

Ellen M. Considine

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Overview

My work lies at the intersection of environmental change, health & wellbeing, and data science. I prioritize collaborating across disciplines and sectors, teaching and mentoring students, and engaging in science communication and policy efforts.

Select Work Experience

Assistant Professor | University of Colorado (CU) Boulder | Incoming, August 2025

- Department of Geography
- Fellow of CIRES (the Cooperative Institute for Research in Environmental Sciences)

Research as a trainee | Harvard and CU Boulder | Sept. 2017 – May 2025

- Biostatistics PhD Student Researcher | National Studies on Air Pollution & Health Group, Harvard | Jan. 2021 – May 2025
- Environmental Health Data Science Intern | CU Earth Lab | Sept. 2017 – Jul. 2020
- Research Consultant | Denver Department of Public Health & Environment | May 2019 – Jul. 2020
- Statistical Collaborator | CU Laboratory for Interdisciplinary Statistical Analysis | Jan. 2020 – May 2020

Education

Ph.D. in Biostatistics | May 2025 | Harvard T.H. Chan School of Public Health (HSPH)

- **M.A. in Biostatistics** | May 2022 | HSPH
 - National Institutes of Health (NIH) Environmental Statistics Training Grant Program
- Advisors: Rachel Nethery and Francesca Dominici
- Thesis: Advancing data science methods for environmental health policy design and evaluation

B.S. in Applied Mathematics | May 2020 | University of Colorado (CU) Boulder

- Engineering Honors Program (EHP)
- Minors: Statistics, Economics, Geography
 - Emphases: Environmental Science, Global Public Health & Development
- Research mentor: Colleen Reid, Department of Geography

Fellowships, Grants, and Funding

American Statistical Association Student Paper Competition, Section on Statistical Learning and Data Science, Applied Track Winner	2024	\$1,000 for travel to the Joint Statistical Meetings
National Science Foundation (NSF) Graduate Research Fellowship	2020	3 years x (\$37,000 stipend + \$12,000 cost of education)
Goldwater Scholarship	2019	\$7,500

Astronaut Scholarship	2019	\$10,000 + conference travel
CU Boulder Undergraduate Research Opportunities Program (UROP) Individual Grant	2019	\$3,000
Norlin Scholarship, CU Boulder Special Undergraduate Enrichment Programs	2018	2 years x \$6,000

Other Honors and Awards

- Trusted Reviewer | IOP Publishing | Jun. 2023
- Outstanding Graduate of the College of Engineering & Applied Science | CU Boulder | May 2020
- Summa cum laude with honors (GPA: 3.98) | CU Boulder | May 2020
- “Outstanding” paper on modeling the spread of the opioid epidemic | COMAP International Mathematical Contest in Modeling | Apr. 2019
- “Finalist” paper on balancing economic growth and happiness through taxation | COMAP International Interdisciplinary Contest in Modeling | Apr. 2017

Publications and Manuscripts

* = this paper has a publicly available code repository; underlined = graduate student mentee

Working papers:

- **Considine EM** and Nethery RC. A Spatiotemporal, Quasi-experimental Causal Inference Approach to Characterize the Effects of Global Plastic Waste Export and Burning on Air Quality Using Remotely Sensed Data. [Submitted; 2025 [preprint on arXiv](#)]

Peer-reviewed:

9. ***Considine EM**, Nethery RC, Wellenius GA, Dominici F, and Tec M. 2025. Optimizing heat alert issuance with reinforcement learning. *Proceedings of the Thirty-Ninth AAAI Conference on Artificial Intelligence (AAAI-25), AI for Social Impact Track*.
8. ***Considine EM**, Braun D, Kamareddine L, Nethery RC, and deSouza P. 2023. Investigating use of low-cost sensors to increase accuracy and equity of real-time air quality information. *Environmental Science & Technology*.
7. ***Considine EM**, Hao J, Braun D, deSouza P, Reid CE, and Nethery RC. 2023. Evaluation of model-based PM_{2.5} estimates for exposure assessment during wildfire smoke episodes in the western U.S. *Environmental Science & Technology*.
6. Reid CE, **Considine EM**, Watson GL, Telesca D, Pfister GG, and Jerrett MLB. 2023. Effect modification of the association between fine particulate air pollution during a wildfire event and respiratory health by area-level measures of socio-economic status, race/ethnicity, and smoking prevalence. *Environmental Research: Health*.
5. ***Considine EM**, Reid CE, Ogletree MR, Dye T. 2021. Improving accuracy of air pollution exposure measurements: Statistical correction of a municipal low-cost airborne particulate matter sensor network. *Environmental Pollution*.
4. ***Reid CE**, **Considine EM**, Maestas MM, Li G. 2021. Daily PM_{2.5} concentration estimates by ZIP code in 11 western states wildfire and non-wildfire, 2008-2018. *Scientific Data*.
3. Bell J, **Considine EM**, McCallen L, and Chatfield K. 2021. The Prevalence of Noonan Spectrum Disorders

