

# Brooke Fitzgerald

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011 Nutrien Building

Department of Agricultural and Resource Economics, Colorado State University

301 University Ave, Fort Collins, CO, USA 80521

Last Update: January 2026

## EDUCATION

### • Colorado State University

*Ph.D. Candidate in Agricultural and Resource Economics*

*Expected 2028*

Fort Collins, CO, USA

### • Hampshire College

*B.A. in Data Science and Applied Mathematics*

*2018*

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** Invited Seminar (Colorado School of Mines)\*, CU Environmental and Resource Economics Workshop (Vail)\*, Environmental and Resource Economics Lab Seminar (Colorado State University)\*, 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

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**2022-2026** Graduate Teaching / Research Assistant – Department of Agricultural and Resource Economics, CSU  
**2023-2025** Best Graduate Poster – Department of Agricultural and Resource Economics, Colorado State University  
**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

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Co-Organizer of the PhD Economics Seminar at the University of Wyoming and Colorado State University – 2023-2026,  
Graduate Liaison for Women in Economics in the Department Agricultural and Resource Economics at CSU – 2024-2026,  
GSC Representative for the Department Agricultural and Resource Economics at Colorado State University – 2025

## TEACHING EXPERIENCE

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**2025-2026** 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

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Association of Environmental and Resource Economists, American Agricultural Economics Association

- **Coding:** Python, R, Stata, SQL, MATLAB, Javascript, C++,  $\LaTeX$
- **Languages:** English (native); Portuguese (conversational); French, Spanish (intermediate)
- **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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**Jesse Burkhardt**  
Associate Professor, Dept. of Agricultural & Resource Economics  
Colorado State University  
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**Jude Bayham**  
Associate Professor, Dept. of Agricultural & Resource Economics  
Colorado State University  
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**Alexandra Hill**  
Assistant Professor of Cooperative Extension,  
Dept. of Agricultural & Resource Economics  
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