James D. East, Ph.D.

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Education

Ph.D., Environmental Engineering 2022
North Carolina State University, Raleigh, NC
Dissertation: Understanding Multiscale Air Quality Impacts of Observed and Projected Emissions Changes using Chemical Transport Models
Faculty Advisor: Fernando Garcia Menendez, Associate Professor

B.S., Environmental Engineering 2015
North Carolina State University, Raleigh, NC

Experience

Postdoctoral Fellow Harvard University
2023 - present Cambridge, MA
School of Engineering and Applied Sciences
Faculty Mentor: Daniel Jacob, Professor

ORISE Research Fellow U.S. Environmental Protection Agency
2020 - 2023 Research Triangle Park, NC
Office of Research and Development
Mentors: Barron H. Henderson, Sergey Napelenok

Graduate Research Assistant NC State University
2017 - 2020 Raleigh, NC
Department of Civil, Construction, and Environmental Engineering
Faculty Advisor: Fernando Garcia Menendez, Associate Professor

Designer I John R. McAdams Company
2015 - 2017 Durham, NC
Design engineer

Undergraduate Research Assistant NC State University
2014-2015 Raleigh, NC
Department of Civil, Construction, and Environmental Engineering
Faculty Advisor: Emily Berglund, Professor

Peer-reviewed Publications

James D. East, E Monier, RK Saari, and F Garcia-Menendez. Projecting changes in the frequency and magnitude of ozone pollution events under uncertain climate sensitivity. *Earth's Future*, 12(6):e2023EF003941, 2024. URL: https://doi.org/10.1029/2023EF003941

James D. East, DJ Jacob, N Balasus, AA Bloom, LP Bruhwiler, Z Chen, JO Kaplan, LJ Mickley, TA Mooring, E Penn, B Poulter, MP Sulprizio, JR Worden, RM Yantosca, and Z Zhang. Interpreting the seasonality of atmospheric methane. *Geophysical Research Letters*, 51(10):e2024GL108494, 2024. URL: https://doi.org/10.1029/2024GL108494

Matt S. Sparks, I Farahbakhsh, M Anand, CT Bauch, KC Conlon, **JD East**, T Li, M Lickley, F Garcia-Menendez, E Monier, and RK Saari. Health and equity implications of individual adaptation to air pollution in a changing climate. *Proceedings of the National Academy of Sciences*, 121(5):e2215685121, 2024. URL: https://doi.org/10.1073/pnas.2215685121

James D. East, E Monier, and F Garcia-Menendez. Characterizing and quantifying uncertainty in projections of climate change impacts on air quality. *Environmental Research Letters*, 17(9), 2022. URL: https://doi.org/10.1088/1748-9326/ac8d17

James D. East, BH Henderson, SL Napelenok, SN Koplitz, G Sarwar, R Gilliam, A Lenzen, DQ Tong, RB Pierce, and F Garcia-Menendez. Inferring and evaluating satellite-based constraints on NO_x emissions estimates in air quality simulations. *Atmospheric Chemistry and Physics*, 22(24):15981–16001,

2022. URL: https://acp.copernicus.org/articles/22/15981/2022/

Daiwen Kang, C Hogrefe, S Golam, **JD East**, JM Madden, R Mathur, and BH Henderson. Assessing the Impact of Lightning NOx Emissions in CMAQ Using Lightning Flash Data from WWLLN over the Contiguous United States. *Atmosphere*, 13(8), 2022. URL: https://www.mdpi.com/2073-4433/13/8/1248

James D. East, JS Montealegre, JE Pachon, and F Garcia-Menendez. Air quality modeling to inform pollution mitigation strategies in a Latin American megacity. *Science of The Total Environment*, 776(145894), 2021. URL: https://doi.org/10.1016/j.scitotenv.2021.145894

