

Daniel M. Westervelt, PhD

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Research and Teaching Interests

Air quality, climate change, atmospheric chemistry, surface observations, global atmospheric modeling, particulate matter, aerosol-climate interactions, aerosol health effects, environmental engineering and science

Education

- Ph.D. Civil and Environmental Engineering. Carnegie Mellon University. Pittsburgh, PA. May 2013 Advisor: Peter Adams
- M.S. Civil and Environmental Engineering. Carnegie Mellon University, Pittsburgh, PA. May 2009
- B.S. Civil Engineering. Purdue University. West Lafayette, IN. May 2008.

Funded research grants

Energy Policy Institute of University of Chicago. Lead PI. \$35,000. 8/1/24 – 7/31/25

National Science Foundation. GEOHealth Intern. Lead PI. \$65,233. 1/1/24 – 12/31/25

National Science Foundation. “Collaborative Research: Accelnet: Clean Air Monitoring and Solutions Network”. \$2,000,000. Lead PI. 1/1/21 – 1/1/26

Department of State, USA. “Capacity building, knowledge sharing, and air quality improvement for Anglophone and Francophone West Africa”. \$440,440 PI. 10/1/2021 – 10/1/2024

Department of State, USA. “International networking, knowledge sharing, and capacity building for improved air quality in four East African countries”. \$300,000 Lead PI. 10/1/20 – 10/1/2023

Columbia University Data Science Institute. “Application of Gaussian Mixture Regression to Obtain Useful, Actionable Air Pollution Data from Consumer-Grade, Low-Cost Monitoring Devices” 2/1/2022 – 1/31/2024. \$150,000. Lead PI

US Agency for International Development. “Catalyzing Clean Air.” \$800,000 subaward to Columbia via World Resources Institute. Co-PI. 10/1/20 – 10/1/25

Columbia University Provost’s Office. “Towards closing the air pollution data gap in sub-Saharan Africa through international collaboration and capacity building.” \$42,000. 7/1/2020 – 6/31/2022. Lead PI

Environmental Protection Agency. “Automated Model Reduction for Atmospheric Chemical Mechanisms”. \$462,025 Co-I. 12/1/2020 – 11/30/2023.

Clean Air Fund. “Early life air pollution exposures and non-communicable disease risk in Ghana” \$500,000. Co-I (Lead PI Darby Jack)

Columbia University Data Science Institute. “Detecting and attributing spatiotemporal variations in sources of ground-level air pollution with a modeling testbed for integrating multiple noisy satellite datasets.” 1/1/2020 – 12/31/2021. \$200,000. Co-PI.

National Institute of Health (NIH) U2R. Advancing Public Health Research in Eastern Africa through Data Science Training (APHREA-DST). 09/01/2021 - 08/31/2026. co-I. \$50,000. (Lead: Kiros Berhane CU MSPH)

Columbia University Earth Institute. 12/1/2019 – 12/31/2020 “Clean air toolbox for cities initiative”. \$150,000. co PI

Columbia Center for Climate and Life. 7/1/2019 – 12/31/2022. “Towards the development of a real-time air pollution monitoring network in sub-Saharan Africa”. \$201,328. Lead PI

Lamont Center for Climate and Life. “The Impact of Rapidly Changing Regional Aerosol Emissions on Near-term Climate.” \$119,926. 12/1/22 – 12/1/25

Industrial Economics, Inc. 2/1/2020 – 12/31/2020. “Data analysis of low cost air pollution monitors in a polluted neighborhood in Accra, Ghana”. \$20,000. Subcontract, Institutional PI.

Lamont-Doherty Earth Observatory, Columbia University. Columbia Climate Center. 2/1/2019-1/31/2021. “Development of an air pollution monitoring network in the megacity of Kinshasa, Democratic Republic of the Congo”. \$10,000. Lead PI

National Science Foundation, Atmospheric and Geospace Science (AGS). \$169,504. 9/1/18 – 9/31/20. “Local and Remote Regional Climate Responses to Regional Forcings from Short-Lived Climate Forcers”. Co-I

National Science Foundation. Atmospheric and Geospace Science (AGS). \$602,918. 11/1/16 – 10/31/20 “Understanding Forced and Natural Asian Monsoon Variability and Change in Observations and CMIP5 Models.” Co-PI

NASA Atmospheric Chemistry, Modeling, Analysis and Prediction (ACMAP). \$748,955. 1/1/17 – 12/31/20. “Variability and trends in tropospheric oxidation: Interactions with regional air quality, global atmospheric composition, and climate”. Co-PI

Columbia University Global Policy Center. \$200,000. 6/1/16 – 5/31/18. “Assessing future Chinese air pollution impacts on mortality in China and the U.S.” Co-PI

Columbia University Earth Institute. \$15,000. 9/1/2015 – 12/19/2016. “Can satellite observations help us better understand the air quality problem in India?” Lead PI

Clean Air Fund. \$200,000. 9/1/2024 – 3/31/26. “Leveraging long-term remote-sensing observations and machine learning to promote clean air policy and improved health across Africa (Westervelt, D, PI)”.

(Pending) Department of Energy. \$900,000. 1/1/25-12/31/27. “Improved Understanding of the Cloud Responses to Regional Aerosol Emission Changes.” (Y. Zhang PI [Westervelt postdoc advisee], Westervelt, Co-PI.)

(Pending) Joint NSF/NERC (United Kingdom). \$5,000,000. 6/1/25 – 5/31/28. “NERC/NSF Study of East African Air Quality (SEAQUAL)”. Westervelt, Co-I.

