Daniel L. Goldberg, Ph.D.

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Professional Preparation

2015	Ph.D.	University of Maryland, College Park, MD, Atmospheric & Oceanic Science
2013	M.S.	University of Maryland, College Park, MD, Atmospheric & Oceanic Science
2009	B.S.	Lafayette College, Easton, PA, Chemical Engineering

Professional Appointments

2019–present	Staff Research Scientist	George Washington University
2019–present	Staff Research Scientist	Argonne National Laboratory
2016–2019	Postdoctoral Scientist	Argonne National Laboratory
2010–2016	Graduate Research Assistant	University of Maryland
2009–2010	Environmental Engineer	TRC Solutions

Service & Leadership

2020	Session Organizer	American Meteorological Society
2019–2020	Session Organizer	American Geophysical Union
2016–2018	Executive Board Member	Argonne Postdoctoral Society
2016–2017	Mentor	ACT-SO High School Science Competition
2011–2013	Executive Board Member	Atmospheric & Oceanic Science Graduate Students
2007–2008	Student President	Lafayette College Environmental Club

Awards & Honors

2015	Outstanding Graduate Assistant Award for top 2% of all graduate students
2012	Service Award for dedicated service to UMD Atmospheric Science Dept
2009	American Chemical Society (ACS) Award for top chemical engineer in class
2008	Tau Beta Pi Engineering Honor Society for top 20% of engineering class

Scientific and Technical Background

Dr. Goldberg is a research scientist working on processing satellite data to better understand the concentrations and trends of key atmospheric pollutants including NO_2, HCHO, O_3, and fine particulate matter ($PM_{2.5}$). His most recent work involves developing new strategies to generate high resolution snapshots of NO_2 from the OMI NO_2 and TROPOMI NO_2 satellite products. Results from his analyses have allowed the scientific community to gain better insight on NO_x and CO_2 emission inventories on a local scale, and to better estimate NO_2 exposures for health assessment studies. He has participated in several NASA sponsored field campaigns, including DISCOVER-AQ, KORUS-AQ, and OWLETS-2. His work involves extensive collaboration with scientists at NASA, NOAA, EPA, universities, state agencies, and non-profit organizations.

