

# Gaige Hunter Kerr

RESEARCH SCIENTIST · AIR QUALITY AND ATMOSPHERIC SCIENCES

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## Experience

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### George Washington University, Department of Environmental and Occupational Health

RESEARCH SCIENTIST

POSTDOCTORAL SCIENTIST

Advisor: Susan Anenberg

Washington, DC

July 2021–Present

July 2020–June 2021

### NASA Goddard Space Flight Center

STUDENT RESEARCH COLLABORATOR

Greenbelt, MD

June 2017–May 2020

## Education

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### Johns Hopkins University, Department of Earth & Planetary Sciences

Ph.D., M.A.; Earth & Planetary Sciences

Advisor: Darryn Waugh

Baltimore, MD

2015–2020

### Cornell University, Department of Earth and Atmospheric Sciences

B.Sc. (*cum laude* with distinction); Atmospheric Sciences

Advisors: Art DeGaetano, Gang Chen

Ithaca, NY

2011–2015

## Publications

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### Submitted

Anenberg, S. C., Mohegh, A., Goldberg, D. L., **Kerr, G. H.**, Brauer, M., Burkart, K., Hystad, P., Larkin, A., Wozniak, S., & Lamsal, L. (under review). Long-term trends in urban NO<sub>2</sub> concentrations and associated pediatric asthma incidence: Estimates from global datasets. [\[link\]](#)

Badr, H. S., Zaitchik, B. F., **Kerr, G. H.**, Nguyen, N.-L. H., Chen, Y.-T., Hinson, P., Colston, J. M., Kosek, M. N., Dong, E., Hongru, D., Marshall, M., Kristen, N., Mohegh, A., Goldberg, D. L., Anenberg, S. C., & Gardner, L. M. (under review). Unified real-time environmental-epidemiological data for multiscale modeling of the COVID-19 pandemic. [\[link\]](#)

### Refereed

[11] Goldberg, D. L., Anenberg, S. C., **Kerr, G. H.**, Lu, Z. & Streets, D. G. (in press). TROPOMI: A revolutionary new satellite instrument measuring NO<sub>2</sub> air pollution. *EM (Pittsburgh Pa)*.

[10] Anenberg, S. C., **Kerr, G. H.**, & Goldberg, D. L. (in press). Leveraging satellite data to address air pollution inequities. *EM (Pittsburgh Pa)*.

[9] **Kerr, G. H.**, Goldberg, D. L. & Anenberg, S. C. (2021). COVID-19 pandemic reveals persistent disparities in nitrogen dioxide pollution. *Proc. Natl. Acad. Sci. U.S.A.* 118(30), e2022409118. [\[link\]](#)

[8] Gorris, M. E., Anenberg, S. C., Goldberg, D. L., **Kerr, G. H.**, Stowell, J. D., Tong, D., & Zaitchik, B. F. (2021). Shaping the future of science: COVID-19 highlighting the importance of GeoHealth. *GeoHealth*, 5(5), e2021GH000412. [\[link\]](#)

[7] Goldberg, D. L., Anenberg, S. C., **Kerr, G. H.**, Mohegh, A., Lu, Z., & Streets, D. G. (2021). TROPOMI NO<sub>2</sub> in the United States: A detailed look at the annual averages, weekly cycles, effects of temperature, and correlation with surface NO<sub>2</sub> concentrations. *Earths Future*, 9(4), e2020EF001665. [\[link\]](#)

[6] **Kerr, G. H.**, Badr, H. S., Gardner, L. M., Perez-Saez, J., & Zaitchik, B. F. (2021). Associations between meteorology and COVID-19 in early studies: Inconsistencies, uncertainties, and recommendations. *OneHealth*, 12, 100225. [\[link\]](#)

[5] **Kerr, G. H.**, Waugh, D. W., & Miller, S. M. (2021). Jet stream-surface tracer relationships: Mechanism and sensitivity to source region. *Geophys. Res. Lett.*, 48(1), e2020GL090714. [\[link\]](#)

[4] **Kerr, G. H.**, Waugh, D. W., Steenrod, S. D., Strode, S. A., & Strahan, S. E. (2020). Surface ozone-meteorology relationships: Spatial variations and the role of the jet stream. *J. Geophys. Res. Atmos.*, 125(21), e2020JD032735. [\[link\]](#)

[3] **Kerr, G. H.**, Waugh, D. W., Strode, S. A., Steenrod, S. D., Oman, L. D., & Strahan, S. E. (2019). Disentangling the drivers of the summertime ozone-temperature relationship over the United States. *J. Geophys. Res. Atmos.*, 124(19), 10503–10524. [\[link\]](#)