(Pending) NSF Science and Technology Center. \$10,000,000. 1/1/26 – 12/31/31. “Center for Research at the Nexus Between Climate and Air Quality in Africa: Applications of Novel AI and Knowledge Blending Data Fusion in Data Sparse Environments”. Institutional PI

(Pending) NASA HAQAST. “Leveraging NASA Earth Observations and well-calibrated air sensors to improve air quality management and health outcomes in Puerto Rico”. Lead PI. 2/1/25 – 1/31/29. \$600,000

(Pending) Belmont/NSF. \$110,000 to Columbia/LDEO. 6/1/25 – 5/31/28. “East Africa Sustainable Training and Capacity-development for Localized Engaged Air Research (EAST-CLEAR)”. Institutional PI

Experience

Lamont Associate Research Professor (primary appointment) Columbia University, Lamont-Doherty Earth Observatory	7/2023 - present
Lamont Assistant Research Professor Columbia University, Lamont-Doherty Earth Observatory	7/2021 – 6/2023
Affiliate Professor Mohammed VI Polytechnic, Benguerir, Morocco	2/2024 - present
Affiliate Faculty Columbia University Data Science Institute	2/2021 - present
Science Collaborator NASA Goddard Institute for Space Studies (NASA GISS)	9/2016 - present
Associate Research Scientist Columbia University, Lamont-Doherty Earth Observatory	8/2015 – 6/2021

**Postdoctoral Research Associate in Science, Technology, and
Environmental Policy**

8/2013 – 8/2015

Princeton University and Geophysical Fluid Dynamics Lab (GFDL)

Advisor: Denise Mauzerall

Peer-reviewed Publications (** indicates student or postdoc advisee) (h-index: 25)

Submitted or in review

1. **Westervelt, D.M.**, Amooli, J.A^{**}; Anand, A^{**}. “High Spatiotemporal Resolution Estimates of PM_{2.5} in West Africa Using Satellite Data, Surface Monitors, and Machine Learning.” Submitted to *ES&T Air*, 2024.
2. Chakraborty, A., Wiser, Fc., Sen, S., **Westervelt, D.M.**, Carter, R., McNeill, V.F., Venkatasubramanian, V. “Evolutionary Optimization of the Reduced Gas-phase Isoprene Oxidation Mechanism”. Submitted to Journal of Advances in modeling earth systems (JAMES), 2024.
3. Waiguru N.E.; Subramanian R.; Giordano, M.; **Westervelt, D.M.**; Gatari, M.; Opinde, G.; Presto, A.A.; Tjernstrom, E.; McNeill, V.F.; Mungai, J. Seasonal multisite low-cost sensor measurements to estimate spatial and temporal variability of particulate matter pollution in Nairobi, Kenya. Submitted to Atmospheric Pollution Research, 2024.
4. Giordano MR, Beekmann M, Appoh E, Hughes A, Gatari MJ, Nimo J, Njeru, MN, Piketh, S., Presto, A., Waiguru, N., **Westervelt, DM**, Subramanian, R. Utilizing Reanalysis Datasets to Improve the Performance of Low-Cost Air Sensors in the Global South. Submitted to *Environmental Science: Atmospheres*; doi:10.26434/chemrxiv-2024-j5dcn, 2024
5. Zhang, Y.^{**}, Knutson, T.R., Shevliakova, E., Horowitz, L.W., Ginoux, P., Paynter, D., and **Westervelt, D.M.** “The fast response of precipitation to historical anthropogenic black carbon and sulfate aerosols in the GFDL ESM4 climate model”. Submitted to *Journal of Climate*. 2024.
6. Watson-Parris, D., Wilcox, L. J., Stjern, C. W., Allen, R. J., Persad, G., Bollasina, M. A., Ekman, A. M. L., Iles, C. E., Joshi, M., Lund, M. T., McCoy, D., **Westervelt, D.M.**, Williams, A., and Samset, B. H.: Weak surface temperature effects of recent reductions in shipping SO₂ emissions, with quantification confounded by internal variability, EGU sphere [preprint], <https://doi.org/10.5194/egusphere-2024-1946>, 2024.
7. Toolan, C. A., Amooli, J. A.^{**}, Wilcox, L. J., Samset, B. H., Turner, A. G., and **Westervelt, D. M.**: Strong inter-model differences and biases in CMIP6 simulations of PM_{2.5}, aerosol optical depth, and precipitation over Africa, EGU sphere [preprint], <https://doi.org/10.5194/egusphere-2024-3057>, 2024.