Peer-Reviewed Publications

1. **Goldberg, D. L.,** Anenberg, S. C., Griffin, D., McLinden, C. A., Lu, Z. and Streets, D. G.: Disentangling the impact of the COVID-19 lockdowns on urban NO2 from natural variability, *Geophys. Res. Lett.*, doi:10.1029/2020GL089269, 2020.
2. Anenberg, S. C., Bindl, M., Brauer, M., Castillo, J. J., Cavalieri, S., Duncan, B. N., Fiore, A. M., Fuller, R., **Goldberg, D. L.,** Henze, D. K., Hess, J., Holloway, T., James, P., Jin, X., Kheirbek, I., Kinney, P. L., Liu, Y., Mohegh, A., Patz, J., Jimenez, M. P., Roy, A., Tong, D., Walker, K., Watts, N. and West, J. J.: Using Satellites to Track Indicators of Global Air Pollution and Climate Change Impacts: Lessons Learned From a NASA-Supported Science-Stakeholder Collaborative, *GeoHealth,* 4(7), doi:10.1029/2020GH000270, 2020.
3. Saide, P., E., M. Gao, Z. Lu, **D. L. Goldberg,** D. G. Streets, J.-H.Woo, A. Beyersdorf, C, A. Corr, K,L. Thornhill, B. Anderson, J. W. Hair, A. R. Nehrir, G. S. Diskin, J. L. Jimenez, B. A. Nault, P. Campuzano-Jost, J. Dibb, E. Heim, K. D. Lamb, J. P. Schwarz, A.E. Perring, J. Kim, M. Choi, B. Holben, G.Pfister, A. Hodzic, G. R. Carmichael, L.Emmons, and J. H. Crawford **(2020)** Understanding and improving model representation of aerosol optical properties for a Chinese haze event measured during KORUS-AQ, *Atmos. Chem. Phys,* doi: 10.5194/acp-20-6455-2020.
4. Liu, F., Duncan, B. N., Krotkov, N. A., Lamsal, L. N., Beirle, S., Griffin, D., McLinden, C. A., **Goldberg, D. L.,** and Lu, Z. **(2020)**, A methodology to constrain carbon dioxide emissions from coal-fired power plants using satellite observations of co-emitted nitrogen dioxide, *Atmos. Chem. Phys.,* 20, 99–116, https://doi.org/10.5194/acp-20-99-2020.
5. **Goldberg, D. L.,** Z. Lu, D. G. Streets, B. de Foy, L. Lamsal, D. Griffin, C. A. McLinden, L. N., Lamsal, N. A., Krotkov, and H. Eskes **(2019),** Enhanced capabilities of TROPOMI NO_2: Estimating NO_x from North American cities and power plants., *Environ. Sci. Tech.,* https://doi.org/10.1021/acs.est.9b04488.
6. **Goldberg, D. L.,** Z. Lu, T. Oda, L. N. Lamsal, F. Liu, D. Griffin, C. A. McLinden, N. A. Krotkov, B. N., Duncan, D. G. Streets **(2019)**, Exploiting OMI NO_2 satellite observations to infer fossil-fuel CO_2 emissions from U.S. megacities, *Sci. Tot. Environ.*, 695, 133805, https://doi.org/10.1016/j.scitotenv.2019.133805.
7. **Goldberg, D. L.,** P. E. Saide, L. N. Lamsal, B. de Foy, Z. Lu, J.-H. Woo, Y. Kim, J. Kim, M. Gao, G. Carmichael, D. G. Streets **(2019)**, A top-down assessment using OMI NO_2 suggests an underestimate in the NOx emissions inventory in Seoul, South Korea, during KORUS-AQ, *Atmos. Chem. Phys.*, 19, 1801-1818, https://doi.org/10.5194/acp-19-1801-2019.
8. **Goldberg, D. L.,** P. Gupta, K. Wang, C. Jena, Y. Zhang, Z. Lu, D. G. Streets **(2019)**, Using MAIAC AOD and WRF-Chem to estimate daily $PM_{2.5}$ concentrations at 1 km resolution in the eastern United States, *Atmos. Environ*, 199, 443-452, https://doi.org/10.1016/j.atmosenv.2018.11.049.
9. Ring, A. M., T. P. Canty, D. C. Anderson, T. P. Vinciguerra, H. He, **D. L. Goldberg**, S. E. Ehrman, R. R. Dickerson, and R. J. Salawitch **(2018)**, Evaluating Commercial Marine Vessel Emissions Inventory Improvements Using Observations and the CMAQ Model: Impacts on Air Quality Attainment Strategies, *Atmos. Environ.*, 173, 96-107, https://dx.doi.org/10.1016/j.atmosenv.2017.10.037
10. **Goldberg, D. L.,** L. N. Lamsal, C.P. Loughner, W. H. Swartz, Z. Lu, D. G. Streets (**2017**), A high-resolution and observationally constrained OMI NO_2 satellite retrieval, *Atmos. Chem. Phys.*, 17, 11403-11421, https://doi.org/10.5194/acp-17-11403-2017.
11. Ren, X., W. T. Luke, P. Kelley, M. D. Cohen, R. Artz, M. L. Olson, D. Schmeltz, **D. L. Goldberg**, A. Ring, G. M. Mazzuca, K. A. Cummings, L. Wojdan, S. Preaux, J. W. Stehr (**2016**), Atmospheric

mercury measurements at a suburban site in the Mid-Atlantic United States: Inter-annual, seasonal and diurnal variations and source-receptor relationships, *Atmos. Environ.*, 142, https://dx.doi.org/10.1016/j.atmosenv.2016.08.028

