

# Stanford

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## Jen Burney

Professor of Environmental Social Sciences, of Earth System Science and Senior Fellow at the Freeman Spogli Institute for International Studies

### Bio

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#### BIO

Jennifer (Jen) Burney is a Professor in Global Environmental Policy and Earth System Science in the Doerr School of Sustainability. Her research focuses on the coupled relationships between climate and food security – measuring air pollutant emissions and concentrations, quantifying the effects of climate and air pollution on land use and food systems, understanding how food production and consumption contribute to climate change, and designing and evaluating technologies and strategies for adaptation and mitigation among the world’s farmers. Her research group combines methods from physics, ecology, statistics, remote sensing, economics, and policy to understand critical scientific uncertainties in this coupled system and to provide evidence for what will – or won’t – work to simultaneously end hunger and stabilize earth’s climate. She earned a PhD in physics in 2007, completed postdoctoral fellowships in both food security and climate science, and was named a National Geographic Emerging Explorer in 2011; prior to joining the Doerr School, she served on the faculty at UC San Diego’s School of Global Policy and Strategy and Scripps Institution of Oceanography.

#### ACADEMIC APPOINTMENTS

- Professor, Environmental Social Sciences
- Professor, Earth System Science
- Senior Fellow, Freeman Spogli Institute for International Studies

#### LINKS

- Research Group Website: <https://www.burney-lab.org>
- Program on Food Security and the Environment: <http://fse.stanford.edu>

### Teaching

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#### COURSES

##### 2025-26

- Modeling Human-Environment Systems: ESS 136, ESS 236, GEP 115, GEP 215 (Win)
- World Food Economy: EARTHSYS 106, EARTHSYS 206, ECON 106, ECON 206, ESS 106, ESS 206, GEP 106, GEP 206 (Win)

#### STANFORD ADVISEES

##### Postdoctoral Faculty Sponsor

Pascal Polonik

##### Doctoral (Program)

Aarabhi Achanta

## Publications

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### PUBLICATIONS

- **Women-led sustainable irrigation improved indicators of nutritional status in children from Northern Benin.** *Journal of health, population, and nutrition*  
Taren, D., Alaofè, H., Burney, J., Luo, H., Suchdev, P. S., Long, J. M., Naylor, R.  
2025
- **Emulation of the Climate Response to Greenhouse Gas and Aerosol Emissions From High- and Low-Income Nations** *GEOPHYSICAL RESEARCH LETTERS*  
Polonik, P., Burney, J., Ricke, K.  
2025; 52 (21)
- **Crop water origins and hydroclimate vulnerability of global croplands** *NATURE SUSTAINABILITY*  
Jiang, Y., Burney, J. A.  
2025
- **Eliminating hunger in a world serious about climate mitigation.** *Proceedings of the National Academy of Sciences of the United States of America*  
Burney, J. A.  
2025; 122 (32): e2410202122
- **The Influence of Wildfire Smoke on Ambient PM2.5 Chemical Species Concentrations in the Contiguous US.** *Environmental science & technology*  
Krasovich Southworth, E., Qiu, M., Gould, C. F., Kawano, A., Wen, J., Heft-Neal, S., Kilpatrick Voss, K., Lopez, A., Fendorf, S., Burney, J. A., Burke, M.  
2025
- **Estimating the impacts of climate change: reconciling disconnects between physical climate and statistical models** *CLIMATIC CHANGE*  
Polonik, P., Ricke, K., Burney, J.  
2025; 178 (2)
- **Climate change exacerbates the environmental impacts of agriculture.** *Science (New York, N.Y.)*  
Yang, Y., Tilman, D., Jin, Z., Smith, P., Barrett, C. B., Zhu, Y. G., Burney, J., D'Odorico, P., Fantke, P., Fargione, J., Finlay, J. C., Rulli, M. C., Sloat, et al  
2024; 385 (6713): eadn3747
- **Empirical modeling of agricultural climate risk** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Burney, J., Mcintosh, C., Lopez-Videla, B., Samphantharak, K., Maia, A.  
2024; 121 (16): e2215677121
- **Age-Dependent Variations in Kawasaki Disease Incidence in Japan** *JAMA NETWORK OPEN*  
DeHaan, L. L., Copeland, C. D., Burney, J. A., Nakamura, Y., Yashiro, M., Shimizu, C., Miyata, K., Burns, J. C., Cayan, D. R.  
2024; 7 (2): e2355001
- **Air quality equity in US climate policy** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Polonik, P., Ricke, K., Reese, S., Burney, J.  
2023; 120 (26): e2217124120
- **Warming reduces global agricultural production by decreasing cropping frequency and yields** *NATURE CLIMATE CHANGE*  
Zhu, P., Burney, J., Chang, J., Jin, Z., Mueller, N. D., Xin, Q., Xu, J., Yu, L., Makowski, D., Ciais, P.  
2022; 12 (11): 1016-+
- **Geographically resolved social cost of anthropogenic emissions accounting for both direct and climate-mediated effects.** *Science advances*  
Burney, J., Persad, G., Proctor, J., Bendavid, E., Burke, M., Heft-Neal, S.  
2022; 8 (38): eabn7307

