

EMILY BURCHFIELD

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RESEARCH AND TEACHING INTERESTS

Food system sustainability, geospatial programming and analysis

APPOINTMENTS

Emory University *August 2019 - present*
Assistant Professor
Department of Environmental Sciences
Emory College of Arts and Sciences

Utah State University *August 2017 - July 2019*
Assistant Professor of Geospatial Analysis
Department of Environment and Society
Quinney College of Natural Resources

EDUCATION

Vanderbilt University *May 2017*
Ph.D. in Environmental Engineering

University of Louvain, Belgium *July 2012*
M.A. in Economics, Grande Distinction

Clemson University (dual degree) *May 2010*
B.A. in Economics
Magna Cum Laude, Honors College, Phi Beta Kappa

University of Louvain, Belgium (dual degree) *May 2010*
B.S. in Economics and Management
Transatlantic Exchange in Economics Scholar

1. RESEARCH

[Google Scholar profile](#) // H-index: 10 // i10-index: 11 // Citations: 233

1.1. PEER-REVIEWED JOURNAL ARTICLES

*Graduate or postdoctoral mentee, +Graduate committee member

20. Christman, M. E., Spears, L. R., Strange, J. P., Pearse, W. D., **Burchfield, E.**, Ramirez, R. A. (2022). Land cover and climate drive shifts in *Bombus* assemblage composition. *339*, 108113. <https://doi.org/10.1016/j.agee.2022.108113>
19. **Burchfield, E.** (2022). Shifting cultivation geographies in the Central and Eastern US. *Environmental Research Letters*. *17*, 054049. <https://doi.org/10.1088/1748-9326/ac6c3d>
18. Spangler, K.*, Schumacher, B.*, Bean, B., **Burchfield, E.** (2022). Path dependencies in US agriculture: Regional factors of diversification. *Agriculture, Ecosystems and Environment*, *333*, 107957. <https://doi.org/10.1016/j.agee.2022.107957>. Assisted with
17. **Burchfield, E.**, Schumacher, B. *, Spangler, K. *, Rissing, A. *(2022). The state of US farm operator livelihoods. *Frontiers in Sustainable Food Systems*, 566. <https://doi.org/10.3389/fsufs.2021.795901>.

16. Nottebrock, H., **Burchfield, E.**, Fenster, C. (2022). Farmers' delivery of floral resources: to 'bee' or not to 'bee.' *American Journal of Botany*. 109(1), 4-8. <https://doi.org/10.1002/ajb2.1809>
15. Schumacher, B.* , Yost, M., **Burchfield, E.**, Allen, N. (2022). Water in the West: trends, production efficiency, and a call for open data. 306, 114330. *Journal of Environmental Management*. <https://doi.org/10.1016/j.jenvman.2021.114330>
14. Nelson, K., **Burchfield, E.** (2021). Landscape complexity and US crop production. *Nature Food*. 2(5). 330-338. <https://doi.org/10.1038/s43016-021-00281-1>
13. **Burchfield, E.**, Nelson, K. (2021). Agricultural yield geographies in the United States. *Environmental Research Letters*. 16, 054051. <https://doi.org/10.1088/1748-9326/abe88d>
12. **Burchfield, E.**, Schumacher, B.* (2020). Bright spots in US corn production. *Environmental Research Letters*. 15(10), 104019. <https://doi.org/10.1088/1748-9326/aba5b4>
11. Spangler, K.* , **Burchfield, E.**, Schumacher, B.* (2020) Past and current dynamics of US agricultural land use and policy. *Frontiers in Sustainable Food Systems*, 4, 9. <https://doi.org/10.3389/fsufs.2020.00098>
10. **Burchfield, E.**, Matthews-Pennanen, N.⁺, Stoebner, J., Lant, C. (2019). Changing yields in the Central United States under climate and technological change. *Climatic Change*, 159, 329-346. <https://doi.org/10.1007/s10584-019-02567-7>
9. **Burchfield, E.**, Nelson, K., Spangler, K.* (2019). The impact of agricultural diversification on US crop production. *Agriculture, Ecosystems & Environment*. 285, 106615. <https://doi.org/10.1016/j.agee.2019.106615>
8. Tozier-de-la-Poterie, A., **Burchfield, E.**, Carrico, A. (2018). The implications of group norms for adaptation in collectively-managed agricultural systems: evidence from Sri Lankan Paddy farmers. *Ecology and Society*. 23(3):21. <https://doi.org/10.5751/ES-10175-230321>
7. **Burchfield, E.**, Williams, N., Carrico, A. (2018). Rescaling drought mitigation in rural Sri Lanka. *Regional Environmental Change*. 18(8): 1-14. <https://doi.org/10.1007/s10113-018-1374-y>
6. **Burchfield, E.**, Tozier-de-la-Poterie, A. (2018). Determinants of crop diversification in rice-dominated Sri Lankan agricultural systems. *Journal of Rural Studies*. 61, 206-215. <https://doi.org/10.1016/j.jrurstud.2018.05.010>
5. Nay, J., **Burchfield, E.**, Gilligan, J. (2018). A machine-learning approach to forecasting remotely sensed vegetation health, *International Journal of Remote Sensing*. 39(6), 1800-1816. <https://doi.org/10.1080/01431161.2017.1410296>
4. Nelson, K., **Burchfield, E.** (2017). Effects of the structure of water rights on agricultural production during drought: A spatiotemporal analysis of California's Central Valley. *Water Resources Research*. 53(10), 8923 - 8309. <https://doi.org/10.1002/2017WR020666>
3. **Burchfield, E.**, Gilligan, J. (2016). Agricultural adaptation to drought in the Sri Lankan dry zone. *Applied Geography*. 77, 92-100. <https://doi.org/10.1016/j.apgeog.2016.10.003>
2. **Burchfield, E.**, Nay, J., Gilligan, J. (2016). Application of machine learning to prediction of vegetation health. *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. XLI-B2, 465-469, [doi:10.5194/isprs-archives-XLI-B2-465-2016](https://doi.org/10.5194/isprs-archives-XLI-B2-465-2016)
1. **Burchfield, E.**, Gilligan, J. (2016). Dynamics of individual and collective agricultural adaptation to water scarcity. *Winter Simulation Conference 2016 Proceedings*. Available at SSRN: <https://ssrn.com/abstract=2807452>
0. Gunda, T., Benneyworth, L., **Burchfield, E.** (2015). Exploring water indices and associated parameters: A case study approach, *Water Policy*, 17(1), 98 - 111.