12. **Goldberg, D. L.**, T. P. Vinciguerra, D. C. Anderson, L. Hembeck, T. P. Canty, S. H. Ehrman, D. K. Martins, R. M. Stauffer, A. M. Thompson, R. J. Salawitch, and R. R. Dickerson (**2016**), CAMx ozone source attribution in the eastern United States using guidance from observations during DISCOVER-AQ Maryland, *Geophys. Res. Lett.,* 43, https://dx.doi.org/10.1002/2015GL067332.
13. **Goldberg, D. L.,** T. P. Vinciguerra, K. M. Hosley, C. P. Loughner, T. P. Canty, R. J. Salawitch, and R. R. Dickerson (**2015**), Evidence for an increase in the ozone photochemical lifetime in the eastern United States using a regional air quality model, *J. Geophys. Res. - Atmos.,* 120, 12,778–12,793, https://dx.doi.org/10.1002/ 2015JD023930.
14. Canty, T. P., L. Hembeck, T. P. Vinciguerra, D. C. Anderson, **D. L. Goldberg**, S.F., Carpenter, D. J. Allen, C. P. Loughner, R. J. Salawitch, and R. R. Dickerson (**2015**), Ozone and NOx chemistry in the eastern US: Evaluation of CMAQ/CB05 with satellite (OMI) data, *Atmos. Chem. Phys.* 15, 10965 – 10982. https://dx.doi.org/10.5194/acp-15-10965-2015
15. Stauffer, R. M., A. M. Thompson, D. K. Martins, R. D. Clark, **D. L. Goldberg**, C. P. Loughner, R. Delgado, R. R. Dickerson, J. W. Stehr, M. A. Tzortziou (**2015**), Bay breeze influence on ozone at Edgewood, MD during July 2011, *J. of Atmos. Chem.*, https://dx.doi.org/10.1007/s10874-012-9241-6.
16. Loughner, C. P., M. Tzortziou, M. Follette-Cook, K. E. Pickering, **D. L. Goldberg**, C. Satam, A. Weinheimer, J. H. Crawford, D. K. Knapp, D. D. Montzka, G. B. Diskin, L. T. Marufu, and R. R. Dickerson (**2014**), Impact of bay breeze circulations on surface air quality and boundary layer export, *J. Appl. Met. Clim.*, 53, 1697 – 1713, https://dx.doi.org/10.1175/JAMC-D-13-0323.1.
17. **Goldberg, D. L.,** C. P. Loughner, M. Tzortziou, J. W. Stehr, K. E. Pickering, L. T. Marufu, J. H. Crawford, A. Mannino, and R. R. Dickerson (**2014**), Higher surface ozone concentrations over the Chesapeake Bay than over the adjacent land: Observations and models from the DISCOVER-AQ and CBODAQ campaigns, *Atmos. Environ.* 84, 9 – 19, https://dx.doi.org/10.1016/j.atmosenv.2013.11.008.

Manuscripts In Review

1. **Goldberg, D. L.,** Z. Lu, D. G. Streets, M. A. Mohegh, S. C. Anenberg: A detailed look at NO_2 in the United States using TROPOMI. *In review*.
2. Mohegh, M. A., **D. L. Goldberg**, S. C. Anenberg: The role of spatial resolution on the quantification of the health impacts from air pollution. *In review*.

Manuscripts In Preparation

1. **Goldberg, D. L.,** Z. Lu, D. G. Streets, V. Southerland, M. A. Mohegh, S. C. Anenberg: Top-down NO_x emissions and their trends in global cities.
2. Dreessen, J., J. Boyle, **D. L. Goldberg**. Direct evidence for increased NO_x emissions during the worst air quality days in the Mid-Atlantic United States.
3. Mohegh, M. A., **D. L. Goldberg**, A. Larkin, P. Hystad, M. Brauer, K. Burkhart, S. C. Anenberg: Trends of surface NO_2 and its health impacts at high spatial resolution in the United States.
4. Burkhart, K., A. Larkin, P. Hystad, M. Brauer, K. Burkhart, Mohegh, M. A., **D. L. Goldberg**, S. C. Anenberg, Global Burden of Disease from the Asthma Impacts of NO_2

Grants Selected for Funding

1. "Inconsistent effects of social distancing on air quality in global cities: lessons for protecting near-term public health and designing longer-term urban transportation policies", Submitted June 2020 – May 2021, $100,000, Co-Principal Investigator (Co-PI: Susan Anenberg, George Washington University)
2. "Updating the Wisconsin Horizontal Interpolation Program for Satellites (WHIPS)", (PI: Tracey Holloway, University of Wisconsin)
3. "Integrating satellites, ground monitoring, and modeling to estimate long-term NO_2 exposures and associated pediatric asthma impacts", Health Effects Institute, November 2019 – November 2021, $120,000, Co-Investigator (PI: Susan Anenberg, George Washington University)
4. "The Changing Atmosphere in North America for 2000 – 2020: High-resolution modeling and satellite analysis", NASA ACMAP, May 2019 – April 2022, $300,000, Co-Investigator (PI: Greg Carmichael, University of Iowa)
5. "Environmental and Technical Analysis of Fossil Energy Technologies", April 2019 – Mar 2020, $150,000, Co-Investigator (PI: David Streets, Argonne National Laboratory)
6. "Taking OMI NO_2 to the next level: Inferring global fossil fuel CO_2 emissions using OMI NO_2 Data Improved with Critical Algorithm Updates", NASA ACMAP, June 2017 – May 2020, $225,000, Co-Investigator (PI: Nickolay Krotkov, NASA Goddard)

Pending Grants

1. "Using satellite NO_2 observations for public health surveillance and environmental policy planning at global, national, and urban scales", Submitted June 2020, Pending, Co-Investigator (PI: Susan Anenberg, George Washington University)
2. "Using Satellites to Monitor Energy Usage and Inform Responses to Disasters", Submitted June 2020, Pending, Co-Investigator (PI: Jason West, University of North Carolina)

