SARA LANCE - Curriculum Vitae

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Atmospheric Sciences Research Center
State University of New York, University at Albany
1220 Washington Ave Room 315, SUNY-ETEC building
Albany, New York 12226
Office: (518) 437-8663

EDUCATION

PhD, Georgia Institute of Technology — Dec 2007
Atmospheric Science — Atlanta, GA
Graduate Advisor: Dr. Athanasios Nenes
Thesis: "Quantifying Compositional Impacts of Ambient Aerosol on Cloud Droplet Formation"

BSE, Arizona State University — May 2002
Chemical Engineering — Tempe, AZ

EMPLOYMENT

Atmospheric Science Research Center (ASRC) — Aug 2016 – Present
State University of New York, University at Albany (UAlbany) — Albany, NY
Research Faculty

Earth, Atmospheric and Planetary Sciences — 2015 – 2016
Massachusetts Institute of Technology (MIT) — Cambridge, MA
Research Scientist within the lab of Dr. Daniel J. Cziczo

Stratton Park Engineering Company (SPEC), Inc. — 2012 – 2015
Cloud Physics and Instrumentation — Boulder, CO
Research Scientist

Cooperative Institute for Research in Environmental Sciences (CIRES)/ — 2010 – 2012
National Oceanic and Atmospheric Administration (NOAA) — Boulder, CO
Research Scientist 1/II, Chemical Sciences Division, Earth System Research Lab

Research Associates Program, National Research Council/NOAA — 2008 – 2010
Postdoctoral Fellow within the lab of Dr. Charles A. Brock — Boulder, CO

Advanced Studies Program, National Center for Atmospheric Research (NCAR) — 2004 – 2007
Graduate Fellow within the lab of Dr. James N. Smith — Boulder, CO

RESEARCH INTERESTS

- Fundamental Aerosol-Cloud-Chemistry Interactions, including:
  - Cloud impacts on the chemical properties and mixing-state of aerosol particles
  - Chemical and physical properties of cloud condensation nuclei
- Instrument development and characterization
- Ambient Measurements

GRANTS AWARDED to PRINCIPAL INVESTIGATOR S. LANCE

National Aeronautics & Space Administration (NASA) Future Investigators in NASA Earth and Space Science and Technology (FINESST) Award: 20-EARTH20-0298, 9/2021 – 8/2024, "Emergence of a New Chemical Regime: Organic Carbon and Base Cations in Whiteface Mountain Cloud Water"

National Science Foundation (NSF) Award: ANS- 2000404, 9/2020 – 8/2024, "Collaborative Proposal: CHemistry in the Artic: Clouds, Halogens and Aerosols (CHACHA) Field Campaign"

NSF Award: AGS-2025215, 7/2020-6/2021, "Workshop on the proposed Network of Mountain Observatories for Composition of the Atmosphere"

NSF CAREER Award: AGS-1945563, 2/2020 – 2/2025, "Revitalizing aerosol-cloud-chemistry research at Whiteface Mountain during an era of chemical change characterized by high pH, water soluble organics and ammonium"

New York State Energy Research and Development Authority (NYSERDA) Award: 81244, 3/2018 – 3/2023, "Whiteface Mountain Cloud Sampling & Analysis"

NSF RAPID Award: 1753278, 5/2017-7/2018, "Supporting Cloud Water Collection at Whiteface Mountain Research Observatory: Pilot Study to Assess Chemical Processing of Organics within Clouds"

CIRES Innovative Research Program, 2011, "Contact Freezing on Demand: Measurement of contact nuclei with a novel instrument using single droplets levitated in an optical trap"

PUBLICATIONS (authors supported by Dr. Lance are underlined)

29 Lawrence, C., P. Casson, R. Brandt, J.J. Schwab, P. Snyder, E. Yerger, D. Kelting, T. VandenBoer and **S. Lance**, Long-term monitoring of cloud water chemistry at Whiteface Mountain: Emergence of a New Chemical Regime, *Atmos. Chem. Phys*., 23, 1619-1639, doi: 10.5194/acp-23-1619-2023, 2023.