1.2. ARTICLES UNDER REVIEW

4. Christman, M.⁺, Spears, L., Strange, J., Pearse, W., **Burchfield, E.**, Ramirez, R. (2022). Land-use and climate drive shifts in *Bombus* assemblage composition. *Revised and resubmitted at Agricultural, Ecosystems and Environment*.
3. Spangler, K.^{*}, **Burchfield, E.**, Radcliff, C., Jackson-Smith, D. (2022). Crop diversification in Idaho's Magic Valley: the present and the imaginary. *Revised and resubmitted at Agronomy for Sustainable Development*.
2. Schumacher, B.^{*}, **Burchfield, E.**, Yost, M. (2022). Utility of machine learning for yield predictions. *Submitted at Agricultural Systems*.
1. Gingrich, J.^{*}, **Burchfield, E.**, (2022). Spatial Patterns of Food Access in the Appalachian Region of the US. *Submitted to Applied Geography*.

1.3. ACTIVE GRANTS

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|-------------|--|
| 2022-2025 | <i>Migration, rural land use, and resilience in coastal Bangladesh</i> NSF HEGS Co-PI, \$415,617 |
| 2022 - 2025 | <i>Managing markets: Assessing farmers' direct marketing experiences on economic viability and quality of life</i> USDA Southern SARE Co-PI, \$313,431 |
| 2022-2024 | <i>Supporting sustainable agriculture in the EU and US</i> Halle Collaborative Research Grant PI, \$29,980 |
| 2022 - 2023 | <i>Agricultural adaptation to climate change in Georgia</i> Emory URC PI, \$29,500 |
| 2020-2023 | <i>Agricultural landscape management for improved sustainability</i> USDA NIFA BNRE Program Co-PI, \$499,949 |

1.4. COMPLETED GRANTS

| | |
|-----------|---|
| 2020-2021 | <i>Socio-environmental indicators of Great Salt Lake desiccation</i> Utah State University SPARC Program Co-PI, \$34,988 |
| 2018-2020 | <i>Resilience of agricultural systems to climate stress</i> Utah Agricultural Experiment Station PI, \$42,498 |
| 2018-2019 | <i>Finding balance: Diversity and agricultural production</i> Utah State University Research Catalyst Grant PI, \$19,938 |
| 2018-2019 | <i>Local water conservation research and education needs</i> Utah State University Extension Grants Program Co-PI, \$19,401 |
| 2016-2017 | <i>Data-driven drought effect estimation</i> SESYNC Graduate Pursuit PI, \$25,000 for travel and stipends |

