Daniel M. Westervelt, PhD

Lamont Doherty Earth Observatory, 207D Oceanography• Palisades, NY 10964
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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, research computing, coding

Education

Ph.D. Civil and Environmental Engineering. Carnegie Mellon University. Pittsburgh, PA. May 2013 Advisor: Dr. 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 and philanthropic gifts

Active

Surge Climate Talent (Gift). $100,000. 6/1/2026 – 5/31/2027. "Source Apportionment of Aerosols in Africa: Emissions, Climate, and Health Implications". Lead PI

Columbia Global. $249,830. 7/1/2025 – 6/30/2028. Columbia World Projects Building Inclusive Cities. "Clean air monitoring interventions for empowering communities in severely under-monitored Queens County, NY". Lead PI.

Clean Air Fund. $200,000. 9/1/2024 – 4/30/26. "Leveraging long-term remote-sensing observations and machine learning to promote clean air policy and improved health across Africa (Westervelt, D, PI)".

Columbia Provost Office. $100,000. 7/15/2025 – 7/14/2026. Research Stabilization Fund. "Leveraging long-term remote-sensing, ground observations, and machine learning to promote clean air policy and improved health across Africa"

National Science Foundation. "Collaborative Research: Accelnet: Clean Air Monitoring and Solutions Network". $2,000,000. Lead PI. 1/1/21 – 6/30/26

Coefficient Giving. $370,000**. "**A policy research partnership with the government of West Bengal to reduce air pollution". 1/1/2026 – 12/31/2027. Co-PI (Lead: V. Faye McNeill, CU ChemE)

Clean Air Fund. "Early life air pollution exposures and non-communicable disease risk in Ghana**"** $500,000. 1/1/2024 – 12/31/2026 Co-I (Lead PI: Darby Jack, CU MSPH)

National Institute of Health (NIH) P3 CHART Center. $40,000. **"**Mapping the air pollution and heat stress data gap in Puerto Rico: low-cost source apportionment and high spatiotemporal resolution datasets.". 4/1/2026 – 3/31/2027. Lead 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)

National Institute of Health (NIH) Fogarty International Center. "GEOHealth Hub for Research and Training in eastern Africa". 1/1/2023 – 1/1/2027. Co-I, $50,000 (Lead: Kiros Berhane and Darby Jack CU MSPH)

Lamont Center for Climate and Life. "The Impact of Rapidly Changing Regional Aerosol Emissions on Near-term Climate." $119,926. 12/1/22 – 12/1/26

Completed

Department of State, USA. "Capacity building, knowledge sharing, and air quality improvement for Anglophone and Francophone West Africa". $440,440 PI. 10/1/2021 – 1/21/2025 (*cancelled by Trump administration*)

Environmental Protection Agency. "Automated Model Reduction for Atmospheric Chemical Mechanisms". $462,025 Co-I. 12/1/2020 – 2/30/2025. (*cancelled by Trump administration*)

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 – 1/21/2025 (*cancelled by Trump administration*)

US Agency for International Development. "Catalyzing Clean Air." $800,000 subaward to Columbia via World Resources Institute. Co-PI. 10/1/20 – 2/1/25. (*cancelled by Trump administration*)

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

Lamont-Doherty Earth Observatory, Columbia University. Columbia Climate Center. 2/1/2025 – 1/31/2026. "Air pollution source apportionment in Tanzania". $20,000. Lead PI

Energy Policy Institute of University of Chicago. "Kinshasa Air Quality Project". Lead PI. $35,000. 8/1/24 – 7/31/25

LDEO OTIC Innovation fund. Developing cost-effective custom-built multipollutant air sensor systems for use-inspired air quality research. $50,000. Lead PI.

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 – 12/31/2024. $150,000. Lead PI

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.

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

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

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

Pending

Coefficient Giving. $500,000. 6/1/2026 – 5/31/2029. "GRASP: Gridded Africa Surface Pollution dataset." Lead PI.

Clean Air Fund [Renewal]. $350,000. 6/1/2026 – 5/31/2028. Leveraging long-term remote-sensing observations and machine learning to promote clean air policy and improved health across Africa (Westervelt, D, PI).

