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EDUCATION

Ph.D.

2023 Department of Mechanical Engineering, University of Colorado Boulder

M.S.

2018 Department of Environmental Engineering, Gillings School of Global Public Health, University of North Carolina at Chapel Hill

B.S.

2017 Department of Physics and Astronomy, University of North Carolina at Chapel Hill

2017 Department of Mathematics, University of North Carolina at Chapel Hill

PROFESSIONAL APPOINTMENTS

Postdoctoral Research Associate

2023- Environmental and Occupational Health Department, Milken Institute School of Public Health, George Washington University

Ph.D. Research Assistant

2018-2022 Department of Mechanical Engineering, University of Colorado Boulder

M.S. Research Assistant

2017-2018 Department of Environmental Engineering, Gillings School of Global Public Health, University of North Carolina at Chapel Hill

PUBLICATIONS

Refereed Journal Articles

2023 **Nawaz, M. O.**, Henze, D. K., Anenberg, S. C., Ahn, D. Y., Goldberg, D. L., Tessum, C. W., & Chafe, Z. A. Sources of air pollution-related health impacts and benefits of radially applied transportation policies in 14 US cities. *Frontiers in Sustainable Cities*, 5. <https://www.frontiersin.org/articles/10.3389/frsc.2023.1102493>

- 2023 **Nawaz, M. O.**, Henze, D. K., Anenberg, S. C., Braun, C., Miller, J., & Pronk, E. A Source Apportionment and Emission Scenario Assessment of PM_{2.5}- and O₃-Related Health Impacts in G20 Countries. *GeoHealth*, 7(1), e2022GH000713. <https://doi.org/10.1029/2022GH000713>
- 2022 Cao, H., Henze, D. K., Cady-Pereira, K., McDonald, B. C., Harkins, C., Sun, K., Bowman, K. W., Fu, T.-M., & **Nawaz, M. O.** COVID-19 Lockdowns Afford the First Satellite-Based Confirmation That Vehicles Are an Under-recognized Source of Urban NH₃ Pollution in Los Angeles. *Environmental Science & Technology Letters*, 9(1), 3–9. <https://doi.org/10.1021/acs.estlett.1c00730>
- 2021 **Nawaz, M. O.**, Henze, D. K., Harkins, C., Cao, H., Nault, B., Jo, D., Jimenez, J., Anenberg, S. C., Goldberg, D. L., & Qu, Z. (2021). Impacts of sectoral, regional, species, and day-specific emissions on air pollution and public health in Washington, DC. *Elementa: Science of the Anthropocene*, 9(1), 00043. <https://doi.org/10.1525/elementa.2021.00043>
- 2021 Malley, C. S., Hicks, W. K., Kulyenstierna, J. C. I., Michalopoulou, E., Molotoks, A., Slater, J., Heaps, C. G., Ulloa, S., Veysey, J., Shindell, D. T., Henze, D. K., **Nawaz, M. O.**, Anenberg, S. C., Mantlana, B., & Robinson, T. P. Integrated assessment of global climate, air pollution, and dietary, malnutrition and obesity health impacts of food production and consumption between 2014 and 2018. *Environmental Research Communications*, 3(7), 075001. <https://doi.org/10.1088/2515-7620/ac0af9>
- 2020 Nault, B. A., Jo, D. S., McDonald, B. C., Campuzano-Jost, P., Day, D. A., Hu, W., Schroder, J. C., Allan, J., Blake, D. R., Canagaratna, M. R., Coe, H., Coggon, M. M., DeCarlo, P. F., Diskin, G. S., Dunmore, R., Flocke, F., Fried, A., Gilman, J. B., Gkatzelis, G., ... **Nawaz, M. O.**, ... Jimenez, J. L. Anthropogenic Secondary Organic Aerosols Contribute Substantially to Air Pollution Mortality. *Atmospheric Chemistry and Physics Discussions*, 1–53. <https://doi.org/10.5194/acp-2020-914>
- 2020 **Nawaz, M. O.**, & Henze, D. K. Premature Deaths in Brazil Associated With Long-Term Exposure to PM_{2.5} From Amazon Fires Between 2016 and 2019. *GeoHealth*, 4(8), e2020GH000268. <https://doi.org/10.1029/2020GH000268>

