Luke D. Schiferl, Ph.D.

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Research Appointments

Research Associate — July 2021-present
John A. Paulson School of Engineering and Applied Sciences, Harvard University, Cambridge, MA

Adjunct Associate Research Scientist — July 2021-present
Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY

Postdoctoral Research Scientist — July 2018-June 2019, January 2020-June 2021
Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY
Advisor: Róisín Commane

Postdoctoral Research Fellow — January-June 2018, July-December 2019
John A. Paulson School of Engineering and Applied Sciences, Harvard University, Cambridge, MA
Advisor: Steven C. Wofsy

Graduate Research Assistant — September 2010-December 2017
Department of Civil and Environmental Engineering, Massachusetts Institute of Technology, Cambridge, MA
Department of Atmospheric Science, Colorado State University, Fort Collins, CO
Advisor: Colette L. Heald

Summer Intern, Undergraduate Student Research Program — June-August 2009
Short-term Prediction Research and Transition (SPoRT) Center, NASA Marshall Space Flight Center, Huntsville, AL
Advisor: Gary J. Jedlovec

Education

Ph.D., Massachusetts Institute of Technology, Cambridge, MA — February 2018
Environmental Chemistry

M.S., Colorado State University, Fort Collins, CO — December 2012
Atmospheric Science

B.S., University of Wisconsin-Madison, Madison, WI — May 2010
Atmospheric and Oceanic Sciences, Environmental Studies Certificate

Peer-reviewed Publications

22. Ying, Q., B. Poulter, J. D. Watts, K. A. Arndt, A.-M. Virkkala, L. Bruhwiler, Y. Oh, B. M. Rogers, S. M. Natali, H. Sullivan, **L. D. Schiferl**, C. Elder, O. Peltola, A. Bartsch, A. Armstrong, A. R. Desai, E. Euskirchen, M. Göckede, B. Lehner, M. B. Nilsson, M. Peichl, O. Sonnentag, E.-S. Tuittila, T. Sachs, A. Kalhori, M. Ueyama, and Z. Zhang (in review), WetCH4: A machine learning-based upscaling of methane fluxes of northern wetlands during 2016–2022, *Earth Syst. Sci. Data Discuss.*, doi:10.5194/essd-2024-84.
21. **Schiferl, L. D.**, C. Cao, B. Dalton, A. Hallward-Driemeier, R. Toledo-Crow, and R. Commane (in review), Multi-year observations of variable incomplete combustion in the New York megacity, *Atmos. Chem. Phys.*, doi:10.5194/egusphere-2024-83.
20. Ludwig, S. M., **L. Schiferl**, J. Hung, S. M. Natali, and R. Commane (2024), Resolving heterogeneous fluxes from tundra halves the growing season carbon budget, *Biogeosciences*, 21, 1301-1321, doi:10.5194/bg-21-1301-2024.