Manuscripts in Review

LH Yang, DJ Jacob, H Lin, R Dang, KH Bates, **East, JD**, KR Travis, DC Pendergrass, and LT Murray. Model underestimates of OH reactivity cause overestimate of hydrogen's climate impact. *arXiv:2408.05127*, 2024. URL: https://doi.org/10.48550/arXiv.2408.05127

LA Estrada, DJ Varon, MP Sulprizio, H Nesser, Z Chen, N Balasus, SE Hancock, M He, **East, JD**, TA Mooring, AO Alonso, JD Maasakkers, I Aben, S Baray, KW Bowman, JR Worden, FJ Cardoso-Saldaña, E Reidy, and DJ Jacob. Integrated Methane Inversion (IMI) 2.0: an improved research and stakeholder tool for monitoring total methane emissions with high resolution worldwide using TROPOMI satellite observations. *EGUsphere*, 2024. URL: https://acmg.seas.harvard.edu/sites/projects.iq.harvard.edu/files/acmg/files/estrada2024_imi.pdf

E Penn, DJ Jacob, Z Chen, **East, JD**, MP Sulprizio, L Bruhwiler, JD Maasakkers, H Nesser, Z Qu, Y Zhang, and W Worden. What can we learn about tropospheric OH from satellite observations of methane? *EGUsphere*, 2024. URL: https://doi.org/10.5194/egusphere-2024-2260

SE Hancock, DJ Jacob, Z Chen, H Nesser, A Davitt, DJ Varon, MP Sulprizio, N Balasus, LA Estrada, **East, JD**, E Penn, CA Randles, J Worden, I Aben, RJ Parker, and JD Maasakkers. Satellite quantification of methane emissions from South American countries: A high-resolution inversion of TROPOMI and GOSAT observations. *EGUsphere*, 2024. URL: https://doi.org/10.5194/egusphere-2024-1763

Q Zhu, DJ Jacob, K Yuan, F Li, BRK Runkle, M Chen, AA Bloom, B Poulter, **East, JD**, WJ Riley, G McNicol, J Worden, C Frankenberg, and M Halabisky. Advancements and opportunities to improve bottom-up estimates of global wetland methane emissions (in review at *Global Change Biology*). 2024

Other Publications

James D. East and F Garcia-Menendez. *Internal climate variability and initial condition ensembles in air quality projections*. In: C. Deser and K. Rodgers (guest eds) New research on climate variability and change using initial-condition Large Ensembles. Special issue of US CLIVAR VARIATIONS. Volume 18, Number 2, Summer 2020. URL: http://dx.doi.org/10.5065/0DSY-WH17

Fernando Garcia-Menendez, **JD East**, BD Pienkosz, and E Monier. Climate model response uncertainty in projections of climate change impacts on air quality. In Wanmin G Mensink C and Hakami A, editors, *Air Pollution Modeling and its Application XXVI*, pages 433–437. Springer International Publishing, 2020. URL: https://doi.org/10.1007/978-3-030-22055-6_69

Juan S. Montealegre, J Vanegas, JE Pachon, A Rojas, **JD East**, and F Garcia-Menendez. Air quality modeling as a tool for adjusting emission inventories. In *2019 Congreso Colombiano y Conferencia Internacional de Calidad de Aire y Salud Pública (CASP)*, pages 1–4, 2019. URL: https://doi.org/10.1109/CASAP48673.2019.9364063

Invited Talks

2024 Air & Waste Management Association - RTP Chapter. April 30, 3024.

2024 Harvard University SEAS Cross Area Seminar. Cambridge, MA. March 20, 2024.

2024 NASA Jet Propulsion Laboratory Science Visitor and Colloquium Program, Earth Science Seminar. Pasadena, CA. January 23, 2024.

2023 AGU Atmospheric and Space Electricity Early Career seminar. June 8, 2023.

2023 NASA Atmospheric Chemistry and Dynamics Lab Seminar. January 5, 2023.

Scientific Presentations

2024 East, J.D. et al., Interpreting the seasonality of atmospheric methane. 11th International GEOS-Chem Meeting. St. Louis, MO. June 13, 2024.