Manuscripts in Submission

- Submitted **Nawaz, M.O.**, Henze, D.K., Huneus, N.J, Opazo, M., Osses, M., Correa, N., Gallardo, L. Sources of air pollution health impacts and co-benefits of carbon neutrality in Santiago, Chile. *Journal of Geophysical Research: Atmospheres*
- Submitted Gu, Y., Henze, D.K., **Nawaz, M.O.**, Cao, H. Sources of PM_{2.5}-associated health risks in Europe and corresponding emission-induced changes during 2005-2015. *GeoHealth*.

Manuscripts in Preparation

In Prep. Muralidharan, R., Zhang, Y., **Nawaz, M.O.**, Tong, D.Q., van Donkelaar, A., Martin, R.V., Serre, M.L., West, J.J., Changes in mortality in response to decreases in PM_{2.5} and ozone concentrations across the United states from 1990 to 2020.

AWARDS AND HONORS

2018 1st place student poster, UNC 5th Climate Change Symposium

PROFESSIONAL ASSOCIATIONS

2018- American Geophysical Union

MEDIA COVERAGE

2023 [The Global Health Benefits of Going Net Zero](#)
2020 [Queimadas na Amazônia aumentam interações](#)

TEACHING EXPERIENCE (TA)

2019 **MCEN 3030: Computational Methods** – Professor Daven Henze
2018 **MCEN 3030: Computational Methods** – Professor Jeffrey Knutsen

PEER REVIEW OF JOURNALS

Environmental Science & Technology: 2023 (1)
GeoHealth: 2023 (1)

REFERENCES

Dr. Daven K. Henze
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Environmental and Occupational Health Department

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Dr. J. Jason West

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Dr. Michael P. Hannigan

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Joshua Miller

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Director of Program Services
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CONFERENCE PRESENTATIONS

- 2023 **Nawaz, M.O.**, Henze, D.K., Anenberg, S.C., Tessum, C. Regional vs local sources of municipal air pollution-related health impacts. January 10. Oral (Presented by Henze).
- 2022 **Nawaz, M.O.**, Henze, D.K., Anenberg, S.C., Harkins, C., Gallardo, L., Barazza Basoa, K. Leveraging satellite-derived data and air quality modeling to characterize source profiles of climate co-benefits at the urban- and country- scale. December 12. Poster.
- 2022 **Nawaz, M.O.**, Henze, D.K., Anenberg, S.C., Huang, T. Developing an interactive tool for characterizing the air pollution-related health impacts in Los Angeles, CA associated