- **Daily Local-Level Estimates of Ambient Wildfire Smoke PM<sub>2.5</sub> for the Contiguous US.** *Environmental science & technology*  
Childs, M. L., Li, J., Wen, J., Heft-Neal, S., Driscoll, A., Wang, S., Gould, C. F., Qiu, M., Burney, J., Burke, M.  
2022
- **Exposures and behavioural responses to wildfire smoke.** *Nature human behaviour*  
Burke, M., Heft-Neal, S., Li, J., Driscoll, A., Baylis, P., Stigler, M., Weill, J. A., Burney, J. A., Wen, J., Childs, M. L., Gould, C. F.  
2022
- **Epidemiological and Clinical Features of Kawasaki Disease During the COVID-19 Pandemic in the United States** *JAMA NETWORK OPEN*  
Burney, J. A., Roberts, S. C., DeHaan, L. L., Shimizu, C., Bainto, E., Newburger, J. W., Dominguez, S., Jone, P., Jaggi, P., Szmuszkovicz, J. R., Rowley, A. H., Samuy, N., Scalici, et al  
2022; 5 (6): e2217436
- **Globally ubiquitous negative effects of nitrogen dioxide on crop growth.** *Science advances*  
Lobell, D. B., Di Tommaso, S., Burney, J. A.  
2022; 8 (22): eabm9909
- **Land-use emissions embodied in international trade.** *Science (New York, N.Y.)*  
Hong, C., Zhao, H., Qin, Y., Burney, J. A., Pongratz, J., Hartung, K., Liu, Y., Moore, F. C., Jackson, R. B., Zhang, Q., Davis, S. J.  
2022; 376 (6593): 597-603
- **Disparate air pollution reductions during California's COVID-19 economic shutdown** *NATURE SUSTAINABILITY*  
Bluhm, R., Polonik, P., Hemes, K. S., Sanford, L. C., Benz, S. A., Levy, M. C., Ricke, K. L., Burney, J. A.  
2022
- **Untangling irrigation effects on maize water and heat stress alleviation using satellite data** *HYDROLOGY AND EARTH SYSTEM SCIENCES*  
Zhu, P., Burney, J.  
2022; 26 (3): 827-840
- **Temporal clustering of Kawasaki disease cases around the world** *SCIENTIFIC REPORTS*  
Burney, J. A., DeHaan, L. L., Shimizu, C., Bainto, E., Newburger, J. W., DeBiasi, R. L., Dominguez, S. R., Portman, M. A., Melish, M., Bratincsak, A., Fabi, M., Corinaldesi, E., Yu, et al  
2021; 11 (1): 22584
- **Widespread Race and Class Disparities in Surface Urban Heat Extremes Across the United States** *EARTHS FUTURE*  
Benz, S., Burney, J.  
2021; 9 (7)
- **Cleaner air has contributed one-fifth of US maize and soybean yield gains since 1999** *ENVIRONMENTAL RESEARCH LETTERS*  
Lobell, D. B., Burney, J. A.  
2021; 16 (7)
- **Drivers and projections of global surface temperature anomalies at the local scale** *ENVIRONMENTAL RESEARCH LETTERS*  
Benz, S. A., Davis, S. J., Burney, J. A.  
2021; 16 (6)
- **Improving production and quality of life for smallholder farmers through a climate resilience program: An experience in the Brazilian Sertão** *PLOS ONE*  
Maia, A., Burney, J., Morales Martinez, J., Cesano, D.  
2021; 16 (5): e0251531
- **Paris Agreement's Ambiguity About Aerosols Drives Uncertain Health and Climate Outcomes** *EARTHS FUTURE*  
Polonik, P., Ricke, K., Burney, J.  
2021; 9 (5)
- **Using Crowd-Sourced Data to Assess the Temporal and Spatial Relationship between Indoor and Outdoor Particulate Matter** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*  
Krebs, B., Burney, J., Zivin, J., Neidell, M.  
2021; 55 (9): 6107-6115