Published

1. Nana, Bernard; Raheja, Garima**; Ouarma, Issoufou; Kayaba, Haro; Gounkaou, Woro; Daho, Tizane; Bere, Antoine; Mellouki, Abdewahid; **Westervelt, Daniel** "Monitoring of PM_{2.5} using well-calibrated low-cost sensors over one year in Burkina Faso". *ES&T Air*, <https://doi.org/10.1021/acsestair.4c00126>, 2024
2. Amooli, J.A.**; Hackman, K.O., Nana, B., **Westervelt, D.M.** "Fine particulate air pollution estimation in Ouagadougou using satellite aerosol optical depth and meteorological parameters". *Environmental Science: Atmospheres*. <https://doi.org/10.1039/D4EA00057A>. 2024
3. Abhishek Anand, N'Datchoh Evelyne Touré, Julien Bahino, Sylvain Gnamien, Allison Felix Hughes, Raphael E Arku, Victoria Owusu Tawiah**, Araya Asfaw, Tesfaye Mamo, Sina Hasheminassab, Solomon Bililign, Vaios Moschos, **Daniel M Westervelt**, Albert A Presto. "Low cost hourly ambient black carbon measurements at multiple cities in Africa". *Environmental Science and Technology*. <https://doi.org/10.1021/acs.est.4c02297>, 58, 28, 12575-12584, 2024.
4. Bililign, S., Brown, S.S., **Westervelt, D.M.**, Kumar, R., Tang, W., Flocke, F., Vizuete, W., Ture, K., Pope, F.D., Demoz, B., Asa-Awuku, A., Levelt, P.F., Kalisa, E., Raheja, G.**; Ndyabakira, A., Gatari, M.J. "East African Megacity Air Quality: Rationale and Framework for a Measurement and Modeling Program". *Bulletin of the American Meteorological Society*. <https://doi.org/10.1175/BAMS-D-23-0098.1>, 2024.
5. Johnson, M., Abuya, Wickramanayake, Anneka, Miller, Heather, Sambu, Mwanga, Daniel, Odwe, Ndwigwa, Piedrahita, Rossanese, Gatari, Giordano, Michael, **Westervelt, Daniel M.**, Wotton, Laura, Rajasekharan. "Patterns and drivers of maternal personal exposure to PM_{2.5} in informal settlements in Nairobi, Kenya". *Environmental Science: Atmospheres*. [10.1039/D3EA00074E](https://doi.org/10.1039/D3EA00074E), April 2024.
6. Fiedler, S., Naik, V., O'Connor, F. M., Smith, C. J., Griffiths, P., Kramer, R. J., Takemura, T., Allen, R. J., Im, U., Kasoar, M., Modak, A., Turnock, S., Voulgarakis, A., Watson-Parris, D., **Westervelt, D. M.**, Wilcox, L. J., Zhao, A., Collins, W. J., Schulz, M., Myhre, G., and Forster, P. M.: Interactions between atmospheric composition and climate change – progress in understanding and future opportunities from AerChemMIP, PDRMIP, and RFMIP, *Geosci. Model Dev.*, 17, 2387–2417, <https://doi.org/10.5194/gmd-17-2387-2024>, 2024.
7. Njeru, M.**; E. Mwangi, Gatari, M.J., Kaniu, I., Raheja, G.**; and **Westervelt, D.M.** First results from a hybrid network of reference and low-cost PM_{2.5} monitors in Mombasa, Kenya. *AGU Geohealth*, Volume 8, Issue 9, <https://doi.org/10.1029/2024GH001049> Sep 2024.
8. Yang, Benjamin**, Wiser, F.C., McNeill, V.F., Fiore, A.M., Tao, M., Henze, D.K, Sen, S., and **Westervelt, D.M.** Implementation and Evaluation of the Automated Model Reduction (AMORE) Version 1.1 Isoprene Oxidation Mechanism in GEOS-Chem. *Environmental Research: Atmospheres*. 2023, <https://doi.org/10.1039/D3EA00121K>

9. **Westervelt, D.M.**, Paulson Kasereka**, Garima Raheja**, Jean-Luc Balogije Selenge, Rodriguez Yombo Phaka, V. Faye McNeill, Guillaume Kiyombo Mbela, Marianthi-Anna Kioumourtzoglu, Joel Nkiama Konde, Jean-Pierre Mfuamba Mulumba, Djibi Buenimio. “A Low cost investigation into sources of PM2.5 in Kinshasa, DRC.” *ACS EST Air* 2024, 1, 1, 43–51. 2023
10. Previdi, M., J.-F. Lamarque, A.M. Fiore, **D.M. Westervelt**, D.T. Shindell, G. Correa, and G. Faluvegi, 2023: Arctic warming in response to regional aerosol emissions reductions. *Environ. Res. Climate*, 2, no. 3, 035011, doi:10.1088/2752-5295/ace4e8.
11. Raheja, Garima**, James Nimo, Emmanuel K.-E. Appoh , Benjamin Essien, Maxwell Sunu, John Nyante, Mawuli Amegah, Reginald Quansah, Raphael E Arku, Stefani L. Penn, Michael R. Giordano, Zhonghua Zheng, Darby Jack, Steven Chillrud, Kofi Amegah, R Subramanian, Rob Pinder, Ebenezer Appah-Sampong, Esi Nerquaye Tetteh, Mathias A. Borketey, Allison Felix Hughes, **Daniel M. Westervelt**. “Low-Cost Sensor Performance Intercomparison, Correction Factor Development, and 2+ Years of Ambient PM2.5 monitoring in Accra, Ghana.” *Environmental Science and Technology*, 75, 29, 10708-10720, 2023
12. Nobell, S., Majumdar, A., Mukherjee, S., Chakraborty, S., Chatterjee, S., Bose, S., Dutta, A., Sethuraman, S., **Westervelt, D.M.**, Sengupta, S., Basu, R., McNeill, V.F. (2023). Validation of In-field Calibration for Low-Cost Sensors Measuring Ambient Particulate Matter in Kolkata, India. *Aerosol Air Qual. Res.* 23, 230010. <https://doi.org/10.4209/aaqr.230010>
13. G. Persad, B. H. Samset, L. J. Wilcox, Robert J. Allen, Massimo A. Bollasina, Ben B. B. Booth Celine Bonfils, Manoj Joshi, Marianne T. Lund, Kate Marvel, Joonas Merikanto, Kalle Nordling, Sabine Undorf, Detlef van Vuuren, **Daniel M. Westervelt**, Alcide Zhao. “Rapidly evolving aerosol emissions are a dangerous blind spot in near-term climate risk.” *Environmental Research: Climate*, 2 032001, 10.1088/2752-5295/acd6af, 2023.
14. Wilcox, L. J., Allen, R. J., Samset, B. H., Bollasina, M. A., Griffiths, P. T., Keeble, J., Lund, M. T., Makkonen, R., Merikanto, J., O'Donnell, D., Paynter, D. J., Persad, G. G., Rumbold, S. T., Takemura, T., Tsigaridis, K., Undorf, S., and Westervelt, D. M.: The Regional Aerosol Model Intercomparison Project (RAMIP), *Geosci. Model Dev.*, 16, 4451–4479, <https://doi.org/10.5194/gmd-16-4451-2023>, 2023.
15. Wiser, F., Place, B. K., Sen, S., Pye, H. O. T., Yang, B., **Westervelt, D. M.**, Henze, D. K., Fiore, A. M., and McNeill, V. F.: AMORE-Isoprene v1.0: a new reduced mechanism for gas-phase isoprene oxidation, *Geosci. Model Dev.*, 16, 1801–1821, <https://doi.org/10.5194/gmd-16-1801-2023>, 2023.
16. Baublitz CB, Fiore AM, Ludwig SM, Nicely JM, Wolfe GM, Murray LT, Commane R, Prather MJ, Anderson DC, Correa G, Duncan BN, Follette-Cook M, **Westervelt DM**, Bourgeois I, Brune WH, Bui TP, DiGangi JP, Diskin GS, Hall SR, McKain K, Miller DO, Peischl J, Thames AB, Thompson CR, Ullmann K, Wofsy SC. An observation-based, reduced-form model for oxidation in the remote marine troposphere. *Proc Natl*

