**M. OMAR NAWAZ, PhD**

Cardiff University, School of Earth and Environmental Sciences, Climate and Atmospheric Science for Action Group

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**RESEARCH EXPERIENCE**

**Lecturer in Climate Change Science**

Cardiff University, School of Earth and Environmental Sciences, Cardiff, Wales, UK

March 2025 – Current

**Postdoctoral Research Associate** with Dr. Susan C. Anenberg

**National Resources Defense Council Health Science Policy Fellow**

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

February 2023 – February 2025

* Led team of researchers in partnership with the National Resources Defense Council to integrate health and equity in climate policy modelling as a Health Science Policy Fellow
* Organized consulting projects ($17,000 total) with the International Council on Clean Transportation to investigate how transportation emission standards affect air quality
* Contributed to multiple selected and pending federal grant awards
* Invited speaker at United Nations Environmental Programme workshop in Bogotá, Colombia on clean air strategies to improve public health and advance climate goals
* Led and contributed to peer-reviewed papers and presented at conferences / workshops

**Ph.D. Research Assistant** with Dr. Daven K. Henze

University of Colorado Boulder, Department of Mechanical Engineering, Boulder, CO

August 2018 – January 2023

* Developed novel method to integrate satellite remote-sensing with adjoint modelling to identify air pollution sources and climate policy impacts
  + This approach was used in reduced form tools: NASA AQACF (NPO-52578-1), the ICCT FATE tool, and the SEI LEAP-IBC tool and in studies by other researchers: Choi et al 2024; Gu et al. 2023a,b
* First author on multiple peer-reviewed manuscripts including two with media coverage:
  + Linking Amazon deforestation to air quality and health impacts in Brazil
  + Exploring the health benefits of net-zero goals in G20 countries
* Organized department seminar series on air quality research

**M.S. Research Assistant** with Dr. J. Jason West

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

January 2016 – July 2018

* Developed GIS approach to integrate US CDC county-level disease rates, with remote-sensing derived pollution, and population data to estimate air pollution health impacts in the United States (won 1st place student poster award at Climate Change symposium)

**GRANTS**

**Current**

2024 Application of satellite observations in estimating NO2 concentrations, mortality burdens, and inequities. NASA ROSES FINESST F.5 (**Collaborator**) ($150,000)

2024 Study of Global Maritime Shipping-Attributable Health Impacts by the International Council on Clean Transportation (ICCT) (**Consultant**) ($5,000)

2023 Study of Global Transportation-Attributable Health Impacts by the International Council on Clean Transportation (ICCT) (**Consultant**) ($12,000)

**Pending**

2024 Societal benefits of TEMPO NO2: Applications for air quality management and environmental justice (**Other Personnel**) ($550,000)

**Competitive Grants Not Selected for Funding**

2024 HEAD-IN: Assessing disaster risk and resilience action benefits associated with compound heat and air quality hazards, exposures, and vulnerabilities. NASA ROSES A42. (**Primary Investigator**) ($1,016,525)

2020 Development of a source attribution and data assimilation framework for MAIA primary and secondary target areas in North America and South America. NASA ROSES FINESST F.5 (**Future Investigator**) ($150,000)

**HONORS AND FELLOWSHIPS**

2024 GeoCAFE Scholar

2023 National Resources Defense Council Health Science Policy Fellowship

2018 Outstanding Mechanical Engineering Research Potential Fellowship

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

**EDUCATION**

**Ph.D. in Mechanical Engineering, Air Quality Focus**

2023 Department of Mechanical Engineering, University of Colorado Boulder

Dissertation: *An adjoint sensitivity framework for public health: the sources of air pollution and their current and future impacts at both the urban and national scale.*

Committee: Dr. Daven K. Henze (Advisor), Dr. Susan C. Anenberg, Dr. Michael P. Hannigan, Dr. Colleen E. Reid, Dr. Christine Wiedinmyer

**M.S. in Environmental Engineering**

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

Dissertation: *Benefits of reduced premature mortality from decreases in PM2.5 and ozone in the United States from 1999 to 2015.*