Grants Not Selected for Funding

1. "Application of Remote Sensing Tools to Verify, Validate, and Improve Emissions of NO_2 and SO_2 for Texas Air Quality Modeling", Submitted January 2020, Co-Investigator (PI: Nathan Pavlovic, Sonoma Technology)
2. "Preparing for TEMPO: Considering future applications of the HCHO/NO_2 ratio using lessons learned from OMI and TROPOMI", NASA Aura Science Team, Submitted Sept 2019, Not Selected, Primary Investigator
3. "Assessing tropospheric ozone pollution and precursors in African cities using OMI", NASA Aura Science Team, Submitted Sept 2019, Not Selected, Co-Investigator (PI: Susanne Bauer, NASA GSFC)
4. "Quantification of Air Pollution from Natural Gas Development and Relationship to Health Outcomes: A Quasi-Experimental Investigation", Submitted Sept 2018 & Sept 2019, Co-Investigator (PI: Charlotte Ward, Dartmouth College)
5. "Coupled Energy-Air Quality-Health System: A Data-Driven Decision Tool for Cost-Benefit Assessment", NASA Applied Sciences, Submitted Nov 2017, Not Selected, Co-Investigator (PI: Yang Zhang, North Carolina State University)

Media Interactions

1. **Washington Post, June 16, 2020,** Commentary in, "Washington has yet to see unhealthful pollution levels this year. That's a record", https://www.washingtonpost.com/weather/2020/06/16/washington-dc-record-low-pollution/
2. **WAMU 88.5, NPR Radio, May 19, 2020,** Subject Matter Expert for The Kojo Nnamdi Show, https://thekojonnamdishow.org/audio/#/shows/2020-05-19/reducing-air-pollution-during-the-pandemic/116753/@00:00
3. **Washington Post, April 22, 2020,** Commentary in, "Washington has its cleanest spring air in 25 years: How air quality has improved during the coronavirus crisis", https://www.washingtonpost.com/weather/2020/04/22/washington-dc-air-quality-coronavirus/
4. **Nature, April 10, 2020,** Commentary in, "Why pollution is plummeting in some cities — but not others", https://www.nature.com/articles/d41586-020-01049-6 doi: 10.1038/d41586-020-01049-6
5. **New York Times, April 3, 2020,** Subject Matter Expert for Visual Investigations Journalist Christoph Koettl, https://www.nytimes.com/by/christoph-koettl
6. **WTOP Radio, April 1, 2020,** Commentary in, "Despite telework, stay-at-home orders, not much change to air quality in DC area", https://wtop.com/local/2020/04/despite-telework-stay-at-home-orders-not-much-change-to-air-quality-in-dc-area/
7. **Science Magazine, February 12, 2020,** Commentary in, "Deadly air pollution is blowing into your state from a surprisingly large source", https://www.sciencemag.org/news/2020/02/deadly-air-pollution-blowing-your-state-surprisingly-large-source
8. **Washington Post, February 3, 2020,** Commentary in, "Why a toxic brown haze loomed over the Capitol on Monday", https://www.washingtonpost.com/weather/2020/02/03/how-toxic-brown-haze-loomed-over-capitol-monday/
9. **Washington Post, July 5, 2019,** Commentary in, "Lost in a wall of smoke: Why so many people couldn't see Washington's Fourth of July fireworks", https://www.washingtonpost.com/weather/2019/07/05/lost-wall-smoke-why-so-many-people-couldnt-see-washingtons-july-th-fireworks/
10. **Washington Post, February 4, 2019,** Commentary in, "There's an air quality alert in Washington, the sky is hazy and it's February. What's going on?", https://www.washingtonpost.com/weather/2019/02/04/theres-an-air-quality-alert-washington-sky-is-hazy-its-february-whats-going/
11. **Washington Post, July 10, 2018,** Commentary in, "Washington posted first Code Red day since 2012 on Monday due to 'unhealthy' pollution levels", https://www.washingtonpost.com/news/capital-weather-gang/wp/2018/07/10/washington-posted-first-code-red-day-since-2012-monday-due-to-unhealthy-pollution-levels/

Oral Presentations

1. **Goldberg, D. L.**, Z. Lu, D. Streets, S. C. Anenberg, A. Mohegh, L. N. Lamsal, N. A. Krotkov, B. N. Duncan, F. Liu, D. Griffin, C. McLinden, H. Eskes (**August 2020**). The satellite data revolution: How new satellite instruments can provide better estimates of NOx pollution. Presented at the *International Society of Environmental Epidemiology Annual Meeting*. Virtually.
2. **Goldberg, D. L.**, Z. Lu, D. Streets, S. C. Anenberg, A. Mohegh, L. N. Lamsal, N. A. Krotkov, B. N. Duncan, F. Liu, D. Griffin, C. McLinden, H. Eskes (**June 2020**). Estimating air pollution emissions,

exposures, and public health impacts in cities worldwide. Presented at the *TOLNET and Pandora Science Team Meeting*. Virtually.

