

# **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**

**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

**(Pending) National Institutes of Health Policy R01** “Are urban policies to reduce car dependency equitable? An interdisciplinary framework to assess impacts on pollution, neighborhoods, and adverse health outcomes”. \$50,000 co-I (Columbia MSPH lead)

## Experience

<b>Lamont Associate Research Professor (primary appointment)</b>	7/2023 - present
Columbia University, Lamont-Doherty Earth Observatory	
<b>Lamont Assistant Research Professor</b>	7/2021 – 6/2023
Columbia University, Lamont-Doherty Earth Observatory	
<b>Affiliate Faculty</b>	2/2021 - present
Columbia University Data Science Institute	
<b>Science Collaborator</b>	9/2016 - present
NASA Goddard Institute for Space Studies (NASA GISS)	
<b>Associate Research Scientist</b>	8/2015 – 6/2021
Columbia University, Lamont-Doherty Earth Observatory	
<b>Postdoctoral Research Associate in Science, Technology, and Environmental Policy</b>	8/2013 – 8/2015
Princeton University and Geophysical Fluid Dynamics Lab (GFDL)	
Advisor: Denise Mauzerall	

## Peer-reviewed Publications (\*\* indicates student or postdoc advisee)

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>

**Westervelt, D.M.**, Paulson Kasereka\*\*, Garima Raheja\*\*, Jean-Luc Balogije Selenge, Rodriguez Yombo Phaka, V. Faye McNeill, Guillaume Kiyombo Mbela, Marianthi-Anna Kioumourtzoglou, Joel Nkiamanda Konde, Jean-Pierre Mfuamba Mulumba, Djibi Buenimio. “A Low cost investigation into sources of PM2.5 in Kinshasa, DRC.” Accepted at *Environmental Science and Technology, Air*.

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.

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-Sampson, 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.” to *Environmental Science and Technology*, 75, 29, 10708-10720, 2023

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>

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.

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.

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.

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. PMID: 37579162; PMCID: PMC10451388.

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

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.

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.

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

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>

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>

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

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>

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

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

McFarlane, C\*\*., Isevulambire, 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<sub>2.5</sub> 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>

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.

**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.

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>.

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, ISSN 0048-9697, <https://doi.org/10.1016/j.scitotenv.2020.144338>.

**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, e2020GL0883 63

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.

Allen, R. J., Turnock, S., Nabat, P., Neubauer, D., Lohmann, U., Olivié, 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., Georgoulias, 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.

**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.

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>

Amiri-Farahani, A., Allen, R.J., Li, King-Fai, Nabat, P., and **Westervelt, D.M.** A La Niña-like climate response to south African biomass burning aerosol in CESM simulations. Accepted in *JGR-Atmospheres*, 2020. <https://doi.org/10.1029/2019JD031832>

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>

Nicely, J. M., Duncan, B. N., Hanisco, T. F., Wolfe, G. M., Salawitch, R. J., Deushi, M., Haslerud, A. S., Jöckel, P., Josse, B., Kinnison, D. E., Klekociuk, A., Manyin, M. E., Marécal, 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 CCM1-1, *Atmos. Chem. Phys.*, 20, 1341–1361, <https://doi.org/10.5194/acp-20-1341-2020>, 2020

**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-21<sup>st</sup> 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>

Fanourgakis, G.S.; Kanakidou, M.; Nenes, A.; Bauer, S.E.; Bergman, T.; Carslaw, K.S.; Grini, A.; Hamilton, D.S.; Johnson, J.S.; Karydis, V.A.; Kirkevag, A.; Kodros, J.K.; Lohmann, U.; Luo, G.; Makkonen, R.; Matsui, H.; Neubauer, D.; Pierce, J.R.; Schmale, J.; Stier, P.; Tsagirisidis, K.; van Noije, T.; Wang, H.; Watson-Parris, D.; **Westervelt, D.M.**; Yang, Y.; Yoshioka, M.; Daskalakis, N.; Decesari, S.; Gysel Beer, M.; Kalivitis, N.; Liu, X.; Mahowald, N.M.; Myrolofaltakis, S.; Schroedner, R.; Sfakianaki, M.; Tsimpidi, A.P.; Wu, M.; and Yu, F., 2019: Evaluation of global simulations of aerosol particle number and cloud condensation nuclei, and implications for cloud droplet formation. *Atmos. Chem. Phys.*, doi:10.5194/acp-2018-1340

**Westervelt, D. M.**, Conley, A. J., Fiore, A. M., Lamarque, J.-F., Shindell, D. T., Previdi, M., Mascioli, N. R., Faluvegi, G., Correa, G., and Horowitz, L. W.: Connecting regional aerosol emissions reductions to local and remote precipitation responses, *Atmos. Chem. Phys.*, 18, 12461-12475, <https://doi.org/10.5194/acp-18-12461-2018>, 2018.

