SOPHIE RUEHR

Ph.D. Candidate
Deptartment of Environmental Science, Policy & Management
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EDUCATION

2020-present; graduating May 2025 **University of California Berkeley** Berkeley, CA
Ph.D. Candidate in Environmental Science, Policy, & Management
Coadvised by Trevor Keenan & Manuela Girotto

My dissertation focuses on the coupling of carbon and water cycles in terrestrial ecosystems using remote sensing, eddy covariance flux tower, and machine learning methodologies, with a focus on solar-induced fluorescence, drought and agricultural systems.

2014-2018 **Yale University** New Haven, CT
Bachelor of Science, Geology & Geophysics (cum laude)

For my senior honors thesis, I used surface energy balance theory to partition the observed oasis effect between irrigated cropland and surrounding desert.

RESEARCH & PROFESSIONAL EXPERIENCE

2022-present **Sponsored Projects for Undergraduate Research Mentor** Berkeley, CA

I mentor undergraduate students on research projects, which have included biomass estimation using remote sensing image classification over an oak savanna, bonsai tree 3D modeling, and science communication on social media.

Spring 2024 **Graduate Student Instructor** Berkeley, CA

In Ecosystem Ecology, an upper-level undergraduate class led by Professor Dennis Baldocchi, I taught two sections of 35 students each, designed lesson plans, developed assignments, and gave a guest lecture on remote sensing.

2020-2024 **D-Lab Consultant** Berkeley, CA

At the UC Berkeley D-lab, I consulted graduate students across campus on questions related to data science, statistical methods and coding in R and Python.

2020-2021 **Be a Scientist Mentor** Berkeley, CA

I mentored five 7th grade students on semester-long research experiments.

2019-2020 ***Provincetown Independent* Reporter** Provincetown, MA

As a reporter for a weekly newspaper, I covered a range of topics, including environmental science, policing, and immigration.

2018-2019 **Yale University Huang Fellow** Port Vila, Vanuatu

I conducted a year-long independent research project on the historic impacts of climate change, sea level rise, and intensifying cyclones in Vanuatu, a Pacific Island Nation, for use in paleoclimatology research.

Summer 2017 **Woods Hole Oceanographic Institution Fellow** Woods Hole, MA

I analyzed paleoclimate hurricane dynamics estimated from sediment cores to determine deposition dynamics in a coastal pond.

PUBLICATIONS

Climate & Environment

Ruehr, S., Gerlein-Safdi, C., Falco, N., Seibert, P., Chou, C., Albert, L., Keenan, T.F. Quantifying seasonal and diurnal cycles of solar-induced fluorescence with a novel hyperspectral imager. 2024. *Geophysical Research Letters*, 51, 14. 10.1029/2023GL107429.

Ruehr, S., Girotto, G., Verfaillie, J., Baldocchi, D., Cabon, A., Keenan, T.F. 2023. Ecosystem groundwater use enhances carbon sinks in a semi-arid oak savanna. *Agricultural & Forest Meteorology*, 342, 109725. 10.1016/j.agrformet.2023.109725.

Ruehr, S., Keenan, T.F., Williams, C., Zhou, Y., Lu, X., Bastos, A., Canadell, P., Prentice, I.C., Sitch, S., Terrer, C. Evidence and attribution of the enhanced land carbon sink. 2023. *Nature Reviews Earth & Environment*, 4, 518-534. 10.1038/s43017-023-00456-3.

Massoud, E.C., Andrews, L., Reichle, R., Molod, A., Park, J., **Ruehr, S.**, Girotto, M. 2022. Seasonal forecasting skill for the High Mountain Asia region in the Goddard Earth Observing System. *Earth System Dynamics*, 14, 147–171. 10.5194/esd-14-147-2023.

Ruehr, S. 2021. Beyond the vulnerability/resilience dichotomy: Perceptions of and responses to the climate crisis on Emau, Vanuatu. *Island Studies Journal*. 10.24043/isj.151

Ruehr, S., Lee, X., Smith, R., Li, X., Xu, Z., Liu, S., Yang, X., Zhou, Y. 2020. A mechanistic investigation of the oasis effect in the Zhangye cropland in semiarid western China. *Journal of Arid Environments*, 176, 104120. 10.1016/j.jaridenv.2020.104120

Espeland, M., Hall, J.P., DeVries, P.J., Lees, D.C., Cornwall, M., Hsu, Y., Wu, L., Campbell, D.L., Talavera, G., Vila, R., Salzman, S., **Ruehr, S.**, Lohman, J.D., Pierce, N.E. 2015. Ancient Neotropical origin and recent recolonisation: Phylogeny, biogeography and diversification of the Riodinidae (Lepidoptera: Papilionoidea). *Molecular Phylogenetic Evolution*, 93, 296-306. 10.1016/j.ympev.2015.08.006

Data Consulting

Rutkove, S.B., Le, M., Nagy, J.A., **Ruehr, S.**, Semple, C., Sanchez, B. 2022. Design and pilot testing of a 26-gauge impedance-electromyography (iEMG) needle in wild type and ALS mice. *Nerve & Muscle*, 65, 6. 10.1002/mus.27551.