3. **Goldberg, D. L.**, Z. Lu, D. Streets, S. C. Anenberg, A. Mohegh, T. Canty, R. J. Salawitch, R. R. Dickerson (**February 2020**) Using models and satellite data to estimate air pollution in the Baltimore-Washington area. Presented at *The Baltimore-Washington Regional Air Quality Symposium*. College Park, MD. ***Invited***
4. **Goldberg, D. L.**, Z. Lu, D. G. Streets, A. Mohegh, V. Southerland, S. C. Anenberg (**January 2020**) Using satellite data to estimate air pollution at high spatiotemporal resolution. Presented at *The Applications for Big Data and the Environment*. Davis, CA. ***Invited***
5. **Goldberg, D. L.**, Z. Lu, D. Streets, S. C. Anenberg, A. Mohegh, V. Southerland, L. N. Lamsal, N. A. Krotkov, B. N. Duncan, F. Liu, D. Griffin, C. McLinden, H. Eskes (**January 2020**). Estimating air pollution emissions, exposures, and public health impacts in cities worldwide. Presented at the *American Meteorological Society Annual Meeting,* Boston, MA.
6. **Goldberg, D. L.**, Z. Lu, D. G. Streets, B. de Foy, L. N. Lamsal, N. A. Krotkov, B. N. Duncan, F. Liu, D. Griffin, C. McLinden, P. Achakulwisut, A. Mohegh, V. Southerland, S. C. Anenberg (**December 2019**). Using NASA satellite data to estimate exposure to air pollution. Presented at the *George Washington University Environmental and Occupational Health Seminar*.Washington, DC. ***Invited***
7. **Goldberg, D. L.**, Z. Lu, D. Streets, S. C. Anenberg, A. Mohegh, V. Southerland, L. N. Lamsal, N. A. Krotkov, B. N. Duncan, F. Liu, D. Griffin, C. McLinden, H. Eskes (**October 2019**). Estimating air pollution emissions, exposures, and public health impacts in cities worldwide. Presented at the *New Applications in the Use of Satellite Data Monitoring for Population Health*. Huntsville, AL.
8. **Goldberg, D. L.**, Z. Lu, T. Oda, L. N. Lamsal, N. A. Krotkov, B. N. Duncan, F. Liu, D. Griffin, C. McLinden, D. G. Streets (**August 2019**). Using OMI NO_2 to infer fossil-fuel emissions of CO_2 from large metropolitan areas in the United States. Presented at the *Aura Science Team Meeting*.Pasadena, CA.
9. **Goldberg, D. L.**, Z. Lu, D. G. Streets, B. de Foy, L. N. Lamsal, N. A. Krotkov, B. N. Duncan, F. Liu, D. Griffin, C. McLinden, P. Achakulwisut, A. Mohegh, V. Southerland, S. C. Anenberg (**July 2019**). Policy-relevant applications of satellite data: Estimating air pollution emissions, exposures, and public health impacts in cities worldwide. Presented at the *Health and Air Quality Applied Sciences Team (HAQAST6) Meeting*.Pasadena, CA.
10. **Goldberg, D. L.**, Z. Lu, B. de Foy, D. G. Streets (**May 2019**). Investigating NO_x emissions from megacities using re-processed OMI NO_2 and TROPOMI NO_2. Presented at the *OWLETS Science Team Meeting*. College Park, MD.
11. **Goldberg, D. L.**, Z. Lu, D. G. Streets, (**March 2019**) Using satellite data to estimate air pollution at high spatiotemporal resolution. Presented at *The Workshop in Environmental Economics and Data Science (TWEEDS)*. Portland, OR. ***Invited***
12. **Goldberg, D. L.**, L. N. Lamsal, P. Saide, G. Carmichael, B. de Foy, D. Henze, Z. Lu, D. G. Streets (**December 2018**). Recent Advances in Deriving NOx Emission Estimates from Satellite Data. Presented at the *AGU Fall Meeting*. Washington, D.C.
13. **Goldberg, D. L.**, Z. Adelman, D. Kenski, M. Janssen, T. Nergui, Z. Lu (**December 2018**). Linking Surface Monitors, Satellite Data, and Emissions Inventories to Investigate Regional Haze Trends in the Eastern U.S. Presented at the *AGU Fall Meeting*. Washington, D.C.
14. **Goldberg, D. L.**, P. Gupta, K. Wang, C. Jena, Y. Zhang, Z. Lu, D. G. Streets (**October 2018**). Using MAIAC AOD and WRF-Chem to estimate daily $PM_{2.5}$concentrations at 1 km resolution in the eastern