2024 Mooring et al., Evaluating Stratospheric Methane in GEOS-Chem with Satellite and Balloon Observations. 12A.4. AMS 104th Annual Meeting, Baltimore, MD. January 31, 2024.

2023 Penn et al., What can we learn about OH from satellite observations of methane? A41C-08. AGU Fall Meeting, San Francisco, CA. December 14, 2023.

2023 Hancock et al., South American methane: a high-resolution inversion of blended TROPOMI+GOSAT satellite observations. A54C-02. AGU Fall Meeting, San Francisco, CA. December 15, 2023.

2023 East, J.D. et al., HTAPv3 Initial Application in Hemispheric CMAQ. Task Force on Hemispheric Transport of Air Pollution Meeting. April 21, 2023.

2022 East, J.D. et al., Lightning-NOx Emissions, Impacts, and Evaluation Using Satellite Data Assimilation and Remote Observations. AE13A-08. AGU Fall Meeting, Chicago, IL. December 13, 2022.

2022 Sparks et al., Effect of natural variability in mediating short term adaptation to air pollution. GC26A-03. AGU Fall Meeting, December 12, 2022.

2022 East, J.D.. Using satellites to better understanding our air. NC State University Three Minute Thesis Competition. October 25, 2022.

2022 East, J.D. et al., Applying satellite data assimilation to infer lightning-NOx emissions in CMAQ. CMAS Conference, Chapel Hill, NC. October 18, 2022.

2022 Madden et al., Evaluating methods of representing lightning NOx emissions across the Northern Hemisphere. 21st Annual CMAS Conference, Chapel Hill, NC. October 18, 2022.

2022 East, J.D. et al., Advancing the use of satellite NO_2 data in the CMAQ modeling platform: framework, emissions estimates, and evaluation. Air Quality Assessment Division Technical Discussion, U.S. EPA. May 20, 2022.

2022 East, J.D.. Using satellites to better understanding our air. Three Minute Thesis Competition, Department of Civil, Construction, and Environmental Engineering. April 18, 2022.

2022 East, J.D. et al., Inferring air pollutant emissions using satellites. Environmental, Water Resources, and Coastal Engineering Symposium at NC State. March 4, 2022.

2022 East, J.D. et al., Applying OMI and TROPOMI NO_2 observations in EPA's CMAQ modeling framework. HAQAST Update22. January 20, 2022.

2022 East, J.D. et al., Comparing OMI and TROPOMI NO_2 data assimilation for estimating NOx emissions. Air Quality Model Applications Group, Research Triangle Park, NC. January 5, 2022.

2021. East, J.D., et al., Enhanced representation of inter-continental pollutant transport by assimilating satellite NO_2 and performing NOx emissions inversions. CMAS Meeting. November 2, 2021.

2021 Madden, et al., Assessment of the Impact of Lightning NOx on Air Quality over the Northern Hemisphere. CMAS Meeting. November 2, 2021.

2021 East, J.D., et al., Using Satellites to better understand our air. Science on Earth Day "ScED" Talks, U.S. EPA Office of Research and Development. April 22, 2021.

2021 East, J.D. et al., Early Career Seminar. National Leadership Training Organization, U.S. EPA. March 25, 2021.

2020 East, J.D. et al., Implementing satellite NO_2 data assimilation in CMAQ for identifying emissions biases and improving regional boundary conditions. Atmospheric and Environmental Systems Modeling Division Seminar, U.S. EPA. November 18, 2020.

2020 East, J.D. et al., Implementing satellite NO_2 data assimilation in CMAQ for identifying emissions biases and improving regional boundary conditions. CMAS Conference, Chapel Hill, NC. October 27, 2020.

2020 East, J.D., et al., Presentation to the Division Director on implementing chemical data assimilation into the CMAQ model. Air Quality Assessment Division, U.S. EPA. September 11, 2020.

