UCSB Blue Economy And Coastal Hazards (BEACH) Lab

Kelly Caylor, Associate Vice Chancellor for Research
Earth, Environmental, and Sustainability Sciences

Professor
Bren School of Environmental Science & Management
Department of Geography

#2 Hispanic-Serving Institute

1st HSI Member of AAU

#2 NY Times Access Index

34% 1st Generation College

Inclusive Excellence in Environmental Sciences

#7 Public University

1st Environmental Studies Department

#10 "Green" School

200+ Env. Sci. Faculty

Institutional Strengths

Bren School of Environmental Science & Management

Masters of Environmental Data Science

Masters of Environmental Science & Management

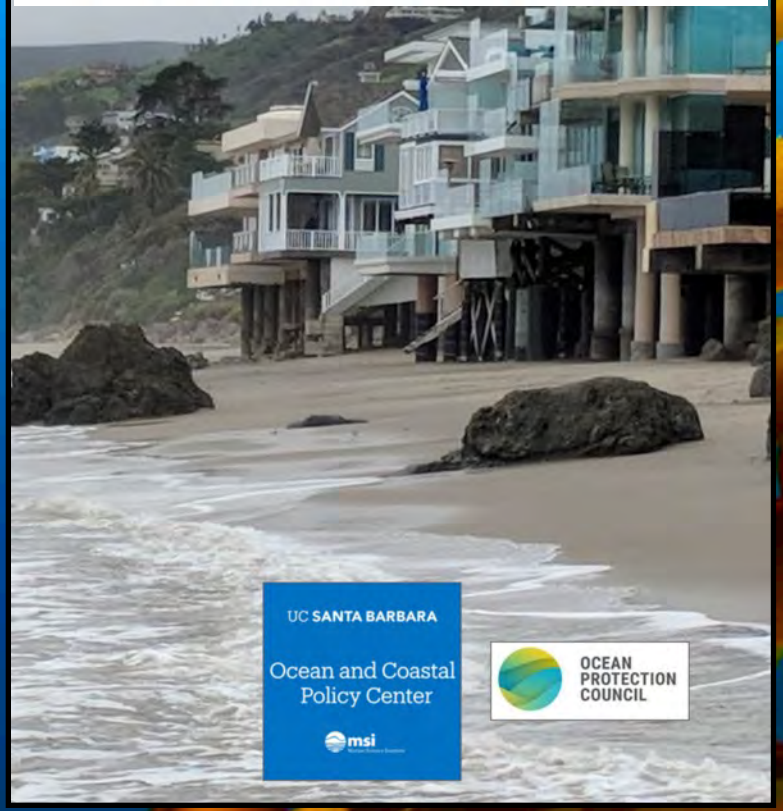
Environmental Innovation and Entrepreneurship Focus

Top 1% globally research citations per capita

Institutional Strengths

msi
Marine Science Institute

UC SANTA BARBARA
Ocean and Coastal Policy Center



Giant kelp genomics to inform kelp farming for biofuels
Dan Reed, Bob Miller

Ocean farming of selected kelp strains
(partnership with Santa Barbara Mariculture Co)

Ocean Alkalinity Enhancement
Carbon Dioxide Removal research
Debora Iglesias Rodriguez (EEMB)

The BEACH Lab at UC Santa Barbara

A state-of-the-art research facility designed to revolutionize our understanding & management of marine ecosystems

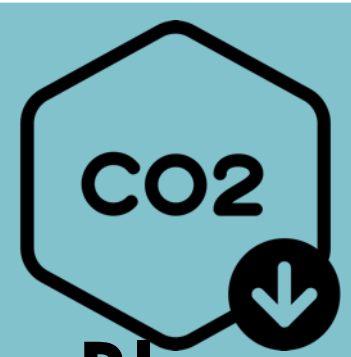
The BEACH Lab at UC Santa Barbara

A state-of-the-art research facility designed to revolutionize our understanding and management of marine ecosystems