Weiss Asset Management Foundation. $866,644. 7/1/2026 – 6/30/2028. "Saving Lives Through Clean Air in Ghana: Building the Evidence Base for Policies That Reduce Air Pollution Mortality". Lead PI.

Environmental Protection Agency. $2,000,000. 9/1/2026 – 8/31/2029. "Characterizing and Addressing Wildfire Smoke Preparedness Gaps Across a Broad Range of Communities in EPA Region 2". Lead PI

National Science Foundation. $75,000 (subaward). 9/1/2026 – 8/31/2029. "CPS-CIR: Artificial intelligence-driven secure, trustworthy and sustainable indoor and outdoor air quality monitoring system for communities". Co-I (Lead: SUNY Albany)

National Science Foundation. $1,048,192. 1/1/2027 – 12/31/2029. "FIRE-MODEL: Next-Generation Coupled Fire-Atmosphere Digital Twins for Predicting Extreme Wildfire Smoke Exposure in the Southeast United States". Co-PI (Lead: Jennie Nakamura)

Experience

Lamont Associate Research Professor, senior staff 7/2026 - present
Columbia University, Lamont-Doherty Earth Observatory

Adjunct Associate Professor of Climate 11/2025 - present
Columbia University Climate School

Affiliate Faculty 2/2021 - present
Columbia University Data Science Institute

Science Collaborator 9/2016 - present
NASA Goddard Institute for Space Studies (NASA GISS)

Lamont Associate Research Professor, junior staff 7/2023 – 6/2026
Columbia University, Lamont-Doherty Earth Observatory

Lamont Assistant Research Professor 7/2021 – 6/2023
Columbia University, Lamont-Doherty Earth Observatory

Affiliate Professor 2/2024 – 2/2025
Mohammed VI Polytechnic, Benguerir, Morocco

Associate Research Scientist 8/2015 – 6/2021
Columbia University, Lamont-Doherty Earth Observatory

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 senior, corresponding author to advisee) (h-index: 30).
Note that the convention in my field is mostly for the PI to be the final author, but varies.

Submitted

1. Abhishek Anand, Joe A. Amooli; Selina Amoah; Esi Nerquaye Tetteh; Nana Ama Browne Klutse; Clement Ackaah; Benjamin Essien; Mawuli Kingsley Amegah; **Daniel M. Westervelt***. "Two decades of kilometer-scale daily PM2.5 from satellite observations and machine learning reveal geographically diverging exposure in Ghana". Submitted to *Atmospheric Measurement Techniques*, 2026.

2. Zhang, Y., Samset, B., Leung, R., Wilcox, L., and **Westervelt, D.M*.** "An Energetic Perspective on Observed and Modeled Hydrological Responses to Climate Change in Global Arid and Semiarid Regions". Submitted to *PNAS*, 2026

3. Bartusek, S., Wu, Y., Ting, M., Fiore, A., and **Westervelt, D. M**.: Global hotspots and mechanisms of extreme humid heat and air pollution co-occurrence, EGUsphere [preprint], https://doi.org/10.5194/egusphere-2025-4874, 2025.

4. Goldberg, P., Anand, A. and **Westervelt, D.M**.* "Variable Short-Term Air Quality Impacts of New York City's Congestion Pricing Policy". In review at *Environmental Science and Technology Letters*, 2026.

5. Ankit Bhandekar, Robert J. Allen, Laura J. Wilcox, Bjørn H. Samset, Sharar Ahmadi, Annica M.L. Ekman, Maxwell T. Elling, Luke Fraser-Leach, Paul Griffiths, James Keeble, Tsuyoshi Koshiro, Paul Kushner, Anna Lewinschal, Molly MacRae, Risto Makkonen, Joonas Merikanto, Pierre Nabat, Larissa Nazarenko, Declan O'Donnell, Naga Oshima, David Paynter, Geeta Persad, Steven T. Rumbold, Neil Swart, Toshihiko Takemura, Kostas Tsigaridis, Knut von Salzen, and **Daniel M. Westervelt**. "South Asian Monsoon Response to Regional Aerosol Emission Reductions: Insights from RAMIP". Submitted to Environmental Research: Climate, 2025