Chin, A., **Ruehr, S.**, Tarulli, A., Rutkove, S. 2007. Saline-saturated Balsa Wood as a Testing Mediumfor Rotational Electrical Impedance Myography. *IFMBE Proceedings*, 17, 272-275. 10.1007/978-3-540-73841-1_72

OUTREACH & JOURNALISM

2023	FLUXNET blog
2022	Keenan Group TikTok
2022	AmeriFlux 25 years data visualization tool
2022	Berkeley Science Review
2019, 2020	Provincetown Independent
2019	InsideClimate News
2019	WOMR Cape Cod's Outermost Radio
2016, 2018	Provincetown Banner

MENTORING & TEACHING

Spring 2024	Ecosystem science, ESPM 111 (graduate student instructor)
2023-4	Adam Rashid, UC Berkeley graduate (mentor)
2022-4	Megan Hur, UC Berkeley undergradate student (mentor)
2022-3	Tyler Goldstein, UC Berkeley undergradate student (mentor)

SERVICE

2024-present Dept. of Environmental Science, Policy & Management Field Safety Committee

2022-present UC Berkeley College of Natural Resources LGBTQ+ Coalition

2021-present AmeriFlux Diversity, Equity & Inclusion Committee member

2020-present UC Berkeley ESPM Graduate Diversity Council member

FUNDING & FELLOWSHIPS

2022 **FLUXNET Secondment**
FLUXNET
Funding for a 6-week research visit to CREAF, Barcelona, Spain

2022 **Future Investigators in NASA Earth and Space Science and Technology**
National Aeronautics and Space Administration (NASA)
Three years of graduate funding

2020 **Carol Baird Fieldwork Grant**
University of California Berkeley
In support of fieldwork at UC reserve sites

2020 **Environmental Forum Starter Grant**
Dept of Environmental Science, Policy and Management, University of California Berkeley
In support of conference attendance and dissertation research

2020 **Achievement Rewards for College Scientists Fellowship**
ARCS Northern California Chapter
Financial support for first two years of graduate study

2018 **Parker Huang Undergraduate Travel Fellowship**
Yale University
In support of independent research in Vanuatu

2017 **Karen Von Damm 1977 Fellowship**
Yale University Dept. of Geology & Geophysics
In support of senior honors thesis field research in China

2017 **Summer Student Fellowship**
Woods Hole Oceanographic Institution
In support of hurricane paleoclimatology research

2015 **Michael Coe Fieldwork Fund**
Council on Archaeological Studies at Yale

In support of archaeology research in Israel

PRESS

2023 Ask MIT Climate

AWARDS

2021 **First Place: Science/Technology Reporting**
New England Newspaper Association

2021 **First Place: Health Reporting**
New England Newspaper Association

2018 **Hammer Prize**
Yale University Department of Geology & Geophysics

WORKSHOPS

2024 **Center for Climate Sciences Summer School** NASA Jet Propulsion Lab, CA
Week-long course on remote sensing and climate modeling at CalTech and JPL

2024 **Spring Teaching Conference** UC Berkeley, CA
Participation in a one-day workshop on teaching, ethics, and inclusion

2024 **FieldFutures Harassment Prevention Training** UC Berkeley, CA
Participation in a full-day workshop on sexual harrassment prevention in fieldwork

2024 **DroneCamp** CSU Monterey Bay, CA
5-day field course on mission planning, drone piloting, photogrammetry, and data processing

2022 **AmeriFlux Field Safety Workshop**
Leading a one-day workshop for safety and inclusivity in field work

2022 **FluxCourse** Nederland, CO
Two-week field course on eddy covariance flux data and modeling

SKILLS

Languages
Bislama (advanced), French (advanced), Italian (basic)

Computer languages
Python, R, MATLAB, Bash, Git

Software
LaTeX, Wordpress, GIS, ENVI, RStudio, Google Earth Engine

Field work
Hyperspectral imager deployment, snow depth and water equivalent, GPS survey, sediment core collection and processing, tree diameter, measurement, in situ leaf-level physiology measurements, anthropological research methods, eddy covariance flux tower deployment

REVIEWING

2024 Nature Communications Earth & Environment

2024 Agricultural & Forest Meteorology
2024 Hydrology
2024 Nature Communications
2024 Earth's Future
2023 AGU Advances
2023 Proceedings of the National Academy of Sciences
2023 Geophysical Research Letters
2021 Journal of Arid Environments

ORAL PRESENTATIONS

Ruehr, S. Evidence and attribution of the land carbon sink's historic enhancement (Fall 2023). EEBIOMASS virtual workshop. Max-Planck Institute for Biogeochemistry, Jena, Germany.

