KAI L. KOPECKY, Ph.D.

Community Ecologist

Marine Ecology • Global Change • Resilience • Coral Reefs

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RESEARCH PROFILE

Integrative ecologist combining field ecology, ecological theory, quantitative modeling, remote sensing, AI-assisted image analysis, data science, and synthesis to understand how global change reshapes ecological resilience across organismal to ecosystem scales and to develop actionable conservation strategies.

EDUCATION

Ph.D., Ecology, Evolution, and Marine Biology, University of California, Santa Barbara | 2024

Committee:

Prof. Russell Schmitt

Prof. Adrian Stier

Prof. Holly Moeller

Prof. Deron Burkepile

M.A., Ecology, Evolution, and Marine Biology, University of California, Santa Barbara | 2021

B.S. (Honors), Ecology & Evolutionary Biology, University of California, Santa Cruz | 2015

PROFESSIONAL APPOINTMENTS

Postdoctoral Research Fellow | 2024 – Present

Environmental Data Science Innovation & Impact Lab (ESIIL), University of Colorado Boulder

Advisor: Katharine N. Suding

Research Consultant | 2025 – Present

One People One Reef

Lecturer / Instructor

2026 | *Department of Environmental Studies*, University of Colorado Boulder

2025 | *Three Seas Program*, Northeastern University

2021 – 2023 | *Department of Ecology, Evolution, and Marine Biology*, University of California, Santa Barbara

Graduate Student Researcher | 2018 – 2024

Moorea Coral Reef LTER, University of California, Santa Barbara

PUBLICATIONS

Published († = student author)

Kopecky, K. L., Castorani, M. C. N., Tuff, T., Barker Plotkin, A., Bell, D. M., Johnstone, J. F., Kominoski, J. S., Nippert, J. B., Nytch, C. J., Pennings, S. C., Reed, D. C., Shiels, A. B., & Suding, K. N. (2026). "Legacies of foundation species shape life after death." *Science Advances*. doi:10.1126/sciadv.aef9983

Kopecky, K. L., Pavoni, G., Corsini, M., DiFiore, B. P., Brooks, A. B., Nocerino, E., & Menna, F. (2025). "Removing dead coral after marine heatwaves can mitigate coral–algae competition and increase viable coral recruitment." *Ecological Applications*. doi:10.1002/eap.70077

Kopecky, K. L., Holbrook, S. J., †Partlow, E., †Cunningham, M., & Schmitt, R. J. (2024).
"Changing disturbance regimes, material legacies, and stabilizing feedbacks: Dead coral skeletons impair key recovery processes following coral bleaching."
Global Change Biology. doi:10.1111/gcb.17504

Kopecky, K. L., Stier, A. C., Schmitt, R. J., Holbrook, S. J., & Moeller, H. V. (2023).
"Material legacies can degrade resilience: Structure-retaining disturbances promote regime shifts on coral reefs."
Ecology. doi:10.1002/ecy.4006

Kopecky, K. L., Pavoni, G., Nocerino, E., Brooks, A. J., Corsini, M., Menna, F., Gallagher, J. P., Capra, A., Castagnetti, C., Rossi, P., et al. (2023).
"Quantifying the loss of coral from a bleaching event using underwater photogrammetry and AI-assisted image segmentation."
Remote Sensing. doi:10.3390/rs15164077

Ingeman, K. E., Zhao, L. Z., Wolf, C., Williams, D. R., Ritger, A. L., Ripple, W. J., **Kopecky, K. L.**, Dillon, E. M., DiFiore, B. P., Curtis, J. S., Csik, S. R., Bui, A., & Stier, A. C. (2022).
"Glimmers of hope in large carnivore recoveries."
Scientific Reports. doi:10.1038/s41598-022-13671-7

Kopecky, K. L., Cook, D. T., Schmitt, R. J., & Stier, A. C. (2021).
"Effects of corallivory and coral colony density on coral growth and survival."
Coral Reefs. doi:10.1007/s00338-021-02076-z

In Review

Kopecky, K. L., Pavoni, G., Corsini, M., Brooks, A. J., Holbrook, S. J., & Schmitt, R. J.
"Tracking demographic changes in individual coral colonies through repeated photogrammetric surveys."
Remote Sensing in Ecology and Conservation. Pre-print available here.