2020 Garcia Menendez, F., et al., Assessing Climate Variability and Change in an Ensemble Simulation of Climate Impacts on U.S. Air Quality and Public Health (Invited). AMS Annual Meeting. January 13, 2020.

2019 East, J.D. et al., Particulate matter sensitivity to local emissions and meteorology over a Latin American megacity for source apportionment and uncertainty analysis. CMAS Conference. October 21, 2019.

2019 East, J.D. et al., A source-scaling method for PM source apportionment in CMAQ simulations of Bogotá air quality. CASAP Conference. Barranquilla, Colombia. August 14, 2019.

2019 East, J.D.. Sensitivity of particulate matter pollution to emissions sector changes in a Latin American Megacity. NC Breathe Conference. Wilmington, NC. April 11, 2019.

2018 Garcia Menendez, F., et al., Uncertainty in integrated projections of climate change impacts on air quality, public health, and policy benefits (Invited). AGU Fall Meeting. December 13, 2018.

2018 East, J.D. Difficulties and successes using Henry2 to compile and benchmark CMAQ, a community air quality model. NC State University High Performance Computing Research Symposium. November 20, 2018.

Poster Presentations

2023 East, J.D. et al., Interpreting the Seasonality of Atmospheric Methane. B21K-2111. AGU Fall Meeting, San Francisco, CA. December 12, 2023.

2022 East, J.D. et al., Projecting Climate-Driven Changes in Extreme Ozone Pollution under Natural Variability and Uncertain Climate Sensitivity. A52N-1166. AGU Fall Meeting, December 16, 2022.

2022 East, J.D. et al., Assimilation of NO_2 - A comparison of multiple products and multiple models. Poster at the International GEOS-Chem Conference. June 8, 2022.

2022 East, J.D. et al., Assimilation of NO_2 - A comparison of multiple products and multiple models. Poster at the TEMPO Science Team Meeting. June 1, 2022.

2021 East, J.D. et al., Comparing OMI and TROPOMI NO_2 Data Assimilation for Estimating NOx Emissions. AGU Fall Meeting. December 13, 2021.

2021 Madden, M. et al., Comprehensive Evaluation of Hemispheric CMAQ Lightning NOx Simulations. AGU Fall Meeting. December 13, 2021.

2021 East, J.D. et al., Assimilating satellite observations of NO_2 pollution in an air quality model to identify emissions biases NC State University Environment, Water Resources, and Coastal Engineering Annual Research Symposium. February 26, 2021.

2020 East, J.D. et al., Impact of climate related uncertainty on projections of US air quality and implications for extremes. AGU Fall Meeting. December 10, 2020.

2020 East, J.D. et al., Impact of climate uncertainty on projections of $PM_{2.5}$ pollution over the US. AAAR Conference. October 5, 2020.

2020 East, J.D. et al., Implementing satellite data assimilation capabilities in the EPA hemispheric modeling platform for improving boundary conditions. HAQAST Showcase. July 21, 2020.

2020 East, J.D., and Garcia-Menendez, F. Impact of climate sensitivity on projections of US air quality and extreme air pollution. NC State University Environment, Water Resources, and Coastal Engineering Annual Research Symposium. March 6, 2020.

2019 East, J.D., and Garcia-Menendez, F. Sensitivity of particulate matter pollution to emissions sector changes in a Latin American Megacity. NC State University Environment, Water Resources, and Coastal Engineering Annual Research Symposium. March 1, 2019.

2019 East, J.D.. Integrating Speciated Particulate Matter Data to Improve Model Performance in Bogota. NC State University Latin American Research Symposium. February 15, 2019.

2018 East, J.D. et al., Integrating Speciated Particulate Matter Data to Improve Model Performance in Bogota. 17th Annual CMAS Conference. October 22, 2018.

2018 East, J.D., and Garcia-Menendez, F. Impact of Climate Sensitivity Uncertainty on US Air Quality Projections. 111th Air & Waste Management Association Annual Conference & Exhibition. June 25, 2018.