28 Barth, M.C., B. Ervens, H. Herrmann, A. Tilgner, V.F. McNeill, W.G. Tsui, L. Deguillaume, N. Chaumerliac, A. Carlton and **S. Lance**, Box Model Intercomparison of Cloud Chemistry, *J. Geophys. Res. Atmos*., 126 (21), e2021JD035486, doi: 10.1029/2021JD035486, 2021.

27 Pratap, V., A.E. Christiansen, A.G. Carlton, **S. Lance**, P. Casson, J. Dukett, H. Hassan, J.J. Schwab and C.J. Hennigan, Investigating the evolution of water-soluble organic carbon in evaporating cloud water, *Environ. Sci. Atmos*., 1 (1), 21–30, doi: 10.1039/D0EA00005A, 2021.

26 Zhang, J., **S. Lance**, J. Marto, Y. Sun, M. Ninneman, Q. Zhang, B.A. Crandall, J. Wang and J.J. Schwab: Evolution of aerosol under moist and fog conditions in a rural forest environment: insights from high resolution aerosol mass spectrometry, *Geophys. Res. Lett.,* 47 (19), e2020GL089714, doi: 10.1029/2020GL089714, 2020.

25 Zhang, J., **S. Lance**, X. Wang, J. Wang and J.J. Schwab, Estimation of aerosol liquid water from optical scattering instruments using ambient and dried sample streams, *Atmos. Environ.*, 239 (15), 117787, doi: 10.1016/j.atmosenv.2020.117787, 2020.

24 **Lance, S.**, J. Zhang, J.J. Schwab, P. Casson, R.E. Brandt, D.R. Fitzjarrald, M.J. Schwab, J. Sicker, C.-H. Lu, S.-P. Chen, J. Yun, J.M. Freedman, B. Shrestha, Q. Min, M. Beauharnois, B. Crandall, E. Joseph, M.J. Brewer, J.R. Minder, D. Orlowski, A. Christiansen, A.G. Carlton, M.C. Barth,

Overview of the Cloud Processing of Organics within Clouds (CPOC) Pilot Study at Whiteface Mountain, NY, *Bull. Amer. Meteor. Soc.*, 101 (10), E1820–E1841, doi: 10.1175/BAMS-D-19-0022.1, 2020.

23 Zawadowicz, M. A., **S. Lance**, J.T. Jayne, P. Croteau, D.R. Worsnop, F. Mahrt, T. Leisner, and D.J. Cziczo, Quantifying and Improving the performance of the Laser Ablation Aerosol Particle Time of Flight Mass Spectrometer (LAAPToF) Instrument, *Aeros. Sci. Technol.*, 54 (7), 761-771, doi: 10.1080/02786826.2020.1724867, 2020.

22 Lawson, R.P., S. Woods, E. Jensen, M. Gallagher, P. Connolly, J. Whiteway, A. Baran, P. May, A. Heymsfield, C. G. Schmitt, G. McFarquhar, J. Um, A. Protat, M. Bailey, **S. Lance**, A. Muhlbauer, J. Stith, C. Gurganus, A. Korolev, O. B. Toon, M. Kramer, A Review of Ice Particle Shapes in Cirrus formed In Situ and in Anvils, *J. Geophys. Res*., 124, 10,049-10,090, doi: 10.1029/2018JD030122, 2019.

21 Zhang, J. **S. Lance**, J. Marto, Y. Sun, B.A. Crandall, J. Wang, J.J. Schwab, Observed below-cloud aerosol chemical and physical properties on Whiteface Mountain, New York during August 2017, *ACS Earth Space Chem.*, 3, 8, 1438-1450, doi: 10.1021/acsearthspacechem.9b00117, 2019.

