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Engineering & Scientific Consulting

Laura Lilly, Ph.D.

Senior Scientist | Ecological and Biological Sciences
Austin
+1-425-519-8723 | llilly@exponent.com

Professional Profile

Dr. Lilly is a biological oceanographer with interdisciplinary background and expertise in marine food webs, climate-ocean dynamics, human use and management of coastal systems, and sustainability and climate solutions. Dr. Lilly possesses over a decade of experience in oceanography and marine resources, ecological systems, and climate change and adaptation, with extensive skills in both technical data analysis and effective communication.

Dr. Lilly's graduate and postdoctoral training focused on quantifying the impacts of climate variability and physical ocean changes on marine zooplankton and finfish in various geographic regions of the California Current System and global oceans. At Exponent, Dr. Lilly has evaluated impacts of offshore wind-induced electromagnetic fields (EMF) on marine ecosystems, threats to endangered marine and freshwater species from coastal development and roadways, potential degradation of coastal wetlands in areas of oil and gas brine discharge, and transport and impacts of chemical contaminants in deep-ocean, coastal, riparian, and terrestrial environments. She also has experience developing and implementing institutional waste reduction programs and extensive working knowledge of climate adaptation and engineering solutions, including carbon capture, uptake, and storage (CCUS) and marine carbon dioxide removal (mCDR).

Dr. Lilly has various technical capabilities, including an array of statistical data analysis skills (timeseries analysis, ecological statistics, evaluation of large and incomplete datasets, and data interpolation), Lagrangian particle tracking, GIS mapping, and coding languages (R, MATLAB, Python). She has conducted extensive literature reviews and critical assessment of scientific publications and has authored scientific blogs for public information outreach. Dr. Lilly has extensive experience in team collaboration and leadership as a seagoing oceanographer with over 250 days at sea, including on-the-deck troubleshooting ability for faulty scientific instrumentation and software.

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

Integrated Ocean Observing System (IOOS) Advisory Committee, 2024-2027

Association for the Sciences of Limnology and Oceanography (ASLO)

Languages

Spanish

Publications

Lilly LE, Suthers IM, Everett JD, Richardson AJ. A global review of pyrosomes: Shedding light on the ocean's elusive gelatinous “fire-bodies”. Limnology and Oceanography Letters 2023; 8(6): 812-29.

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.

Project Experience

Endangered Species Act

- Litigation support to determine whether lake elevation and other environmental factors in a high-altitude arid lake system influence survival of endangered long-lived lake-dwelling fish species
- Litigation support about the effects of tire road wear particle chemical components on salmonids along the U.S. West Coast
- Project development, expertise, and technical support for a petition for variance for coastal construction in proximity to sea turtle nesting beaches in the southeast U.S.

Environmental pollutants & ecosystems (marine, freshwater, terrestrial)

- Oceanographic expertise and technical support in evaluation of DDT circulation between sediments and marine food webs off Southern California
- Historical background for analysis of PCB impacts on ecosystems in Maryland
- Technical support for assessment of relative impacts of oil and gas drilling activities on wetlands of coastal Louisiana
- Support for several projects assessing movement of chemical contaminants (PFAS, natural gas products, ordnance explosives) in soil and groundwater systems

Assessment of climate change impacts

- Ecological expertise in support of questions related to impacts of climate change on ecosystem function and biodiversity in several regions of the U.S.
- Coastal ocean expertise and technical support for analysis of potential threats to coastal oil terminals from extreme weather events
- Leadership and development in tracking current events and evolution of business approaches to climate change and sustainability

Environmental permitting

- Assessment of potential marine ecological impacts of electromagnetic fields (EMF) from proposed offshore wind project undersea cables on the Northeast U.S. Continental Shelf

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

Science of the Total Environment