Anna Boser

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EDUCATION

University of California, Santa Barbara, California
      Ph.D., Environmental Science and Management   2026 (expected)
      Committee: Kelly Caylor, Ashley Larsen, and Tamma Carleton
University of California, Berkeley, California
      B.A. *with Highest Distinction (University medal)*, Statistics   2020

RESEARCH INTERESTS

Ecohydrology, agriculture, food systems, water scarcity, machine learning, remote sensing, econometrics.

HONORS

AGU Science for Solutions Award	2024
Fulbright U.S. Student Program Fellowship	2024
University Medal, UC Berkeley (most distinguished graduating senior)	2020
National Science Foundation Graduate Research Fellowship	2020
Eugene Cota-Robles Fellowship, UC Santa Barbara	2020
Kuni Research Fellowship, Kuni Foundation	2022
Gordon Research Accelerator Award, UC Santa Barbara	2022
AGU Remote Sensing Technical Committee Best F22 Presentation - Student Award	2022
AGU Ecohydrology Tiny Grant	2022
Schmidt Mentorship Award, Schmidt Foundation	2023
AGU Chapman Conference on Remote Sensing of the Water Cycle Travel Grant	2024
Undergraduate Research Apprenticeship Program Summer Fellowship, UC Berkeley	2018

RESEARCH EXPERIENCE & APPOINTMENTS

Fellow, Fulbright U.S. Student Program Fellowship, U.S. Department of State (Zambia)	2024-2025
Fellow, UCSB Eugene Cota-Robles Fellowship	2023-Present
Fellow, National Science Foundation Graduate Research Fellowship (at UCSB)	2020-2023
Intern, NASA Jet Propulsion Laboratory. Advisors: JT Reager and Madeleine Pascolini-Campbell	2021
Intern, NASA Marshall Space Flight Center. Advisor: Mohammed Al-Hamdan	2020
Research Assistant, UC Berkeley College of Natural Resources. Advisor: Matthew Potts	2019-2020
Research Assistant, UC Berkeley School of Public Health. Advisor: Daniel Perlman	2017-2019

FUNDED RESEARCH

Seizing the rain: Locally initiated irrigation for a more climate resilient Zambia. Fulbright U.S. Student Program Fellowship, U.S. Department of State – PI ($31,940)	2024-2025
Deep learning for historical water data digitization in the United States. UCSB Coastal Fund ($14,560) – Co-PI (Lead PI: Annette Hilton)	2024
Bringing ecosystem water stress into focus using artificial intelligence. UCSB Coastal Fund ($11,200) – PI	2023-2024
Small-scale gardens for food security and environmental conservation in Sub-Saharan Africa. Schmidt Mentorship Award ($9,000) – PI	2023-2024
The equity impacts of irrigation cutbacks in California agriculture. Kuni Research Fellowship ($15,000) – PI with Sandy Sum and Vincent Thivierge	2022-2024
Ground Level $PM_{2.5}$ Effects of Prescribed Burns and Wildfires in California. National Science Foundation Graduate Research Fellowship ($150,000) – PI	2020-2023

PUBLICATIONS

RESEARCH MANUSCRIPTS

1. **Anna S. Boser**, Kelly Caylor, Ashley E. Larsen, Madeleine Pascolini-Campbell, John T. Reager, Tamma Carleton. "Field-scale crop water consumption estimates reveal potential water savings in California agriculture." Nature Communications. (2024).

2. **Anna S. Boser**. "Validating spatio-temporal environmental machine learning models: Simpson's paradox and data splits." Environmental Research Communications. (2024).

3. Tyler Liddell, **Anna S. Boser**, Sara Orofino, Tracey Mangin, Tamma Carleton. "stagg:: A data pre-processing R package for climate impacts analysis." Environmental Modelling & Software. (Accepted).

4. Andrew J. MacDonald, David Hyon, Samatha Sambado, Kacie Ring, **Anna S. Boser**. "Remote sensing of temperature-dependent mosquito and viral traits predicts field surveillance-based disease risk." Ecology. (Accepted).

5. Brian Lee, Samantha Sambado, D. Nākoa Farrant, **Anna S. Boser**, Kacie Ring, David Hyon, Ashley E. Larsen, and Andrew J. MacDonald. "Bat activity reveals targeted foraging with agricultural and vector disease control implications." Agriculture, Ecosystems and Environment. (In review).