Kopecky, K. L., Barker Plotkin, A., Bell, D. M., Castorani, M. C. N., Huang, D., Johnstone, J. F., Kominoski, J. S., Nippert, J. B., Nytch, C. J., Pennings, S. C., Reed, D. C., Shiels, A. B., Tuff, T., & Suding, K. N.
"Life after death: A harmonized dataset of live and dead foundation species across marine and terrestrial ecosystems."
Ecology.

Balch, J., Nagy, R. C., Hummel do Amaral, C., … **Kopecky, K. L.,** et al.
"The Environmental Data Science Innovation & Impact Lab (ESIIL): Accelerating synthesis discovery by fostering a broad community."
Environmental Data Science.

Selected Manuscripts in Preparation (*indicates equal lead-authorship)

Schmitt, R. J.*, **Kopecky, K. L.***, Brooks, A. J., & Holbrook, S. J.
"Heat Waves Promote, but Cyclones Reverse, Coral-to-Seaweed Regime Shifts by Reshaping Reef Resilience." Preprint available here.

Byers, J., Band, A., Suding, K. N., **Kopecky, K. L.**
"Afterlife of ecosystem engineers: A unified framework for quantifying material legacy effects across ecosystems."

Miller, S., Adam, T., Briggs, C., Brooks, A., Burkepile, D., Enright, L., Holbrook, S., John, C., **Kopecky, K. L.**, Lenihan, H., Moeller, H., Rassweiler, A., Schmitt, R., Speare, K.
"Fine-scale spatial processes interact with herbivore feeding preferences to influence coral recovery."

GRANT & FELLOWSHIP FUNDING

Current

2024 – Present | Environmental Data Science Innovation & Impact Lab Postdoctoral Fellowship (~**$310,000**)

2025 – Present | Scientific Peers Advancing Research Collaborations Working Group (PI), NSF LTER Network Office / NCEAS (~**$40,000**)

Past

2023 | Graduate Division Dissertation Fellowship, University of California, Santa Barbara (~**$15,000**)

2023 | Charles A. Storke Graduate Fellowship (**$2,500**)

2022 | Worster Research Award (**$5,000**)

2021 | Graduate Student Accelerator Award, Schmidt Family Foundation (**$5,000**)

2019 – 2020 | Departmental Fellowship, University of California, Santa Barbara (~**$45,000**)

Pending

Special Targeted Awards for Research (STAR) grant (PI), NSF (**$400,000**)

INVITED PRESENTATIONS

Research Seminars

2026 | **University of Colorado Boulder,** Department of Geography Colloquium
Life after death in foundation species

2026 | **Institute of Arctic and Alpine Research,** Mountain Research Station Summer Seminar Series
Life after death: How dead organisms serve as nature's memories

2026 | **American Physical Society**, Global Physics Summit
The remains of change: How shifting disturbance regimes leave novel legacies that impact coral reef resilience

2026 | **Emory University,** Department of Environmental Sciences
Ecology of change: Understanding resilience in a changing world

2025 | **Rendezvous Symposium**, Cooperative Institute for Research in Environmental Sciences

2025 | **University of Colorado Boulder**, Department of Ecology & Evolutionary Biology
Impacts of material legacies on the resilience of foundation species

2025 | **Institute for Conservation Research and Education**, Expert Seminar Series
The role of material legacies in conservation and restoration

2024 | **University of Sassari, Italy**
Material legacies, disturbance, and resilience

Guest Lectures

2024 – 2026 | **Coral Reef Ecology (EBIO 4090)**, Dept. of Ecology & Evolutionary Biology, CU Boulder

2026 | **Restoration Ecology (EBIO 4145)**, Dept. of Ecology & Evolutionary Biology, CU Boulder

2026 | **Introduction to Marine Biology (EBIO 4090)**, Dept. of Ecology & Evolutionary Biology, CU Boulder

