García-Pando, J. P. Perlwitz, M. J. Puma, D. Rind, A. Romanou, D. T. Shindell, S. Sun, N. Tausnev, K. Tsigaridis, G. Tselioudis, E. Weng, J. Wu, and M.-S. Yao (2021), CMIP6 Historical Simulations (1850–2014) With GISS-E2.1, *J Adv Model Earth Syst*, 13(1), doi:[10.1029/2019ms002034](https://doi.org/10.1029/2019ms002034)
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Other Publications

2. Plummer, D., T. Nagashima, S. Tilmes, A. Archibald, G. Chiodo, S. Fadnavis, H. Garny, B. Josse, J. Kim, J.-F. Lamarque, O. Morgenstern, **L. T. Murray**, C. Orbe, A. Tai, M. Chipperfield, B. Funke, M. Jukes, D. Kinnison, M. Kunze, B. Luo, K. Matthes, P. Newman, C. Pascoe, T. Peter, and L. Thomason (2021), CCMI-2022: A new set of Chemistry-Climate Model Initiative (CCMI) Community Simulations to Update the Assessment of Models and Support Upcoming Ozone Assessment Activities, *SPARC Newsletter*, No. 57, 22–30, [link](#)
1. **Murray, L. T.**, and E. M. Leibensperger (2020), Long-Term Monitoring of Methane within New York State: Assessing the Impact of Shifting Energy Portfolios on Regional Air Quality and Climate, *Tech. Rep. 23-21*, Prepared for the New York State Energy Research and Development Authority, [link](#)

Select Presentations at Scientific Meetings

Title	Kind	Venue
<i>Estimating Methane Fluxes from Landfills in New York State: A Methodological Intercomparison</i>	Oral (Invited)	2025 AGU Fall Meeting New Orleans, LA, Dec 15, 2025
<i>Key Challenges for Calibrating Chemistry in Global Models</i>	Oral (Invited)	VESRI Calibration Workshop Virtual Earth System Research Inst. Washington, DC, Oct 29, 2025
<i>Using ¹⁴C observations from in situ, ice-core and firn measurements to constrain the atmospheric oxidative capacity and evaluate CMIP5 and CMIP6 simulations since the preindustrial</i>	Oral	3 rd CACTI Workshop Exeter, UK, Sep 18, 2025
<i>Constraining spatial, seasonal and temporal variability in OH with ¹⁴C</i>	Poster	20 th Atmospheric Chemistry Gordon Research Conference Newry, ME, Aug 6, 2025
<i>An Introduction to GISS-GC and its variants</i>	Oral	7 th ICECAP Science Team Meeting Seattle, WA, May 28, 2025
<i>Estimating future climate change impacts on human mortality and crop yields via air pollution with GCAP2</i>	Oral	2 nd GEOS-Chem Asia Meeting Nanjing, China, May 19, 2025
<i>Coupling Between Lightning and Air Pollution: A Global Perspective</i>	Oral (Invited)	2024 AGU Fall Meeting Washington, DC, Dec 11, 2024
<i>Forecasted climate penalties and benefits to ozone and PM_{2.5} across the 21st century under different SSP scenarios</i>	Poster	2 nd CACTI Workshop San Diego, CA, Sep 17, 2024
<i>Future insights into gas-phase atmospheric chemistry</i>	Oral (Invited)	TSRC New Insights into Gas-Phase Atmospheric Chemistry Workshop Telluride, CO, Jul 18, 2024
<i>Methane monitoring and inverse modeling efforts in New York State</i>	Oral	US EPA Methane Inverse Modeling Technical Workshop Durham, NC, Jul 18, 2024
<i>Working Group 2 Updates</i>	Oral	1 st Cross-VESRI Meeting Cambridge, UK, Jul 7, 2024
<i>Use of the GEOS-Chem 3-D chemical transport model for future air pollution/vegetation studies</i>	Oral	Agri-Food Systems Assessment Kick-off Meeting Rome, Italy, Jun 26, 2024