in Pediatric Patients with Pulmonary Valve Stenosis. *The Journal of Pediatrics*.

2. Reid CE, **Considine EM**, Watson GL, Telesca D, Pfister GG, and Jerrett MLB. 2019. Associations between ozone and fine particulate matter with respiratory health during a wildfire event. *Environment International*.
1. **Considine EM**, Soti S, and Webb E. 2019. Random Walks and Rehab: Analyzing the Spread of the Opioid Crisis. *Undergraduate Mathematics and Its Applications (UMAP)*.

Presentations

Invited presentations at other institutions:

- **Considine EM**. “Advancing Environmental Health Decision-Making with Data Science.” Hosted by the CU Boulder Cooperative Institute for Research in Environmental Sciences (CIRES). Boulder, CO. March 10, 2025.
- **Considine EM**. “[Heat Alert Reinforcement Learning: Bridging AI and Environmental Health.](#)” [Start at minute 41.] CAFÉ (Climate & Health Research Coordinating Center) webinar, titled “Research to Inform Optimization of Heat Health Early Warning Systems”. April 26, 2024.
- **Considine EM**. “Air Pollution, Global Health, and Data Science.” Guest lecture for undergraduate course CVEN 2837: Intro to Global Engineering at CU Boulder. Virtual. September 23, 2021.

Invited presentations at home institution:

- **Considine EM**. “Optimizing Heat Alert Issuance with Reinforcement Learning.” Harvard Biostatistics Student Seminar. Boston, MA. March 4, 2024.
- **Considine EM**. “Can Reinforcement Learning Improve Strategies for Issuing Heat Alerts?” Harvard Causal Inference Working Group. Boston, MA. February 2, 2023.
- **Considine EM**. “Using Statistics to Improve Air Quality and Respiratory Health in Denver, CO.” Special Undergraduate Enrichment Programs Research Conference at CU Boulder. Virtual. April 11, 2020.
- **Considine EM**. “When the Western US Burns: Understanding the Population Health Impacts of Smoke from Wildfires.” Special Undergraduate Enrichment Programs Research Conference at CU Boulder. Boulder, CO. April 13, 2019.

Conference presentations: [*denotes invitation to present in a specific session]

- ***Considine EM**. “Optimizing Heat Alert Issuance with Reinforcement Learning.” Joint Statistical Meetings, in session “SLDS [Statistical Learning & Data Science] Student Paper Awards.” Portland, OR. August 8, 2024.
- ***Considine EM**. “Optimizing Heat Alert Issuance with Reinforcement Learning.” Annual conference of WNAR, the Western North American Region of the International Biometric Society, in session “Advances in causal inference for environmental exposures”. Fort Collins, CO. June 11, 2024.
- **Considine EM**. “Reinforcement Learning Methods to Optimize Heat Alert Issuance for Public Health in the United States.” Annual conference of ENAR, the Eastern North American Region of the International Biometric Society. Baltimore, MD. March 12, 2024.
- deSouza P and **Considine EM**. “Investigating Use of Low-Cost Sensors to Increase Accuracy and Equity of Real-Time Air Quality Information.” Air Sensors International Conference. Virtual. May 11, 2022.
- ***Considine EM**. “Investigating the Health Impacts of Air Pollution from Wildfires.” Astronaut Scholarship Foundation Technical Conference. Washington DC. August 24, 2019.
- **Considine EM**, Soti S and Webb E. “Mars Vives: Jointly Optimizing GDP and Happiness.” Society for Industrial & Applied Mathematics (SIAM) Front Range Student Conference. Denver, CO. March 4, 2017.