19. Arndt, K. A., J. Hashemi, S. M. Natali, **L. D. Schiferl**, and A.-M. Virkkala (2023), Recent advances and challenges in monitoring and modeling non-growing season carbon dioxide fluxes from the Arctic boreal zone, *Curr. Clim. Change Rep.*, 9, 27-40, doi:10.1007/s40641-023-00190-4.
18. Cao, C., D. R. Gentner, R. Commane, R. Toledo-Crow, **L. D. Schiferl**, and J. E. Mak (2023), Policy-related gains in urban air quality may be offset by increased emissions in a warming climate, *Environ. Sci. Technol.*, 57, 9683-9692, doi:10.1021/acs.est.2c05904.
17. Ludwig, S. M., S. M. Natali, J. D. Schade, M. Powell, G. Fiske, **L. D. Schiferl**, and R. Commane (2023), Scaling waterbody carbon dioxide and methane fluxes in the arctic using an integrated terrestrial-aquatic approach, *Environ. Res. Lett.*, 18, 064019, doi:10.1088/1748-9326/acd467.
16. Watts, J. D., M. Farina, J. S. Kimball, **L. D. Schiferl**, Z. Liu, K. A. Arndt, D. Zona, A. Ballantyne, E. S. Euskirchen, F.-J. W. Parmentier, M. Helbig, O. Sonnentag, T. Tagesson, J. Rinne, H. Ikawa, M. Ueyama, H. Kobayashi, T. Sachs, D. F. Nadeau, J. Kochendorfer, M. Jackowicz-Korczynski, A. Virkkala, M. Aurela, R. Commane, B. Byrne, L. Birch, M. S. Johnson, N. Madani, B. Rogers, J. Du, A. Endsley, K. Savage, B. Poulter, Z. Zhang, L. M. Bruhwiler, C. E. Miller, S. Goetz, and W. C. Oechel (2023), Carbon uptake in Eurasian boreal forests dominates the high-latitude net ecosystem carbon budget, *Global Change Biol.*, 29, 1870-1889, doi:10.1111/gcb.16553.
15. **Schiferl, L. D.**, J. D. Watts, E. J. L. Larson, K. A. Arndt, S. C. Biraud, E. S. Euskirchen, J. P. Goodrich, J. M. Henderson, A. Kalhori, K. McKain, M. E. Mountain, J. W. Munger, W. C. Oechel, C. Sweeney, Y. Yi, D. Zona, and R. Commane (2022), Using atmospheric observations to quantify annual biogenic carbon dioxide fluxes on the Alaska North Slope, *Biogeosciences*, 19, 5953-5972, doi:10.5194/bg-19-5953-2022.
14. Wei, D., A. Reinmann, **L. D. Schiferl**, and R. Commane (2022), High resolution modeling of vegetation reveals large summertime biogenic CO_2 fluxes in New York City, *Environ. Res. Lett.*, 17, 124031, doi:10.1088/1748-9326/aca68f.
13. Tao, M., A. M. Fiore, X. Jin, **L. D. Schiferl**, R. Commane, L. M. Judd, S. Janz, J. T. Sullivan, P. J. Miller, A. Karambelas, S. Davis, M. Tzortziou, L. Valin, A. Whitehall, K. Civerolo, and Y. Tian (2022), Investigating changes in ozone formation chemistry during summertime pollution events over the northeastern United States, *Environ. Sci. Technol.*, 56, 15312-15327, doi:10.1021/acs.est.2c02972.
12. Sweeney, C., A. Chatterjee, S. Wolter, K. McKain, R. Bogue, S. Conley, T. Newberger, L. Hu, L. Ott, B. Poulter, **L. Schiferl**, B. Weir, Z. Zhang, and C. E. Miller (2022), Using atmospheric trace gas vertical profiles to evaluate model fluxes: a case study of Arctic-CAP observations and GEOS simulations for the ABoVE domain, *Atmos. Chem. Phys.*, 22, 6347-6364, doi:10.5194/acp-22-6347-2022.
11. Commane, R. and **L. D. Schiferl** (2022), Climate mitigation policies for cities must consider air quality impacts, *Chem*, 8, 910-923, doi:10.1016/j.chempr.2022.02.006.
10. Tzortziou, M., C. F. Kwong, D. Goldberg, **L. Schiferl**, R. Commane, N. Abuhassan, J. J. Szykman, and L. C. Valin (2022), Declines and peaks in NO_2 pollution during the multiple waves of the COVID-19 pandemic in the New York metropolitan area, *Atmos. Chem. Phys.*, 22, 2399-2417, doi:10.5194/acp-22-2399-2022.
9. Larson, E. J. L., **L. D. Schiferl**, R. Commane, J. W. Munger, A. T. Trugman, T. Ise, E. S. Euskirchen, S. Wofsy, and P. M. Moorcroft (2022), The changing carbon balance of tundra ecosystems: results from a vertically-resolved peatland biosphere model, *Environ. Res. Lett.*, 17, 014019, doi:10.1088/1748-9326/ac4070.
8. Watts, J. D., S. M. Natali, C. Minions, D. Risk, K. Arndt, D. Zona, E. S. Euskirchen, A. V. Rocha, O. Sonnentag, M. Helbig, A. Kalhori, W. Oechel, H. Ikawa, M. Ueyama, R. Suzuki, H. Kobayashi, G. Celis, E. A. G. Schuur, E. Humphreys, Y. Kim, B.-Y. Lee, S. Goetz, N. Madani, **L. D. Schiferl**, R. Commane, J. S. Kimball, Z. Liu, M. S. Torn, S. Potter, J. A. Wang, T. M. Jorgenson, J. Xiao, X. Li, and C. Edgar (2021), Soil respiration strongly offsets carbon uptake in Alaska and Northwest Canada, *Environ. Res. Lett.*, 16, 084051, doi:10.1088/1748-9326/ac1222.