<i>Potential GEOS-Chem contributions to CMIP7</i>	Oral	11 th Int'l GEOS-Chem Meeting St. Louis, MO, Jun 14, 2024
<i>Using GEOS-Chem to estimate future climate penalties and benefits to human mortality and crops</i>	Oral	11 th Int'l GEOS-Chem Meeting St. Louis, MO, Jun 11, 2024
<i>GISS-GC Model Clinic</i>	Oral	11 th Int'l GEOS-Chem Meeting St. Louis, MO, Jun 10, 2024
<i>ICECAP: Past, Present, and Future</i>	Oral	6 th ICECAP Science Team Meeting Atlanta, GA, May 30, 2024
<i>Forecasted climate penalties and benefits to surface ozone and PM_{2.5} across the 21st century under different Shared Socioeconomic Pathway scenarios</i>	Oral (Invited)	2023 AGU Fall Meeting San Francisco, CA, Dec 11, 2023
<i>FETCH₄ Working Group II Overview</i>	Oral	1 st FETCH ₄ Science Team Meeting San Francisco, CA, Dec 10, 2023
<i>Forecasted climate penalties and benefits to ozone and PM_{2.5} across the 21st century under different SSP scenarios</i>	Oral	7 th IGAC/SPARC CCM1 Meeting Toulouse, France, Oct 3-5, 2023
<i>Forecasted climate penalties and benefits to ozone and PM_{2.5} across the 21st century under different SSP scenarios</i>	Poster	19 th Atmospheric Chemistry Gordon Research Conference Newry, ME, Aug 2, 2023
<i>Future impacts of climate change on human health via air quality</i>	Oral (Invited)	URMC Human Health and the Environment Research Symposium Rochester, NY, Jun 29, 2023
<i>Chemistry-Climate Model Initiative: Current Activities and Future Plans</i>	Oral	CACTI Workshop Kiel, Germany, Jun 15, 2023
<i>Forecasted climate penalties and benefits to ozone and PM_{2.5} across the 21st century under different SSP scenarios</i>	Oral	CACTI Workshop Kiel, Germany, Jun 14, 2023
<i>Estimating methane fluxes from large point sources in New York State: A methodological intercomparison</i>	Poster	2022 AGU Fall Meeting Chicago, IL, Dec 13, 2022
<i>The equilibrium response of climate and composition to lightning</i>	Oral (Invited)	2022 AGU Fall Meeting Chicago, IL, Dec 12, 2022
<i>Past and present variability in the oxidative capacity of the atmosphere</i>	Oral (Invited)	2022 ACS Northeast Reg. Meeting Rochester, NY, Oct 3, 2022
<i>Insights into OH variability from a "departing friend" and a rekindled old friendship</i>	Oral (Invited)	TSRC New Insights into Gas-Phase Atmospheric Chemistry Workshop Telluride, CO, Jul 18, 2022
<i>An introduction to GISS-GC</i>	Oral	10 th Int'l GEOS-Chem Meeting St. Louis, MO, Jun 9, 2022
<i>Forecasted climate penalties and benefits to ozone and PM_{2.5} across the 21st century under different SSP scenarios</i>	Oral	10 th Int'l GEOS-Chem Meeting St. Louis, MO, Jun 9, 2022
<i>Forecasted climate penalties to surface ozone across the 21st century</i>	Oral	2021 AGU Fall Meeting New Orleans, LA, Dec 15, 2021
<i>Impact of prescribed global and geostationary lightning observations on surface air quality in a chemical transport model</i>	Oral	2020 AGU Fall Meeting Online, Dec 12, 2020