2018 East, J.D., and Garcia-Menendez, F. Impact of Climate Model Response on Projections of Future Air Quality under various Climate Scenarios. NC State University Environment, Water Resources, and Coastal Engineering Annual Research Symposium. March 2, 2018.

2015 East, J.D., and Berglund, E. Agent Based Modeling to Simulate Water Use Adaptations on the Upper Neuse River Basin. 108th Air & Waste Management Association Annual Conference & Exhibition. June 22, 2015.

Technical Skills

Languages: Python (advanced), MATLAB (intermediate), FORTRAN (intermediate)
Air quality modeling tools: Experience using satellite observation data from OMI and TROPOMI satellites. CMAQ, WRF, GSI, NetCDF, IOAPI, NCO.

Teaching & Mentoring

Undergrad research advisor. Summer 2024. Trained an undergraduate researcher in inverse modeling research.

Lecture. CE596 Environmental Modeling. March 2, 2022. Developed and led class Python coding activity and delivered lecture.

Undergrad research advisor. Summer 2021. Trained an undergraduate researcher in conducting atmospheric modeling research.

Teaching Assistant. CE373 Fundamentals of Environmental Engineering. Spring 2018.

Guest instructor. Boy Scouts Merit Badge College event at NC State University. Spring 2018. Led class in presentation about contemporary issues in air pollution.

Awards & Fellowships

Finalist: Three Minute Thesis Competition. North Carolina State University. 2022.

1st Place: Three Minute Thesis Competition. Department of Civil, Construction, and Environmental Engineering at North Carolina State University. 2022.

Fellowship: U.S. Environmental Protection Agency ORISE Fellowship. 2020-2023

Scholarship: Sustainability Research and Study Related to Air Quality and Waste Management, 2019, presented by Air & Waste Management Association

Travel Award: NC State Graduate School competitive workshop funding for travel to NCAR WRF Training, Boulder, CO, Summer 2019

1st Place: Masters student poster competition, 2018 AWMA ACE, Hartford, CT

Honorable Mention: Poster competition, 2018 Environmental, Water Resources, and Coastal Engineering Annual Symposium, NC State University, Raleigh, NC

Graduate Merit Award: 2017, NC State University

1st Place: Undergrad student poster competition, 2015 AWMA ACE, Raleigh, NC

Service

Seminar Coordinator: Atmospheric & Environmental Chemistry Seminar. Harvard University.

Participant: EPA Methane Inverse Modeling Technical Workshop. Research Triangle Park, NC. July 2024.

Peer-review: *Environmental Pollution; Environmental Science & Technology; JGR: Atmopsheres; Biogeosciences*

A&WMA Student Chapter: NC State University. Secretary, 2019-2020. President, 2018-2019

Race Director: Hope Through Education 5K, Raleigh, NC. December 2018, November 2019. Planned and directed the event which raised over $10,000 for student scholarships and had over 150 participants. `hopethroughed5k.com`.

Team Member: Sir Walter Running. Raleigh, NC. 2020 - 2023. **Prepared procurement requests and monitored technical performance** in my role coordinating the site layout of an annual professional track

meet hosting over 2,000 attendees. Planned and coordinated parking at an annual half marathon with over 600 participants. Volunteer at community track events. `sirwalterrunning.com`.

Mentor: Ligon Adoption Mentorship Program (LAMP), Raleigh, NC 2016-2018

Cross Country & Track Club at NC State: Vice-President, 2013-2014.

Professional Memberships

American Geophysical Union

Air & Waste Management Association – Member, RTP Chapter

Tau Beta Pi

N.C. Engineering Intern Certification A-28871 – Environmental Engineering

Training

WRF Tutorial. NCAR Campus, Boulder, CO. July 15-19, 2019.

Introduction to HPC at NC State. NC State University, Raleigh, NC. October 4, 2018.

BenMAP-CE Training. U.S. EPA Campus. Research Triangle Park, NC. September 25-27, 2018.