6. Nimo, James; Ibrahim-Anyass, Yussif ; Borketey, Mathias; Osei Boakye, Emmanuel; Banahene Asante, Emmanuel; Obeng Anim, Nathaniel; Fianko Akonor, Emmanuel; Offei-Darko, Hilda; Boateng, Damaris; Hertty, Blankson; Owusu-Tawiah, Victoria; Klutse, Nana Ama Browne ; Presto, Albert; Subramanian, R; **Westervelt, Daniel M.**; Arku, Raphael; Bari, Md Aynul; HUGHES, ALLISON. "Calibration of 14 Commercial PM2.5 Low-Cost Sensors at Afri-SET in Accra, Ghana: Seasonal Bias, Dust Influence, and Transferability under West African Conditions". Submitted to *Environmental International*, 2026

7. Sheng, B., Bollasina, M. A., Gagnon, A. S., Wilcox, L. J., Reynolds, T. P. S., Beckett, C. T. S., Wang, H., Li, Q., Nabat, P., Allen, R. J., Samset, B. H., Merikanto, J., Persad, G. G., Takemura, T., Tsigaridis, K., Ahmadi, S., Elling, M. T., von Salzen, K., **Westervelt, D. M**., Oshima, N., and Koshiro, T.: East Asian Anthropogenic Aerosols Strongly Influence Past and Present Southern African Hydroclimate and Ecosystem Changes, EGUsphere [preprint], https://doi.org/10.5194/egusphere-2026-2198, 2026.

8. Jeon J-G, Allen R J, Yeh S-W, Park C-E, Wilcox L J, Samset B H, Ahmadi S, Ekman A M L, Elling M T, Fraser-Leach L, Griffiths P, Keeble J, Koshiro T, Kushner P, Lewinschal A, MacRae M, Makkonen R, Merikanto J, Nabat P, Nazarenko L, O'Donnell D, Oshima N, Persad G, Rumbold S T, Swart N, Takemura T, Tsigaridis K, von Salzen K and **Westervelt D M.** 2026. Regional aerosol emission reductions alter tropical circulation *Environ. Res.: Climate* (submitted)

Published (or accepted)

1. Sandhya Sethuraman, **Daniel M. Westervelt**, Kedong Gong, Vicki H. Grassian, V. Faye McNeill. "Modeling and parameterization of size-dependent processes in multiphase aerosol chemistry". *Accepted at ACS Environmental Science and Technology: Air*, 2026. https://doi.org/10.1021/acsestair.5c00486

2. Amooli, J.A., R.L. Miller, K. Tsigaridis, S. Chowdhury, Y. Zhang, C.A. Toolan, S. Ahmadi, R.J. Allen, M.T. Elling, A.M.L. Ekman, L. Fraser-Leach, P. Griffiths, J. Keeble, T. Koshiro, P. Kushner, A. Lewinschal, M.T. Lund, M. MacRae, R. Makkonen, J. Merikanto, L. Nazarenko, P. Nabat, D. O'Donnell, N. Oshima, G. Persad, S.T. Rumbold, K. von Salzen, B.H. Samset, N.C. Swart, T. Takemura, L.J. Wilcox, and **D.M. Westervelt***, 2026: Multi-model impacts of dust on African air quality and mortality under regional and global anthropogenic aerosol changes. *J. Geophys. Res. Atmos.*, **131**, no. 9, e2025JD046135, doi:10.1029/2025JD046135.

3. Allen, Robert J., Timothy Carson, Wei Liu, Laura J. Wilcox, Bjørn H. Samset, Sharar Ahmadi, Annica M. L. Ekman, Maxwell T. Elling, Luke Fraser-Leach, Paul Griffiths, James Keeble, Tsuyoshi Koshiro, Paul Kushner, Anna Lewinschal, Molly MacRae, Risto Makkonen, Joonas Merikanto, Pierre Nabat, Larissa Nazarenko, Declan O'Donnell, Naga Oshima, David Paynter, Geeta Persad, Steven T. Rumbold, Neil Swart, Toshihiko Takemura, Kostas Tsigaridis, Knut von Salzen, **Daniel M. Westervelt**, and Taufiq Hassan. "AMOC Weakening in Response to Global and Regional Reductions in Aerosol Emissions." *Environmental Research: Climate*, vol. 5, no. 2, 2026, article 025025, https://doi.org/10.1088/2752-5295/ae63ef.