Aquaculture Resilience

Marine Biopolymers

Coastal Pollution & Toxic Bloom Mitigation



Blue Carbon Strategies

NOAA

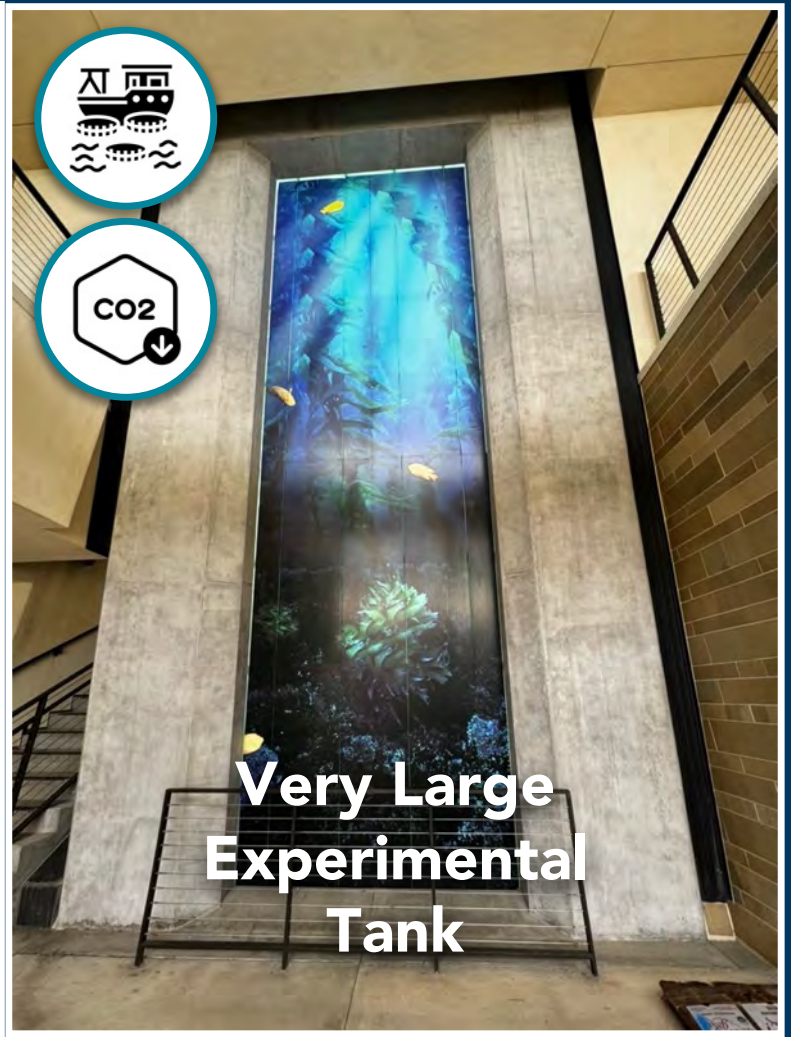
SBCC SANTA BARBARA CITY COLLEGE

REACH Ideas + Action for a Thriving Central Coast

CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS 2002

The BEACH Lab at UC Santa Barbara

A state-of-the-art research facility marine ecosystems



The BEACH Lab at UC Santa Barbara

A state-of-the-art research facility designed to revolutionize our understanding and management of marine ecosystems

Marine Sensor and Analytics Lab

UCSB Research & Innovation in Support of the Blue Economy and Coastal Health

UCOP Climate Action Funding Awardees, 2023-2024

Net-negative CO_2 removal is necessary to meet climate goals

The deep ocean may be able to store climatically-relevant amounts of carbon as organic matter.

To understand the risks and benefits of these approaches, we need **monitoring, reporting, and verification (MRV) approaches** that can operate in extreme environments

Climate Action Innovation Seed-funding:

Building a prototype monitoring system for deep-sea Carbon Dioxide Removal (CDR) applications.

Morgan Raven
Assistant Professor
Earth Science

Talia Evans
Climate Action
Innovation Fellow

Ongoing field experiments with components of MRV system.