- with different proposed emission scenarios. Earth Science Information Partners Meeting, July 19. Oral.
- 2022 **Nawaz, M.O.**, Henze, D.K., Anenberg, S.C., Harkins, C., Gallardo, L., Barazza Basoa, K. Leveraging satellite-derived data in GEOS-Chem adjoint simulations to characterize the sources of PM_{2.5}-, O₃-, and NO₂-related health impacts at multiple spatial scales. 10th International GEOS-Chem Meeting, June 9. Oral.
- 2022 Gu, Y., Henze, D.K., **Nawaz, M.O.**, Cao, H. Sources of PM_{2.5} associated health risks in Europe and corresponding changes affected by the emission changes during 2005-2015. 10th International GEOS-Chem Meeting, June 9. Oral.
- 2022 **Nawaz, M.O.**, Henze, D.K., Braun, C., Miller, J., Pronk, E., Anenberg, S.C. Characterizing the sources of air pollution at the urban- and country-scale: case studies in Santiago, Chile and G20 countries. Graduate Engineering Annual Research and Recruitment Symposium, February 17. Oral.
- 2021 **Nawaz, M.O.**, D. Henze, S.C. Anenberg, C. Braun, J. Miller. Comparing domestic and extra-regional contributions to pollutant exposures and health impacts in G20 countries through a novel adjoint modeling approach. American Geophysical Union Fall Meeting, December 15, New Orleans. Oral.
- 2021 Muralidharan, R., Y. Zhang, T. Glotfelty, **Nawaz, M.O.**, D. Tong, A. van Donkelaar, R. Martin, M. L. Serre, J. J. West (2021). Changes in mortality in response to decreases in ozone and PM_{2.5} concentrations across the United States from 1990 to 2019. Community Modeling and Analysis System Conference, November 1. Poster.
- 2021 Henze, D. K., **Nawaz, M.O.**, C. Lyu, S. Capps. Observationally constrained source attribution modeling of air pollution health impacts. Meteorology and Climate - Modeling for Air Quality (MAC-MAQ), Oral.
- 2021 Muralidharan, R., Y. Zhang, T. Glotfelty, **Nawaz, M.O.**, D. Tong, A. van Donkelaar, R. Martin, M. L. Serre, J. J. West. Changes in mortality response to decreases in ozone and PM_{2.5} concentrations across the United States from 1990 to 2019. International Global Atmospheric Chemistry Conference, September 12. Oral.
- 2021 Anenberg, S.C., M. Castillo, D. Goldberg, D. Henze, P. Kinney, D. Malashock, J. Marshall, A. Mohegh, **Nawaz, M.O.**, V. Southerland, C. Tessum, M. Brauer, Z. Chafe, M. Harris, C. Heaps, I. Kheirbek, G. Kleiman, J. Kuylenstierna, C. Malley, A. Roy, C. Thomas. Recent Advances in Integrating Climate Change, Air Quality, and Public Health into Urban Decision-Making. American Meteorological Society, Jan. 15. Oral.
- 2020 **Nawaz, M.O.**, D. Henze, D. Goldberg, S. Anenberg, D. Jo, B. Nault, J.L. Jimenez, H. Cao, C. Harkins, Z. Qu. Characterizing the regional, sectoral and species-specific sources of pollution exposure and its associated health impacts in urban environments: case

studies in Washington, D.C. and Santiago, Chile. American Geophysical Union Fall Meeting, Dec. 14. Oral.

- 2020 **Nawaz, M.O.**, Y. Zhang, D. Q. Tong, A. Van Donkelaar, R. Martin, M. L. Serre, J. J. West. Health benefits of decreases in PM_{2.5} and ozone in the United States, 1990-2016. NASA Health and Air Quality Applied Sciences Team Final Showcase, July 21. Poster.
- 2020 **Nawaz, M.O.**, Henze, D.K., Anenberg, S.C., Goldberg, D. Premature deaths in Brazil associated with long-term exposure to PM_{2.5} from Amazon fires and development of a nested South American domain for the GEOS-Chem Adjoint. 19th GEIA Conference, June 23. Oral.
- 2019 Goldberg, D.L., S. Anenberg, A. Mohegh, B. de Foy, D. Griffin, C. McLinden, B. Duncan, N. Krotkov, L. Lamsal, F. Liu, **Nawaz, M.O.**, D. Henze, Z. Lu, D. Streets. High-resolution NO₂ exposure estimates and top-down NO_x emissions using OMI NO₂ and TROPOMI NO₂. American Geophysical Union, San Francisco, CA, Dec. 19. Poster.
- 2019 **Nawaz, M.O.**, D.K. Henze, S.C. Anenberg, D. Goldberg, Z. Qu (2019). Source attribution of PM_{2.5} and O₃ concentrations and health outcomes from 2010 and 2011 in Washington D.C. using sensitivity analyses in the GEOS-Chem adjoint model. American Geophysical Union, San Francisco, CA, Dec. 19. Poster.
- 2019 **Nawaz, M.O.**, Henze, D.K. Source attribution of PM_{2.5} from sensitivity analyses in the GEOS-Chem adjoint model. Young Scientists Symposium on Atmospheric Research, October 25. Oral.
- 2019 Henze, D. K., H. Cao , **Nawaz, M.O.**, C. Malley. Evaluation and application of remote sensing and air quality modeling for international health and climate assessment studies, European Commission Joint Research Centre, Ispra, Italy, Oct 3. Oral.
- 2019 **Nawaz, M.O.**, D.K. Henze, C.S. Malley, J.C.I. Kuylenstierna, H.W. Vallack, Y. Davila, S.C. Anenberg, S. Terry, A. Curry-Brown, N. Fann, E. Lefevre, C. Heaps, S. Penn, H. Roman, J. Neumann. Source attribution of climate and health impacts from aerosols. 9th International GEOS-Chem Meeting, Cambridge, MA, May 6. Poster.
- 2019 Henze, D. K., F. Lacey, H. Cao , K. Brown, J. Milford, **Nawaz, M.O.**, Application of remote sensing and air quality models for constraining sources and impacts of air quality and greenhouse gas emissions, Johns Hopkins University, Department of Environmental Health and Engineering, Baltimore, MD, Apr 30. Oral.
- 2019 Henze, D. K., F. Lacey, H. Cao , K. Brown, J. Milford, **Nawaz, M.O.**, Evaluation and application of remote sensing and air quality modeling for international health and climate assessment studies, Department of Mechanical Engineering, University of California Riverside, Apr 19. Oral.