<i>ICE age Chemistry And Proxies (ICECAP) 2.0 Overview</i>	Oral	4 th ICECAP Science Team Meeting Online (Harvard Host), Jul 13, 2020
<i>Evaluation of the reactive nitrogen budget in the Chemistry-Climate Modeling Initiative (CCMI) ensemble versus ATom observations</i>	Oral	2019 ATom Science Team Meeting Boulder, CO, Nov 18, 2019
<i>Isotopic constraint on the 20th-century increase in tropospheric ozone</i>	Oral	6 th IGAC/SPARC CCMI Meeting Hong Kong, China, Aug 08, 2019
<i>Why do global models strongly disagree on their NO_y and HO_y budgets?</i>	Oral (Invited)	18 th Atmospheric Chemistry Gordon Research Conference Newry, ME, Jul 31, 2019
<i>Coupling GEOS-Chem and GISS ModelE2.1</i>	Oral	3 rd ICECAP Science Team Meeting Seattle, WA, May 29, 2019
<i>Optimizing OH distributions using ¹⁴CO and methyl chloroform in the GEOS-Chem adjoint</i>	Oral	9 th Int'l GEOS-Chem Meeting Cambridge, MA, May 08, 2019
<i>Distributions and chemistry of NO_x in the remote troposphere and the validity of the photo-stationary state approximation</i>	Oral	99 th AMS Annual Meeting Phoenix, AZ, Jan 10, 2019
<i>A methane observation and monitoring network for New York State</i>	Oral	2018 AGU Fall Meeting Washington, DC, Dec 14, 2018
<i>The equilibrium response of climate and composition to lightning</i>	Poster	14 th iCACGP/15 th IGAC Science Conf. on Atmospheric Chemistry Takamatsu, Japan, Sept 25-29, 2018
<i>Chemistry-ecosystems-climate coupling in GEOS-Chem</i>	Oral	NCAR/GEOS-Chem Workshop Boulder, CO, Jul 30, 2018
<i>The ICECAP Model: Overview</i>	Oral	2 nd ICECAP Science Team Meeting Rochester, NY, Jun 27, 2018
<i>The equilibrium response of climate and composition to lightning</i>	Oral (Invited)	15 th Annual Meeting of the Asia Oceania Geosciences Society Honolulu, HI, Jun 8, 2018
<i>Evaluation of the reactive nitrogen budget of the remote atmosphere in global models using airborne measurements</i>	Oral	98 th AMS Annual Meeting Austin, TX, Jan 9, 2018
<i>Evaluation of the reactive nitrogen budget of the remote atmosphere in global models using airborne measurements</i>	Poster	2017 AGU Fall Meeting New Orleans, LA, Dec 11, 2017
<i>Lightning impacts on air quality and climate across multiple time horizons</i>	Poster	17 th Atmospheric Chemistry Gordon Research Conference Newry, ME, Aug 2-3, 2017
<i>Background NO_x-NO_y-HO_x-HO_y from a global model perspective</i>	Oral	2017 ATom Science Team Meeting Boulder, CO, Jul 26, 2017
<i>Chemistry-Climate Interactions of Lightning NO_x Across Multiple Time Horizons</i>	Poster	5 th IGAC/SPARC CCMI Meeting Toulouse, France, Jun 13-15, 2017
<i>How representative are airborne field campaigns of reactive tropospheric composition?</i>	Oral	8 th Int'l GEOS-Chem Meeting Cambridge, MA, May 2, 2017
<i>Lightning NO_x Impacts on Surface Air Quality Across Multiple Time Horizons</i>	Poster	2016 AGU Fall Meeting San Francisco, CA, Dec 12, 2016

<i>A novel proxy for OH variability from space: implications for evaluating global chemistry-climate models</i>	Poster	10 th NASA ACAST Semiannual Meeting Research Tri Park, NC, Jan 5-7, 2016
<i>Assessing the Ability of Instantaneous Aircraft and Sonde Measurements to Characterize Climatological Means and Long-Term Trends in Tropospheric Composition</i>	Oral	2015 AGU Fall Meeting San Francisco, CA, Dec 18, 2015
<i>A novel proxy for OH variability from space: implications for evaluating global chemistry-climate models</i>	Poster	4 th IGAC/SPARC CCM1 Meeting Frascati, Italy, Oct 7-9, 2015
<i>Insights on local-to-global OH variability from model discrepancies and satellite instruments</i>	Poster	16 th Atmospheric Chemistry Gordon Research Conference Waterville Valley, NH, Aug 5-6, 2015
<i>Process-oriented attribution of tropospheric OH variability using a space-based proxy and GEOS-Chem</i>	Oral	7 th Int'l GEOS-Chem Meeting Cambridge, MA, May 4, 2015
<i>A Multi-Component Proxy for OH Variability Measured from Space: Evaluation and</i>	Oral	2014 AGU Fall Meeting San Francisco, CA, Dec 17, 2014
<i>Quantifying feedbacks from lightning in the GISS ModelE2 chemistry-climate model</i>	Poster	13 th iCACGP/13 th IGAC Science Conf. on Atmospheric Chemistry Natal, Brazil, Sept 22, 2014
<i>Assessing the ability of OMI NO₂ to detect interannual variability and trends in anthropogenic versus natural sources of NO_x</i>	Poster	7 th NASA ACAST Semiannual Meeting Cambridge, MA, Jun 17, 2014
<i>Identifying key processes for constraining OH globally in chemistry-climate models</i>	Oral	3 rd IGAC/SPARC CCM1 Workshop Lancaster, UK, May 21, 2014
<i>Factors controlling inter- and intramodel variability in global mean OH</i>	Oral	2013 AGU Fall Meeting San Francisco, CA, Dec 9-13 2013
<i>Factors controlling the oxidative capacity of the troposphere since the Last Glacial Maximum</i>	Oral	2 nd IGAC/SPARC CCM1 Workshop Boulder, CO, May 15, 2013
<i>Factors controlling the oxidative capacity of the troposphere since the Last Glacial Maximum</i>	Oral	6 th Int'l GEOS-Chem Meeting Cambridge, MA, May 6-9, 2013
<i>Factors controlling the oxidative capacity of the troposphere since the Last Glacial Maximum</i>	Oral	1 st ICECAP Science Team Meeting Cambridge, MA, Mar 13-14, 2013
<i>The role of lightning in controlling interannual variability of tropical tropospheric ozone and OH and its implications for climate</i>	Oral	2012 AGU Fall Meeting San Francisco, CA, Dec 3-7, 2012
<i>Sensitivity of the oxidative capacity of the troposphere since the Last Glacial Maximum</i>	Poster	2012 AGU Fall Meeting San Francisco, CA, Dec 3-7, 2012
<i>Variability in tropospheric oxidant concentrations on interannual to interglacial time scales</i>	Oral	5 th Int'l GEOS-Chem Meeting Cambridge, MA, May 2-5, 2011
<i>Investigating lightning-driven interannual variability in the oxidative capacity of the troposphere</i>	Poster	2010 EGU General Assembly Vienna, Austria, May 5, 2010
<i>Evolution of the oxidative capacity of the troposphere since the Last Glacial Maximum</i>	Oral	2009 AGU Fall Meeting San Francisco, CA, Dec 18, 2009