Committee: Dr. J. Jason West (Advisor), Dr. Marc Serre, Dr. William Vizuete

**B.S. in Physics, B.S. in Applied Mathematics, Minor in Astronomy**

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

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

**POSTGRADUATE TEACHING**

**Professorial Lecturer**

*Course*: Global Climate Change and Air Pollution (PuBH 6140)

Department of Environmental and Occupational Health

Milken Institute School of Public Health, George Washington University

Fall 2024

* Designed and delivered lectures for a group of graduate students on the linkages between climate, air quality, and health
* Graded exams, papers, presentations, and other assignments; proctored exams
* Led class discussions on climate and air pollution topics and current events

**UNDERGRADUATE TEACHING**

**Lead Teaching Assistant**

*Course:* Computational Methods (MCEN 3030)

Department of Mechanical Engineering

University of Colorado Boulder

Spring 2019

* Led tutorials and office hours for a class of around 100 undergraduate students
* Graded exams, homework, and computational projects; proctored exams.
* Managed a group of graders and teaching assistants

**Teaching Assistant**

*Course:* Computational Methods (MCEN 3030)

Department of Mechanical Engineering

University of Colorado Boulder

Fall 2018

* Led tutorials and office hours for a class of around 100 undergraduate students
* Graded exams, homework, and computational projects; proctored exams.

**MENTORSHIP**

**Research Mentees**

Olivia Paquette (B.S. Student, 2024)

* Supported undergraduate researcher to develop contributions to pending federal grant

Erin Campbell (M.P.H Student, 2023-2024)

Katie O’Donnell (M.P.H, 2023-2024)

* Supported M.P.H researchers to advise the National Resources Defense Council on integrating health and equity in climate policy modeling as Health Science Policy Fellow

Soo-Yeon Kim (Ph.D., 2024)

* Advised PhD researcher on proposal selected for funding in NASA FINESST program

Mohammed Alwakeel (B.S., 2021, next a mechanical engineer)

* Recipient of the Outstanding Undergraduate for International Engagement award

**ACADEMIC SERVICE**

**Ad-Hoc Peer-Review for Journals (24)**

*Atmospheric Chemistry and Physics*: 2024 (1)

*Discover Cities*: 2024 (1)

*Elementa: Science of the Anthropocene*: 2021 (1)

Environmental Monitoring and Assessment: 2025 (1)

*Environmental Research Letters*: 2024 (1)

*Environmental Science & Technology*: 2023 (1), 2022 (1), 2019 (1)

*Environmental Science & Technology Air*: 2024 (1)

*GeoHealth*: 2024 (2), 2023 (1)

*Health Data Science*: 2024 (1)

*International Geoscience and Remote Sensing Symposium*: 2024 (6)

npj Clean Air: 2025 (1)

*Nature Food*: 2024 (1)

*Lancet Planetary Health*: 2021 (1)

*Journal of the Air and Waste Management Association*: 2019 (1)

*Scientific Reports*: 2024 (1)

**Department Service, Conferences, and Seminars**

* Seminar series coordinator for the “Collaborative for Air Quality Research” (CAQR) at the University of Colorado Boulder for the Department of Mechanical Engineering
* Student lead and mentor for Thermodynamics and Fluid Mechanics preliminary exams
* Volunteer research presenter for “Mechanical Engineering as a Profession” (MCEN 2000) research round tables
* Student presenter and volunteer for the “Graduate Engineering Annual Research & Recruiting Symposium” (GEARRS), University of Colorado Boulder
* Student coordinator for the Community Modeling and Analysis System (CMAS) conference, Chapel Hill, NC (Funded)

**PROFESSIONAL ASSOCIATIONS**

2024- American Chemistry Society

2024- GeoCAFE Scholar

2024- Global Burden of Disease Study Collaborator

2023- American Meteorological Society

2023- European Geophysical Union

2018- American Geophysical Union

**MEDIA COVERAGE**

2023 [The Global Health Benefits of Going Net Zero](https://eos.org/research-spotlights/the-global-health-benefits-of-going-net-zero)