2015-2016

Adaptive management in the Sri Lankan dry zone
American Institute for Sri Lankan Studies Dissertation Planning Grant
PI, \$4,500

1.5. GRANTS UNDER REVIEW

*Date reflects date of submission

| | |
|----------------|--|
| April 2022 | <i>Towards Explainable AI in Food Systems: A Transdisciplinary Exploration of How Workers Understand AI and its Effects on Labor</i> AI.Humanity Co-PI, \$99833 |
| April 2022 | <i>Quantifying the Potential to Reduce Greenhouse Gas Emissions and Increase Carbon Sequestration by Growing and Marketing Climate-Smart Commodities in the Southern Piedmont</i> USDA Climate-smart Commodities Co-PI, \$33,824,624 |
| September 2021 | <i>PIPP: Predictive intelligence for atmospheric incursions of plant pandemics</i> NSF PIPP Program, Phase 1 Co-PI, \$29,980 |

1.6. FELLOWSHIPS, AWARDS, AND HONORS

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|---|-------------|
| Arts and Social Justice Fellow, Emory University (class project / showcase) | Fall 2021 |
| University Graduate Fellowship, Vanderbilt University | 2012 - 2016 |
| Martin Luther King Award for Service Excellence, Clemson University | 2009 |
| Duckenfield Scholarship, University of Oxford | 2008 |

1.7. MEDIA COVERAGE

8. [“Climate change could spell the end for Midwestern corn, study finds”](#), Yahoo News, June 1, 2022.
7. [“The U.S. Corn Belt will take a hard hit from climate change”](#), Earth, May 25, 2022.
6. [“Even as we see the flaws in our food system we aim to force it on the world”](#), CounterPunch, April 22, 2022.
5. [“The U.S. forces its flawed food system on the world”](#), CommonDreams, April 22, 2022.
4. [“New research shows struggles of US farm livelihoods”](#), AgDaily, March 7, 2022.
3. [“First-of-its-kind study shows that diverse landscapes could boost US crop yields by 20 percent”](#), Anthropocene, August 27, 2021.
2. [“Diverse landcover boosts yields for major crops”](#), Oklahoma Farm Report, August 19, 2021.
1. [“Diversity may boost US wheat and corn yields by 20 percent, Futurity](#), August 12, 2021.

1.8. INVITED PRESENTATIONS

6. *Sharing data and shaping policies across the EU and US to support sustainable agricultural transitions*, presented at Göttingen University, Germany, June 2022.
5. *Cultivating agricultural sustainability in a changing world*, presented to the Department of Earth and Environmental Sciences at Vanderbilt University, April 2022.
4. *Using mixed methods to understand socio-ecological trajectories of crop diversity*, presented to the Department of Geography at Kansas State University, February 2022.
3. *Socioenvironmental implications of changing US landscapes*, presented to the PBEE Program Faculty at Emory University, November 2020.

2. *Agricultural sustainability in the US*, presented to the Emeritus College at Clemson University, October 2020. [Video](#).
1. *Cultivating food security in a changing world*, presented to the PhenoRob Female Talk Series group at University of Bonn, Germany, July 2020. [Video](#).

1.9. PAPER PRESENTATIONS

Selected from submitted abstracts.

16. *The state of US farm operator livelihoods*, presented at the Association for the Study of Food and Society Annual Conference, held virtually, May 2022.
15. *Agricultural and biophysical drivers of US cultivation geographies*, presented at the American Association of Geographers Annual Meeting, held virtually, February 2022.
14. *Geographies of US food production*, presented at the Just Food Conference, held virtually, June 2021.
13. *Geographies of agricultural production*, presented at the Applied Statistics in Agriculture and Natural Resources Annual Conference, held virtually, May 2021.
12. *The future of US croscapes*, presented at the American Association of Geographers Annual Meeting, held virtually, April 2021.
11. *The impact of agricultural diversification on US crop production*, presented at the International Association of Landscape Ecology Meeting in Fort Collins, CO, April 2019.
10. *Spatiotemporal dynamics of yield-response to climate extremes*, presented at the American Association of Geographers Annual Meeting in New Orleans, LA, April 2018.
9. *Agricultural response to changes in water availability and temperature in the coterminous US*, presented at the American Geophysical Union Annual Meeting in New Orleans, LA, December 2017.
8. *Application of machine learning to the prediction of vegetation health*, presented at the International Society for Photogrammetry and Remote Sensing in Prague, July 2016.
7. *Agricultural adaptation in the Sri Lankan Dry Zone*, presented at the IPWSD Workshop at Columbia University, NY, April 2016.
6. *Application of machine learning to big environmental datasets to predict vegetation health*, presented at the Association for American Geographers Annual Meeting in San Francisco, CA, April 2016. Session organizer, "Human-Environment Interactions: Linking Remote Sensing and the Social Sciences"
5. *The application of PCA for the identification of adaptive agricultural systems in the tropics*, presented at the Workshop on the Use of Remote Sensing for Decision-Making in Agricultural and Water Management in Colombo, Sri Lanka, August 2015.
4. *Institutions and imagery: Mapping water management in rural Sri Lanka*, presented at the Association of American Geographers Conference in Chicago, IL, April 2015.
3. *ADAPT-SL: Agricultural Decision Making and Adaptation to Precipitation Trends in Sri Lanka*, presented at the National Science Foundation Water, Sustainability and Climate PI meeting in Washington, D.C., February 2015.
2. *Patterns of meteorological and agricultural drought in Sri Lankan agricultural areas*, presented at the Gordon Research Seminar on Science, Technology and Policy, in Waterville Valley, NH, August 2014.