<i>Spatially and temporally constraining the lightning flash rate parameterization in GEOS-Chem and its impact on tropospheric ozone variability</i>	Oral	4 th GEOS-Chem Scientific and Users' Meeting Cambridge, MA, Apr 7-10, 2009
<i>Improving techniques for satellite-based constraints on the lightning parameterization in a global chemical transport model</i>	Oral	89 th AMS Annual Meeting Phoenix, AZ, Jan 14, 2009
<i>Lightning NO_x source emissions in GEOS-Chem</i>	Oral	3 rd GEOS-Chem Users' Meeting Cambridge, MA, Apr 11-13, 2007
<i>Characterization of North American Ozone-CO Correlations During the ICARTT Study</i>	Oral	2005 AGU Fall Meeting San Francisco, CA, Dec 8, 2005

Invited Research Seminars

Topic	Series
<i>Atmospheric Chemistry Across Scales: From Drivers of Oxidative Capacity to Climate-Health Impacts</i>	Prog. in Atm. Ocn. and Clim. Colloquium Massachusetts Institute of Technology Cambridge, MA, Oct 20, 2025
<i>Atmospheric Chemistry Across Scales: From Drivers of Oxidative Capacity to Climate-Health Impacts</i>	Meteorology Seminar Florida State University Tallahassee, FL, Oct 14, 2025
<i>A Geologically Based Indoor-Radon Potential Map of New York State</i>	Environmental Health Sciences Center Meeting UR Medical Center Rochester, NY, Oct 11, 2024
<i>Global simulation of isotopologues to constrain atmospheric chemistry in the deep past and present</i>	Berkeley Atmospheric Sciences Center Series UC Berkeley Berkeley, CA, Apr 03, 2024
<i>Quantifying emissions of the greenhouse gas methane from New York State from observational constraints</i>	Sustainability Seminar Series University of Rochester Rochester, NY, Mar 27, 2024
<i>A methodological inter-comparison of monitoring methane emissions from landfills in Upstate New York</i>	Methane Landfill Convening Harvard Law School Cambridge, MA, Jan 18, 2024
<i>Air Pollution and Climate Change: Big Problems with Big Data</i>	Goergen Inst. for Data Sci. Research Sem. Ser. University of Rochester Rochester, NY, Oct 20, 2023
<i>Quantifying urban methane fluxes in New York State</i>	Urban Methane Workshop Environmental Defense Fund HQ Washington, DC, Jun 15, 2022
<i>The intersection of COVID-19 with air pollution, weather, and climate: what have we learned?</i>	Sustainability Seminar Series University of Rochester Rochester, NY, Feb 23, 2022
<i>The coupling of lightning, air quality, and climate</i>	Ocean & Climate Physics Seminar Series Columbia University Palisades, NY, Apr 22, 2022
<i>Inverse observational constraints on methane emissions in New York State and surroundings</i>	Northeast Corridor GHG Project Team Meeting National Institute of Standards and Technology Online, Dec 6, 2021

Factors controlling variability in the oxidative capacity of the atmosphere

Chemistry Seminar Series
Colby College
Waterville, ME, Oct 29, 2021

Factors driving variability in atmospheric composition within and between global atmospheric models

Earth System Science Seminar
NASA Global Modeling and Assimilation Office
Online, Oct 12, 2021

Factors controlling variability in the oxidative capacity of the atmosphere

Climate and Space Seminar Series
University of Michigan
Ann Arbor, MI, Oct 7, 2021

Inverse observational constraints on methane emissions and abundances in the troposphere