4. Allen, Robert J., Laura J. Wilcox, Bjørn H. Samset, Sharar Ahmadi, Annica M. L. Ekman, Maxwell T. Elling, Luke Fraser-Leach, Paul Griffiths, James Keeble, Tsuyoshi Koshiro, Paul Kushner, Anna Lewinschal, Molly MacRae, Risto Makkonen, Joonas Merikanto, Pierre Nabat, Larissa Nazarenko, Declan O'Donnell, Naga Oshima, David

Paynter, Geeta Persad, Steven T. Rumbold, Neil Swart, Toshihiko Takemura, Kostas Tsigaridis, Knut von Salzen, and Daniel M. Westervelt. "Decomposing the Global and Regional Aerosol Effective Radiative Forcing Associated with Strong versus Weak Air Quality Policies by Mid-21st Century." *Environmental Research: Climate*, vol. 5, no. 2, 2026, article 025014, https://doi.org/10.1088/2752-5295/ae5418.

5. Gopikrishnan, G. P., **Westervelt, D. M.***, and Kuttippurath, J.: Sensitivity of photochemical surface ozone formation regimes to emissions and meteorology in India, Atmos. Chem. Phys., 26, 1907–1929, https://doi.org/10.5194/acp-26-1907-2026, 2026.

6. G S, Gopikrishnan; **Westervelt, Daniel***; Kuttippurath, Jayanarayanan. "Assessing Cancer Risk From Formaldehyde Air Pollution Exposure in India". *Environmental Research Communications*. 7, 111003, 10.1088/2515-7620/ae1784

7. Victoria Owusu-Tawiah, Thompson Annor, Edmund I. Yamba, James Nimo, Cosmos S. Wemegah, Collins Gameli Hodoli, Daniel Amponsah, Allison Felix Hughes, Leonard K. Amekudzi, **Daniel M. Westervelt**.* "Spatiotemporal Assessment and Source Attribution of PM2.5 in Senior High Schools in Kumasi, Ghana using Low-Cost Sensors". *Aerosol Air Qual. Res.* **25**, 66 (2025). https://doi.org/10.1007/s44408-025-00066-2

8. Amooli, J. A.**, Lund, M. T., Chowdhury, S., Myhre, G., Johansen, A. N., Samset, B. H., and **Westervelt, D. M**.*: An uncertain future for the climate and health impacts of anthropogenic aerosols in Africa, Atmos. Chem. Phys., 25, 11611–11632, https://doi.org/10.5194/acp-25-11611-2025, 2025.

9. Toolan, C. A., Amooli, J. A.**, Wilcox, L. J., Samset, B. H., Turner, A. G., and **Westervelt, D. M**.: Strong intermodel differences and biases in CMIP6 simulations of $PM_{2.5}$, aerosol optical depth, and precipitation over Africa, Atmos. Chem. Phys., 25, 10523–10557, https://doi.org/10.5194/acp-25-10523-2025, 2025.

10. Wenfu Tang, Rajesh Kumar, Anna Del Moral Méndez, Felicity Ahafianyo, Akintomide Akinsanola, Agbeli Ameko, Marleen Dekker, Rong Fu, Benjamin Gaubert, Samson Hagos, Cenlin He, Forrest Lacey, Kelly M. Núñez Ocasio, Isla R. Simpson, Kassahun Ture, Christopher D. Wirz, Ronnie Abolafia-Rosenzweig, Emmanuel O. Audu, Shima Bahramvash-Shams, Solomon Bililign, Roelof Bruintjes, Cyndi Castro, Belay Demoz, Ismaila Diallo, Ross D. Dixon, Jimy Dudhia, Abdulamid A. Fakoya, Rebecca M. Garland, Cindy Halley Gotway, Yaoxian Huang, Ata Hussain, Dorcas Idowu, Yan Jiang, Agnieszka H. Kazimierczuk, Peter Lawrence, Danny M. Leung, Samar Minallah, Naoki Mizukami, Israel R. Orimoloye, Paul A. Kucera, Kwesi A. Quagraine, Addisu Semie, Simone Tilmes, **Daniel M. Westervelt**, Daile Zhang, Zhe Zhang, Helen Worden, Pieternel F. Levelt.: The UCAR Africa Initiative: Recent insights, challenges, and opportunities to foster collaborative research for environmental sustainability. *Bulletin of the American Meteorological Society*, 2025. https://doi.org/10.1175/BAMS-D-24-0118.1