- **Climate resilience programmes and technical efficiency: evidence from the smallholder dairy farmers in the Brazilian semi-arid region** *CLIMATE AND DEVELOPMENT*  
Gori Maia, A., Silveira, R., Veneo Campos Fonseca, C., Burney, J., Cesano, D.  
2022; 14 (3): 197-207
- **Characterization of Groundwater Recharge and Flow in California's San Joaquin Valley From InSAR-Observed Surface Deformation** *WATER RESOURCES RESEARCH*  
Neely, W. R., Borsa, A. A., Burney, J. A., Levy, M. C., Silverii, F., Sneed, M.  
2021; 57 (4): e2020WR028451
- **The adaptive benefits of agricultural water markets in California** *ENVIRONMENTAL RESEARCH LETTERS*  
Arellano-Gonzalez, J., AghaKouchak, A., Levy, M. C., Qin, Y., Burney, J., Davis, S. J., Moore, F. C.  
2021; 16 (4)
- **Temporal Clusters of Kawasaki Disease Cases Share Distinct Phenotypes That Suggest Response to Diverse Triggers** *JOURNAL OF PEDIATRICS*  
Burns, J. C., DeHaan, L. L., Shimizu, C., Bainto, E., Tremoulet, A. H., Cayan, D. R., Burney, J. A.  
2021; 229: 48-+
- **The changing risk and burden of wildfire in the United States.** *Proceedings of the National Academy of Sciences of the United States of America*  
Burke, M., Driscoll, A., Heft-Neal, S., Xue, J., Burney, J., Wara, M.  
2021; 118 (2)
- **Global and regional drivers of land-use emissions in 1961-2017.** *Nature*  
Hong, C. n., Burney, J. A., Pongratz, J. n., Nabel, J. E., Mueller, N. D., Jackson, R. B., Davis, S. J.  
2021; 589 (7843): 554-61
- **Temperature-driven harvest decisions amplify US winter wheat loss under climate warming** *GLOBAL CHANGE BIOLOGY*  
Zhu, P., Burney, J.  
2021; 27 (3): 550-562
- **Fine-scale spatiotemporal variation in subsidence across California's San Joaquin Valley explained by groundwater demand** *ENVIRONMENTAL RESEARCH LETTERS*  
Levy, M. C., Neely, W. R., Borsa, A. A., Burney, J. A.  
2020; 15 (10)
- **The COVID-19 lockdowns: a window into the Earth System** *NATURE REVIEWS EARTH & ENVIRONMENT*  
Diffenbaugh, N. S., Field, C. B., Appel, E. A., Azevedo, I. L., Baldocchi, D. D., Burke, M., Burney, J. A., Ciais, P., Davis, S. J., Fiore, A. M., Fletcher, S. M., Hertel, T. W., Horton, et al  
2020; 1 (9): 470-481
- **Dust pollution from the Sahara and African infant mortality** *NATURE SUSTAINABILITY*  
Heft-Neal, S., Burney, J., Bendavid, E., Voss, K. K., Burke, M.  
2020
- **The downstream air pollution impacts of the transition from coal to natural gas in the United States (vol 3, pg 152, 2020)** *NATURE SUSTAINABILITY*  
Burney, J. A.  
2020; 3 (6): 481-490
- **The downstream air pollution impacts of the transition from coal to natural gas in the United States** *NATURE SUSTAINABILITY*  
Burney, J. A.  
2020; 3 (2): 152-+
- **The impact of a Solar Market Garden programme on dietary diversity, women's nutritional status and micronutrient levels in Kalale district of northern Benin** *PUBLIC HEALTH NUTRITION*  
Alaofe, H., Burney, J., Naylor, R., Taren, D.  
2019; 22 (14): 2670-81
- **Techno-ecological synergies of solar energy for global sustainability** *NATURE SUSTAINABILITY*