Acad Sci U S A. 2023 Aug 22;120(34):e2209735120. doi: 10.1073/pnas.2209735120. Epub 2023 Aug 14.

17. Zheng, Z.**; Fiore, A.M, **Westervelt, D.M.**, et al. "Automated machine learning to evaluate the information content of tropospheric trace gas columns for fine particle estimates over India: a modeling testbed". JAMES, 15, 3, <https://doi.org/10.1029/2022MS003099>, 2023
18. Sebastian, M., Kompalli, S. K., Kumar, V. A., Jose, S., Babu, S. S., Pandithurai, G., Singh, S., Hooda, R. K., Soni, V. K., Pierce, J. R., Vakkari, V., Asmi, E., **Westervelt, D. M.**, Hyvärinen, A.-P., and Kanawade, V. P.: Observations of particle number size distributions and new particle formation in six Indian locations , Atmos. Chem. Phys., 22, 4491–4508, <https://doi.org/10.5194/acp-22-4491-2022>, 2022.
19. Raheja, Garima**, Sabi, Kokou, Hèzouwè, Sonla, Gbedjangni, Eric Kokou, McFarlane, Celeste M., Holdoli, Collins Gameli, and **Westervelt, D.M.**, “A network of field-calibrated low-cost sensor measurements of PM2.5 in Lomé, Togo, over one to two years.” ACS Earth and Space chemistry,6,4, 1011-1021, <https://doi.org/10.1021/acsearthspacechem.1c00391>, 2022.
20. Raheja, Garima**.; Harper, L.; Hoffman, A.; Gorby, Y.; Freese, L.; O’Leary, B.; Deron, N.; Smith, S.; Auch, T.; Goodwin, M.; **Westervelt, D. M.** Community-Based Participatory Research for Low-Cost Air Pollution Monitoring in the Wake of Unconventional Oil and Gas Development in the Ohio River Valley: Empowering Impacted Residents through Community Science. Environ. Res. Lett. 2022, 17 (6), 065006. <https://doi.org/10.1088/1748-9326/ac6ad6>. 2022
21. Yang, H., Huang, X., **Westervelt, D.M.**, Horowitz, L.W. and Peng, W. "Socio-demographic factors shaping the future global health burden from air pollution". Nat Sustain (2022). <https://doi.org/10.1038/s41893-022-00978-6>
22. Karambelas, A., Fiore, A. M., **Westervelt, D. M.**, McNeill, V. F., Randles, C. A., Venkataraman, C., et al. (2022). Investigating drivers of particulate matter pollution over India and the implications for radiative forcing with GEOS-chem-tomas15. Journal of Geophysical Research: Atmospheres, 127, e2021JD036195. <https://doi.org/10.1029/2021JD036195>
23. E. X. Bonilla , L. J. Mickley , G. Raheja , S. D. Eastham , J. J. Buonocore , A. Alencar , L. Verchot , **D. M. Westervelt** , M. C. Castro. Health impacts of smoke exposure in South America: Increased risk for populations in the Amazonian Indigenous territories. Environmental Research: Health. 1 021007 DOI 10.1088/2752-5309/acb22b
24. Ivey CE, Amegah AK, Hodoli CG, Kelly KE, Lawal_A, Pant P, Singh S, Subramanian R, Torres I, **Westervelt D.** and Yu H (2022). To Share Or Not To Share? Academic Incentives May Hamper Public Good. *Environmental Science & Technology*, 55, 22, 15072–15081. <https://pubs.acs.org/doi/10.1021/acs.est.2c05721>