United States. Presented at the *17th Annual Community Modeling and Analysis System (CMAS) Conference*. Chapel Hill, NC.

15. **Goldberg, D. L.**, L. N. Lamsal, P. Saide, G. Carmichael, Z. Lu, D. G. Streets (**August 2018**) A top-down assessment using OMI NO_2 suggests an underestimate in the NO_x emissions inventory in Seoul, Korea during KORUS-AQ. Presented at the *KORUS-AQ Science Team Meeting*. Irvine, CA.
16. **Goldberg, D. L.**, L. N. Lamsal, C. P. Loughner, W. H. Swartz, P. Saide, G. Carmichael, D. Henze, Z. Lu, D. G. Streets (**July 2018**). Recent advances in estimating NO_x emissions from OMI. Presented at the *Health and Air Quality Applied Sciences Team (HAQAST4) Meeting*. Madison, WI.
17. **Goldberg, D. L.**, L. N. Lamsal, C. P. Loughner, W. H. Swartz, P. Saide, G. Carmichael, D. Henze, Z. Lu, D. G. Streets (**December 2017**). Estimating NO_x emissions and surface concentrations at high spatial resolution. Presented at the *AGU Fall Meeting*. New Orleans, LA.
18. **Goldberg, D. L.**, L. N. Lamsal, C. P. Loughner, W. H. Swartz, P. Saide, G. Carmichael, D. Henze, Z. Lu, D. G. Streets (**November 2017**). Estimating NO_x emissions and surface concentrations at high spatial resolution. Presented at the *Health and Air Quality Applied Sciences Team (HAQAST3) Meeting*. Palisades, NY.
19. **Goldberg, D. L.**, L. N. Lamsal, C.P. Loughner, Z. Lu, D. G. Streets, T. P. Canty, T.P. Vinciguerra, D. C. Anderson, R. J. Salawitch & R. R. Dickerson (**October 2017**) Ground measurements, satellite observations, and model simulations of air quality in the Chesapeake Bay region. Presented at the *OWLETS Science Team Meeting*. Baltimore, MD. ***Invited***
20. **Goldberg, D. L.**, L. N. Lamsal, C.P. Loughner, P. Saide, G. Carmichael, Z. Lu, D. G. Streets, (**September 2017**) A new satellite technique to derive high-resolution tropospheric NO_2 columns in the eastern United State. Presented at the *OMI Science Team Meeting*. Greenbelt, MD. ***Invited***
21. **Goldberg, D. L.**, L. N. Lamsal, C.P. Loughner, Z. Lu, D. G. Streets, T. P. Canty, T.P. Vinciguerra, D. C. Anderson, R. J. Salawitch & R. R. Dickerson (**August 2017**) Innovative techniques to observe and model air pollution in the eastern United States. Presented at *Northwestern University*. Evanston, IL. ***Invited***
22. **Goldberg, D. L.**, L. N. Lamsal, C.P. Loughner, Z. Lu, D. G. Streets, T. P. Canty, T.P. Vinciguerra, D. C. Anderson, R. J. Salawitch & R. R. Dickerson (**June 2017**) Innovative techniques to observe and model air pollution in the eastern United States. Presented at the *University of Wisconsin-Madison*. Madison, WI. ***Invited***
23. **Goldberg, D. L.**, L. N. Lamsal, P. Saide, G. Carmichael, Z. Lu, D. G. Streets (**February 2017**) Validation of a satellite technique to derive high-resolution tropospheric NO_2 columns in Korea. Presented at the *KORUS-AQ Science Team Meeting*. Seogwipo, Jeju, South Korea.
24. **Goldberg, D. L.**, C. P. Loughner, L. N. Lamsal, Z. Lu, D. G. Streets (**October 2016**). High-resolution OMI satellite retrievals of tropospheric NO_2 in the eastern United States. Presented at the *15th Annual Community Modeling and Analysis System (CMAS) Conference*. Chapel Hill, NC.
25. **Goldberg, D. L.**, T. P. Canty, T.P. Vinciguerra, C.P. Loughner, D. C. Anderson, R. J. Salawitch & R. R. Dickerson (**February 2016**) Lifetime and distribution of ozone air pollution in the eastern United States. Presented at *Carnegie Mellon University*.Pittsburgh, PA. ***Invited***
26. **Goldberg, D. L.**, T. P. Canty, L. Hembeck, T. P. Vinciguerra, R. J. Salawitch & R. R. Dickerson. (**October 2015**). Evidence for an increasing geographic region of influence on ozone air pollution in the eastern United States. Presented at the *14th Annual Community Modeling and Analysis System (CMAS) Conference*. Chapel Hill, NC.