Hernandez, R. R., Armstrong, A., Burney, J., Ryan, G., Moore-O'Leary, K., Diedhiou, I., Grodsky, S. M., Saul-Gershenz, L., Davis, R., Macknick, J., Mulvaney, D., Heath, G. A., Easter, et al  
2019; 2 (7): 560-568

- **Clustering and climate associations of Kawasaki Disease in San Diego County suggest environmental triggers** *SCIENTIFIC REPORTS*  
Rypdal, M., Rypdal, V., Burney, J. A., Cayan, D., Bainto, E., Skochko, S., Tremoulet, A. H., Creamean, J., Shimizu, C., Kim, J., Burns, J. C.  
2018; 8: 16140
- **Estimating global agricultural effects of geoengineering using volcanic eruptions.** *Nature*  
Proctor, J., Hsiang, S., Burney, J., Burke, M., Schlenker, W.  
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- **Robust relationship between air quality and infant mortality in Africa.** *Nature*  
Heft-Neal, S., Burney, J., Bendavid, E., Burke, M.  
2018
- **Pilot of a mobile money school fee payment system in rural Benin** *PLOS ONE*  
Adida, C. L., Bouko, A., Verink, A., Chockalingam, G., Burney, J.  
2018; 13 (6): e0198240
- **Cognition impact of sand and dust storms highlights future research needs?** *LANCET PLANETARY HEALTH*  
Bharadwaj, P., Burney, J.  
2018; 2 (5): E196-E197
- **High Spatial Resolution Visual Band Imagery Outperforms Medium Resolution Spectral Imagery for Ecosystem Assessment in the Semi-Arid Brazilian Sertao** *REMOTE SENSING*  
Goldblatt, R., Ballesteros, A., Burney, J.  
2017; 9 (12)
- **Impact of a rural solar electrification project on the level and structure of women's empowerment** *ENVIRONMENTAL RESEARCH LETTERS*  
Burney, J., Alaofe, H., Naylor, R., Taren, D.  
2017; 12 (9)
- **Prevalence of anaemia, deficiencies of iron and vitamin A and their determinants in rural women and young children: a cross-sectional study in Kalale district of northern Benin** *PUBLIC HEALTH NUTRITION*  
Alaofe, H., Burney, J., Naylor, R., Taren, D.  
2017; 20 (7): 1203–13
- **Ecosystem Services Mapping for Sustainable Agricultural Water Management in California's Central Valley** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*  
Mafios, E., Burney, J.  
2017; 51 (5): 2593-2601
- **Association Between Women's Empowerment and Maternal and Child Nutrition in Kalalé District of Northern Benin.** *Food and nutrition bulletin*  
Alaofè, H. n., Zhu, M. n., Burney, J. n., Naylor, R. n., Douglas, T. n.  
2017; 38 (3): 302–18
- **Solar-Powered Drip Irrigation Impacts on Crops Production Diversity and Dietary Diversity in Northern Benin** *FOOD AND NUTRITION BULLETIN*  
Alaofe, H., Burney, J., Naylor, R., Taren, D.  
2016; 37 (2): 164–75
- **The potential for land sparing to offset greenhouse gas emissions from agriculture** *NATURE CLIMATE CHANGE*  
Lamb, A., Green, R., Bateman, I., Broadmeadow, M., Bruce, T., Burney, J., Carey, P., Chadwick, D., Crane, E., Field, R., Goulding, K., Griffiths, H., Hastings, et al  
2016; 6 (5): 488-492
- **Cookstoves illustrate the need for a comprehensive carbon market** *ENVIRONMENTAL RESEARCH LETTERS*  
Sanford, L., Burney, J.  
2015; 10 (8)