Physics Colloquium
Rochester Institute of Technology
Henrietta, NY, Sept 20, 2021

The coupling of air quality and climate change

Environmental Health Sciences Center Seminar
University of Rochester Medical Center
Rochester, NY, Sept 16, 2021

The coupling of lightning, air quality and climate

Chemistry Seminar Series
Western Connecticut State University
Online, Mar 19, 2021

Inverse observational constraints on methane emissions and abundances in the troposphere

Ocean & Climate Physics Seminar Series
Columbia University
Online, Feb 12, 2021

Long-Term Monitoring of Methane within New York State Phase I Findings and Plans for Phase II: Assessing Trends and Characterizing Hot Spots

NYS Energy Research & Development Authority
Methane Symposium
Online, Jan 13, 2021

The coupling of lightning, air quality, and climate

[Frontiers in Atmospheric Chem. Seminar Series](#)
MIT, CSU, Michigan, Toronto, Reed, UC Davis
Online, Sept 25, 2020

Quantifying the flux of methane from New York State

Bureau of Air Quality Analysis & Research
NYS Dept. of Environmental Conservation
Albany, NY, Nov 25, 2019

What drives variability in the oxidative capacity of the atmosphere?

Wolman Seminar Series, Env. Health & Eng.,
Johns Hopkins University
Baltimore, MD, Sept 10, 2019

The coupling of reactive chemistry in the atmosphere with global climate

Dept. of Atmospheric and Oceanic Sci. Seminar
Peking University
Beijing, China, Aug 16, 2019

The coupling of reactive chemistry in the atmosphere with global climate

Earth System Science Seminar
Chinese University of Hong Kong
Hong Kong, China, Aug 12, 2019

The coupling of lightning, air quality, and climate

Atmospheric Sciences Colloquium
University of Washington
Seattle, WA, May 30, 2019

Quantifying the flux of atmospheric methane emissions from New York State and its surroundings

Department of Chemistry Seminar Series
SUNY College of Environmental Sci. & Forestry
Syracuse, NY, Apr 18, 2019

Methods and challenges in constraining methane emissions from New York State

NYSERDA Energy-Related Air Quality and
Health Effects Research Workshop
Albany, NY, Apr 10, 2019

Quantifying the flux of atmospheric methane emissions from New York State and its surroundings

Digital Imaging and Remote Sensing Lab
Rochester Institute of Technology
Henrietta, NY, Oct 31, 2018

The coupling of reactive chemistry in the atmosphere with global climate

Atmospheric Sciences Seminar Series
SUNY Albany
Albany, NY, Oct 29, 2018

University of Rochester modeling efforts to the ATom project

ACOM Seminar
National Center for Atmospheric Research
Boulder, CO, Aug 1, 2018

Lightning, methane and climate change

CIRC Symposium
University of Rochester
Rochester, NY, Mar 16, 2018

The coupling of reactive chemistry in the atmosphere with global climate

Chemistry Colloquium
University of Rochester
Rochester, NY, Mar 7, 2018

The coupling of lightning, climate and air quality across multiple time horizons

Air Quality Division
Environment & Climate Change Canada
Toronto, ON, Feb 13, 2018

Source attribution and monitoring of methane in New York State

Climate Research Division
Environment & Climate Change Canada
Toronto, ON, Feb 13, 2018

The coupling of lightning, climate and air quality across multiple time horizons

Atmospheric Physics Seminar Series
Department of Physics, University of Toronto
Toronto, ON, Feb 12, 2018

The two-way coupling of lightning and climate

Physics and Astronomy Colloquium
University of Rochester
Rochester, NY, Feb 8, 2018

Characterizing key processes controlling variability in the oxidative capacity of the atmosphere

ARVE Group Seminar
Université de Lausanne
Lausanne, Switzerland, Jun 19, 2017

Air Quality in a Changing World

Sustainability Seminar Series
University of Rochester
Rochester, NY, Mar 20, 2017

Quantifying the impact of shale-gas production on air quality and climate change

NY Dept. of Environmental Conservation,
Albany, NY, Feb 27, 2017

Characterizing key processes controlling variability in the oxidative capacity of the atmosphere

Atmospheres, Oceans, & Climate Dyn. Series
Yale University
New Haven, CT, Mar 3, 2016

A peek under the hood of global atmospheric chemistry and climate models: insights into air quality, biogeochemical cycling, and climate change

EES Graduate Student Seminar
University of Rochester
Rochester, NY, Apr 28, 2015

Climate and anthropogenic driven changes in the oxidative capacity of the atmosphere since the Last Glacial Maximum