Conley, A.J., **Westervelt, D.M.**, Lamarque, J.-F., Fiore, A.M., Shindell, D., Correa, G., Faluvegi, G., Horowitz, L.W. Multi-model surface temperature responses to removal of U.S. sulfur dioxide emissions. *J. Geophys Res.* 123, no. 5, 2773-2796, doi:10.1002/2017JD027411. 2018

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**Westervelt, D. M.**, A. J., Conley, A. M., Fiore, J.-F., Lamarque, D., Shindell, M., Previdi, G., Faluvegi, G., Correa, and L. W., Horowitz (2017), Multimodel precipitation responses to removal of U.S. sulfur dioxide emissions, *J. Geophys. Res. Atmos.*, 122, doi:10.1002/2017JD026756.

**Westervelt, D.M.**, L.W. Horowitz, V. Naik, A.P.K. Tai, A.M. Fiore, D.L. Mauzerall, Quantifying PM2.5-meteorology sensitivities in a global climate model, *Atmospheric Environment*, ISSN 1352-2310, <http://dx.doi.org/10.1016/j.atmosenv.2016.07.040>, 2016

**Westervelt, D. M.**, Horowitz, L. W., Naik, V., Golaz, J.-C., and Mauzerall, D. L.: Radiative forcing and climate response to projected 21st century aerosol decreases, *Atmos. Chem. Phys.*, 15, 12681-12703, doi:10.5194/acp-15-12681-2015, 2015

Pierce, J. R., **Westervelt, D. M.**, Atwood, S. A., Barnes, E. A., and Leaitch, W. R.: New-particle formation, growth and climate-relevant particle production in Egbert, Canada: analysis from 1 year of size-distribution observations, *Atmos. Chem. Phys.*, 14, 8647-8663, doi:10.5194/acp-14-8647-2014, 2014

**Westervelt, D. M.**, Pierce, J. R., and Adams, P. J.: Analysis of feedbacks between nucleation rate, survival probability and cloud condensation nuclei formation, *Atmos. Chem. Phys.*, 14, 5577-5597, doi:10.5194/acp-14-5577-2014, 2014.

D'Andrea, S. D., Hakkinen, S. A. K., **Westervelt, D. M.**, Kuang, C., Levin, E. J. T., Kanawade, V. P., Leaitch, W. R., Spracklen, D. V., Riipinen, I., and Pierce, J. R.: Understanding global secondary organic aerosol amount and size-resolved condensational behavior, *Atmos. Chem. Phys.*, 13, 11519-11534, doi:10.5194/acp-13-11519-11534, 2013

**Westervelt, D. M.**, Pierce, J. R., Riipinen, I., Trivitayanurak, 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

Hennigan, C. J., **Westervelt, D.M.** , I. Riipinen, G. J. Engelhart, T. Lee, J. L. Collett Jr., S. N. Pandis, P. J. Adams, and A. L. Robinson (2012), New particle formation and growth in biomass burning plumes: An important source of cloud condensation nuclei, *Geophys. Res. Lett.*, 39, L09805, doi:10.1029/2012GL050930.

**Westervelt, D. M.**, Moore, R. H., Nenes, A., and Adams, P. J.: Effect of primary organic sea spray emissions on cloud condensation nuclei concentrations, *Atmos. Chem. Phys.*, 12, 89-101, doi:10.5194/acp-12-89-2012, 2012.