7. Gonzalez, Y., R. Commane, E. Manninen, B. C. Daube, **L. D. Schiferl**, J. B. McManus, K. McKain, E. J. Hintsa, J. W. Elkins, S. A. Montzka, C. Sweeney, F. Moore, J. L. Jimenez, P. C. Jost, T. B. Ryerson, I. Bourgeois, J. Peischl, C. R. Thompson, E. Ray, P. O. Wennberg, J. Crounse, M. Kim, H. M. Allen, P. A. Newman, B. B. Stephens, E. C. Apel, R. S. Hornbrook, B. A. Nault, E. Morgan, and S. C. Wofsy (2021), Impact of stratospheric air and surface emissions on tropospheric nitrous oxide during ATom, *Atmos. Chem. Phys.*, 21, 11113-11132, doi:10.5194/acp-21-11113-2021.
6. von Schneidemesser E., C. Driscoll, H. E. Rieder, and **L. D. Schiferl** (2020), How will air quality effects on human health, crops and ecosystems change in the future?, *Phil. Trans. R. Soc. A*, 378, 20190330, doi:10.1098/rsta.2019.0330.
5. **Schiferl, L. D.**, C. L. Heald, and D. Kelly (2018), Resource and physiological constraints on global crop production enhancement from particulate matter and nitrogen deposition, *Biogeosciences*, 15, 4301-4315, doi:10.5194/bg-15-4301-2018.
4. **Schiferl, L. D.** and C. L. Heald (2018), Particulate matter air pollution may offset ozone damage to global crop production, *Atmos. Chem. Phys.*, 18, 5953-5966, doi:10.5194/acp-18-5953-2018.
3. Marais, E. A., D. J. Jacob, S. Choi, J. Joiner, M. Belmonte-Rivas, R. C. Cohen, S. Beirle, L. T. Murray, **L. D. Schiferl**, V. Shah, and L. Jaeglé (2018), Nitrogen oxides in the global upper troposphere: interpreting cloud-sliced NO_2 observations from the OMI satellite instrument, *Atmos. Chem. Phys.*, 18, 17017-17027, doi:10.5194/acp-18-17017-2018.
2. **Schiferl, L. D.**, C. L. Heald, M. Van Damme, L. Clarisse, C. Clerbaux, P.-F. Coheur, J. B. Nowak, J. A. Neuman, S. C. Herndon, J. R. Roscioli, and S. J. Eilerman (2016), Interannual variability of ammonia concentrations over the United States: sources and implications, *Atmos. Chem. Phys.*, 16, 12305-12328, doi:10.5194/acp-16-12305-2016.
1. **Schiferl, L. D.**, C. L. Heald, J. B. Nowak, J. S. Holloway, J. A. Neuman, R. Bahreini, I. B. Pollack, T. B. Ryerson, C. Wiedinmyer, and J. G. Murphy (2014), An investigation of ammonia and inorganic particulate matter in California during the CalNex campaign, *J. Geophys. Res. Atmos.*, 119, 1883-1902, doi:10.1002/2013JD020765.

Published Datasets

2. **Schiferl, L.**, R. Commane, C. Cao, A. Hallward-Driemeier, and R. Toledo-Crow (2024), ASRC Rooftop CO observations, NYCMA observed and simulated ΔCO, and relative NYC surface influence, *Dryad*, doi:10.5061/dryad.612jm649n.
1. **Schiferl, L.** and R. Commane (2022), ABoVE: TVPRM Simulated Net Ecosystem Exchange, Alaskan North Slope, 2008-2017, *ORNL DAAC*, doi:10.3334/ORNLDAAC/1920.