11. Forwood Wiser, Siddhartha Sen, Zhizhao Wang, Julia Lee-Taylor, Kelley C Barsanti, John Orlando, **Daniel M Westervelt**, Daven K Henze, Arlene M Fiore, Alexander Berman, Reese Carter, V Faye McNeill, A graph theory-based algorithm for the

reduction of atmospheric chemical mechanisms, PNAS Nexus, 2025;, pgaf273, https://doi.org/10.1093/pnasnexus/pgaf273

12. **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." *ES&T Air*, 2025. https://doi.org/10.1021/acsestair.4c00366

13. Bjørn H. Samset, Laura J. Wilcox, Robert J. Allen, Camilla W. Stjern, Marianne T. Lund, Sharar Ahmadi, Maxwell T. Elling, Luke Fraser-Leach, Paul Griffiths, James Keeble, Tsuyoshi Koshiro, Paul Kushner, Anna Lewinschal, Risto Makkonen, Joonas Merikanto, Pierre Nabat, Larissa Narazenko, Declan O'Donnell, Naga Oshima, Steven T. Rumbold, Toshihiko Takemura, Kostas Tsigaridis, **Daniel M. Westervelt.** "China's aerosol cleanup has contributed strongly to the recent acceleration in global warming". *Communications Earth and Environment.* 6, 543, (2025). https://doi.org/10.1038/s43247-025-02527-3

14. 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. Atmospheric Pollution Research, Vol 16, Issue 10. 2025. https://doi.org/10.1016/j.apr.2025.102630

15. 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". Journal of Advances in modeling earth systems (JAMES), 17, 5, **https://doi.org/10.1029/2024MS004511**, 2025.

16. 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". 2395-2411. 2025. https://doi.org/10.1175/JCLI-D-24-0240.1

17. Gopikrishnan, G.S., **Westervelt, D.M**.* & Kuttippurath, J. Aerosol inhibition on photochemical surface ozone formation under future climate and air quality scenarios. *npj Clim Atmos Sci* **8**, 154 (2025). https://doi.org/10.1038/s41612-025-01048-2

18. 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. I. L., and Samset, B. H.: Surface temperature effects of recent reductions in shipping SO_2 emissions are within internal variability, Atmos. Chem. Phys., 25, 4443–4454, https://doi.org/10.5194/acp-25-4443-2025, 2025.

19. Nimo, James; Borketey, Mathias; Appoh, Emmanuel; Abena Kyerewaa, Morrison; Ibrahim-Anyass, Yussif ; Owusu Tawiah, Audrey ; Arku, Raphael; Amoah, Selina; Tetteh, Esi; Brown, Tim; Presto, Albert; Subramanain , R; **Westervelt, Daniel**; Giordano, Michael R.; Hughes, Allison. "Low-cost PM2.5 sensor performance characteristics against meteorological influence in sub-Saharan Africa: Evidence from the

Air Sensor Evaluation and Training Facility for West Africa (Afri-SET) project". *Environmental Science and Technology*, https://doi.org/10.1021/acs.est.4c09752, 2025.