[2] **Kerr, G. H.**, & Waugh, D. W. (2018). Connections between summer air pollution and stagnation. *Environ. Res. Lett.*, 13(8), 084001. [\[link\]](#)

[1] **Kerr, G. H.**, DeGaetano, A. T., Stoof, C. R., & Ward, D. (2018). Climate change effects on wildland fire risk in the Northeastern and Great Lakes states predicted by a downscaled multi-model ensemble. *Theor. Appl. Climatol.*, 131, 625–639. [\[link\]](#)

## Datasets

[1] Badr, H. S., Zaitchik, B. F., **Kerr, G. H.**, Colston, J. M., Hinson, P., Chen, Y., Nguyen, N. H., Kosek, M., Du, H., Dong, E., & Gardner, L. M. (2020). Unified COVID-19 Dataset. GitHub. [\[link\]](#)

## Non-Refereed

[4] Krocak, M. J., **Kerr, G. H.**, & Flournoy, M. D. (2019). Diversity, equity, and inclusion in the atmospheric sciences. An interview with Kevin Petty. *Bull. Amer. Meteor. Soc.*, 100(6), 1126.

[3] Flournoy, M. D., Krocak, M. J., & **Kerr, G. H.** (2018). An introvert's guide to networking. *Bull. Amer. Meteor. Soc.*, 99(11), 2379.

[2] **Kerr, G. H.**, Krocak, M. J., Flournoy, M. D., & Knox, J. A. (2018). Weathering together: Building a climate of diverse community perspectives. *Bull. Amer. Meteor. Soc.*, 99(10), 2150.

[1] **Kerr, G. H.** (2015) Climate change effects on fire risk in the U. S. Northeast, honors thesis, Cornell University, Ithaca, New York, USA. May 22.

## Research Grants

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### Pending

Co-I (*Susan Anenberg is PI*): “From space to the street: Using satellite remote sensing to address environmental injustice from transportation-related air pollution,” NASA HAQ (1 January 2022–31 December 2024).

### Current

Co-I (*Anenberg is PI*): “Value of GeoXO atmospheric composition data for estimating air pollution-related health impacts,” NOAA (\$199K; 1 August 2021–31 July 2022).

Principal Coordinator (*Anenberg and Qian Xiao are PIs*): “Earth observations for environmental justice (EO4EJ),” NASA HAQAST Tiger Team (\$140K; 1 July 2021–30 December 2022).

## Presentations

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### Invited talks

[5] **Kerr, G. H.** (2021). *COVID-19 pandemic reveals persistent disparities in NO<sub>2</sub> pollution*. Online Summer Workshop in Environment, Energy, and Transportation (virtual).

[4] **Kerr, G. H.** (2021). *Transportation Impacts on NO<sub>2</sub> Pollution and Racioethnic Disparities during COVID-19*. Environmental Sciences Graduate Program, University of California, Riverside (virtual).

[3] **Kerr, G. H.** (2021). *Elucidating the relationship between O<sub>3</sub> and meteorology & COVID-19 pandemic reveals persistent NO<sub>2</sub> disparities*. Atmospheric Chemistry Modeling Group, Harvard University (virtual).

[2] **Kerr, G. H.** (2020). *Elucidating the relationship between surface ozone and meteorology*. University of Maryland, College Park, MD.

[1] **Kerr, G. H.** (2019). *What controls the ozone-temperature relationship? Results from the GMI CTM over the United States*. CCM Meeting, NASA Goddard Space Flight Center.