20 Zhang, J., **S. Lance**, J.M. Freedman, Y. Sun, B.A. Crandall, X. Wei, and J.J. Schwab, Detailed Measurements of Submicron Particles from an Independence Day Fireworks Event in Albany, New York Using HR-ToF-AMS, *ACS Earth Space Chem*., 3, 8, 1451-1459, doi: 10.1021/acsearthspacechem.9b00046, 2019.

19 **Lance, S.**, M. Barth, and A.M. Carlton, Multiphase chemistry: Experimental design for coordinated measurement and modeling of cloud processing at a mountain top, *Bull. Amer. Meteor. Soc*., ES163-167, doi: 10.1175/BAMS-D-17-0015.1, 2017.

18 Carlton, A., M. Barth and **S. Lance**, Designing mountaintop cloud experiments, *EOS*, 98, https://doi.org/10.1029/2017EO072373, 2017.

17 Cziczo, D.J., L. Ladino-Moreno, Y. Boose, Z.A. Kanji, P. Kupiszewski, **S. Lance**, S. Mertes, H. Wex, Measurements of Ice Nucleating Particles and Ice Residuals. *Meteor. Mono.*, 58, 8.1-8.13, doi: 10.1175/amsmonographs-D-16-0008.1, 2017.

16 Davis, R. D., **S. Lance**, J. A. Gordon, S. B. Ushijima, M. A. Tolbert, Contact Efflorescence as a pathway for crystallization of atmospherically relevant particles, *Proc. Nat. Acad. Sci.*, 112 (52), 15815-15820, doi:10.1073/pnas.1522860113, 2015.

15 Davis, R. D., **S. Lance**, J. A. Gordon, M. A. Tolbert, A long working-distance optical trap for in situ analysis of contact induced phase transformations of single aerosol particles, *Anal. Chem.*, 87 (12), 6186–6194, doi: 10.1021/acs.analchem.5b00809, 2015.

14 Beswick, K., D. Baumgardner, M. Gallagher, A. Volz-Thomas, P. Nedelec, K.-Y. Wang, and **S. Lance**, The backscatter cloud probe – a compact low-profile autonomous optical spectrometer, *Atmos. Meas. Tech*., 7, 1443-1457, 2014.

13 **Lance, S.**, T. E. Raatikainen, T. Onasch, D. Warsnop, X.-Y. Yu, L. Alexander, M. Stolzenberg, P. McMurry, J. N. Smith and A. Nenes, Aerosol mixing-state and cloud activation efficiency during MIRAGE 2006, *Atmos. Chem. Phys*., 13, 5049-5062, doi:10.5194/acpd-13-5049-2013, 2013.

12 Jensen, E. J., G. Diskin, R. P. Lawson, **S. Lance**, T. P. Bui, D. Hlavka, M. McGill, L. Pfister, O.B. Toon, and R. Gao, Ice nucleation and dehydration in the Tropical Tropopause Layer, *Proc. Nat. Academ. Sci.,* 110 (6), 2041-2046, 2013.

11 Raatikainen, T., A. Nenes, J.H. Seinfeld, R. Morales, R.H. Moore, T. Lathem, **S. Lance**, L.T. Padro, J.J. Lin, K.M. Cerully, A. Bougiatioti, J. Cozic, C.R. Ruel, P.Y. Chuang, B.E. Anderson, R.C. Flagan, H. Jonsson, N. Mihalopoulos, J.N. Smith, Worldwide data sets constrain the water vapor

uptake coefficient in cloud formation, *Proc. Natl. Acad. Sci*., 110 (10), 3760-3764, doi:10.1073/pnas.1219591110, 2013.

10 McBride, P. J., K. S. Schmidt, P. Pilewskie, A. Walther, A. K. Heidinger, D. E. Wolfe, C. Fairall, and **S. Lance**, A Calnex climatology of cloud optical properties retrieved from a ship-based spectrometer and comparisons with satellite and aircraft retrieved cloud properties, *J. Geophys. Res*., 117, D00V23, doi:10.1029/2012JD017624, 2012.