2025 | **Spatial Analytics (GEOG 4103/5103)**, Dept. of Geography, CU Boulder

2024 | **Applied Marine Ecology (ESM 260)**, Bren School, UC Santa Barbara

TEACHING EXPERIENCE

Instructor of Record

2026 | **Applied Ecology** (ENVS 2000)
Department of Environmental Studies, University of Colorado Boulder

2025 | **Conservation and Restoration of Marine Systems**
Three Seas Program, Northeastern University

2023 | **Biology and Ecology of Coral Reefs** (EEMB 147)
Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara

2022 | **Marine Conservation Ecology** (EEMB 142C)
Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara

2021 | **Aquatic Community Ecology** (EEMB 142A)
Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara

Lead Teaching Assistant

2019 – 2023 | **Methods in Aquatic Community Ecology** (EEMB 142AL)
Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara

2019 – 2023 | **Applied Marine Ecology** (EEMB 152)
Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara

Teaching Assistant

2020 | **Introduction to Ecology and Evolution** (EEMB 2)
Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara

2018 | **Aquatic Community Ecology** (EEMB 142A)
Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara

MENTORSHIP

Mentored 30+ undergraduate and graduate researchers in field ecology, experimental design, quantitative analysis, scientific communication, thesis preparation, and career development.

Graduate student mentees

Annie Meeder, Huner Geist-Sanchez, Advyth Ramachandran, Madeline Ward, Ninah Munk, Lauren Enright

Undergraduate mentees *(*indicates students now in graduate programs)*

Mackenzie Grebner, Madeline Cunningham*****, Emalia Partlow*****, Yadi Galindo-Salazar, Lauren Enright*****, Anneke Padmos, Jaden Harding, Joaquin Sandoval, Marina Stoilova*****, Jada Alexander, Lexi Stittenfeld-Parkhurst, Elizabeth McEligot, Madigan Boborci, Katie Riley, Adam Goodman*****, Kai Oda, Kera Heimlich, Maya Gorgas*****, Journ Galvan, Haley Glasmann*****, Hayden Vega*****, Emma Harris, Andrew Gonzales, Stella Malva, Zara Furtado-Quesenberry, Jake Denton, Molly Banks, Karen Thornton*****

PROFESSIONAL SERVICE

Subject Matter Editor: *Ecosphere* (2024 – Present)

Proposal Reviewer: National Science Foundation, Biological Oceanography

Peer Reviewer: *Ecology Letters, Methods in Ecology and Evolution, Theoretical Ecology, Ecological Informatics, Scientific Reports, Limnology and Oceanography, Landscape Ecology, Ecosphere, Marine Ecology Press Series, Coral Reefs, Hydrobiologia, Marine Geodesy*

MEDIA COVERAGE

2026 | *Morning Edition*, NPR

2026 | *The Conversation*

2026 | *Inside Climate News*

2026 | *BioGraphic Magazine*, California Academy of Sciences

2025 | *Applied Ecology Newsletter,* Ecological Society of America

2024 | *Discovery Files,* National Science Foundation

OUTREACH & PUBLIC ENGAGEMENT

Student & Community Engagement

2024 – Present | *CIRES Science Pathways Program:* Career talks for community college students in Colorado

2026 | *Science & Spirits:* public-facing science talk at a local distillery

2025 | *Science Under the Dome:* talk for a public-facing speaker series with Fiske Planetarium

2024 | *Sea the Future:* Science demonstration for junior high school students in California

2023 – 2024 | *Letter to Pre-Scientists:* Pen pal for junior high school student

2022 – 2024 | *Earth Day Festival:* Science Communication in Santa Barbara, CA

2019 – 2023 | *Science as a Career Outreach Project Experiment (SCOPE):* Career talks for high school students

2019 – 2023 | Science demonstrations for elementary school students in Moorea, French Polynesia

Stakeholder Engagement

2023 | *Tetiaroa Society*, Reef photogrammetry training for marine stewards

2019 – 2021 | *Recherche collaborative pour la pêche à Moorea:* knowledge exchanges with local fishers

SELECTED CONTRIBUTED CONFERENCE PRESENTATIONS

Kopecky, K. L., Castorani, M. C. N., Tuff, T. A., Hayes, K., Barker-Plotkin, A., Nippert, J., Nytch, C., Hennessy, E. C., Kominoski, J. S., Smith, R., Bell, D., & Suding, K. N.
Legacies of dead foundation species influence ecological trajectories by reshaping species interactions.
Ecological Society of America (2026), Salt Lake City, UT.