Ruehr, S. Groundwater drought decreases carbon fixation in a semi-arid oak savannah (Fall 2023). CREAF, Barcelona, Spain.

Ruehr, S., Girotto, M., Verfaillie, J., Baldocchi, D., Keenan, T.F. Groundwater drought decreases carbon fixation in a semi-arid oak savannah (Fall 2022). GC55A-03. AGU fall meeting, Chicago, IL, USA.

Ruehr, S., Seibert, P., Gerlein-Safdi, C., Falco, N., Wu, Y., Chou, C., Keenan, T.F. Hyperspectral imagery illuminates drivers of solar-induced fluorescence across landscapes (Fall 2022). B43C-04. AGU fall meeting, Chicago, IL, USA.

Ruehr, S., Girotto, M., Keenan, T.F. Quantifying ecosystem reliance on groundwater (Fall 2021). H51E-01. AGU fall meeting, New Orleans, LA, USA.

Ruehr, S., Gerlein-Safdi, C., Falco, N., Keenan, T.F., Torn, M. S. Picturing SIF: field readiness and initial results from a novel SIF imaging instrument (Fall 2021). B22C-09. AGU fall meeting, New Orleans, LA, USA.

Ruehr, S. Carbon emissions and offsets: Global and local research. ARCS Forward National Speaker Series, distinguished speaker (August 24, 2021). Ohio ARCS Chapter, Cleveland, OH, USA.

Ruehr, S. Celebration of Distinguished Fellows Selected Student Speaker (April 26, 2021). University of California Berkeley, CA, USA.

Ruehr, S. Achievement Rewards for College Scientists Symposium Selected Scholar (April 20, 2021). National presentation, USA.

Ruehr, S., Lee, X., Smith, R... Latent heat drives cooling over oases (December 2020). H026-01A. AGU Fall Meeting, USA.

Ruehr, S. Stakeholder feedback for a paleoclimate study. (December 10, 2019). Coastal Research Laboratory, Woods Hole Oceanographic Institution, Woods Hole, MA, USA.

Ruehr, S. Tracing ancient cyclones: paleoclimate, oral history & climate futures. (November 8, 2018). University of the South Pacific Emalus Campus, Vanuatu.

Ruehr, S. The Oasis Effect: Evaluating Intrinsic Biophysical Mechanism Theory and its Implications for Sustainable Water Management in Zhangye, Gansu, China. (May 11, 2018). Dept. of Geology & Geophysics, Yale University, New Haven, CT, USA.

Ruehr, S. & Lee, X. Intrinsic Biophysical Mechanism Theory & the Oasis Effect. (March 15, 2018). Key Laboratory of West China's Environmental System, Lanzhou University, Gansu, China.

Ruehr, S. & Lee, X. Intrinsic Biophysical Mechanism Theory & the Oasis Effect. (March 13, 2018). School of Geography, Beijing Normal University, Beijing, China.

POSTER PRESENTATIONS

Ruehr, S., Gerlein-Safdi, C., Falco, N., Keenan, T.F., Torn, M. S. Picturing SIF: field readiness and initial results from a novel SIF imaging instrument (Fall 2021). B22C-09. AGU fall meeting, New Orleans, LA, USA.

Ruehr, S., Girotto, M., Keenan, T.F. Quantifying ecosystem reliance on groundwater (Fall 2021). H51E-01. AGU fall meeting, New Orleans, LA, USA.

Ruehr, S., Keenan, TF., Girotto, M. Inter-annual groundwater variation affects ecosystem productivity. (October 2021). AmeriFlux Fall Meeting.

Ruehr, S., Lee, X., Smith, R... A mechanistic investigation of the oasis effect in the Zhangye cropland in semiarid western China. (October 2020). AmeriFlux Fall Meeting.

Castagno, K., Ruehr, S., Donnelly, J., Woodruff, J. Grain-size distribution and patterns in storm-induced event beds in a coastal pond. (October 2018). EP13D-2125. American Geophysical Union Fall Meeting.

Ruehr, S., Castagno, K., Donnelly, J. Newfound aspects of ancient hurricanes: reconstructing storm intensity and sediment deposition dynamics in northeastern coastal ponds. (August 2017). Summer Student Fellow Poster Session, Woods Hole Oceanographic Institution, Woods Hole, MA.