25. Hancock, S.** , Fiore, A.M., **Westervelt D.M.**, Correa, G., Lamarque, J.-F., Venkataraman, C., Sharma, A. "Changing PM 2.5 and related meteorology over India from 1950-2014: A new perspective from a chemistry-climate model ensemble". Volume 2, 015003 DOI 10.1088/2752-5295/acb22a
26. McFarlane, C.M.** , Raheja, G.** , Malings., C., Appoh, Emmanuel K.E., Hughes, Alison Felix, and **Westervelt, D.M.** "Application of Gaussian Mixtrue Regression for the Correction of Low Cost PM2.5 Monitoring Data in Accra, Ghana". ACS Earth and Space Chemistry. 10.1021/ acsearthspacechem.1c00217, 2021
27. McFarlane, C**., Isevlambire, P.K., Lumbuenamo, R.S., Ndinga, A.M.E., Dhammapala, R., Jin, X., McNeill, V.F., Malings, C., Subramanian, R. **Westervelt, D.M.** (2021). First Measurements of Ambient PM_{2.5} in Kinshasa, Democratic Republic of Congo and Brazzaville, Republic of Congo Using Field-calibrated Low-cost Sensors. Aerosol Air Qual. Res. <https://doi.org/10.4209/aaqr.200619>
28. M. Sebastian, V. P. Kanawade, V. K. Soni, E. Asmi, **D. M. Westervelt**, V. Vakkari, A.-P.Hyvarinen, J. R. Pierce: New Particle Formation and Growth to Climate-relevant Aerosols at a High Altitude Site in the Western Himalaya, *J. Geophys. Res.*, 2021.
29. **Westervelt, D. M.**, Fiore, A. M., Baublitz, C. B., and Correa, G.: Impact of regional Northern Hemisphere mid-latitude anthropogenic sulfur dioxide emissions on local and remote tropospheric oxidants, *Atmos. Chem. Phys.*, 21, 6799–6810, <https://doi.org/10.5194/acp-21-6799-2021>, 2021.
30. Michael R. Giordano, Carl Malings, Spyros N. Pandis, Albert A. Presto, V.F. McNeill, **Daniel M. Westervelt**, Matthias Beekmann, R. Subramanian, From low-cost sensors to high-quality data: A summary of challenges and best practices for effectively calibrating low-cost particulate matter mass sensors, *Journal of Aerosol Science*, Volume 158, 2021, 105833, ISSN 0021-8502, <https://doi.org/10.1016/j.jaerosci.2021.105833>.
31. Song Liu, Jia Xing, **Westervelt, D.M.**, Shuchang Liu, Dian Ding, Arlene M. Fiore, Patrick L. Kinney, Yuqiang Zhang, Mike Z. He, Hongliang Zhang, Shovan K. Sahu, Fenfen Zhang, Bin Zhao, Shuxiao Wang, Role of emission controls in reducing the 2050 climate change penalty for PM2.5 in China, *Science of The Total Environment*, Volume 765, 2021, 144338,SSN 0048-9697, <https://doi.org/10.1016/j.scitotenv.2020.144338>.
32. **Westervelt, D. M.**, You, Y., Li, X., Ting,M., Lee, D. E., & Ming, Y. (2020).Relative importance of greenhouse gases, sulfate, organic carbon, and black carbon aerosol for South Asian monsoon rainfall changes. *Geophysical Research Letters*, 47, e2020GL088363
33. Malings, C., **Westervelt, D. M.**, Hauryliuk, A., Presto, A. A., Grieshop, A., Bittner, A., Beekmann, M., and R. Subramanian: Application of low-cost fine particulate mass monitors to convert satellite aerosol optical depth to surface concentrations in North America and Africa, *Atmos. Meas. Tech.*, 13, 3873–3892, <https://doi.org/10.5194/amt-13-3873-2020>, 2020.

34. Allen, R. J., Turnock, S., Nabat, P., Neubauer, D., Lohmann, U., Oliv  , D., Oshima, N., Michou, M., Wu, T., Zhang, J., Takemura, T., Schulz, M., Tsigaridis, K., Bauer, S. E., Emmons, L., Horowitz, L., Naik, V., van Noije, T., Bergman, T., Lamarque, J.-F., Zanis, P., Tegen, I., **Westervelt, D. M.**, Le Sager, P., Good, P., Shim, S., O'Connor, F., Akritidis, D., Georgoulas, A. K., Deushi, M., Sentman, L. T., John, J. G., Fujimori, S., and Collins, W. J.: Climate and air quality impacts due to mitigation of non-methane near-term climate forcers, *Atmos. Chem. Phys.*, 20, 9641–9663, <https://doi.org/10.5194/acp-20-9641-2020>, 2020.
35. **Westervelt, D. M.**, Mascioli, N. R., Fiore, A. M., Conley, A. J., Lamarque, J.-F., Shindell, D. T., Faluvegi, G., Previdi, M., Correa, G., and Horowitz, L. W.: Local and remote mean and extreme temperature response to regional aerosol emissions reductions, *Atmos. Chem. Phys.*, 20, 3009–3027, <https://doi.org/10.5194/acp-20-3009-2020>, 2020.
36. Baublitz, C.B, Fiore, A.M; Clifton, O.E.; Mao, J.; Li, J.; Correa, G., **Westervelt, D. M.**, Horowitz, L.W., Paulot, F.; Williams, A.P., (2020). Sensitivity of Tropospheric Ozone Over the Southeast USA to Dry Deposition. *Geophysical Research Letters*, 47, e2020GL087158. <https://doi.org/10.1029/2020GL087158>
37. Amiri-Farahani, A., Allen, R.J., Li, King-Fai, Nabat, P., and **Westervelt, D.M.** A La Ni  a-like climate response to south African biomass burning aerosol in CESM simulations. *JGR-Atmospheres*, 2020. <https://doi.org/10.1029/2019JD031832>
38. Li, Xiaoqiong, Ting, Mingling, You, Yujia, Lee, Dong Eun, **Westervelt, D. M.** Ming, Yi., South Asian summer monsoon response to aerosol-forced sea surface temperatures. Vol 47, Issue 1. 2020 <https://doi.org/10.1029/2019GL085329>
39. Nicely, J. M., Duncan, B. N., Hanisco, T. F., Wolfe, G. M., Salawitch, R. J., Deushi, M., Haslerud, A. S., J  ckel, P., Josse, B., Kinnison, D. E., Klekociuk, A., Manyin, M. E., Mar  cal, V., Morgenstern, O., Murray, L. T., Myhre, G., Oman, L. D., Pitari, G., Pozzer, A., Quaglia, I., Revell, L. E., Rozanov, E., Stenke, A., Stone, K., Strahan, S., Tilmes, S., Tost, H., **Westervelt, D. M.**, and Zeng, G.: A machine learning examination of hydroxyl radical differences among model simulations for CCMI-1, *Atmos. Chem. Phys.*, 20, 1341–1361, <https://doi.org/10.5194/acp-20-1341-2020>, 2020
40. **Westervelt, D.M.**, Ma, C.T., He, M.Z., Fiore, A.M, Kinney, P.L, Kioumourtzoglou, M.-A., Wang, S., Xing, J., Ding., D, Correa, G. Mid-21st century ozone air quality and health burden in China under emissions scenarios and climate change. *Environmental Research Letters*. 14, 2019, 074030, doi: <https://iopscience.iop.org/article/10.1088/1748-9326/ab260b>
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51. **Westervelt, D. M.**, Pierce, J. R., Riipinen, I., Trivittayanurak, W., Hamed, A., Kulmala, M., Laaksonen, A., Decesari, S., and Adams, P. J.: Formation and growth of nucleated particles into cloud condensation nuclei: model-measurement comparison, *Atmos. Chem. Phys.*, 13, 7645-7663, doi:10.5194/acp-13-7645-2013, 2013
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growth in biomass burning plumes: An important source of cloud condensation nuclei, *Geophys. Res. Lett.*, 39, L09805, doi:10.1029/2012GL050930.