Accurate and standardized monitoring systems are necessary to unlock industry/startups as well as regulators/verifiers focused on buying and selling carbon credits for marine Carbon Dioxide Removal (CDR)

Karbon Aquaculture

Sara Matsumura
Climate Action
Innovation Fellow

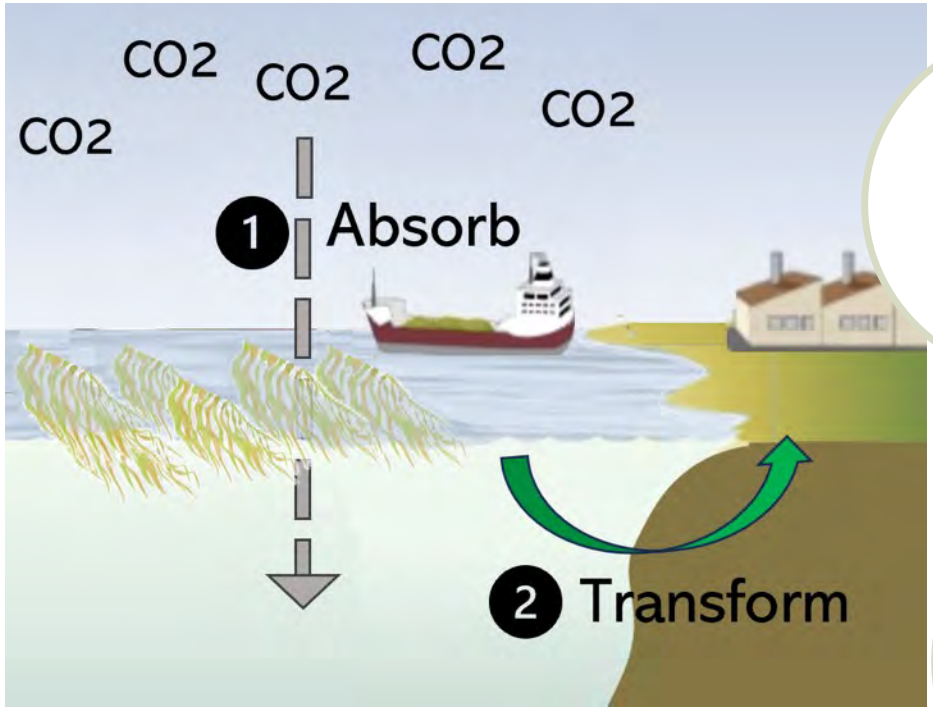
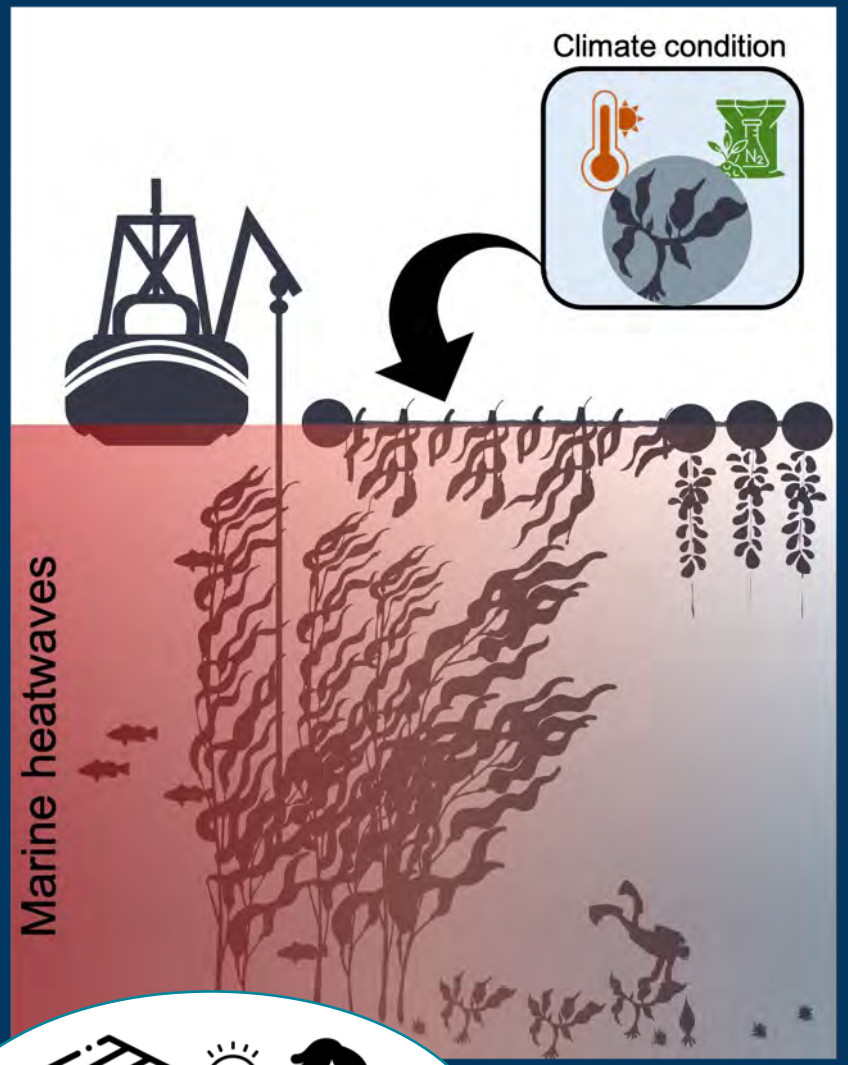