EES Frontiers of Science Seminar
University of Rochester
Rochester, NY, Apr 27, 2015

Characterizing key processes controlling variability in the oxidative capacity of the atmosphere

Atmospheric Sciences Seminar
Massachusetts Institute of Technology
Cambridge, MA, Mar 2, 2015

Characterizing key processes controlling variability in the oxidative capacity of the atmosphere

AOSC Brown Bag Talk Series
University of Maryland
College Park, MD, Feb 6, 2015

Lightning-driven variability in atmospheric composition and climate

Atmospheric Chemistry and Dynamics Seminar
NASA Goddard Space Flight Center
Greenbelt, MD, Feb 5, 2015

Characterizing key processes controlling variability in the oxidative capacity of the atmosphere

Lunchtime Seminar Series
NOAA Geophysical Fluid Dynamics Laboratory
Princeton, NJ, Oct 29, 2014

Variability in the oxidative capacity of the troposphere on interannual to interglacial time scales

Department of Chemistry Seminar Series
University of York
York, UK, May 23, 2014

Variability in the oxidative capacity of the troposphere on interannual to interglacial time scales

LDEO Postdoc Symposium
Columbia University
Palisades, NY, Sept 18, 2013

Variability in the oxidative capacity of the troposphere on interannual to interglacial time scales

Ocean & Climate Physics Seminar Series
Columbia University
Palisades, NY, Sept 28, 2012

Variability in the oxidative capacity of the troposphere on interannual to interglacial time scales

Brownbag Seminar Series
NASA Goddard Institute for Space Studies
New York, NY, Sept 27, 2012

The role of lightning on the variability of tropospheric composition: lessons from satellite constraints

EPS Graduate Student and Postdoc Seminar
Harvard University
Cambridge, MA, Dec 2, 2010

Radically Different: How the oxidative capacity of the troposphere has changed since the Last Glacial Maximum

EPS Graduate Student and Postdoc Seminar
Harvard University
Cambridge, MA, Mar 25, 2010

Outreach and General Education Talks

Title	Event
<i>Air Quality in a Changing Climate: A Local to Global Issue</i>	Environmental Health and Sci. Summer Inst. UR Warner School of Education Jul 16, 2025
<i>How does radon enter our homes and what are its risks?</i>	Community Conversation on Radon UR Wilmot Cancer Institute May 16, 2024
<i>Air Quality in a Changing Climate: A Local to Global Issue</i>	Regional Science Leadership Cadre UR Warner School/Monroe County BOCES Nov 8, 2023
<i>Certainty and Uncertainty in Climate Change</i>	In These Times/Climates of Opinion University of Rochester Humanities Center Online, Mar 17, 2021
<i>Climate Change: The Physical Science Basis</i>	University of Rochester Climate Summit Online, Feb 19, 2021

<i>Climate Science 101</i>	Plug In & Power Up! Rochester Museum & Science Center Rochester, NY, Nov 16, 2019
<i>Climate Change and Air Quality</i>	Invited Speaker, Annual Conference of the Science Teachers Association of NYS Rochester, NY, Nov 4, 2018
<i>Decoding the Weather Machine</i>	Discussion Leader Monroe County Central Library Rochester, NY, Sept 8, 2018
<i>Why should we care about climate change?</i>	Earth Hour Presentation Physics and Astronomy Club University of Rochester Rochester, NY, Mar 24, 2018
<i>Climate Change: Prediction and Uncertainties</i>	Finger Lakes NYS Master Teachers Professional Training Class SUNY Geneseo, Geneseo, NY, Nov 18, 2017
<i>Climate Change: The Physical Science Basis</i>	Finger Lakes NYS Master Teachers Professional Training Class SUNY Geneseo, Geneseo, NY, Nov 18, 2017
<i>Air Quality and Climate Change</i>	Roundtable Speaker, Climate Change Hackathon, Hobart and William Smith Colleges Geneva, NY, Sept 30, 2017
<i>Climate Change: Uncertainties and Predictions</i>	Rochester Jewish Community Center Rochester, NY, Sept 29, 2017
<i>Climate Modeling and Uncertainty</i>	Science Teach In University of Rochester Rochester, NY, Mar 3, 2017

In the Media

[“La pollution par les particules fines pourrait diminuer malgré les menaces du changement climatique sur la santé et l’agriculture,”](#) *Mongabay*, Oct 29, 2024

[“New Study to Help Understanding of the Contribution of Methane as a Greenhouse Gas,”](#) *NOAA GFDL Press Release*, Aug 15, 2024

[“They left California to escape wildfires. Then New York turned orange.”](#) *Washington Post*, Jun 9, 2023