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55. Snow-Kropla, E. J., Pierce, J. R., **Westervelt, D. M.**, and Trivittayanurak, W.: Cosmic rays, aerosol formation and cloud-condensation nuclei: sensitivities to model uncertainties, *Atmos. Chem. Phys.*, 11, 4001-4013, doi:10.5194/acp-11-4001-2011, 2011

Book chapters

Donahue, N. M., Posner, L. N., **Westervelt, D. M.**, Li, Z., Shrivastava, M., Presto, A. A., Sullivan, R. C., Adams, P. J., Pandis, S. N., Robinson, A. L.: Where Did This Particle Come From? Sources of Particle Number and Mass for Human Exposure Estimates. *Airborne Particulate Matter: Sources, Atmospheric Processes, and Health*. pp. 35–71., doi:10.1039/9781782626589-00035, 2016.

Invited Presentations

Johns Hopkins Wolman Seminar	Dec 2024
Air Pollution and Climate Change in the Global South: From Air Sensors to Supercomputers	
NYC Climate Week	Sep 2024
Towards Clean Air and Clean Energy in the Global South	
India Clean Air Summit	Aug 2024
<i>Keynote</i> invited speaker (3 talks), co-organizer	
NASA Health and Air Quality Applied Science Team	June 2024
“Potential for well-calibrated air sensors to enhance utility of satellite retrievals for air quality management”	
National Science Foundation Headquarters	May 2024
“International collaboration for use-inspired air quality research in overburdened communities”	
Air Sensors International Community Conference	May 2024
<i>Keynote invited speaker</i> : Getting useful, actionable data from low cost air sensors	
CICERO + University of Oslo Seminar	Nov 2023

“Air Pollution and Climate Change in the Global South: from air sensors to supercomputers”	
ASIC Ghana	Oct 2023
“Demonstrating the power of air sensors in East, West, and Central Africa”	
Department of Physics, University of Ghana	Aug 2023
“Air Quality studies in Ghana”	
US EPA Air Sensors QA Workshop	July 2023
“Calibration of air sensors for air quality measurement”	
Aerodyne Research, Inc	July 2023
“The State of Particulate Matter Monitoring on the African Continent and Future Needs”	
CICERO Regional Aerosol Forcing workshop	Mar 2023
“Regional Aerosol-induced Arctic amplification”	
AfriqAir annual meeting	Mar 2023
“Source apportionment of PM _{2.5} using low-cost sensors”	
University of Puerto Rico at Mayagüez	Feb 2023
Department seminar	
American Meteorological Society 2023 Annual Meeting	Jan 2023
(Invited) Getting useful, actionable data from low cost air sensors	
Department Seminar, US EPA Office of Research and Development	July 2022
“Getting useful, actionable air quality data from low cost sensors in the US and abroad”	
Department Seminar, US EPA Region 2 Office (NY, NJ, PR, VI)	May 2022
“Getting useful, actionable air quality data from low cost sensors in the US and abroad”	
Workshop on The Power of TROPOMI to bridge African science and policy	April 2022
“Air quality data analysis and capacity building in Africa”	
Tri-MIP 3: AerChemMIP, PDRMIP, and RAMIP	Nov 2021
“Developing emulators of climate responses to regional aerosol perturbations using three coupled chemistry-climate models”	
Department Seminar, North Carolina State A&T University	Nov 2021
“Towards closing the air pollution data gap in sub-Saharan Africa”	
Workshop on a Pilot Design for Air Quality in Africa	Jun 2021
First measurements of PM _{2.5} in Togo and the Democratic Republic of Congo	
European Geophysical Union (invited)	April 2021
“Developing emulators of regional climate responses to regional aerosol perturbations using three coupled chemistry-climate models”	
iLEAPS Early Career Meeting	Nov 2020
“Towards closing the air pollution data gap in sub-Saharan Africa”	
US Department of State Air Quality Fellows Seminar	Sep 2020

