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Engineering & Scientific Consulting

Laura Lilly, Ph.D.

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Professional Profile

Dr. Laura Lilly is a biological oceanographer with interdisciplinary background and statistical analysis skills in marine food web dynamics, habitat mapping, and climate-ocean perturbations. She brings over 8 years of experience in multivariate statistical analyses, computer programming, and dynamical modeling, with particular emphasis on mapping seasonal ocean dynamics and developing zooplankton prediction metrics to improve marine ecosystem models and protected species management. Dr. Lilly also has experience developing and implementing institutional waste reduction programs.

Dr. Lilly's doctoral and postdoctoral research focused on quantifying habitat ranges and seasonal-to-decadal variability in zooplankton species compositions in various regions of the California Current System using multivariate statistics, spatial mapping, generalized additive models, and dynamical particle tracking forced by ocean state estimate models. She also has expertise in long-term timeseries analysis and trend detection. She has extensive experience combining disparate data types, interpolating patchy data, and working with large datasets in various programming languages (MATLAB, R, Python). Dr. Lilly has contributed to efforts to improve forecasts of fisheries stock assessments and protected marine species migrations, and has worked for and collaborated with agencies that provide public data access, summary, and visualization.

In addition to ocean-climate ecosystem research, Dr. Lilly helped initiate and collaborated with university-level administrators on sustainable waste reduction practices at Scripps Institution of Oceanography, UC San Diego. Dr. Lilly co-founded and led the Scripps Sustainability Group, a student/staff-run group that collaborated with campus-wide sustainability partners to implement composting programs, assess efficacy of compostable dining-ware materials, eliminate single-use plastics from campus events, and encourage and raise awareness of campus sustainability practices.

Through her scientific work, Dr. Lilly has collaborated with researchers along the U.S. West Coast, Mexico, Chile, and Australia. She has over 250 days of sea-going experience, including various multi-week trips, as well as field experience in coral reefs, mangroves, and tropical rainforests. She has developed and taught oceanography courses for students ranging from middle school to post-graduate curriculum, including a three-week course for graduate students at Oregon State University in "Applied Statistical Analyses for Biological Oceanographers". Dr. Lilly is an experienced science communicator and has authored several science blogs and articles for public audiences.

Academic Credentials & Professional Honors

Ph.D., Oceanography, University of California, San Diego, 2021

M.S., Earth Sciences, Stanford University, 2013

B.S., Earth Sciences, Stanford University, 2012

Fulbright Futures Postdoctoral Fellow, 2022

National Science Foundation Graduate Research Fellow, 2016-2020

Phi Beta Kappa, 2012

Prior Experience

Fulbright Futures Postdoctoral Fellow, University of Queensland, 2022

Postdoctoral Scholar, NOAA NWFSC/Oregon State University, 2021-2022

Co-Founder and President, Scripps Sustainability Group, UC San Diego, 2017-2021

Research Analyst, Southern California Coastal Ocean Observing System, 2015

California Sea Grant State Fellow, West Coast Governors Alliance, 2013-2014

Professional Affiliations

Association for the Sciences of Limnology and Oceanography (ASLO)

Languages

Spanish

Publications

Lilly LE, Cornuelle BD, Ohman MD. Using a Lagrangian particle tracking model to evaluate impacts of El Niño-related advection on euphausiids in the southern California Current System. *Deep Sea Research Part I: Oceanographic Research Papers* 2022; 187: 103835.

Lilly LE, Ohman MD. Euphausiid spatial displacements and habitat shifts in the southern California Current System in response to El Niño variability. *Progress in Oceanography* 2021; 193: 102544.

Lilly LE, Send U, Lankhorst M, Martz TR, Feely RA, Sutton AJ, Ohman MD. Biogeochemical Anomalies at Two Southern California Current System Moorings During the 2014–2016 Warm Anomaly-El Niño Sequence. *Journal of Geophysical Research: Oceans* 2019; 124(10): 6886-6903.

Lilly LE, Ohman MD. CCE IV: ENSO-related zooplankton community shifts in the southern California Current System. *Deep Sea Research Part I: Oceanographic Research Papers* 2018; 140: 36-51.

Lilly LE, Bonaventura J, Lipnick MS, Block BA. Effect of temperature acclimation on hemoglobin-oxygen binding in Pacific bluefin tuna (*Thunnus orientalis*) and yellowfin tuna (*Thunnus albacares*). *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology* 2015; 181: 36-44.

Lilly LE, Blinebry SK, Viscardi CM, Perez L, Bonaventura J, McMahon TJ. Parallel Assay of Oxygen Equilibria of Hemoglobin. *Analytical Biochemistry* 2013; 441: 63-68.

Presentations

(Selected)

Invited Seminars:

Lilly LE. Here to stay or just passing through? Insights into the mechanisms and impacts of zooplankton community variability. Oral seminar, Ecology Seminar Series, School of Biological, Earth, and Environmental Sciences, University of New South Wales, Sydney, Australia, 2022.

Lilly LE. Analyzing physical drivers of seasonal and interannual zooplankton community variability in the California Current System. Oral seminar, Marine Ecology Seminar Series, Hatfield Marine Science Center, Newport, OR, 2021.

Lilly LE, Ohman MD. ENSO-related zooplankton variability in the southern California Current System. Oral seminar, Marine Biology Seminar, CICESE, Ensenada, BC, Mexico, 2018.

Conference Presentations:

Lilly LE, Fisher JL, Jacobson KC, Hunsicker ME, Zeman SM, Cervantes BT, Fewings MR, Morgan CA, Ciannelli L. Seasonal composition and spring transition timing of the copepod community off Newport, OR. Oral presentation, Eastern Boundary Upwelling Systems (EBUS) Conference, Lima, Peru, 2022.

Lilly LE, Ohman MD. Forecasting ENSO impacts on the California Current Ecosystem planktonic food web. Oral presentation, US CLIVAR Workshop, Woods Hole Oceanographic Institution, 2022.

Lilly LE, Cornuelle BD, Ohman MD. Using a Lagrangian particle tracking model to evaluate impacts of El Niño-related advection on euphausiids in the Southern California Current System. Oral presentation, Ocean Sciences Meeting, Honolulu, HI, 2022.

Lilly LE, Ohman MD. El Niño-related spatial displacements of subtropical and cool-water euphausiids in the southern California Current System. Oral presentation, Association for the Sciences of Limnology and Oceanography (ASLO) Conference, San Juan, Puerto Rico, 2019.

Peer Reviews

Nature Climate Change

Nature: Communications Biology

Deep-Sea Research Part II

Marine Biodiversity

Progress in Oceanography

Journal of Plankton Research

Frontiers in Marine Science