2020 [Queimadas na Amazônia aumentam internações](https://revistapesquisa.fapesp.br/queimadas-na-amazonia-aumentam-internacoes/)

**PUBLICATIONS (21)**

**Refereed Journal Articles (17)**

2024 **Nawaz, M.O.**, Goldberg, D.L., Kerr, G.H., Anenberg, S.C. TROPOMI satellite data reshape NO2 Air Pollution Land-Use Regression Modeling Capabilities in the United States. ES&T Air 2024. [10.1021/acsestair.4c00153](https://doi.org/10.1021/acsestair.4c00153)

2024 Goldberg, D.G., de Foy, B., **Nawaz, M.O**, Johnson, J., Yarwood, G., Judd, L.,Identifying Sources of Urban NOx Emissions in Houston, Texas using Remote Sensing Aircraft Measurements and Source Apportionment Regression Models. *ACS ES&T Air*. <https://doi.org/10.1021/acsestair.4c00097>

2024 Dyer, G. M. C., Khomenko, S., Adlakha, D., Anenberg, S. C., Angelova, J., Behnisch, M., Boeing, G., Chen, X., Cirach, M., de Hoogh, K., Diez-Roux, A. V., Esperon-Rodriguez, M., Flueckiger, B., Gasparrini, A., Iungman, T., Khreis, H., Kondo, M., Masselot, P., McDonald, R., … **Nawaz, M. O.**, … Nieuwenhuijsen, M. (2024). Commentary: A road map for future data-driven urban planning and environmental health research. *Cities* **155**, 105340 (2024). <https://doi.org/10.1016/j.cities.2024.105340>

2024 Choi, J., Henze, D. K., **Nawaz, M. O.**, & Malley, C. S. (2024). Source Attribution of Health Burdens From Ambient PM2.5, O3, and NO2 Exposure for Assessment of South Korean National Emission Control Scenarios by 2050. *GeoHealth* (Vol. 8, Issue 8). American Geophysical Union (AGU). <https://doi.org/10.1029/2024gh001042>

2024 Georgia M.C. Dyer, Sasha Khomenko, Deepti Adlakha, Susan Anenberg, Martin Behnisch, Geoff Boeing, Manuel Esperon-Rodriguez, Antonio Gasparrini, Haneen Khreis, Michelle C. Kondo, Pierre Masselot, Robert I. McDonald, Federica Montana, Rich Mitchell, Natalie Mueller, **Nawaz, M.O.**, Enrico Pisoni, Rafael Prieto-Curiel, Nazanin Rezaei, Hannes Taubenböck, Cathryn Tonne, Daniel Velázquez-Cortés, Mark Nieuwenhuijsen. Exploring the nexus of urban form, transport, environment and health in large-scale urban studies: A state-of-the-art scoping review, *Environmental Research*, Volume 257, 2024, <https://doi.org/10.1016/j.envres.2024.119324>.

2024 **Nawaz, M. O.,** Johnson, J., Yarwood, G., de Foy, B., Judd, L., and Goldberg, D. L.: An intercomparison of satellite, airborne, and ground-level observations with WRF–CAMx simulations of NO2 columns over Houston, Texas, during the September 2021 TRACER-AQ campaign, *Atmos. Chem. Phys.*, 2024, 6719–6741, <https://doi.org/10.5194/acp-24-6719-2024>.