“Towards closing the air pollution data gap in sub-Saharan Africa”	
Digital Air Quality, A Systems Approach to Air Pollution	Aug 2020
“Columbia University’s air quality research in Africa”	
MAIA Science Team Meeting (virtual due to COVID19)	May 2020
Makerere University, Kampala, Uganda	Aug 2019
Air Pollution in Africa: Current research and future directions at Columbia University	
University of Birmingham / Population Council Air Pollution Workshop	Aug 2019
Air Pollution in Africa: Current research and future directions at Columbia University	
USAID Air Pollution Solutions Workshop, New York, NY	April 2019
Development of a low cost air pollution sensor network in sub-Saharan Africa	
Georgia Institute of Technology, Department of Earth and Atmospheric Science	Feb 2019
The Atmospheric Chemistry, Air Quality, and Climate Change Nexus: From the nano to the global scale”	
American Geophysical Union Fall Meeting 2018	Dec 2018
Washington, DC. “Connecting regional aerosol emissions reductions to local and remote precipitation responses”. Invited, GH11C: Short-Lived Pollutants in the Human–Climate System	
Columbia Mailman School of Public Health Climate and Health Department Seminar. “Mid-21st century ozone air quality in China under emissions scenarios and climate change”	Sep 2018
Nanjing Agricultural University, Department of Environmental Science	July 2018
“Air pollution and climate change research at Columbia”	
Rutgers University, Department of Environmental Sciences Seminar	May 2018
“The Air Quality – Climate Change Nexus: From the nano to the global scale”	
Ball State University, Department of Environmental Management	May 2018
“The Air Quality – Climate Change Nexus: From the nano to the global scale”	
New York University, Department of Environmental Engineering Department Seminar. “All about atmospheric aerosols: from air quality to climate change”. New York, NY	Mar 2017
American Geophysical Union Fall Meeting 2016	Dec 2016
San Francisco, CA. “The impact of sulfate removal on global and regional precipitation in three coupled climate models”. A11L: Tropospheric Chemistry-Climate Interactions	
Lamont-Doherty Earth Observatory Ocean and Climate Physics Seminar	Jan 2016
Palisades, NY. “Taming the aerosol monster: a multimodel approach to elucidating the cloud and precipitation response to regional changes in aerosol emissions”	

Teaching Experience

Instructor, Columbia Department of Earth and Environmental Sciences UN3400 Computational Earth Science	Fall 2024
Instructor, Columbia Department of Earth and Environmental Sciences Research Computing for Earth and Environmental Scientists	Spring 2024
Adjunct Professor, Tandon School of Engineering, New York University Courses: CE-GY 7523, Air Pollution. Graduate-level class. Overall evaluation: 4.6 / 5.0 CE-UY 3223, Introduction to Environmental Engineering	Fall 2017- present
Faculty, New Jersey Scholars Program, The Lawrenceville School Taught summer course on “Climate Change and the Human Experience”	Summer 2015
Encouraging Networks between Geoscience and Geoscience Education (ENGAGE) workshop Held in Washington, DC. Sponsored and funded by National Science Foundation.	Jan 2015
Eberly Center for Teaching Excellence Future Faculty Program Completed teaching observations, course and syllabus development, attended seminars	2012-2013
Guest Lecturer, Introduction to Atmospheric Chemistry. Columbia University. Sulfate-nitrate-ammonium atmospheric thermodynamics.	Mar 2016, 2017, 2019, 2020
Guest Lecturer, Fundamentals of Atmospheric Aerosols (CU). Taught 2 lecture (3 hours each) on aerosol microphysics	April 2017, 2018
Guest Lecturer, Fundamentals of Atmospheric Aerosols (CMU) Taught 3 lectures on single particle dynamics, aerosol size distributions, and aerosol and cloud optical properties	2013
Teaching and Lab Assistant, Various Classes Assisted lab sessions, taught guest lectures, held weekly office hours, administered exams, grading	2009-2013

Students and postdocs advised

Abhishek Anand Postdoctoral research scientist	2024-present
Gopikrishna Gopalakrishnan IIE Fulbright Scholar	2024-present
Sophia Roberts LDEO summer intern	2024-present
Trevor Durning Undergraduate research assistant	2024-present

Yanda Zhang Postdoctoral research scientist	2023-present
Joe Amooli Lamont/DEES PhD student	2023-present
Paulson Kasereka UM6P PhD student	2023-present
Ollie McDonald Barnard senior thesis	2024-present
Jordan Hill Columbia Senior thesis	2024-present
Benjamin Yang Lamont/DEES PhD student	2021 – 2024
Garima Raheja Lamont/DEES PhD Student	2021 - present
Andrea Belvis-Aquino University of Puerto Rico Mayaguez Undergraduate	2023- present
Victoria Owusu Tawiah Kwame Nkrumah University of Science and Technology PhD	2021-present
Moses Njeru University of Nairobi Master's Student	2022-2024
Josephine Kanyeria Jomo Kenyatta University Master's Student	2021-2024
Savannah Ward LDEO Summer Intern	Summer 2021- Summer 2022
Zhonghua Zheng Postdoctoral Research Scientist	Spring 2021 – Spring 2022
Oreoluwa Solanke LDEO Summer intern	Summer 2020
Sarah Hanock LDEO Summer Intern	Summer 2020
Celeste McFarlane Undergraduate researcher (ChemE)	Spring 2020 – Fall 2021
William Tsui PhD defense committee	Spring 2020
Alison Fankhauser PhD defense committee	Fall 2020

Chang Wang MS Environmental Engineering (Dec 2019) Poster presented at AGU 2019	Fall 2019
Anant Majumdar Earth Institute Intern (BA Computer Science 2020).	Spring 2019
Clara T. Ma LDEO summer intern. (BS Geology and Geophysics Yale 2020) Oral presentation given by Clara at AGU Fall Meeting 2017	Summer 2017
Karen Xia Earth Institute Intern (BS Computer Science and Statistics 2018) Poster presented at AAAR 35 th annual fall meeting.	2015-2017
Karen Yu Undergraduate intern. (BS CMU Environmental Engineering 2012, PhD Harvard Atmospheric Science 2019)	2010-2012

Committees and Professional Development

Science Team/Advisory Board

MAIA Project – Multi Angle Imager for Aerosols
 MEASMA-GEO – new geostationary satellite for Middle East and north Africa
 AfriqAir – Air quality in Africa community
 RAMIP – Regional Aerosol Model Intercomparison Project
 AerChemMIP2 – CMIP7 community

Session chair convener

EGU: Regional aerosol emissions impact on climate. April 2024
 AMS: Wildfire and Its Impact. January 2024
 AMS: Air Quality and Perspectives Towards Health and Air Quality and Environmental
 Justice. January 2024
 AMS: Air pollution in growing megacities. January 2023, January 2022, January 2021

LDEO Mentoring and Justice, Equity, Diversity, and Inclusion Committee (JEDI)
 2019-2022

Lamont Colloquium Faculty Coordinator and Committee Chair

Responsible for overseeing Colloquium, inviting speakers. 2022-2023

Lamont Executive Committee

Junior faculty representative, 2022-present

Meeting organizer

Clean Air Monitoring and Solutions Network, CAMS-Net, symposium at Air Sensors
 International Conference, May 2022
 Clean Air Monitoring and Solutions Network, CAMS-Net, Annual Meeting. Kigali, Rwanda,
 March 2023.