27. **Goldberg, D. L.**, T. P. Canty, T. P. Vinciguerra, H. He, R. J. Salawitch & R. R. Dickerson. (**July 2015**). Recent ozone modeling results in the Mid-Atlantic. Presented at the *Mid-Atlantic Regional Air Management Association (MARAMA) Science Team Meeting*. Richmond, VA.
28. **Goldberg, D. L.**, T. P. Canty, L. Hembeck, C. P. Loughner, D. C. Anderson, R. J. Salawitch & R. R. Dickerson. (**June 2015**). Evidence for an increasing geographic region of influence on ozone air pollution in the Eastern United States. Presented at the *NASA Air Quality Applied Sciences Team (AQAST) Summer 2015 Meeting*. St Louis, MO.
29. **Goldberg, D. L.**, T. P. Canty, T. P. Vinciguerra, H. He, R. J. Salawitch & R. R. Dickerson. (**April 2015**). Scientific insight from CAMx OSAT modeling. Presented at the *Ozone Transport Commission (OTC) Spring Meeting*. Washington, DC.
30. **Goldberg, D. L.**, C. P. Loughner, M. A. Tzortziou, J. W. Stehr, K. E. Pickering & R. R. Dickerson. (**January 2015**). The Impact of the Chesapeake Bay Climate and Boundary Layer Dynamics on Air Pollutant Concentrations during Smog Episodes. Presented at the *American Meteorological Society (AMS) 2015 Annual Meeting*. Phoenix, AZ.
31. **Goldberg, D. L.**, T. P. Canty, C. P. Loughner, L. Hembeck, D. C. Anderson, T. P. Vinciguerra, R. J. Salawitch, R. R. Dickerson. (**October 2014**) Recent Improvements in Regional Air Quality Models and their Impacts on Ozone Source Attribution. Presented at the *13th Annual Community Modeling and Analysis System (CMAS) Conference*. Chapel Hill, NC.
32. **Goldberg, D. L.**, C. P. Loughner, M. A. Tzortziou, J. W. Stehr, K. E. Pickering, & R. R. Dickerson. (**October 2014**). Increased Air Pollution over the Chesapeake Bay and its Effect on Deposition to the Bay. Presented at the *NADP 2014 Fall Meeting*. Indianapolis, IN
33. **Goldberg, D. L.**, C. P. Loughner, M. A. Tzortziou, L. T. Marufu, J. W. Stehr, K. E. Pickering & R. R. Dickerson. (**February 2014**). Higher surface ozone concentrations over the Chesapeake Bay than over adjacent land: Observations and models from DISCOVER-AQ. Presented at the *Winter 2014 DISCOVER-AQ Science Team Meeting*. Newport News, VA.

Conference Poster Presentations

1. **Goldberg, D. L**, Z. Lu, D. G. Strets, B. de Foy, D. Griffin, C. McLinden, B. N. Duncan, N. A. Krotkov, Lok N. Lamsal, F. Liu, M. O. Nawaz, D. Henze, M.A. Mohegh, S. C. Anenberg (**December 2019**). High-reolution NO_2 exposure estimates and top-down NO_x emissions using OMI NO_2 and TROPOMI NO_2. Presented at the *American Geophysical Fall Meeting*. San Francisco, CA.
2. **Goldberg, D. L.**, P. Gupta, K. Wang, Y. Zhang, Z. Lu, D. G. Streets (**June 2019**). Using MAIAC AOD to estimate daily $PM_{2.5}$ and its long-term trends (2008 – 2018) at 1 km resolution in the Eastern United States. Presented at the *EPA Air Climate & Energy (ACE) Centers Annual Meeting*. Pittsburgh, PA.
3. **Goldberg, D. L.,** P. Gupta, K. Wang, Y. Zhang, Z. Lu, D. G. Streets (**May 2019**). Using MAIAC AOD to estimate daily $PM_{2.5}$ and its long-term trends (2008 – 2018) at 1 km resolution in the Eastern United States. Presented at the *OWLETS Science Team Meeting*. College Park, MD.
4. **Goldberg, D. L.**, L. N. Lamsal, C. P. Loughner, W. H. Swartz, P. Saide, G. Carmichael, D. Henze, Z. Lu, D. G. Streets (**July 2018**). Using MODIS AOD and WRF-Chem to infer daily $PM_{2.5}$ concentrations at 1 km resolution in the eastern United States. Presented at the *Health and Air Quality Applied Sciences Team Bi-annual Meeting*. Madison, WI.
5. **Goldberg, D. L.**, Z. Lu, L. N. Lamsal, C. P. Loughner, R. C. Levy, P. Gupta, Y. Zhang, D. G. Streets. (**December 2016**). High resolution satellite retrievals of NO_2 and Aerosol Optical Depth for health