9 **Lance, S.**, Coincidence Errors in a Cloud Droplet Probe (CDP) and a Cloud and Aerosol Spectrometer (CAS), and the Improved Performance of a Modified CDP, *J. Atmos. Oceanic Technol*., 29, 1532-1541, doi:10.1175/JTECH-D-11-00208.1, 2012.

8 Baumgardner, D., L. Avallone, A. Bansemer, S. Borrmann, P. Brown, U. Bundke, P. Y. Chuang, D. Cziczo, P. Field, M. Gallagher, J.-F. Gayet, A. Heymsfield, A. Korolev, M. Krämer, G. McFarquhar, S. Mertes, O. Möhler, **S. Lance**, P. Lawson, M. D. Petters, K. Pratt, G. Roberts, D. Rogers, O. Stetzer, J. Stith, C. Twohy, M. Wendish, In situ airborne instrumentation: addressing and solving measurement problems in ice clouds, *Bull. Amer. Meteor. Soc*., 93, ES29-ES34, doi: 10.1175/BAMS-D-11-00123.1, 2012.

7 Cerully, K. M., T. Raatikainen, **S. Lance**, D. Tkacik, P. Tiitta, T. Petaja, M. Ehn, M. Kulmala, D. R. Worsnop, A. Laaksonen, J. N. Smith, and A. Nenes, Aerosol hygroscopicity and CCN activation kinetics in a boreal forest environment during the 2007 EUCAARI campaign, *Atmos. Chem. Phys.*, 11, 12369-12386, 2011.

6 **Lance, S.**, M. Shupe, G. Feingold, C.A.Brock, J. Cozic, J. S. Holloway, R. H. Moore, A. Nenes, J. P. Shwartz, J. R. Spackman, K. D. Froyd, D. M. Murphy, J. Brioude, O. R. Cooper, A. Stohl, J. F. Burkhart, H. Sodemann, Cloud condensation nuclei as a modulator of ice processes in Arctic mixed-phase clouds, *Atmos. Chem. Phys*., 11, 8003-8015, 2011.

5 Brock, C. A., J. Cozic, R. Bahreini, K. D. Froyd, A. M. Middlebrook, A. McComiskey, J. Brioude, O. R. Cooper, A. Stohl, K. C. Aikin, J. A. de Gouw, D. W. Fahey, R. A. Ferrare, R.-S. Gao, W. Gore, J. S. Holloway, G. Hubler, A. Jefferson, D. A. Lack, **S. Lance**, et al., Characteristics, sources, and transport of aerosols measured in spring 2008 during the aerosol, radiation, and cloud processes affecting Arctic Climate (ARCPAC) Project, *Atmos. Chem. Phys*., 11, 2423-2453, 2011.

4 **Lance, S.**, C.A. Brock, D. Rogers, and J.A. Gordon, Water droplet calibration of a cloud droplet probe and in-flight performance in liquid, ice and mixed-phase clouds during ARCPAC, *Atmos. Meas. Tech.,* 3, 1683–1706, 2010.

3 **Lance, S.**, A. Nenes, C. Mazzoleni, M.K. Dubey, H. Gates, V. Varutbangkul, T.A. Rissman, S.M. Murphy, A. Sorooshian, R.C. Flagan, J.H. Seinfeld, G. Feingold, H.H. Jonsson, Cloud condensation nuclei activity, closure, and droplet growth kinetics of Houston aerosol during the Gulf of Mexico Atmospheric Composition and Climate Study (GoMACCS), *J. Geophys. Res.*, 114, D00F15, doi:10.1029/2008JD011699, 2009.

2 **Lance, S.**, J. Medina, J.N. Smith and A. Nenes. Mapping the Operation of the DMT Continuous Flow CCN Counter, *Aerosol Sci. Technol., 40* (4): 242−254, 2006.

1 **Lance, S.**, T. Rissman and A. Nenes, Chemical and Dynamical Effects on Cloud Droplet Number: Implications for Estimates of the Aerosol Indirect Effect, *J. Geophys. Res., 109*, D22208, 2004.