Kopecky, K. L., Tuff, T. A., Johnstone, J. F., Castorani, M. C. N., Barker-Plotkin, A., Nippert, J., Nytch, C., Pennings, S. C., Kominoski, J. S., Reed, D. C., Bell, D., & Suding, K. N.
Life after death: Exploring how the legacies of dead foundation species influence demography of living foundation species across marine and terrestrial systems.
Ecological Society of America (2025), Baltimore, MD.

Kopecky, K. L., Pavoni, G., Corsini, M., DiFiore, B. P., Brooks, A. B., Nocerino, E., & Menna, F.
Clearing a path to resilience: Removal of dead coral skeletons mitigates downstream impacts of marine heatwaves on coral reefs.
ASLO Aquatic Sciences Meeting (2025), Charlotte, NC.

Kopecky, K. L., Pavoni, G., Nocerino, E., Brooks, A. J., Corsini, M., Menna, F., *et al*.
Quantifying coral loss and community change from coral bleaching using underwater photogrammetry and AI-assisted image segmentation.
Western Society of Naturalists (2023), Monterey, CA.

Kopecky, K. L., Brooks, A. J., Holbrook, S. J., & Schmitt, R. J.
Material legacies and hysteresis in reef communities.
Moorea Coral Reef LTER All Investigators Meeting (2023), Santa Barbara, CA.

Kopecky, K. L., Stier, A. C., Schmitt, R. J., Holbrook, S. J., & Moeller, H. V.
Material legacies can degrade resilience: Structure-retaining disturbances promote regime shifts on coral reefs.
Western Society of Naturalists (2022), Oxnard, CA.

Kopecky, K. L., Pavoni, G., Nocerino, E., Brooks, A. J., Corsini, M., Menna, F., Gallagher, J. P., Capra, A., Castagnetti, C., Rossi, P., *et al*.
Towards an effective assessment of change detection on coral reefs.
International Coral Reef Symposium (2021).

Kopecky, K. L., Pavoni, G., Nocerino, E., Brooks, A. J., Corsini, M., Menna, F., Holbrook, S. J., & Schmitt, R. J.
Use of automated segmentation software for 3D measurement and change detection of coral reefs.
Moorea Coral Reef LTER All Investigators Meeting (2020).

SELECTED TRAINING

Collaboration Plans Beyond the Proposal
Environmental Data Science Innovation & Impact Lab (ESIIL), University of Colorado Boulder

Data Science Short Course
National Center for Ecological Analysis & Synthesis (NCEAS), Baltimore, MD

Cultural and Tribal Sensitivity in Research
Environmental Data Science Innovation & Impact Lab (ESIIL), University of Colorado Boulder

Inclusive Language
Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado Boulder

Diversity, Equity, Inclusion, and Belonging in Data Science
Environmental Data Science Innovation & Impact Lab (ESIIL), University of Colorado Boulder

Team Science
Environmental Data Science Innovation & Impact Lab (ESIIL), University of Colorado Boulder

Cyberinfrastructure
Environmental Data Science Innovation & Impact Lab (ESIIL), University of Colorado Boulder

FIELD & TECHNICAL EXPERTISE, SKILLS & CERTIFICATIONS

AAUS Scientific Diver (1100+ dives)
NAUI Divemaster (1300+ total dives)
Small vessel operations (Motorboat Operator Training Course certification)
Underwater photogrammetry
Long-term ecological monitoring
Field logistics and technician supervision
Programming & software: R, Git/GitHub, Agisoft Metashape, TagLab, Adobe Creative Suite