[“Retrieving a ‘Weather Balloon’ From the Last Ice Age,”](#) *AGU Advances Viewpoint*, Aug 17, 2022

[“In the West, Lightning Grows as a Cause of Damaging Fires,”](#) *New York Times*, Oct 23, 2020

[“Rochester may double in population in next 50 years as climate warms,”](#) *WROC*, Oct 11, 2020

[“Earth Day: Coronavirus clears the air in Rochester and beyond,”](#) *Rochester City Newspaper*, Apr 22, 2020

[“Ozone mystery laid to rest,”](#) *Nature News and Views*, Jun 12, 2019

[“Satellite Tracks Ozone Pollution by Monitoring its Key Ingredients,”](#) *NASA SciTechDaily*, Nov 7, 2019

[“Earth’s atmosphere more chemically reactive in cold climates,”](#) *phys.org*, May 17, 2017

[“Extreme weather and climate change in Rochester,”](#) *WROC*, Apr 24, 2017

[“This US Oil Field is Single-Handedly Raising Global Greenhouse Gas Levels,”](#) *Gizmodo*, Apr 29, 2016

[“Fracking in the US causing global surge in dangerous gas, study finds,”](#) *The Independent*, Apr 29, 2016

[“The U.S. oil and gas boom is having global atmospheric consequences, scientists suggest,”](#) *Washington Post*, Apr 28, 2016

Public Service

Climate Solutions Accelerator of the Genesee-Finger Lakes Region

Climate Collective Impact Steering Committee, Member, 2021-present

Science Advisory Board, Member, 2019-present

Research Grants

2023–2028	“FETCH ₄ : Fate, Emissions, and Transport of CH ₄ in past and modern atmospheres,” Schmidt Futures Virtual Earth System Research Institute, \$10,000,000 [Co-PIs A.J. Turner (UW), L.T. Murray, and V.V. Petrenko]
2023–2026	“Constraining the local-to-global methane budget by simulating stable methane isotopologues within the NOAA GFDL AM4.1 model and comparing to new regional and existing global observational constraints,” NOAA AC4 and NYSERDA, \$620,044 [PI L.T. Murray; Co-PIs V.V. Petrenko, V. Naik (GFDL), and L. W. Horowitz (GFDL)]
2023–2025	“Assimilating global satellite and ground-based lightning flash rates within the Goddard Earth Observing System Data Assimilation System (GEOS-DAS),” NASA Global Modeling and Assimilation Office, \$212,000 [PI L.T. Murray]
2023–2024	“A Geologically Based Indoor-Radon Potential Map of New York State,” University of Rochester Environmental Health Science Center Pilot Funding, \$14,020 [PI L.T. Murray; Co-PIs C. Kamen, K. S. Korfmacher (URMC)]
2022–2026	“Long-Term Monitoring of Methane within New York State Phase III: Harmonizing <i>in situ</i> and satellite observations to constrain the methane source,” NYSERDA PON 4895, \$499,818 [PI L.T. Murray; Co-PI E.M. Leibensperger (Ithaca College)]
2022–2025	“Collaborative proposal: Glacial-interglacial variability in tropospheric reactive halogens,” NSF P2C2, \$254,882 to University of Rochester [PI B. Alexander (UW); Co-PI L.T. Murray]
2019-2024	“Long-Term Monitoring of Methane within New York State Phase II: Assessing Trends in Sources and Characterizing Hot Spots,” NYSERDA PON 3921, \$669,860 [PI L.T. Murray; Co-PIs E.M. Leibensperger (SUNY Plattsburgh) and R. Commane (LDEO/Columbia)]
2021-2023	“Mobile Laboratory Measurements of Methane, Ethane, and Co-pollutants from Landfills, Oil and Gas Systems and Other Sources in New York State,” NYSERDA PON 4230, \$59,258 to University of Rochester [PI J.A. Schwab (SUNY Albany); Co-PI L.T. Murray]
2020-2023	“Collaborative Research: P2C2–Interrogating the Free Troposphere during the Last Deglaciation,” NSF P2C2 2002414, \$91,636 to University of Rochester [PI L. Yeung (Rice); Co-PI L.T. Murray]
2019-2022	“Assessing the ability of measurements of Carbon-14 of atmospheric carbon monoxide in a global network to improve understanding of spatial and temporal hydroxyl radical variability,” NSF Atmospheric Chemistry, \$824,193 [PI V.V. Petrenko; Co-PI L.T. Murray]
2018-2022	“Collaborative Research: Reconstructing Carbon-14 of Atmospheric Carbon Monoxide from Law Dome, Antarctica to Constrain Long-Term Hydroxyl Radical Variability,” NSF Antarctic Glaciology 1643669, \$507,804 [PI V.V. Petrenko; Co-PI L.T. Murray]
2017-2022	“Collaborative Research: Drivers for Past Variability in Tropospheric Reactive Halogens: Implications for Climate and Evaluation of Ice Core Proxies,” NSF P2C2 1702106, \$201,549 to University of Rochester [PI B. Alexander (UW); Co-PI L.T. Murray]