## Conference talks

- [15] Anenberg, S., Goldberg, D., & **Kerr, G. H.** (2021). *Inconsistent NO<sub>2</sub> during COVID-19 Lockdowns: Lessons for protecting near-term public health and designing longer-term environmental policies*. MARAMA Mobile Sources Workshop (virtual).
- [14] Goldberg, D.L., Anenberg, S., Griffin, D., McLinden, C. A., **Kerr, G. H.**, Lu, Z., Streets, D. G. (2020) *Using TROPOMI and re-analysis meteorology to disentangle the impact of the COVID-19 lockdowns on urban NO<sub>2</sub> from natural variability*. Fall Meeting of the American Geophysical Union (virtual).
- [13] **Kerr, G. H.**, Goldberg, D. L. & Anenberg, S. C. (2021). *Impact of Coronavirus Lockdowns on NO<sub>2</sub>: Successes and Challenges for Environmental Inequality in the United States*. 23rd Conference on Atmospheric Chemistry/12th Conference on Environment and Health, American Meteorological Society (virtual).
- [12] Anenberg, S., Goldberg, D. L., **Kerr, G. H.**, Lu, Z., Griffin, D., McLinden, C. A., Duncan, B. N., Miller, J., Minjares, R. J., & Dreessen, J. (2020). *Inconsistent NO<sub>2</sub> drops during COVID-19 lockdowns: Lessons for protecting near-term public health and designing longer-term environmental policies*. Fall Meeting of the American Geophysical Union (virtual).
- [11] **Kerr, G. H.**, Goldberg, D. L. & Anenberg, S. C. (2020). *Environmental injustices associated with coronavirus-related changes in NO<sub>2</sub> pollution*. Fall Meeting of the American Geophysical Union (virtual).
- [10] **Kerr, G. H.**, Goldberg, D. L. & Anenberg, S. C. (2020). *COVID-19 lockdowns reveal pronounced disparities in nitrogen dioxide pollution levels*. Urban Air Quality Breakout, Keck Institute for Space Studies, Caltech (virtual).
- [9] Goldberg, D., Anenberg S., **Kerr, G.**, Lu, Z., McLinden, C., & Griffin, D. (2020). *Disentangling the impact of COVID-19 lockdowns on urban NO<sub>2</sub> from natural variability*. Community Modeling and Analysis System Conference (virtual).
- [8] **Kerr, G. H.**, Waugh, D. W. (2020). *Connections between the surface-Level ozone-temperature relationship and the eddy-driven jet stream*. 22nd Conference on Atmospheric Chemistry, American Meteorological Society, Boston, MA.
- [7] **Kerr, G. H.**, Waugh, D. W., Steenrod, S. D., & Strode, S. A. (2019). *Sensitivity of surface-level ozone to temperature-related processes*. 21st Conference on Atmospheric Chemistry, American Meteorological Society, Phoenix, AZ.
- [6] **Kerr, G. H.**, & Waugh, D. W. (2018). *Impacts of emission variability on CTM pollutant representation*. 20th Joint Conference on the Applications of Air Pollution Meteorology with the A&WMA, American Meteorological Society, Austin, TX.
- [5] **Kerr, G. H.**, & Waugh, D. W. (2017). *Connections between air pollution and stagnation*. Fall Meeting of the American Geophysical Union, New Orleans, LA.
- [4] **Kerr, G. H.**, & Waugh, D. W. (2017). *Modeling of regional air pollution events*. Meteorology And Climate–Modeling for Air Quality Conference, Davis, CA.
- [3] **Kerr, G. H.**, & Waugh, D. W. (2017). *Air pollution in the Northeastern United States: Elucidating drivers of PM<sub>2.5</sub> and O<sub>3</sub> events*. 19th Conference on Atmospheric Chemistry, American Meteorological Society, Seattle, WA.
- [2] **Kerr, G. H.**, & DeGaetano, A. T. (2016). *Climate change effects on wildland fire risk in the Northeastern United States and Great Lakes region*. 28th Conference on Climate Variability and Change, American Meteorological Society, New Orleans, LA.
- [1] **Kerr, G. H.**, DeGaetano, A. T., & Flannigan, M. D. (2015). *Climate change effects on fire risk in the Northeast U.S.* Northeastern Storms Conference, Saratoga Springs, NY.

## Conference posters

- [5] **Kerr, G. H.**, Badr, H. S., Perez-Saez, J., & Zaitchik, B. F. (2020). *Bridging the Worlds of modeling the spread of COVID-19 and meteorology*. Paper presented at the Climatological, Meteorological and Environmental factors in the COVID-19 pandemic of the World Meteorological Organization (virtual meeting).
- [4] **Kerr, G. H.**, Badr, H. S., Gardner, L. M., Perez-Saez, J., & Zaitchik, B. F. (2020). *Consequences of modeling assumptions and scope of analysis on connections between meteorology and COVID-19*. Japan Geoscience Union-American Geophysical Union Joint Meeting (virtual meeting).
- [3] **Kerr, G. H.**, & Waugh, D. W. (2019). *What causes the observed surface ozone-temperature relationship? Effect of the eddy-driven jet on surface-level transport*. Meteorology And Climate–Modeling for Air Quality Conference, Davis, CA.
- [2] **Kerr, G. H.**, & Waugh, D. W. (2018). *Temperature-dependent drivers of summer surface-level ozone: Insights from a chemical transport model within the Eastern United States*. iCACGP-IGAC Science Conference, Takamatsu, Kagawa, Japan.

[1] Kerr, G., Chaubey, J. P., O'Neill, N. T., Hayes, P., & Atkinson, D. E. (2014). *Identification of absorbing organic (brown carbon) aerosols through sun photometry: Results from AEROCAN/AERONET stations in high Arctic and urban locations*. Fall Meeting of the American Geophysical Union, San Francisco, CA.