Sponsored Research Awards

4. NASA - 80NSSC22K1245 9/1/2022 - 8/31/2025 Contributions of tundra and boreal systems to radiative forcing in North America and Russia under contemporary and future conditions (PI Watts, J., Co-I Rogers, B., Co-I Jafarov, E., Co-I Genet, H., Co-I Commane, R., **Co-I Schiferl, L.**)
3. NOAA - NA21OAR4310235 9/1/2021 - 8/31/2024 Understanding methane changes in cities affected by COVID-19 shutdowns (PI Commane, R., PI Hutyra, L., PI Wofsy, S., **Co-I Schiferl, L.**, Co-I Sargent, M.)
2. NOAA - NA20OAR4310306 6/1/2020 - 8/31/2024 Quantifying the impact of biogenic and anthropogenic fluxes on the atmospheric composition of the New York City Metro Area (PI Commane, R., PI Mak, J., PI Reinmann, A., Co-I Fiore, A., **Co-I Schiferl, L.**)
1. NASA - NNX15AG58A 4/1/2018 - 3/31/2021 LDEO Atmospheric Tomography Experiment (AToM) - Global budget of carbonyl sulfide (PI Commane, R., **Co-I Schiferl, L.**)

Research Community Contributions

Journal Referee

Atmos. Chem. Phys., Biogeosciences, Environ. Health Insights, Environ. Sci. Technol., Geophys. Res. Lett., Geosci. Model Dev., Global Change Biol., J. Geophys. Res. Atmos., Phil. Trans. R. Soc. A, PNAS.

Panel Reviewer
NASA Earth Science Division (2023)
Mail-in Specialist Reviewer
NOAA AC4 (Atmospheric Chemistry, Carbon, and Climate) Program (2020)
Student Presentation/Poster Judge
Annual AMS Meeting (2020), AGU Fall Meeting (2018-2020, 2022)

Science Team Memberships

NASA ABoVE Science Team, Methane Synthesis Activity (2018-present)

Meeting Organizing Committees and Leadership

Session Convener and Co-chair
"Air Quality Impacts from Energy Production and Generation", Annual AMS Meeting, 2020
Session Moderator
"Carbon Dynamics" parallel session, 7th NASA ABoVE Science Team Meeting, May 2021

Advising and Teaching Experience

Advisor/Mentor
Yuwei Zhao, Columbia University, graduate student, 2022-present
Devin Guevara, Harvard College, summer research student, 2022
Danny Rodriguez, Columbia College, senior thesis student, 2022
Shannon Reault, Clark University, NASA Goddard Space Flight Center graduate intern, 2020-2021
Ethan Manninen, Harvard College, senior thesis student, 2020-2021
Savannah Ferretti, Cornell University, LDEO summer REU student, 2020
Bronte Dalton, Columbia College, senior thesis student, 2019-2020
Margaret Powell, Harvard College, senior thesis student, 2018-2019
Guest Instructor
EESC UN3031: Chemistry of Climate, Columbia University, September 2023
EESC GU4924: Introduction to Atmospheric Chemistry, Columbia University, March 2023
EESC GR6935: Instrumentation in Atmosphere, Ocean, & Climate Science, Columbia University, October 2021
EESC GR9910: Seminars in Atmospheric Science, Columbia University, April 2019
Graduate Teaching Assistant
1.085: Air Pollution, MIT, September-December 2015

Invited Oral Presentations

Lamont-Doherty Earth Observatory, Geochemistry Seminar, February 2022, Palisades, NY.
"Using atmospheric observations to understand urban and remote carbon cycling"
Woodwell Climate Research Center, October 2021, Virtual Seminar.
"Using atmospheric observations to understand urban and remote carbon cycling"
Johns Hopkins University, November 2020, Virtual Seminar.
"Source or sink: Uncertainty in CO_2 fluxes from Alaskan North Slope tundra ecosystems"
Arctic-Boreal Carbon Flux Upscaling Virtual Workshop, October 2020.
"Evaluation of modeled CH_4 fluxes using atmospheric CH_4 concentration comparisons"
Woods Hole Research Center, November 2019, Falmouth, MA.
"Quantifying regional-scale CO_2 fluxes in the Alaskan North Slope"

Selected Oral Presentations

104th AMS Annual Meeting, January 2024, Baltimore, MD.
"A case-study synthesis of observed and simulated Arctic tundra and boreal biogenic methane fluxes in Alaska and northwest Canada"
2023 AGU Fall Meeting, December 2023, San Francisco, CA.
"Atmospheric concentration measurements improve Arctic-boreal carbon dioxide (CO_2) and methane (CH_4) flux model development"
2020 AGU Virtual Fall Meeting, December 2020.
"Synthesis of Arctic-Boreal region biogenic methane fluxes, model-data mismatch and knowledge gaps"
"Quantifying and attributing methane (CH_4) and carbon monoxide (CO) emission changes in New York City during the COVID-19 shutdown"