20. DeSouza, P., Ibsen, P., **Westervelt, D.M.,** Kahn, R., Zaitchick, B.F., and Kinney, P.L. "A Nationwide Evaluation of Crowd-Sourced Ambient Temperature Data." *Frontiers in Environmental Science*. Volume 13 - 2025 | doi: 10.3389/fenvs.2025.1527855

21. Ngutuka Kinzunga, M.; **Westervelt, D.M**.; Matondo Masisa, D.; Bangelesa, F.; Kasereka Isevulambire, P.; Tangou Tabou, T.; Kabengele Obel, B.; Kiyombo Mbela, G.; Kayembe Ntumba, J.M. Assessment of Respiratory Health Impacts of $PM_{2.5}$ by AirQ+ Software in a Sub-Saharan African Urban Setting. *Atmosphere* **2024**, *15*, 1518. https://doi.org/10.3390/atmos15121518

22. Nana, Bernard; Raheja, Garima; Ouarma, Issoufou; Kayaba, Haro; Gounkaou, Woro; Daho, Tizane; Bere, Antoine; Mellouki, Abdewahid; **Westervelt, Daniel*** "Monitoring of PM2.5 using well-calibrated low-cost sensors over one year in Burkina Faso". *ES&T Air*, https://doi.org/10.1021/acsestair.4c00126, 2024

23. 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

24. 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.

25. 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.

26. Johnson, M., Abuya, Wickramanayake, Anneka, Miller, Heather, Sambu, Mwanga, Daniel, Odwe, Ndwiga, 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, April 2024.

27. 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.

28. 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 PM2.5 monitors in Mombasa, Kenya. *AGU Geohealth*, Volume 8, Issue 9, **https://doi.org/10.1029/2024GH001049** Sep 2024.

29. 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

30. **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

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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

Columbia University Climate School Faculty Affairs Seminar Mar 2026
Multi-scale Approaches to Understanding Aerosol-driven Air Pollution and Climate Change: From Sensors to Supercomputers

University of Reading Department of Meteorology Feb 2026

Multi-scale Approaches to Understanding Aerosol-driven Air Pollution and Climate Change: From Sensors to Supercomputers

Ocean and Climate Physics Seminar, LDEO Jan 2026

Multi-scale Approaches to Understanding Aerosol-driven Air Pollution and Climate Change: From Sensors to Supercomputers

Stony Brook University SoMAS Seminar Nov 2025

Air Pollution and Climate Change in the Global South: From Air Sensors to Supercomputers

C40 Cities Aug 2025

"Measurement principles and calibration of optical and electrochemical air sensors"

SPARTAN + CAMS-Net meeting June 2025

Keynote: "Closing the air pollution data gap"

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

Keynote 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

Keynote invited speaker: 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 PM2.5 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 PM2.5 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 Climate School Spring 2026

Research computing and big data for climate science

Instructor, Columbia Department of Earth and Environmental Sciences Fall 2024

UN3400 Computational Earth Science

Instructor, Columbia Department of Earth and Environmental Sciences Spring 2024

Research Computing for Earth and Environmental Scientists

Adjunct Professor, Tandon School of Engineering, New York University Fall 2017-present

Courses: CE-GY 7523, Air Pollution. Graduate-level class. Overall evaluation: 4.6 / 5.0

CE-UY 3223, Introduction to Environmental Engineering

Faculty, New Jersey Scholars Program, The Lawrenceville School Summer 2015
Taught summer course on "Climate Change and the Human Experience"

Encouraging Networks between Geoscience and Geoscience Education (ENGAGE) workshop Jan 2015
Held in Washington, DC. Sponsored and funded by National Science Foundation.

Eberly Center for Teaching Excellence Future Faculty Program 2012-2013
Completed teaching observations, course and syllabus development, attended seminars

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). April 2017, 2018
Taught 2 lecture (3 hours each) on aerosol microphysics

Guest Lecturer, Fundamentals of Atmospheric Aerosols (CMU) 2013
Taught 3 lectures on single particle dynamics, aerosol size distributions, and aerosol and cloud optical properties

Teaching and Lab Assistant, Various Classes 2009-2013
Assisted lab sessions, taught guest lectures, held weekly office hours, administered exams, grading

Students and postdocs advised

Lillian Ehlinger 2026-present
LDEO summer intern

Dr. Jiaqi Shen 2026-present
LDEO postdoctoral fellow

Sai Pinakana 2025-present
Lamont/DEES PhD student

Kathryn Cheng 2025-present
Lamont/DEES PhD student

Polina Goldberg 2025-present
LDEO summer intern, undergraduate researcher

Dr. Abhishek Anand 2024-present
Postdoctoral research scientist

Joe Amooli 2023-present
Lamont/DEES PhD student

Dr. Garima Raheja 2021 - 2025
Lamont/DEES PhD Student
(now at: Google)