2023 Gu, Y., Henze, D.K., **Nawaz, M.O**., Wagner, U.J. Response of the ozone-related health burden in Europe to changes in local anthropogenic emissions of ozone precursors. *Environmental Research Letters*. 18(11). <https://doi.org/10.1088/1748-9326/ad0167>

2023 Jo, D., Nault, B.A., Tilmes, S., Gettelman, A., McCluskey, C., Hodzic, A., Henze, D.K., **Nawaz, M.O.**, Fung, K., Jimenez, J. Global Health and Climate Effects of Organic Aerosols from Different Sources. *Environmental Science and Technology*. 2023, 57, 37, 13793–13807. <https://doi.org/10.1021/acs.est.3c02823>

2023 **Nawaz, M.O.**, Henze, D.K., Huneeus, N.J., Osses, M., Álamos, N., Opazo, M., Gallardo, L., Sources of air pollution health impacts and co-benefits of carbon neutrality in Santiago, Chile. *Journal of Geophysical Research: Atmospheres* 128(19)<https://doi.org/10.1029/2023JD038808>

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://doi.org/10.3389/frsc.2023.1102493>

2023 Gu, Y., Henze, D.K., **Nawaz, M.O.**, Cao, H. Wagner, U.J., Sources of PM2.5-associated health risks in Europe and corresponding emission-induced changes during 2005-2015. *GeoHealth* 2023. <https://doi.org/10.1029/2022GH000767>

2023 **Nawaz, M. O.**, Henze, D. K., Anenberg, S. C., Braun, C., Miller, J., & Pronk, E. A Source Apportionment and Emission Scenario Assessment of PM2.5- 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>

2021 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-21-11201-2021>

2020 **Nawaz, M. O.**, & Henze, D. K. Premature Deaths in Brazil Associated With Long-Term Exposure to PM2.5 From Amazon Fires Between 2016 and 2019. *GeoHealth*, *4*(8), e2020GH000268. <https://doi.org/10.1029/2020GH000268>

**Manuscripts Under Review (3)**

Submitted Jin, L. Benoit, J. Ferrini Rodrigues, P. Miller, J. Alvarez, G., Osipova, L., Anenberg, S.C., **Nawaz, M.O.**, Henze, D.K., Wiecko, P. Current and future burden of mortality and paediatric asthma from transport-related policy measures. *In Revision*.

Submitted **Nawaz, M.O.** & Henze, D.K., Climate action can ameliorate, perpetuate, or exacerbate geopolitical air pollution inequities. *Under Review*.

Submitted Wiecko P., Henze, D.K., **Nawaz, M.O.,** Sector-, season-, and country-specific health benefits from anthropogenic emissions reductions. *Under Review*.

**Manuscripts in Preparation (1)**

In prep. **Nawaz, M.O.**, O’Donnell, K., Campbell, E., Anenberg, S.C., Ensuring health-conscious and equitable climate policy through fine-resolution modeling   
and clarified uncertainty.

**PRESENTATIONS (24)**

**Invited (1)**

2023 Using satellite data to characterize air pollution and health in cities and countries. April 27th. Environmental Defense Fund / Climate and Clean Air Coalition / United Nations Environmental Programme Workshop for Clean Air Solutions in Latin America and the Caribbean. Bogotá, Columbia.

**Oral Presentation (11)**

2024 **Nawaz, M.O.**, Anenberg, S.C., Goldberg, D.L., Kerr, G.H., Kondragunta, S. Development of a Land-Use Regression of Hourly Surface NO2 in preparation for GeoXO Atmospheric Composition Data. April 17th. European Geophysical Union. Vienna, Austria.

2024 **Nawaz, M.O.**, O’Dell, K., Anenberg, S.C., Goldberg, D.L., Kerr, G.H., He, J., McDonald, B., Kondragunta, S. Value of GeoXO Atmospheric Composition Data for Estimating Air Pollution-Related Health Impacts. January 30th. American Meteorological Society. Baltimore, MD, USA.

2023 **Nawaz, M.O.,** Henze, D.K., Anenberg, S.C., Goldberg, D.L., Investigating climate co-benefits using GEOS-Chem adjoint sensitivities. August 15th. Second GEOS-Chem Europe Meeting. London, UK.

2023 **Nawaz, M.O.,** Henze, D.K., Anenberg, S.C., Tessum, C. Regional vs local sources of municipal air pollution-related health impacts. January 10th. American Meteorological Society. (Presented by Henze). Denver, CO, USA.

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. July 19th. Earth Science Information Partners Meeting. Pittsburgh, PA, USA (Virtual).