6. **Anna S. Boser**, Daniel Sousa, Ashley E. Larsen, Andrew J. MacDonald. "Micro-climate to macro-risk: mapping fine scale differences in mosquito-borne disease risk using remote sensing." Environmental Research Letters. (2021).

7. Jennifer R. Head, … **Anna S. Boser**…, Justin Remais. "The effect of school closures and reopening strategies on COVID-19 infection dynamics in the San Francisco Bay Area: a cross-sectional survey and modeling analysis." MedRxiv (2020).

8. Mosnier E, Epelboin L, Guiraud N, Huber F, Adriouch L, Guarmit B, **Anna S. Boser**, . . . Nacher, M. "Spatial dynamics and epidemiology for AIDS in remote areas in French Guiana." AIDS Care,1-7 (2018).

9. **Anna S. Boser**, Bidaud B, Maues S, Guiraud N, Mendes AM, Lacapere F Rhodes S, Huber F, Adriouch L, Nacher M, Mosnier E. "Addressing HIV on the French Guianese-Brazilian border: No choice but collaboration!" AIDS 32, 539–542 (2018).

CONFERENCE PAPERS, PRESENTATIONS AND POSTERS

1. **Anna S. Boser**, Kelly Caylor, Ashley E. Larsen, Madeleine Pascolini-Campbell, John T. Reager, Tamma Carleton. "Field-scale crop water consumption estimates reveal potential water savings in California agriculture." HydroML. Richland, Washington. May 2024.

2. **Anna S. Boser**, Kelly Caylor, Ashley E. Larsen, Madeleine Pascolini-Campbell, John T. Reager, Tamma Carleton. "Field-scale crop water consumption estimates reveal potential water savings in California agriculture." Interdisciplinary Ph.D. Workshop in Sustainable Development (IPWSD). New York City, New York. April 2024.

3. **Anna S. Boser**, Kelly Caylor, Ashley E. Larsen, Madeleine Pascolini-Campbell, John T. Reager, Tamma Carleton. "Field-scale crop water consumption estimates reveal potential water savings in California agriculture." AGU Chapman Conference on Remote Sensing of the Water Cycle: Sensors to Science to Society. Honolulu, Hawaii. February 2024.

4. Yang Hu, Kelly Caylor, **Anna S. Boser**. "Segment-then-Classify: Few-shot instance segmentation for environmental remote sensing." Tackling Climate Change with Machine Learning at NeurIPS. New Orleans,

Louisiana. December 2023.

5. Jason Perez, Yang Hu, **Anna S. Boser**, Kelly Caylor. "Mapping and monitoring center pivot irrigation in data-poor settings." American Geophysical Union. San Francisco, California. December 11-17 2023.

6. **Anna S. Boser**, Ryan Stofer, Kelly Caylor. "Downscaling remote sensing data using deep learning." TWEEDS. Eugene, Oregon. September 15-16 2023.

7. **Anna S. Boser**, Tamma Carleton, Ashley Larsen, Madeleine Pascolini-Campbell, John T. Reager, Kelly Caylor. "Estimating agricultural water consumption and irrigation efficiency in California using machine learning and remote sensing." American Geophysical Union. Chicago, Illinois. December 12-16 2022.

8. **Anna S. Boser**, Ryan Stofer, Kelly Caylor. "Super-resolution of Land Surface Temperature Using Deep Learning." American Geophysical Union. Chicago, Illinois. December 12-16 2022.

9. Tyler Liddell, **Anna S. Boser**, Sara Orofino, Tracey Mangin, Tamma Carleton.. "Stagg: An R Package for Spatiotemporal Aggregation of ERA5 Climate Data." Chicago, Illinois. American Geophysical Union. December 12-16 2022.

10. **Anna S. Boser**, Tamma Carleton, Ashley Larsen, Madeleine Pascolini-Campbell, John T. Reager, Kelly Caylor. "Machine learning and remote sensing elucidate an 80% water savings potential in California agriculture." TWEEDS. Eugene, Oregon. October 7-8 2022.

11. **Anna S. Boser**, Madeleine Pascolini-Campbell, John T. Reager. ECOSTRESS detects a 20% increase in evapotranspiration over agricultural lands in California. American Geophysical Union. New Orleans, Louisiana. December 2021.

12. **Anna S. Boser**, Daniel Sousa, Ashley Larsen, Andrew MacDonald. "Mosquito-borne disease risk mapping at high spatial and temporal resolutions using remotely sensed land surface temperature measurements." Ecological Society of America. Long Beach, California. August 2021.