Gopikrishna Gopalakrishnan IIE Fulbright Scholar (now at: Finnish Meteorological Institute, postdoc)	2024-2025
Yanda Zhang Postdoctoral research scientist (now at: Hong Kong University of Science and Technology, Assistant Prof.)	2023-2025
Sophia Roberts LDEO summer intern	2024-2025
Elsevar Zeynalov LDEO summer intern	Summer 2025
Trevor Durning Undergraduate research assistant (now at: South Coast Air Quality Management District)	2024-2025
Jordan Hill Columbia Senior thesis	2024-2025
Sizhou Su Climate School Intern	2024-2025
Benjamin Yang Lamont/DEES PhD student (now at: Ramboll Environmental Consultants)	2021 – 2024
Andrea Belvis-Aquino University of Puerto Rico Mayaguez Undergraduate (now at SUNY Albany PhD student)	2023- 2025
Dr. Victoria Owusu Tawiah Kwame Nkrumah University of Science and Technology PhD (now at: Kigali Collaborative Research Center, Carnegie Mellon)	2021-2025
Moses Njeru University of Nairobi Master's Student (now at: University of York, UK PhD student)	2022-2024
Josephine Kanyeria Jomo Kenyatta University Master's Student	2021-2024
Savannah Ward LDEO Summer Intern	Summer 2021- Summer 2022
Dr. Zhonghua Zheng Postdoctoral Research Scientist (now at: University of Manchester, assistant professor)	Spring 2021 – Spring 2022
Oreoluwa Solanke LDEO Summer intern	Summer 2020

Dr. Sarah Hanock — Summer 2020
LDEO Summer Intern
(now at: Harvard postdoc, Jacob group)

Celeste McFarlane — Spring 2020 – Fall 2021
Undergraduate researcher (ChemE)

Dr. William Tsui — Spring 2020
PhD defense committee

Dr. Alison Fankhauser — Fall 2020
PhD defense committee

Chang Wang — Fall 2019
MS Environmental Engineering (Dec 2019)
Poster presented at AGU 2019

Anant Majumdar — Spring 2019
Earth Institute Intern (BA Computer Science 2020).

Clara T. Ma — Summer 2017
LDEO summer intern. (BS Geology and Geophysics Yale 2020)

Karen Xia — 2015-2017
Earth Institute Intern (BS Computer Science and Statistics 2018)

Karen Yu — 2010-2012
Undergraduate intern. (BS CMU Environmental Engineering 2012, PhD Harvard Atmospheric Science 2019)

Committees and Professional Development

LDEO Director Search Committee member

Conference chair
Air Sensors International Community 2026. Los Angeles, CA

Conference continuity chair
Air Sensors International Community 2025. Bangkok, Thailand
Air Sensors International Community 2027. Santiago, Chile

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, 2022-2026

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.

Clean Air Monitoring and Solutions Network, CAMS-Net, Annual Meeting. St. Louis, MO, USA, June 2025

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 and Kintampo, Ghana: January 2026 (GRASP)

Nairobi, Kenya: February 2025 (NBO-Chem atmospheric chemistry field campaign, lead PI)

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

The Weather Channel. July 2025. https://weather.com/health/respiratory/video/fireworks-impact-the-environment-climate?cm_ven=dnt_social_twitter

NPR Morning Edition. August 2025. https://www.npr.org/2025/08/07/nx-s1-5494439/canadian-wildfires-are-impacting-air-quality-in-the-u-s

Outreach Activities

LDEO INSPIRE partner-host, 2024-2025. 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, October 2024

New York State Science and Engineering Fair Judge, March 2017, New York, NY

Lamont-Doherty Earth Observatory Open House. Oct 2016, 2018, 2024 Palisades, NY. Designed and conducted a "clouds in a jar" experiment at the Ocean and Climate Physics booth. Designed an air sensors exhibit.

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

Columbia University Graduate School of Arts and Sciences Faculty Mentoring Award, 2025

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)