1. *Resettlement and coloniality in the Mahaweli Ganga Watershed*, presented at the Annual Dimensions of Political Ecology Conference on Nature/Society in Lexington, KY, February 2013.

1.10. POSTER PRESENTATIONS

Selected from submitted abstracts.

7. *Landscape complexity and US crop production*, presented virtually at the Landscape 2021 conference in Berlin, Germany, September 2021.
6. *Using R-INLA to understand institutional moderators of drought*, presented at the **user!** Conference in Brussels, Belgium, July 2017.
5. *Dynamics of collective and individual agricultural adaptation to water scarcity*, presented at the American Geophysical Union Conference in San Francisco, CA, December 2016.
4. *Agricultural adaptation to water scarcity in the Sri Lankan dry zone: A comparison of two water management regimes*, presented at the National Science Foundation Water, Sustainability and Climate PI meeting in Washington, D.C., February 2015.
3. *Mapping water management: A case study from Sri Lanka*, presented at the American Geophysical Union Annual Conference in San Francisco, CA, December 2014.
2. *Patterns of meteorological and agricultural drought in the Sri Lankan Dry Zone*, presented at the Gordon Research Conference on Science, Technology and Policy in Waterville Valley, NH, August 2014.
1. *Patterns of agricultural drought in Sri Lankan paddy fields: Spatiotemporal image analysis*, presented at the Borlaug Summer Institute on Global Food Security, Lafayette, IN, June 2014.

1.11. PUBLIC PRESENTATIONS

1. *Open House Public Talk: Community, Arts, and Science*, presented virtually to Science Gallery Atlanta and community members on how the arts and sciences can help us better understand community narrative in April, 2022.

2. TEACHING

2.1. COURSES TAUGHT

*Original courses developed by Dr. Burchfield.

Emory University - Undergraduate Courses

- **IDS 290R: Interdisciplinary Sidecar: Revolution in the Anthropocene**
Spring 2022 (co-taught with [Dr. Lynne Huffer](#))
- **ENVS 224: Economy and the Environment***
Spring 2021, Spring 2022
- **ENVS 270: Environmental Data Science***
Fall 2020, Fall 2021
- **ENVS 495R: Honors Research**
Fall 2021, Spring 2022
- **ENVS 498R: Individual Directed Reading***
Spring 2022

Emory University - Graduate Courses

- **ENVS 585: Environmental Data Science***
Fall 2020
- **ENVS 585: Spatial Patterns of Food Insecurity***
Spring 2021, reading course for MS student
- **ENVS 599R: Master's Thesis Research**
Fall 2021, Spring 2022

Utah State University

- **GEOG 3800: Data Visualization***
Fall 2018
- **USU, ENVS 2000: Natural Resources Professional Orientation***
Fall 2018
- **GEOG 49/6950: Geospatial Analysis***
Spring 2018, Spring 2019

Vanderbilt University

- **Vanderbilt Programs for Talented Youth**
Developed and taught geospatial analysis to gifted middle and high school students.
Summer 2015, Summer 2016
- **Certificate in College Teaching**
Spring 2014

2.2. GUEST LECTURES

- Spring 2021, *Agriculture and climate change 101*. Emory Climate Organization student organization.
- Spring 2021, *How to R: An introduction to programming*. ECAST student organization.
- Spring 2021, *Data visualization: The good, bad, and ugly*. HLTH 385 Storytelling for Scientists, Dr. Amanda Freeman
- Fall 2019, *US Agricultural Policy*. ENVS/POLS 227 Environmental Policy, Dr. Tracy Yandle
- Fall 2019, *An Introduction to US Agriculture*. ENVS 399 Agroecology, Dr. John Wegner

3. STUDENT MENTORING

3.1. CURRENT GRADUATE AND POSTDOCTORAL MENTEES

Jean Ribert Francois (Committee Member)
PhD Geography, Kansas State University, 2025
Rural well-being in agricultural communities

Dr. Andrea Rissing (Postdoctoral Researcher, 2021-2022)
PhD Anthropology, Emory University, 2019
USDA-funded qualitative fieldwork in rural N.C.