Figure adapted from Bach *et al* 2021 in *Nature*

Kelp farming for renewable, sustainable west coast biochemicals & materials

Climate Training Giant Kelp



Global climate change threatens commercially and ecologically valuable **kelp**.

UCSB venture is developing approaches that 'train' juvenile kelp to withstand marine heatwaves

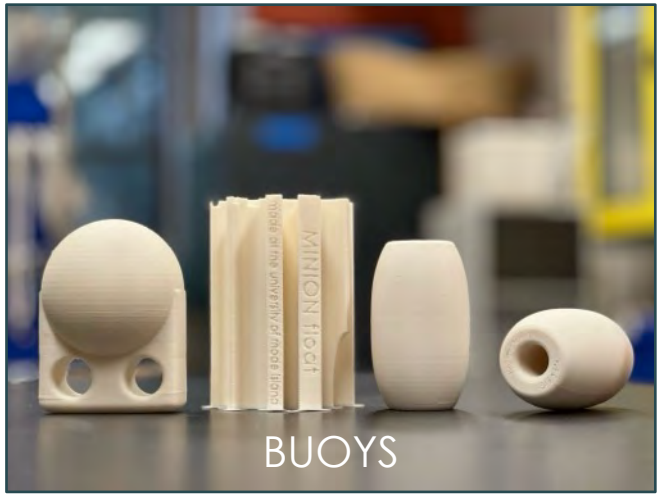
Halley Froehlich
Assistant Professor
Ecology & Marine Science

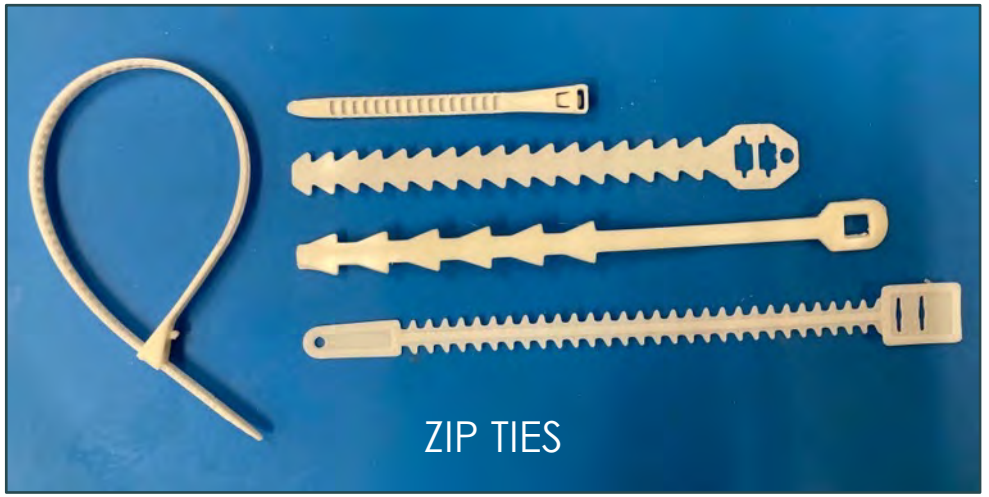
Lauren Smith
Climate Action Innovation Fellow

There may be more plastic than fish in the ocean by 2050

Nereid Biomaterials

Truly ocean-degradable bioplastics for the marine commercial sector.