SELECT PRESENTATIONS since 2019 (authors supported by Dr. Lance are underlined)

- **Lance, S.** et al., Jan 2023, *Whiteface Mountain as a Natural Laboratory to Study Chemical Processing of Aerosols by Clouds,* Joint ACOM/EOL Seminar at the National Center for Atmospheric Research, Boulder, CO.

- Lawrence, C. et al., Jan 2023, *Investigating the Contribution of Cloud Water Chemistry to Organic Acids at Whiteface Mountain*, American Meteorological Society (AMS) Conference, Denver, CO.
- **Lance, S.** et al., Jan 2023, *Whiteface Mountain as a Natural Laboratory to Study Chemical Processing of Aerosols by Clouds*, AMS Conference, Denver, CO.
- Tripathy, A. et al., Jan 2023, *Organic Acids in Cloud Water Samples from Whiteface Mountain*, AMS Conference, Denver CO.
- Deitsch, A. et al., Jan 2023, *Assessing Filter-Based Measurements for Evidence of Atmospheric Micro- and Nanoplastic (MNP) Aerosols through Laboratory Analysis*, AMS Conference, Denver, CO.
- **Lance, S.** et al., Jan 2023, *Overview of the CHemistry in the Arctic: Clouds, Halogens, and Aerosols (CHACHA) Campaign Conducted Along the Coastal Alaskan North Slope (Invited Presentation, Core Science Keynote)*, AMS Conference, Denver, CO.
- Woods, S. et al., Jan 2023, *Arctic lead cloud microphysics observed during CHACHA (Invited Presentation)*, AMS Conference, Denver, CO.
- Fuentes, J.D. et al., Jan 2023, *Atmospheric Boundary Layer characteristics over the Coastal Alaskan North Slope during spring 2022 (Invited Presentation)*, AMS Conference, Denver, CO.
- Lawrence, C. et al, Nov 2022, *The Emerging Role of Organic Carbon in Atmospheric Chemistry at Whiteface Mountain*, National Acid Deposition Program (NADP) Scientific Symposium & Fall Meeting (won "Best Student Oral Presentation"), Knoxville, TN
- **Lance, S.** et al., Oct 2022, *Whiteface Mountain as a Natural Laboratory to Study Chemical Processing of Aerosols by Clouds (Invited)*, Frontiers in Atmospheric Chemistry Seminar Series, MIT, online format.
- **Lance, S.** et al., Oct 2022, *The Shifting Adirondacks: Observed Trends of Atmospheric Chemistry and Ecosystem Health (Invited)*, Adirondack Research Consortium Fall Webinar Series and Panel Discussion
- Hennigan et al., Sep 2022, pH-Dependence of Brown Carbon (BrC) Absorbance in Cloud Water, American Association for Aerosol Research (AAAR) Annual Conference, poster, Raleigh, NC
- Lawrence, C. et al., Jan 2022, *Investigating the Chemistry of Water Soluble Organic Gases in Upstate New York Using WRF-Chem and Chemical Box Modeling*, AMS Conference, online format
- Lawrence, C. et al., Oct 2021, *Changes in Atmospheric Aqueous Chemistry at Whiteface Mountain: Shifting focus from Acid Rain*, NADP Scientific Symposium & Fall Meeting, online format
- Lawrence, C. et al., Jan 2021, *Investigating Characteristic Air Masses Affecting Organic and Inorganic Cloud Water Composition at Whiteface Mountain Using HYSPLIT and Cluster Analysis*, AMS Conference, online format
- **Lance, S.** et al., Nov 2020, *Characterization of Organics in Cloud Water: Measurements from the Present Day and from Decades Past at Whiteface Mountain*, Brookhaven National Lab Seminar, online format
- Lawrence, C. et al., Jul 2020, *The Role of Clouds in Atmospheric Chemistry: Current Understanding, Ongoing Research and Future Work at Whiteface Mountain*, Falconer Lecture Series, ASRC, online format
- Niehaus, J. et al., Jan 2020, *Developing an Electrodynamic Balance for Chemical Speciation of Atmospheric Organics in Cloud Water*, New York State Department of Environmental Conservation (NYSDEC) Bureau of Air Quality Analysis and Research (BAQAR) poster session, Albany, NY
- **Lance, S.** et al., Jan 2020, *Characterization of Organics in Cloud Water: Measurements from the Present Day and Decades Past,* AMS Conference, Boston, MA
- Lawrence, C. et al., Oct 2019, *Emergence of a New Chemical Regime: Growing Abundance of Water Soluble Organics in Cloud Water Associated with a Growing Ion Imbalance,* AAAR Conference, Portland, OR