- **Recent climate and air pollution impacts on Indian agriculture** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Burney, J., Ramanathan, V.  
2014; 111 (46): 16319-16324
- **Climate change adaptation strategies for smallholder farmers in the Brazilian Sertao** *CLIMATIC CHANGE*  
Burney, J., Cesano, D., Russell, J., La Rovere, E., Corral, T., Coelho, N., Santos, L.  
2014; 126 (1-2): 45-59
- **Methods for attributing land-use emissions to products** *CARBON MANAGEMENT*  
Davis, S. J., Burney, J. A., Pongratz, J., Caldeira, K.  
2014; 5 (2): 233-245
- **Getting serious about the new realities of global climate change** *BULLETIN OF THE ATOMIC SCIENTISTS*  
Burney, J. A., Kennel, C. F., Victor, D. G.  
2013; 69 (4): 49-57
- **The case for distributed irrigation as a development priority in sub-Saharan Africa** *Proceedings of the National Academy of Sciences*  
Burney, J. a., Naylo, R. L., Postel, S. L.  
2013; 110 (31): 12513-12517
- **Real-Time Assessment of Black Carbon Pollution in Indian Households Due to Traditional and Improved Biomass Cookstoves** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*  
Kar, A., Rehman, I. H., Burney, J., Puppala, S., Suresh, R., Singh, L., Singh, V. K., Ahmed, T., Ramanathan, N., Ramanathan, V.  
2012; 46 (5): 2993-3000
- **Smallholder Irrigation as a Poverty Alleviation Tool in Sub-Saharan Africa** *WORLD DEVELOPMENT*  
Burney, J. A., Naylor, R. L.  
2012; 40 (1): 110-123
- **Greenhouse gas mitigation by agricultural intensification** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Burney, J. A., Davis, S. J., Lobell, D. B.  
2010; 107 (26): 12052-12057
- **Solar-powered drip irrigation enhances food security in the Sudano-Sahel** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Burney, J., Woltering, L., Burke, M., Naylor, R., Pasternak, D.  
2010; 107 (5): 1848-1853
- **Transition edge cameras for fast optical spectrophotometry** *2nd Galway Conference on High Time Resolution Astrophysics*  
Romani, R. W., Bay, T. J., Burney, J., Cabrera, B.  
SPRINGER.2008: 311-325
- **The optical imaging TES detector array: Considerations for a cryogenic imaging instrument** *11th International Workshop on Low-Temperature Detectors*  
Bay, T. J., Burney, J. A., Barral, J., Brink, P. L., Cabrera, B., Castle, J. P., Miller, A. J., Nam, S. W., Romani, R. W., Tomada, A.  
ELSEVIER SCIENCE BV.2006: 506-8
- **Transition-edge sensor arrays for UV-optical-IR astrophysics** *11th International Workshop on Low-Temperature Detectors*  
Burney, J., Bay, T. J., Barral, J., Brink, P. L., Cabrera, B., Castle, J. P., Miller, A. J., Nam, S., Rosenberg, D., Romani, R. W., Tomada, A.  
ELSEVIER SCIENCE BV.2006: 525-27
- **Development and characterization of a TES optical imaging array for astrophysics applications** *10th International Workshop on Low Temperature Detectors*  
Burney, J., Bay, T. J., Brink, P. L., Cabrera, B., Castle, J. P., Romani, R. W., Tomada, A., Nam, S. W., Miller, A. J., Martinis, J., Wang, E., Kenny, T., Young, et al  
ELSEVIER SCIENCE BV.2004: 533-36
- **UV-IR science prospects with TES imaging arrays** *Workshop on Hubbles Science Legacy - Future Optical/Ultraviolet Astronomy from Space*  
Romani, R. W., Burney, J., Brink, P., Cabrera, B., Castle, P., Kenny, T., Wang, E., Young, B., Miller, A. J., Nam, S. W.

ASTRONOMICAL SOC PACIFIC.2003: 399–402

- **Development of superconducting transition edge sensors for time and energy resolved single photon counters with application to imaging astronomy** *Conference on Materials for Infrared Detectors III*

Bay, T. J., Burney, J. A., Brink, P. L., Cabrera, B., Castle, J. P., Romani, R. W., Tomada, A., Young, B. A., Nam, S. W., Miller, A. J., Martinis, J. M., Kenny, T., Wang, et al

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