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 PM2.5-, O3-, and NO2-related health impacts at multiple spatial scales. June 9th. 10th International GEOS-Chem Meeting. St. Louis, MO, USA. (Virtual).

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. February 17th. Graduate Engineering Annual Research and Recruitment Symposium. Boulder, CO, USA.

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. December 15th. American Geophysical Union Fall Meeting. New Orleans, LA, USA (Virtual).

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. December 14th. American Geophysical Union. (Virtual)

2020 **Nawaz, M.O.**,Henze, D.K., Anenberg, S.C., Goldberg, D. Premature deaths in Brazil associated with long-term exposure to PM2.5 from Amazon fires and development of a nested South American domain for the GEOS-Chem Adjoint. June 23rd. 19th GEIA Conference. (Virtual)

2019 **Nawaz, M.O.**, Henze, D.K. Source attribution of PM2.5 from sensitivity analyses in the GEOS-Chem adjoint model. October 25th. Young Scientists Symposium on Atmospheric Research. Fort Collins, CO, USA.

**Poster (12)**

**2024 Nawaz, M.O.,** Goldberg, D.L., Kerr, G.H., Anenberg, S.C., Integrating TROPOMI and TEMPO Satellite Remote-sensing Observations in Land-use and Machine Learning Regression Modeling to Infer Surface-level NO2 in the United States. December 13th. AGU 2024. Washington, DC, USA.

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 12th. American Geophysical Union. Chicago, IL, USA.

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 PM2.5 and ozone in the United States, 1990-2016. July 21st. NASA Health and Air Quality Applied Sciences Team Final Showcase. (Virtual).

2019 **Nawaz, M.O.**, D.K. Henze, S.C. Anenberg, D. Goldberg, Z. Qu (2019). Source attribution of PM2.5 and O3 concentrations and health outcomes from 2010 and 2011 in Washington D.C. using sensitivity analyses in the GEOS-Chem adjoint model. December 19th. American Geophysical Union, San Francisco, CA, USA

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. May 6th. 9th International GEOS-Chem Meeting, Cambridge, MA, USA.

2019 **Nawaz, M.O.**, Henze, D.K., The use of adjoint modeling to assess the sources of air pollution and its associated health impacts. February 21st. Graduate Engineering Annual Research and Recruitment Symposium. Boulder, CO, USA.

2018 **Nawaz**, **M.O.**, D. K. Henze, C. Malley, GH41C-1446: Source Attribution of Climate and Health Impacts from Aerosols. February 14th. AGU Fall Meeting. Washington, DC, USA.

2018 **Nawaz, M.O.**, Y. Zhang, D. Q. Tong, A. van Donkelaar, R. V. Martin, J. J. West. Health benefits of decreases in PM2.5 and ozone in the United States, 1990-2015. July 16th. NASA Health and Air Quality Applied Sciences Team Meeting. Madison, WI, USA.

2018 **Nawaz, M.O.,** Y. Zhang, D. Q. Tong, A. van Donkelaar, R. V. Martin, J. J. West (2018). Health benefits of decreases in PM2.5 and ozone in the United States, 1990-2015. April 20th. Climate Change and Resilience Symposium. Chapel Hill, NC, USA.

2017 **Nawaz, M.O.,** Y. Zhang, D. Q. Tong, J. J. West. Health benefits of decreases in PM2.5 and ozone in the United States from 1990 to 2015. December 11th. American Geophysical Union. New Orleans, LA, USA.

2017 **Nawaz, M.O.**, Y. Zhang, D. Q. Tong, J. J. West. Health benefits of decreases in PM2.5 and ozone in the United States from 1990 to 2015. October 23rd. Community Modeling and Analysis System Conference. Chapel Hill, NC, USA.

2017 **Nawaz M.O.**, Y. Zhang, West, J.J. Impact of regional ozone precursor emissions on global ozone burden. April 12th. Celebration of Undergraduate Research. Chapel Hill, NC, USA.

**REFERENCES**

**Dr. Daven K. Henze** (PhD Advisor)

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