Other Conference Presentations

20th GEIA Conference, June 2023, Brussels, Belgium. Poster.; 2022 AGU Fall Meeting, December 2022, Chicago, IL. Poster.; 16th IGAC Science Conference on Atmospheric Chemistry, September 2021. Virtual Poster.; 100th AMS Annual Meeting, January 2020, Boston, MA. Poster.; 2019 AGU Fall Meeting, December 2019, San Francisco, CA. Oral Presentation.; 2018 AGU Fall Meeting, December 2018, Washington, DC. Oral Presentation.; 2017 AAAS Annual Meeting, February 2017, Boston, MA. Poster.; 2016 AGU Fall Meeting, December 2016, San Francisco, CA. Poster.; 14th IGAC Science Conference on Atmospheric Chemistry, September 2016, Breckenridge, CO. Poster.; 2015 AGU Fall Meeting, December 2015, San Francisco, CA. Oral Presentation.; 13th IGAC Science Conference on Atmospheric Chemistry, September 2014, Natal, Brazil. Poster.; 2013 AGU Fall Meeting, December 2013, San Francisco, CA. Poster.; 2012 AGU Fall Meeting, December 2012, San Francisco, CA. Oral Presentation.; 90th AMS Annual Meeting, January 2010, Atlanta, GA. Poster.; 89th AMS Annual Meeting, January 2009, Phoenix, AZ. Poster.

Meetings, Workshops, and Symposia

9th NASA ABoVE Science Team Meeting, January 2023, San Diego, CA., Poster.; 8th NASA ABoVE Science Team Meeting, May 2022, Fairbanks, AK. Oral Presentation and Poster.; 7th NASA ABoVE Science Team Meeting, May 2021, Virtual Oral Presentation.; 7th NACP Open Science Meeting, March 2021, Virtual Poster.; Permafrost Carbon Network Meeting, November 2020, Virtual Meeting.; 6th NASA ABoVE Science Team Meeting, June 2020, Virtual Poster.; Permafrost Carbon Network Meeting, December 2019, San Francisco, CA.; Lamont-Doherty Earth Observatory PostDoc Symposium, September 2019, Palisades, NY. Poster.; Permafrost Carbon Network Meeting, December 2018, Washington, DC.; Air Quality Extremes Workshop, November 2018, New York, NY.; Community Earth System Model Tutorial, August 2018, Boulder, CO.; 4th NASA ABoVE Science Team Meeting, January 2018, Seattle, WA. Poster.; 8th International GEOS-Chem Meeting, May 2017, Cambridge, MA. Oral Presentation.; 5th Annual UMass Boston Environmental Research Colloquium, April 2017, Boston, MA. Oral Presentation.; MIT Water and Food Security Student Symposium, November 2016, Cambridge, MA. Invited Oral Presentation.; 7th International GEOS-Chem Meeting, May 2015, Cambridge, MA. Oral Presentation.; 4th New England Atmospheric Chemistry Symposium, November 2013, Cambridge, MA. Poster.; 6th International GEOS-Chem Meeting, May 2013, Cambridge, MA. Poster.; 5th International GEOS-Chem Meeting, May 2011, Cambridge, MA.

Honors

Highlight Paper in *Biogeosciences*	December 2022
Martin Family Society of Fellows for Sustainability, MIT	2014-2015
Research Spotlight in *Eos, Transactions, American Geophysical Union*, AGU	August 2014
Graduate with Distinction, College of Letters and Science, UW-Madison	May 2010
Phi Beta Kappa, Alpha of Wisconsin Chapter, UW-Madison	April 2010

Other Activities

CSU Student Chapter of the American Association for Aerosol Research September 2010-August 2012
Officer, including President (2009-2010) September 2008-May 2010
UW-Madison Student Chapter of the American Meteorological Society

Memberships: American Meteorological Society (AMS), American Geophysical Union (AGU), Wisconsin Alumni Association, Colorado State Alumni Association, MIT Alumni Association