## Fellowships, Honors & Awards

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2021	<b>Selected to participate in ACCESS XVI</b> , Brookhaven National Laboratory
2021	<b>Jane Warren Trainee Conference Award</b> , Health Effects Institute
2020–2021	<b>Air Quality Fellow</b> , Greening Diplomacy Initiative, U.S. Department of State
2020	<b>Postdoc Appreciation Day Research Symposium Award</b> , George Washington University
2020	<b>ASP Postdoctoral Fellowship</b> , National Center for Atmospheric Research (declined)
2020	<b>Earth Institute Postdoctoral Fellowship</b> , Columbia University (declined)
2018	<b>Best Student Presentation</b> , Department of Earth & Planetary Sciences, Johns Hopkins University
2018	<b>J. Brien Key Travel Award</b> , Johns Hopkins University
2018	<b>Jay Fein Scholarship</b> , American Meteorological Society
2017	<b>Travel Award</b> , UC Davis Air Quality Research Center/California Air Resources Board
2017	<b>Committee on Atmospheric Chemistry Travel Award</b> , American Meteorological Society
2016–2018	<b>Water, Climate, and Health Integrative Graduate Education and Research Traineeship (IGERT) Program</b> , NSF

## Teaching & Outreach

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### Invited panelist:

Environmental Justice Series, Georgetown University School of Medicine, Summer 2021

### Instructor:

Python for Beginners (BIOF 020), National Institutes of Health Foundation for Advanced Education in the Sciences, Summer 2021

### Guest lecturer:

Global Climate Change and Air Pollution (PUBH 6140), George Washington University, Summer 2021

### Teaching assistant:

Oceans & Atmospheres (AS.270.224), Johns Hopkins University, 11 students, Spring 2019

Introduction to Global Environmental Change (AS.270.103), Johns Hopkins University, 45 students, Fall 2018

Atmospheric Thermodynamics and Hydrostatics (EAS 3410), Cornell University, Fall 2014

### Grader:

Climate Change and Global Warming (EAS 2680), Cornell University, Spring 2015

**Johns Hopkins Teaching Academy:** Completed a three-phase professional development program to learn an overview of pedagogy, acquire teaching and assessment skills, and served as an apprentice with faculty mentors (August 2018–April 2019).

**Engineering Innovation:** Developed and taught an intensive, two-week curriculum reviewing Algebra, Physics, Trigonometry, and Computer Science for ~20 Baltimore City high school students (Summers 2016–2019).

## Leadership

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**Ad-hoc reviewer:** *Journal of Geophysical Research: Atmospheres, Atmospheric Chemistry and Physics, Geophysical Research Letters, One-Health, Atmospheric Environment, Weather and Climate Dynamics, Remote Sensing of Environment, International Journal of Environmental Research and Public Health*

**Member:** George Washington University, Department of Environmental and Occupational Health, Diversity & Inclusion Subcommittee (2020–present)

**Member:** American Meteorological Society (AMS), Annual Meeting Oversight Committee (2020–present)

**Member:** AMS Board on Representation, Accessibility, Inclusion, and Diversity (chair of Coriolis LGBTQ+ committee and responsible for planning webinars and social/networking activities for AMS LGBTQ+ community and co-chair of ad-hoc environmental justice committee) (2017–present)

**Member:** AMS Charles Anderson Award Committee (2019), AMS Louis J. Battan Author's Award Committee (2020, 2021)

**Student presentation judge:** AMS Student Conference poster session (2020, 2021), American Geophysical Union (2020)

**Co-chair:** AMS Student Conference (responsible for organizing an annual two-day conference for 800+ students and overseeing a budget of ~\$120,000) (2018–2020)

**Student Member:** AMS Task Force on Professional Conduct (2019–2020)

**Student Member:** AMS Committee on Meteorological Aspects of Air Pollution (2016–2019)

## Public Spotlights & Highlights

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**Stat** “The pandemic made clear who doesn’t get to breathe clean air. Now what?” [\[link\]](#)

**ABC News** “Air pollution remained higher in minority communities during the pandemic, revealing persistent health disparities” [\[link\]](#)

**NASA** “Q&A: Scientists analyze how the pandemic affected air quality” [\[link\]](#)

**National Geographic** “Does everyone need to wear a mask outside? Experts weigh in” [\[link\]](#)

**Scripps Media, Inc.** “What environmental changes from COVID-19 will stick around after pandemic?” [\[link\]](#)

**The Weather Channel** [\[link\]](#)

**Baltimore Daily Sun** “Crude oil shipments threaten city neighborhoods” [\[link\]](#)

## Interests

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traveling, hiking, and backpacking • cooking • genealogy • houseplants • classical piano and pipe organ