Pierce, J. R., Leaitch, W. R., Liggio, J., **Westervelt, D. M.**, Wainwright, C. D., Abbatt, J. P. D., Ahlm, L., Al-Basheer, W., Cziczo, D. J., Hayden, K. L., Lee, A. K. Y., Li, S.-M., Russell, L. M., Sjostedt, S. J., Strawbridge, K. B., Travis, M., Vlasenko, A., Wentzell, J. J. B., Wiebe, H. A., Wong, J. P. S., and Macdonald, A. M.: Nucleation and condensational growth to CCN sizes during a sustained pristine biogenic SOA event in a forested mountain valley, *Atmos. Chem. Phys.*, 12, 3147-3163, doi:10.5194/acp-12-3147-2012, 2012

Snow-Kropla, E. J., Pierce, J. R., **Westervelt, D. M.**, and Trivitayanurak, 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

<b>CICERO + University of Oslo Seminar</b>	Nov 2023
“Air Pollution and Climate Change in the Global South: from air sensors to supercomputers”	
<b>ASIC Ghana</b>	Oct 2023
“Demonstrating the power of air sensors in East, West, and Central Africa”	
<b>Department of Physics, University of Ghana</b>	Aug 2023
“Air Quality studies in Ghana”	
<b>US EPA Air Sensors QA Workshop</b>	July 2023
“Calibration of air sensors for air quality measurement”	
<b>Aerodyne Research, Inc</b>	July 2023
“The State of Particulate Matter Monitoring on the African Continent and Future Needs”	
<b>CICERO Regional Aerosol Forcing workshop</b>	Mar 2023
“Regional Aerosol-induced Arctic amplification”	
<b>AfriqAir annual meeting</b>	Mar 2023
“Source apportionment of PM2.5 using low-cost sensors”	
<b>University of Puerto Rico at Mayagüez</b>	Feb 2023
Department seminar	
<b>American Meteorological Society 2023 Annual Meeting</b>	Jan 2023
(Invited)	
<b>Department Seminar, US EPA Office of Research and Development</b>	July 2022
“Getting useful, actionable air quality data from low cost sensors in the US and abroad”	
<b>Department Seminar, US EPA Region 2 Office (NY, NJ, PR, VI)</b>	May 2022
“Getting useful, actionable air quality data from low cost sensors in the US and abroad”	
<b>Workshop on The Power of TROPOMI to bridge African science and policy</b>	April 2022
“Air quality data analysis and capacity building in Africa”	
<b>Tri-MIP 3: AerChemMIP, PDRMIP, and RAMIP</b>	Nov 2021
“Developing emulators of climate responses to regional aerosol perturbations using three coupled chemistry-climate models”	
<b>Department Seminar, North Carolina State A&amp;T University</b>	Nov 2021
“Towards closing the air pollution data gap in sub-Saharan Africa”	
<b>Workshop on a Pilot Design for Air Quality in Africa</b>	Jun 2021
First measurements of PM2.5 in Togo and the Democratic Republic of Congo	
<b>European Geophysical Union (invited)</b>	April 2021
“Developing emulators of regional climate responses to regional aerosol perturbations using three coupled chemistry-climate models”	

<b>iLEAPS Early Career Meeting</b>	Nov 2020
“Towards closing the air pollution data gap in sub-Saharan Africa”	
<b>US Department of State Air Quality Fellows Seminar</b>	Sep 2020
“Towards closing the air pollution data gap in sub-Saharan Africa”	
<b>Digital Air Quality, A Systems Approach to Air Pollution</b>	Aug 2020
“Columbia University’s air quality research in Africa”	
<b>MAIA Science Team Meeting (virtual due to COVID19)</b>	May 2020
<b>Makerere University, Kampala, Uganda</b>	Aug 2019
Air Pollution in Africa: Current research and future directions at Columbia University	
<b>University of Birmingham / Population Council Air Pollution Workshop</b>	Aug 2019
Air Pollution in Africa: Current research and future directions at Columbia University	
<b>USAID Air Pollution Solutions Workshop, New York, NY</b>	April 2019
Development of a low cost air pollution sensor network in sub-Saharan Africa	
<b>Georgia Institute of Technology, Department of Earth and Atmospheric Science</b>	Feb 2019
The Atmospheric Chemistry, Air Quality, and Climate Change Nexus: From the nano to the global scale”	
<b>American Geophysical Union Fall Meeting 2018</b>	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	
<b>Columbia Mailman School of Public Health Climate and Health Department Seminar.</b> “Mid-21st century ozone air quality in China under emissions scenarios and climate change”	Sep 2018
<b>Nanjing Agricultural University, Department of Environmental Science</b>	July 2018
“Air pollution and climate change research at Columbia”	
<b>Rutgers University, Department of Environmental Sciences Seminar</b>	May 2018
“The Air Quality – Climate Change Nexus: From the nano to the global scale”	
<b>Ball State University, Department of Environmental Management</b>	May 2018
“The Air Quality – Climate Change Nexus: From the nano to the global scale”	
<b>New York University, Department of Environmental Engineering</b>	Mar 2017
<b>Department Seminar.</b> “All about atmospheric aerosols: from air quality to climate change”. New York, NY	
<b>American Geophysical Union Fall Meeting 2016</b>	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	
<b>Lamont-Doherty Earth Observatory Ocean and Climate Physics Seminar</b>	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