- 2019 **Nawaz, M.O.**, Henze, D.K., The use of adjoint modeling to assess the sources of air pollution and its associated health impacts. Graduate Engineering Annual Research and Recruitment Symposium. February 21. Poster.
- 2019 Henze, D. K., C. Malley, J. C. I. Kuylenstierna, R. W. Pinder, S. Terry, H. Vallack, C. Heaps, E. Lefevre, S. Anenberg, S. Penn, A. CurryBrown, N. Fann, J. Neumann, H. Roman, K. Hicks, Y. Davila , E. Marais, F. Lacey, **Nawaz, M.O.**, J. Choi , H. Lee, Air quality and climate assessment tools and analyses to inform policy, American Association for the Advancement of Science (AAAS) 185th Annual Meeting, Panel Member for Transboundary Air Pollution: The Impact of Science on Policy, Washington D.C., Feb 16. Oral.
- 2018 **Nawaz, M.O.**, D. K. Henze, C. Malley, GH41C-1446: Source Attribution of Climate and Health Impacts from Aerosols, AGU Fall Meeting, Washington D.C., Dec. 10 – 14. Poster.
- 2018 West, J. J., Y. Zhang, **Nawaz, M.O.**, D. Tong, A. van Donkelaar, R. Martin. Changes in air pollution-related deaths in the United States since 1990. IGAC / iCACGP meeting, September 25, Takamatsu, Japan. Poster.
- 2018 **Nawaz, M.O.**, Y. Zhang, D. Q. Tong, A. van Donkelaar, R. V. Martin, J. J. West (2018). Health benefits of decreases in PM_{2.5} and ozone in the United States, 1990-2015. NASA Health and Air Quality Applied Sciences Team meeting, July 16. Poster.
- 2018 **Nawaz, M.O.**, Y. Zhang, D. Q. Tong, A. van Donkelaar, R. V. Martin, J. J. West (2018). Health benefits of decreases in PM_{2.5} and ozone in the United States, 1990-2015. Climate Change and Resilience Symposium, April 20. Poster.
- 2017 **Nawaz, M.O.**, Y. Zhang, D. Q. Tong, J. J. West. Health benefits of decreases in PM_{2.5} and ozone in the United States from 1990 to 2015. AGU Fall Meeting, December 11, New Orleans, LA. Poster.
- 2017 **Nawaz, M.O.**, Y. Zhang, D. Q. Tong, J. J. West. Health benefits of decreases in PM_{2.5} and ozone in the United States from 1990 to 2015. CMAS Conference, October 23. Poster.
- 2017 **Nawaz M.O.**, Y. Zhang, West, J.J. Impact of regional ozone precursor emissions on global ozone burden. Celebration of Undergraduate Research, April 12. Poster.