impact studies. Presented at the *American Geophysical Union (AGU) Fall 2016 Meeting*. San Francisco, CA.

6. **Goldberg, D. L.**, T. P. Vinciguerra, L. Hembeck, D. C. Anderson, T. P. Canty, R. J. Salawitch & R. R. Dickerson. (**January 2016**). CAMx Ozone Source Attribution in the Eastern United Sates using Guidance from Observations during DISCOVER-AQ Maryland. Presented at the *NASA Air Quality Applied Sciences Team (AQAST) Winter 2016 Meeting*. RTP, NC.
7. **Goldberg, D. L.**, T. P. Vinciguerra, L. Hembeck, D. C. Anderson, S. Carpenter, T. P. Canty, R. J. Salawitch & R. R. Dickerson. (**December 2014**). Using Source Apportionment to Evaluate the Cross State Transport of Ozone in the Eastern United States. Presented at the *American Geophysical Union (AGU) Fall 2014 Meeting*. San Francisco, CA.
8. **Goldberg, D. L.**, T. P. Vinciguerra, L. Hembeck, D. C. Anderson, S. Carpenter, T. P. Canty, R. J. Salawitch & R. R. Dickerson. (**June 2014**). Using CAMx and CMAQ to Investigate Cross-state Transport of Ozone in the Eastern United States. Presented at the *NASA Air Quality Applied Sciences Team (AQAST) Summer 2014 Meeting*. Boston, MA.
9. **Goldberg, D. L.**, T. P. Vinciguerra, L. Hembeck, D. C. Anderson, T. P. Canty, R. J. Salawitch & R. R. Dickerson. (**December 2013**). CAMx and CMAQ Model Intercomparison for July 2007 in the Baltimore-Washington Metropolitan Region. Presented at the *American Geophysical Union (AGU) Fall 2013 Meeting*. San Francisco, CA.

Teaching Experience

George Washington University, Global Climate Change and Air Pollution: Science, Impacts, and Solutions 2020
Guest Lecturer on the use of measurements and models to estimate air pollution exposures

University of Maryland, **AOSC200: Introduction to Weather and Climate** 2012 – 2013
Head TA. Taught two lectures per week for 2 semesters. Graded all exams, quizzes, and projects.

Related Professional Experience

National Atmospheric Deposition Program Primary Site Operator 2012 – 2014
Clean Air Status & Trends Network Primary Site Operator 2012 – 2014

Editorial Review

Peer reviewer for academic journals: Atmospheric Chemistry and Physics (3); Atmospheric Environment (5); Atmospheric Measurement Techniques (1); Atmosphere (3); Environmental Research Letters (2); Environmental Science and Technology (3); Geophysical Research Letters (1); Journal of Geophysical Research – Atmospheres (1); Remote Sensing (2); Science of the Total Environment (1); Environmental Science and Technology Letters (1); Elementa (1)

Peer reviewer for academic proposals: NASA Research Opportunities in Space and Earth Science (ROSES), NASA Postdoctoral Program (NPP), Netherlands Organization for Scientific Research Innovational Research Incentives Scheme (Vici)

Professional Membership

American Geophysical Union (AGU)
American Meteorological Society (AMS)

Skills & Proficiencies

Mastery of:	CAMx air quality model, TROPOMI NO_2, OMI NO_2, OMI SO_2, OMI HCHO, MODIS AOD (Dark Target & Deep Blue), MAIAC AOD, IDL, Visual Basic, HTML, HDF file formats, netCDF file formats, C-shell & Linux
Understanding of:	CMAQ air quality model, WRF, WRF-Chem, Geos-Chem, Python, Fortran