3.2. PAST GRADUATE MENTEES

Jared Gingrich (Primary Advisor)
MS ENVS, Emory University, 2022
Food access in rural Appalachia

Dr. Mo Christman (Committee Member)
PhD Biology, Utah State University, 2022
Landscape ecology of beneficial insects in agronomic crops of Utah

Dr. Kaitlyn Spangler (**Primary Advisor**)
PhD Environment and Society, Utah State University, 2021
Cultivating agrobiodiversity in the US: Barriers and bridges at multiple scales

Britta Schumacher (**Primary Advisor**)
MS Ecology, Utah State University, 2020
Trends in US agricultural production

Jenna Keaton (Committee Member)
MS Watershed Sciences, Utah State University, 2019
The vulnerability of littoral structures under multiyear drought conditions

Neil Matthews-Pennanen (Committee Member)
MS Environment and Society, Utah State University, 2019
Assessment of potential changes in crop yields in the Central US under climate change regimes

3.3. PAST POSTDOCTORAL MENTEES

3.4. CURRENT UNDERGRADUATE MENTEES

Caroline Maki (Research Mentee)
ENVS BS 2024, Spring 2022 - present

Ilana Fischer ([SIRE Mentee](#), **Honors Thesis Advisor**)
ENVS BS 2023, Spring 2021 - present
Crop insurance and climate change

Kendra Ding (Research Mentee)
ENVS BS 2023, Fall 2021 - present

3.5 PAST UNDERGRADUATE MENTEES

Emily Isaac (**Honors Thesis Advisor**)
ENVS BS 2022, Spring 2021 - Spring 2022
On the Fence: Role of the attitude-behavior gap in residential landscaping decisions

Sophia Benzi (Research Mentee)
ENVS/ECON BS 2021, Fall 2020 - Spring 2021

Dading Shi (QTM Undergraduate Fellow)
QTM BS 2022, Fall 2019

3.7. STUDENT GRANTS AND AWARDS

Jared Gingrich (MS), Lester Research Grant, Fall 2021
Jared Gingrich (MS), Lester Travel Grant, Fall 2021
Emily Isaacs (Undergraduate), Lester Research Grant, Fall 2021
Kaitlyn Spangler (PhD), Presidential Doctoral Research Fellow, Fall 2019
Britta Schumacher (MS), Ecology Center Graduate Research Grant, Spring 2019

4. SERVICE

4.1. DEPARTMENTAL SERVICE

Spring 2022 - present ENVS Diversity, Equity and Inclusion Committee (chair)
Fall 2020 - Spring 2022 ENVS Diversity, Equity and Inclusion Committee (member)
Fall 2019 - present ENVS Graduate Committee (member)
Fall 2020 - present ENVS Honors Coordinator

4.2. COLLEGE SERVICE

Spring 2022 - present ECAS Education Abroad Committee (elected member)

4.3. UNIVERSITY SERVICE

Spring 2021 - present Emory Sustainable Food Committee (President-appointed member)

4.4. PROFESSIONAL SERVICE

Article reviews for academic journals including:

Climatic Change
International Journal of Disaster Risk Reduction
Environmental Research Letters
International Journal of the Commons
Environmental Management
Weather, Climate and Society
Agricultural, Ecosystems and Environment
Journal of Environmental Management
Nature Food
Global Environmental Change

Grant reviews for the following agencies:

NSF Geospatial Sciences

Conference session chair:

Convener: *Agricultural Landscape Transitions*, Association of American Geographers Annual Meeting, Spring 2022

Convener: *Geographies of climate impacts*, Association of American Geographers Annual Meeting, Spring 2018

4.5. PROFESSIONAL MEMBERSHIPS

American Association of Geographers
American Geophysical Union
International Association of Landscape Ecology
Agriculture, Food, and Human Values Society

LANGUAGE PROFICIENCIES

English Native speaker
French Fluent written and spoken

**Last updated on August 8, 2022.*