

Sarah Hancock
sarahhancock@g.harvard.edu
sarahhancock.github.io
Updated March 2025

Education

Harvard University, Cambridge, MA 2021 – Present
School of Engineering and Applied Sciences
Ph.D. Candidate, Environmental Science and Engineering

Columbia University, New York, NY 2017 – 2021
Fu Foundation School of Engineering and Applied Science
Bachelor of Science, Computer Science

First-Author Publications

Hancock, S.E., D.J. Jacob, Z. Chen, H. Nesser, A. Davitt, D.J. Varon, M.P. Sulprizio, N. Balasus, L.A. Estrada, M. Cazorla, Satellite quantification of methane emissions from South American countries: a high-resolution inversion of TROPOMI and GOSAT observations, *Atmos. Chem. Phys.*, 25, 2, 797-817, <https://doi.org/10.5194/acp-25-797-2025>, 2025.

Hancock, S.E., A.M. Fiore, D.M. Westervelt, G. Correa, J.-F. Lamarque, C. Venkataraman, A. Sharma, Changing PM_{2.5} and related meteorology over India from 1950-2014: A new perspective from a chemistry-climate model ensemble, *Environ. Res.: Climate* 2, 015003, DOI 10.1088/2752-5295/acb22a, 2023.

Co-Author Publications

Estrada, L.A., D.J. Varon, M. Sulprizio, H. Nesser, Z. Chen, N. Balasus, **S.E. Hancock**, M. He, J.D. East, T.A. Mooring, 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, 1-31, <https://doi.org/10.5194/egusphere-2024-31>, 2024.

Chen, Z., Jacob, D. J., Gautam, R., Omara, M., Stavins, R. N., Stowe, R. C., Nesser, H. O., Sulprizio, M. P., Lorente, A., Varon, D. J., Lu, X., Shen, L., Qu, Z., Pendergrass, D. C., and **Hancock, S.E.**, Satellite quantification of methane emissions and oil/gas methane intensities from individual countries in the Middle East and North Africa: implications for climate action, *Atmos. Chem. Phys.*, 23, 5945–5967, <https://doi.org/10.5194/acp-23-5945-2023>, 2023.

Varon, D.J., D.J. Jacob, M. Sulprizio, L.A. Estrada, W.B. Downs, L. Shen, **S.E. Hancock**, H. Nesser, Z. Qu, E. Penn, Z. Chen, X. Lu, A. Lorente, A. Tewari, and C.A. Randles, Integrated Methane Inversion (IMI 1.0): a user-friendly, cloud-based facility for inferring high-resolution

methane emissions from TROPOMI satellite observations, *Geosci. Model Dev.*, 15, 5787–5805, <https://doi.org/10.5194/gmd-15-5787-2022>, 2022.

Fiore, A.M., **S.E. Hancock**, J.-F. Lamarque, G.P. Correa, K.-L. Chang, M. Ru, O. Cooper, A. Gaudel, L.M. Polvani, B. Sauvage, J.R. Ziemke, Understanding recent tropospheric ozone trends in the context of large internal variability: A new perspective from chemistry-climate models, *Environ. Res.: Climate* 1 025008 DOI 10.1088/2752-5295/ac9cc2, 2022

Fiore, A. M., Milly, G. P., **Hancock, S. E.**, Quiñones, L., Bowden, J. H., Helstrom, E., et al. Characterizing changes in eastern U.S. pollution events in a warming world. *Journal of Geophysical Research: Atmospheres*, 127, e2021JD035985. <https://doi.org/10.1029/2021JD035985>, 2022

PRESENTATIONS

American Meteorological Society (AMS) Annual Meeting, January 2025.
Evaluating the Utility of Satellite Observations for Improving Bottom-Up National Emission Inventories: Application to Colombia. (Oral)

Private and Public, Scientific, Academic, and Consumer Food Policy Group (PAPSAC), December 2024. Using satellite observations to monitor methane from livestock. (Oral)

American Geophysical Union (AGU) Fall 2023 Meeting, December 2023.
Remote. South American methane: a high-resolution inversion of blended TROPOMI+ GOSAT satellite observations. (Oral)

American Meteorological Society (AMS) Annual Meeting, January 2021.
Remote. Changing PM_{2.5} and related meteorology over India from 1950-2014: A new perspective from a chemistry-climate model ensemble. (Oral)

Community Earth System Model (CESM) Winter Working Group Meeting, February 2021.
Remote. Changing PM_{2.5} and related meteorology over India from 1950-2014: A new perspective from a chemistry-climate model ensemble. (Oral)

American Geophysical Union (AGU) Fall 2020 Meeting, December 2020.
Remote. Changing PM_{2.5} and related meteorology over India from 1950-2014: A new perspective from a chemistry-climate model ensemble. (Oral)

Lamont-Doherty Earth Institute Summer Intern Poster Session, August 2020.
Remote. Changing PM_{2.5} and related meteorology over India from 1950-2014: A new perspective from a chemistry-climate model ensemble. (Poster)

RESEARCH EXPERIENCE

Harvard, Atmospheric Chemistry Modeling Group

August 2021– Present

Graduate Research Assistant

Advisor: Dr. Daniel Jacob

Lamont-Doherty Earth Institute, Atmospheric Chemistry Group May 2020 – October 2021

Research Assistant

Advisors: Dr. Arlene M. Fiore, Dr. Daniel M. Westervelt

TEACHING EXPERIENCE

Harvard University

January 2023 – Spring 2024

SCIENCE 5, Introduction to Computation Teaching Fellow, Spring 2023, Spring 2024

- Designed problem sets and laboratory exercises for new, introductory computer science course

EPS 200, Atmospheric Chemistry Teaching Fellow, Fall 2023

- Wrote problem sets and taught weekly sections for graduate-level atmospheric chemistry class

Children's Creativity Museum

May 2019 – September 2020

Senior Education Intern, May 2020 – September 2020

- Researched changes in museum programming during COVID-19 and created digestible reports using JavaScript, HTML/CSS, and Google Sheets.
- Designed curriculum and taught introductory coding classes for over 40 children on Zoom using block coding.

Education Intern, May 2019 – September 2019

- Facilitated GSK “Science in the Summer” outreach program in community centers.
- Taught block coding to youth using Blockly robots and growth-mindset techniques.

Columbia University Center for Student Advising

January 2020 – May 2020

Computer Science Tutor

- Selected to work as 1 of 30 peer tutors to assist with coursework in Python, Java, data structures, discrete math, and calculus.

Harlem Grown

August 2018 – May 2019

Farm Education Intern

- Directed outdoor farm tours for groups of 10 to 40 youth at urban farm sites across Harlem.
- Developed and facilitated curriculum about agriculture, nutrition, and hydroponics.

Columbia Tutoring and Learning Center

September 2017 – May 2018

Mathematics Tutor

- Tutored high schoolers in mathematics and assisted with implementation of online learning systems.

HONORS AND GRANTS

American Meteorological Society Best Student Presentation Award (3rd Place) (2024)

Harvard Teaching Staff Special Recognition (2023)

NSF GRFP (2022)

Winston Chen Family Graduate Fellowship (2022)

Harvard University Graduate Prize Fellowship (2021)

American Meteorological Society Graduate Fellowship (2021-2022)

Columbia University Earth Institute Collaborative Research Grant (2020-2021)

Columbia Engineering Internship Fund (2018-2020)

Columbia Work Exemption Award (2018-2020)

Pinterest Engage Scholar (2019)