- **Lance, S.** et al., Jul 2019, *Emergence of a New Chemical Regime: Growing Abundance of Water Soluble Organics in Cloud Water Associated with a Growing Ion Imbalance,* Gordon Research Conference, Atmospheric Chemistry, Newry, ME
- **Lance, S.** et al., Apr 2019, *Long-term monitoring of cloud water at Whiteface Mountain,* New York State Energy Research and Development Authority (NYSERDA) project status meeting, Albany, NY

TEACHING

Co-Lecturer, "ATM 505: Atmospheric Physics", SUNY-Albany, Spring 2018, 2020, 2021, 2023.

Guest Lecturer, "12.335/12.835: Experimental Atmospheric Chemistry" taught by Prof. Dan Cziczo, MIT, Fall 2015.

Guest Lecturer, "ATOC 5151: Atmospheric Chemistry" taught by Prof. Maggie Tolbert, CU-Boulder, Spring 2015.

Teaching Assistant, "EAS 4803/8803: Experimental Methods in Air Quality" for Dr. Greg Huey, Dr. Michael Bergin and Dr. Karsten Baumann, Georgia Institute of Technology, Spring 2004.

Teaching Assistant, "EAS 2750: Physics of the Weather" for Dr. George Chimonas, Georgia Institute of Technology, Fall 2003.

MENTORSHIP

Postdoctoral Researchers

Dr. Joseph Niehaus, 2019-2021

Graduate Students (*primary PhD advisor, †PhD or Master's thesis committee member)

Ali Catena†, ASRC/DAES, UAlbany, 2022-Present

Adam Deitsch*, Atmospheric Sciences Research Center (ASRC)/Department of Atmospheric and Environmental Sciences (DAES), UAlbany, 2021-Present

Archana Tripathy*, ASRC/DAES, UAlbany, 2020-Present

Christopher Lawrence*, ASRC/DAES, UAlbany, 2018-Present

Suqian Chu†, ASRC/DAES, UAlbany, 2021-Present

Kevin Michael Scruggs Walker†, Department of Earth Atmospheric and Planetary Sciences (EAPS), Purdue, 2021-Present

Dr. Jie Zhang†, ASRC/DAES, UAlbany, 2017-2019

Dr. Joseph Marto†, ASRC/DAES, UAlbany, 2017-2021

Dr. Ryan Davis, CU-Boulder, 2011-2015

Undergraduate Students

Daniel Orlowski, RPI student, summer 2017

Matthew Brewer, UAlbany DAES student, summer 2017

SERVICE, DISTINCTIONS and AWARDS

American Meteorological Society (AMS) Cloud Physics Conference Committee member, 2013-2018.

Advanced Study Program Graduate Fellowship at the National Center for Atmospheric Research (NCAR), Boulder, CO, 2004-2007.

Glen Cass Award, Georgia Institute of Technology, 2006.

President's Fellowship, Georgia Institute of Technology, Atlanta, GA, 2002-2003.

Professional Development Grant, Georgia Institute of Technology, Atlanta, GA, 2002.

Arizona State University Academic Scholarship, Regents and President's Awards, Tempe, AZ, 1998.