Posters:

- **Considine EM.** “Reinforcement Learning Methods to Optimize Heat Alert Issuance for Public Health in the United States.” First annual CAFÉ Climate & Health Conference. Virtual. February 6, 2024.

Other presentations:

- **Considine EM.** [“The Promise of Blue Skies: Air Pollution, Health, and Data Science.”](#) Harvard Science in the News (SITN) Speaker Series. Virtual. March 30, 2022.

Teaching / Mentoring

Research Mentees:

- Luke Shawler, May 2024 – Dec. 2024 (Harvard Biostatistics master’s)
- Jiayuan Hao, Aug. 2021 – May 2022 (Harvard Biostatistics master’s)

Teaching Experiences:

- Teaching Fellow for graduate-level biostatistics courses | HSPH | Aug. 2021 – May 2024
 - BST 226: Applied Longitudinal Analysis (Spring 2024)
 - BST 210: Applied Regression Analysis (Fall 2023)
 - BST 222: Basics of Statistical Inference (Fall 2021)
- Pedagogy Fellow for the Department of Biostatistics and HSPH overall | Aug. 2022 – May 2023
 - Developed curriculum for PhD-level (bio)statistical consulting / collaboration course
 - Developed [short course, “Overview of Data Science Tools for Climate & Health”](#) for the HSPH online MPH program. Includes ~1 hour of video lectures, auto-graded quizzes, and reading list.
 - Collaboratively created recommendations for participation tracking in HSPH courses
- Recitation Leader | CU Engineering Honors Program philosophy course | Aug. 2018 – May 2020

Miscellaneous:

- Alumni Mentor | Goldwater Foundation Diversity, Equity, & Inclusion Program | Jan. 2021 – Jan. 2024
- Data Science Instructor | StatStart (camp for underrepresented high school students) | Jul. 2022
- Probability & Machine Learning Instructor | CU STEM Camp for grades 6-12 | July 2019

Professional Service / Extracurriculars

Outside of home institution:

- Peer Reviewer for the following journals (total papers refereed = 11):

<i>Environmental Health</i>	<i>Population and Environment</i>
<i>Environmental Research: Health</i>	<i>npj Climate and Atmospheric Science</i>
<i>Environmental Science & Technology</i>	<i>Scientific Reports</i>
<i>Environmental Research Communications</i>	
- Reviewer for the [2024 edition of the World Meteorological Organization’s report on the state of the science and recommended use of low-cost air quality sensors](#) | Jan. 2024
- Review Editor for the [Fifth National Climate Assessment, Western Wildfires Focus](#) | U.S. Global Change Research Program | Nov. 2022 – May 2023
- Reflections on Professional Experiences | [Personal website / blog](#) | Oct. 2020 – present
 - Career advice as well as academic thought leadership

Within (based at) home institution:

- Vice President / E-Board Member | Harvard Griffin GSAS Science Policy Group | Sept. 2022 – May 2024

- During academic year 2023-2024, co-organized a three-part series of events on the intersection of climate change & health, sponsored by the Harvard Salata Institute for Climate and Sustainability; spearheaded and moderated a panel and networking dinner on the translation of research into policy
- Service to the Department of Biostatistics | HSPH | Sept. 2020 – May 2024
 - Various committees on PhD student workload & mental health and departmental EDIB
- Founding Member | HSPH Spatial Methods in Public Health Journal Club | Feb. 2023 – May 2024
- Fellow / Columnist: [“Breathing Data” blog](#) on air pollution, health, and data science | *HPHR Journal* (formerly the *Harvard Public Health Review*) | May 2021 – Sept. 2021
- CU Engineers Without Borders (EWB) | Aug. 2016 – May 2020
 - Science Manager | CU EWB Chapter Board | Jan. 2019 – May 2020
 - Sustainability Lead | CU EWB Nepal Team | Jan. 2017 – Jan. 2019
 - Drone Mapping Team | CU EWB Nepal Team | May 2017 – Dec. 2018
- CU Diversity in Engineering Programs (BOLD Center, AWM, SWE) | Aug. 2016 – Mar. 2020