Brooke Fitzgerald

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Department of Agricultural and Resource Economics, Colorado State University
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Last Update: January 2026

Education

- **Colorado State University** — *Expected 2028*
  Ph.D. Candidate in Agricultural and Resource Economics — Fort Collins, CO, USA
- **Hampshire College** — *2018*
  B.A. in Data Science and Applied Mathematics — Amherst, MA, USA

Research Interests

Primary: Environmental and climate change, pollution, remote sensing, machine learning
Secondary: Causal inference for environmental justice and policy.

Selected Works in Progress

"Is that Smoke in the Air? Estimating the Global Economic Cost of Smoke Exposure Using Machine Learning" with Jesse Burkhardt, Kimberly Corwin, Yawen Guan, Emily Fischer, and Jeffrey Pierce.

"The Price of Staying In: Estimating Wildfire Smoke Avoidance Costs Using Comprehensive US Mobility and Spending Data" with Jude Bayham, Alexandra Hill, and Jesse Burkhardt.

"Measurement of PM2.5 from Wildfire Smoke: Implications for econometric analyses with application to agricultural worker productivity" with Jesse Burkhardt, Alexandra Hill, and Jude Bayham

Non–Peer-Reviewed Publications

"Engine Icing Data-An Analytics Approach." with Ashley Flegel. ***NASA Technical Report***. No. GRC-E-DAA-TN40097, May 2017. [Link].

Invited Talks and Conference Presentations (* = scheduled, - = pre-2023)

2026 Allied Social Science Association Annual Meeting (Philadelphia)

2025 UC Berkeley Grad Camp in Energy and Environmental Economics (Berkeley), AAEA Annual Meeting (Denver), AERE Annual Meeting (Santa Ana Pueblo), The Workshop for Environmental Economics and Data Science (Portland), Front Range Energy and Environmental Economics Workshop (Boulder), Environmental and Resource Economics Lab Seminar (Colorado State University), Joint University of Wyoming and Colorado State University Graduate Research Seminar (Colorado State University)

2024 AAEA Annual Meeting (New Orleans), Western Fruit and Horticultural Society Annual Meeting (Grand Junction), Environmental and Resource Economics Lab Seminar (Colorado State University), Joint University of Wyoming and Colorado State University Graduate Research Seminar (Colorado State University)

2023- Western Agricultural Economics Association Annual Meeting (Whistler, Canada), Western Fruit and Horticultural Society Annual Meeting (Grand Junction), Environmental and Resource Economics Lab Seminar (Colorado State University), Society for Industrial and Applied Mathematics Conference on Data Mining (Calgary)

Grant and Fellowship Activity

2025 *NASA* - Future Investigator. Estimating the Dual Impact of Wildfire Smoke on Global Crop Yields Using Machine Learning and Satellite Data. $134,524 - **Awarded**

2025 Berkeley/Sloan Summer School in Energy and Environmental Economics Travel Fellowship - $750

Patents

2022 "Systems and methods for managing and controlling electronic messaging campaigns." U.S. Patent Application 16/930,916, with Kyle Tate and Pascal Potvin.

2022 "Systems and methods for controlling electronic message transmissions." U.S. Patent 11,368,422 with Mary-Juen Sohn and Tengke Xiong.

2022 "Systems and methods for dynamic messaging campaign." U.S. Patent 11,270,355 with Kevin Clark, David Cornu, and Jacinthe Ricard.

Honors and Awards

2023-2025 Best Graduate Poster – Department of Agricultural and Resource Economics, Colorado State University

2022-2025 Graduate Teaching / Research Assistant – Department of Agricultural and Resource Economics, CSU

2018 Lorna M. Petersen Prize for Collaborative Research – 5 College Consortium, Amherst, MA

2017 Best Hampshire College Statistics Student – 5 College Consortium, Amherst, MA

Professional Service

Co-Organizer of the PhD Economics Seminar at the University of Wyoming and Colorado State University – 2023-2025, Graduate Liaison for Women in Economics in the Department Agricultural and Resource Economics at CSU – 2024-2025, GSC Representative for the Department Agricultural and Resource Economics at Colorado State University – 2025

Teaching Experience

2025 Colorado State University
UG: Natural Resource Economics, Module on Wildfire and Smoke

Materials Developer / Guest Lecturer

2024-2025 Colorado State University
PhD: Econometric Theory II (2x)

pre-2022 Five College Consortium and Hampshire College
UG: Frontiers in Biomathematics

Teaching Assistant

2022-2025 Colorado State University
PhD: Econometric Theory II (2x)
UG: Energy Economics, Agricultural Policy

pre-2022 Hampshire College
UG: Calculus I & II, Dynamical Systems, Introduction to Data Science, Frontiers in Biomathematics

Professional Memberships and Skills

Association of Environmental and Resource Economists, American Agricultural Economics Association

- **Coding:** Python, R, Stata, SQL, MATLAB, Javascript, C++, LaTeX
- **Languages:** English (native); Portuguese, Spanish (intermediate); French (basic)
- **Econometrics and Causal Inference:** Diff-in-Diff, Synthetic Control, Causal Forests
- **Machine learning:** Deep learning, unsupervised learning, tree-based methods
- **Big data analysis:** Parallel and cloud computing, PySpark, Arrow
- **Software engineering:** version control, web application development

References

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