13. **Anna S. Boser**, Christian White, Mohammad Al-Hamdan. "Using Statistical and Machine Learning Models with Remotely Sensed Data to Estimate $PM_{2.5}$ in the San Francisco Bay Area." American Geophysical Union. San Francisco, California. December 1-17 2020.

14. **Anna S. Boser**, Samuel Evans, Matthew D. Potts. "The Effect of Prescribed Burn Smoke on Emergency Department Visits and Hospitalizations in California." 3rd International Smoke Symposium. Davis, California. April 20-24 2020.

15. **Anna S. Boser**, Bidaud B, Adriouch L, Epelboin L, Guiraud N, Gaillet M, Carrera C, Brousse P, Mosnier E. "VIH sur la frontière franco-brésilienne: mobilité et précarité sur une région en épidémie généralisée. 18th National Congress of the French Society for the Fight Against AIDS (SFLS)." Nice, France. Oct 19-20, 2017.

TEACHING EXPERIENCE

Teaching assistant, UCSB, EDS 217: Principles of Environmental Data Science	2023, 2024
Tutor, UCSB, EDS 217: Principles of Environmental Data Science	2022
Teaching Assistant, UCSB, ESM 203: Earth Systems Science	2021

MENTORSHIP

Bren Environmental Diversity Leaders and Mentorship Program. Mentee: Emily Miller	2024
UCSB EUREKA summer undergraduate internship. Mentee: Jason Perez	2023
Bren Environmental Diversity Leaders and Mentorship Program. Mentee: Yang Hu	2023
WAVES lab undergraduate research. Mentees: Ryan Stofer, Mitali Gaidhani	2022-2023
emLab summer undergraduate internship. Mentee: Tyler Liddell	2022
UCSB Data Science Capstone Project	2022

MEMBERSHIPS

American Geophysical Union	2020-Present
Ecological Society of America	2020-2021

SERVICE

Outreach Chair, Women in Science and Engineering, UCSB	2023-Present
Organizer and attendee, Bren Anti-Racism Caucus, UCSB	2021-Present
Reviewer, International Journal of Biometerology (x1)	2024
Reviewer, Air, Soil and Water Research (x1)	2023
Reviewer, CV4Ecology Summer Program at California Institute of Technology (x3)	2022-Present
Reviewer, World Development (x1)	2022
Bren Seminar Committee, UCSB	2021-2022
Bren PhD Symposium Committee, UCSB	2021

INVITED TALKS

NASA Jet Propulsion Laboratory, Caltech   Sept. 26, 2024
  Field-scale crop water consumption estimates reveal potential water savings in California agriculture
GS3 Seminar Series, Center for Scientific Computing, UCSB   Sept. 11, 2023
  Ten-fold super-resolution of remote sensing data using weakly supervised deep learning
GS3 Seminar Series, Center for Scientific Computing, UCSB   August 23, 2023
  Ten-fold super-resolution of remote sensing data using weakly supervised deep learning
GS3 Seminar Series, Center for Scientific Computing, UCSB   July 20, 2022
  Machine learning and remote sensing elucidate an 80% water savings potential in California agriculture
NASA ECOSTRESS Annual Team Meeting   April 12-14, 2022
  Micro-climate to macro-risk: Mapping fine scale differences in mosquito-borne disease risk
  Agriculture's effects on evapotranspiration and runoff generation in California

MEDIA COVERAGE

NPR KCBX Central Coast Public Radio, Beth Thorton   April 10, 2024
  UCSB research shows more options for reducing water use in agriculture
CalMatters, Rachel Becker   March 26, 2024
  California farmers could save a lot of water — but their profits would suffer
Newsweek, Robyn White   March 25, 2024
  California 'Overlooking' Ways To Save Water, Study Suggests
The Current, UC Santa Barbara, Harrison Tasoff   March 25, 2024
  Small changes can yield big savings in agricultural water use
USGS Earth Resources Observation and Science (EROS) Center "Eyes on Earth" Podcast   June 27, 2022
  Episode 76 – ECOSTRESS and Disease Risk
TEDx Youth Talk   February 29, 2022
  How to Save the Earth from Space

SYNERGISTIC ACTIVITIES

Participant, UCSB Science Storytelling for Impact workshop	2023
Participant, ESIIL Innovation Summit	2023
Participant, CV4Ecology Summer Program at California Institute of Technology	2022
Participant, Center for Inclusive Teaching and Learning (CITRAL) Community of Practice (CooP)	2022-2023