Clean Air Monitoring and Solutions Network, CAMS-Net, Annual Meeting. Bangalore, India, August 2024.

Meeting organizer

Air Quality Certificate Program in East Africa. July 25-29 2021. Online

Air Quality Certificate Program in Nairobi, Kenya. Aug 14-18, 2023. In-person

Air Quality Certificate Program in Accra, Ghana. Jan 15-19, 2024. In person

Meeting organizer

Columbia University Air Pollution Roundtable. Nairobi, Kenya. August 26, 2019. Columbia Global Centers

Meeting co-organizer

“Air Pollution Extremes”. Columbia University Initiative on Extreme Weather. November 1-2, 2018

Session Convener and Chair

“Interactions of Air Quality and Meteorology on Local to Synoptic Scales”. AGU Fall Meeting 2017. New Orleans, LA and AGU Fall Meeting 2018, Washington, DC, and 2019 at San Francisco, CA.

“Regional Aerosol interactions with air quality and climate extremes”. AGU Fall Meeting 2024, Washington, DC

Session Chair

“Carbonaceous Aerosols in the Atmosphere”. American Association for Aerosol Research 34th annual meeting. Minneapolis, MN. Oct. 2015

Peer reviewer

Atmospheric Chemistry and Physics, Geoscientific Model Development, Atmospheric Environment, Journal of the Advances of Modeling Earth Systems, Aerosol Science and Technology, Environmental Science and Technology, Journal of Geophysical Research, Geophysical Research Letter, Nature Climate Change

President

American Association of Aerosol Research Carnegie Mellon Chapter (2012)

Secured funding and started guest speaker series, supervised creation of an air quality community awareness blog

Poster Judge, student poster competition

AGU 2014, 2016, 2017, 2018, 2019, 2020, 2024 AAAR 2014, 2015, 2016, 2019, 2020, 2021, 2022, 2023, 2024

Field Work and International Capacity Building

Accra, Ghana: November 2024

Accra, Ghana: January 2024

Accra, Ghana: October 2023

Accra, Ghana: August 2023

Kigali, Rwanda: March 2023

Puerto Rico: February 2023

Kigali, Rwanda; Nairobi, Kenya; Mombasa, Kenya, Jan 2023

Marrakech, Morocco, Oct-Nov 2022

Accra and Kumasi, Ghana, June 2022

Lomé, Togo, July 2022

Nairobi and Mombasa, Kenya, July 2021

Accra, Ghana, February 2020

Lomé, Togo, March 2020

Nairobi, Kenya, August 2019

Kampala, Uganda, September 2019

Mumbai, India, February 2016

Media Appearances

2023 NYC Wildfire Event (~50 appearances)

CNN This Morning, June 7 2023. Topic: Wildfires in New York City.

<https://transcripts.cnn.com/show/ctmo/date/2023-06-08/segment/02>

CNN, The Lead with Jake Tapper. <https://transcripts.cnn.com/show/cg/date/2023-06-08/segment/01>

New York Times. June 6, 2023. <https://www.nytimes.com/live/2023/06/07/us/canada-wildfires-air-quality-smoke>

Bloomberg, June 7, 2023. <https://www.bloomberg.com/news/articles/2023-06-07/smoky-blanket-over-us-northeast-raises-asthma-heart-concerns>

Other appearances

The Economist. July 30, 2020. Africa's skies are badly polluted.

<https://www.economist.com/middle-east-and-africa/2020/07/30/africas-skies-are-badly-polluted>

Nature News. March 2020. Why pollution is plummeting in some cities – but not others.

<https://www.nature.com/articles/d41586-020-01049-6>

Eureka Alert. May 2017. Reduced US air pollution will boost rainfall in Africa's Sahel, says study. <https://www.eurekalert.org/news-releases/560536>

Ghana News Agency. February 2020 <https://www.modernghana.com/news/985664/media-schooled-on-air-quality-in-africa.html>

Outreach Activities

LDEO INSPIRE partner-host, 2024-present. Dr. Amy Quarkume of Howard University

Department of State Air Quality Advisor, 2017-present

National Society for Black Engineers Career Workshop, Guest Speaker, November 2021

Lamont-Doherty Earth Observatory Open House Public Speaker. October 2019
New York State Science and Engineering Fair Judge, March 2017, New York, NY
Lamont-Doherty Earth Observatory Open House. Oct 2016, 2018. Palisades, NY.
Designed and conducted a “clouds in a jar” experiment at the Ocean and Climate Physics booth.
Invited guest speaker, St. Thomas Aquinas College Earth Day Fair, 2016
Early career researcher panel member, 2015-2016, Various occasions at LDEO
Judge, 2012 Pittsburgh Regional Middle and High School Science Fair

Honors and awards

Fellow, Norwegian Center for Advanced Study (2023-2024)
Fellow, Columbia Center for Climate and Life (2019-present)
Science, Technology, and Environmental Policy Research Fellowship (2013-2014)
Dean’s Fellowship, Carnegie Mellon University (2009-2010)