2017-2022	“Isotopic constraints in the NASA GISS global chemistry-climate model to evaluate the oceanic and freshwater contributions to the atmospheric methane budget,” NASA NNH16ZDA001N-IDS, \$296,139 [PI L.T. Murray; Co-PI T. Weber]
2018-2021	“GEOS-Chem and ModelE code development and simulations for the ATom project,” NASA 80NSSC18M0074, \$151,879 [PI L.T. Murray]
2018-2020	“Moist convection, lightning, and climate sensitivity: Use of airborne and satellite observations to constrain a new convective microphysics scheme in ModelE,” NASA NNH16ZDA001N-MAP, \$80,790 to University of Rochester [PI A. Ackerman (NASA GISS); Institutional PI L.T. Murray]
2016-2019	“Long-Term Monitoring of Methane within New York State: Assessing the Impact of Shifting Energy Portfolios on Regional Air Quality and Climate,” NYSERDA PON 3208, Agreement #100413, \$362,948 [PI L.T. Murray; Co-PI E.M. Leibensperger (SUNY Plattsburgh)]

Thesis Committees

U Rochester

Mingjian Shi, Geosciences, Ph.D., Primary Advisor

Xin Tie, Geosciences, Ph.D., Primary Advisor

Matthew Loman, Geosciences, Ph.D., Primary Advisor

Alexander Ihle, Geosciences, Ph.D., Internal Committee Member

Shengyu Wang, Geosciences, Ph.D., Internal Committee Member

Hanna Falber, Environmental Studies, B.A., 2024, Senior Thesis Reader

Joshua Bridges, Geosciences, Ph.D., 2023, Internal Committee Member

En Yuan Li, Environmental Sciences, B.S., 2021, Senior Thesis Advisor

Andrew VanderWeide, Chemistry, Ph.D., 2021, Chair

Alexander Debrecht, Physics & Astronomy, Ph.D., 2021, Internal Committee Member

Philip Place, Geosciences, Ph.D., 2021, Internal Committee Member

Robert Fine, Physics, Ph.D., 2020, Chair

Aura Cuervo Gomez, Geological Sciences, M.S., 2019, Internal Committee Member

Benjamin Hmiel, Geosciences, Ph.D., 2019, Internal Committee Member

Nicola Wiseman, Environmental Sciences, B.S., 2018, Senior Thesis Reader

Timothy O'Brien, Geosciences, 2017, Oral Defense Committee Member

External

Alexandra Catena, Atmospheric Sciences, Ph.D., SUNY Albany, External Thesis Reader

University Service

Departmental

Faculty Search Committee in Remote Sensing, Co-Chair, 2024–2025
 Diversity, Equity and Inclusion Committee, Co-Chair, 2021–
 Faculty Search Committee in Climate Science, Member, 2018–2019
 Faculty Search Committee in Surface Processes, Member, 2018–2019
 Faculty Search Committee in Geosciences, Member, 2016–2017
 Graduate Admissions Committee, Member, 2016–
 Environmental Science Curriculum Committee, Member, 2016–; Co-Chair, 2020–

University

UR Center for Integrated Research Computing, Executive Committee Member, 2024–
 Research Data Storage Committee, Faculty Member, 2024–
 GIDS-AI Seed Funding, Reviewer, 2024
 GIDS-AI AI for Physical Sciences Data Science Research Focus Area, Co-Chair, 2023–
 IT Governance Committee, Faculty Member, 2023–
 URM Environmental Health Sciences Center, Faculty Member, 2021–
 Diversity, Equity and Inclusion Committee, EES Representative, 2021–
 Sustainability Steering Committee, Member, 2021–
 AS&E Research Advisory Committee (*presently inactive*), Member, 2018–
 Faculty Council, EES Representative, 2021–2023
 University Pump Primer Awards, Reviewer, 2022, 2024
 Provost Fellowship, Natural Sciences, Reviewer, 2017, 2022
 University Research Awards, Reviewer, 2021
 Faculty Senate Sustainable Transportation Committee, Member, 2017–2018
 Goergen Institute for Data Sciences and AI (GIDS-AI), Affiliated Faculty, 2016–