<b>Adjunct Professor, Tandon School of Engineering, New York University</b>	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	
<b>Faculty, New Jersey Scholars Program, The Lawrenceville School</b>	Summer 2015
Taught summer course on “Climate Change and the Human Experience”	
<b>Encouraging Networks between Geoscience and Geoscience Education (ENGAGE) workshop</b>	Jan 2015
Held in Washington, DC. Sponsored and funded by National Science Foundation.	
<b>Eberly Center for Teaching Excellence Future Faculty Program</b>	2012-2013
Completed teaching observations, course and syllabus development, attended seminars	
<b>Guest Lecturer, Introduction to Atmospheric Chemistry.</b> Columbia University. Sulfate-nitrate-ammonium atmospheric thermodynamics.	Mar 2016, 2017, 2019, 2020
<b>Guest Lecturer, Fundamentals of Atmospheric Aerosols (CU).</b>	April 2017, 2018
Taught 2 lecture (3 hours each) on aerosol microphysics	
<b>Guest Lecturer, Fundamentals of Atmospheric Aerosols (CMU)</b>	2013
Taught 3 lectures on single particle dynamics, aerosol size distributions, and aerosol and cloud optical properties	
<b>Teaching and Lab Assistant, Various Classes</b>	2009-2013
Assisted lab sessions, taught guest lectures, held weekly office hours, administered exams, grading	

## Students and postdocs advised

<b>Yanda Zhang</b>	2023-present
Postdoctoral research scientist	
<b>Joe Amooli</b>	2023-present
Lamont/DEES PhD student	
<b>Paulson Kasereka</b>	2023-present
UM6P PhD student	
<b>Benjamin Yang</b>	2021 – present
Lamont/DEES PhD student	

<b>Garima Raheja</b>	2021 - present
Lamont/DEES PhD Student	
<b>Savannah Ward</b>	Summer 2021-
LDEO Summer Intern	Summer 2022
<b>Zhonghua Zheng</b>	Spring 2021 –
Postdoctoral Research Scientist	Spring 2022
<b>Oreoluwa Solanke</b>	Summer 2020
LDEO Summer intern	
<b>Sarah Hanock</b>	Summer 2020
LDEO Summer Intern	
<b>Celeste McFarlane</b>	Spring 2020 – Fall
Undergraduate researcher (ChemE)	2021
<b>William Tsui</b>	Spring 2020
PhD defense committee	
<b>Alison Fankhauser</b>	Fall 2020
PhD defense committee	
<b>Chang Wang</b>	Fall 2019
MS Environmental Engineering (Dec 2019)	
Poster presented at AGU 2019	
<b>Anant Majumdar</b>	Spring 2019
Earth Institute Intern (BA Computer Science 2020).	
<b>Clara T. Ma</b>	Summer 2017
LDEO summer intern. (BS Geology and Geophysics Yale 2020)	
Oral presentation given by Clara at AGU Fall Meeting 2017	
<b>Karen Xia</b>	2015-2017
Earth Institute Intern (BS Computer Science and Statistics 2018)	
Poster presented at AAAR 35 <sup>th</sup> annual fall meeting.	
<b>Karen Yu</b>	2010-2012
Undergraduate intern. (BS CMU Environmental Engineering 2012, PhD Harvard Atmospheric Science 2019)	

### Committees and Professional Development

#### **LDEO Mentoring and Justice, Equity, Diversity, and Inclusion Committee (JEDI)**

2019-present

#### **Lamont Colloquium Faculty Coordinator and Committee Chair**

Responsible for overseeing Colloquium, inviting speakers. 2022-2023

#### **Lamont Executive Committee**

Junior faculty representative, 2022-2024

**Meeting organizer**

Clean Air Monitoring and Solutions Network, CAMS-Net, symposium at Air Sensors International Conference, May 2022

**Meeting organizer**

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

**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.

**Session Chair**

“Carbonaceous Aerosols in the Atmosphere”. American Association for Aerosol Research 34<sup>th</sup> 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 AAAR 2014, 2015, 2016, 2019, 2020, 2021

## **Field Work and International Capacity Building**

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

## **Outreach Activities**

**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 Academy of Sciences 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)