Alyson Santoro
Associate Professor
Ecology & Marine Science

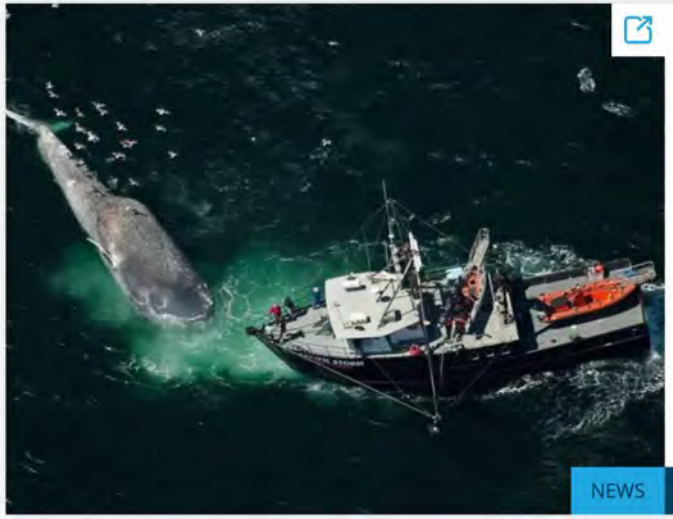
- Verified in-ocean degradation rates
- Complete dissolution of materials, no microplastics
- Consistent material properties with petrochemical plastics

NSF Convergence Accelerator, Phase 2 Awardee

UCSB Centers of Excellence in Marine Conservation and Coastal Resilience

UCOP Climate Action Funding Awardees, 2023-2024

A center for applied marine conservation at the University of California, Santa Barbara

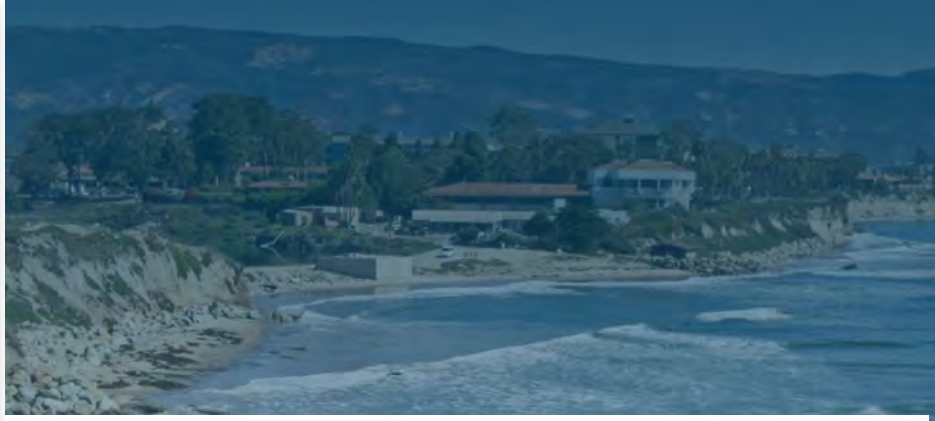


APR 11, 2024 | THE ECONOMIST

New Technology Can Keep Whales Safe From Speeding Ships

Whale Safe

NEWS | Species Conservation



Reduced Risk of Ship Strikes

Providing mariners with near real-time whale data to reduce the likelihood and fatality of ship strikes.

Improved Air Quality

Decreasing emissions and pollutants by encouraging slower vessel speeds along the California coast.

Sequestered Carbon

Protecting whales that sequester carbon, directly in their biomass and indirectly through nutrient cycling.

Photos by Adam Ernster (front); © Doug Croft // Blue Ocean Whale Watch (back)

Environmental Markets Lab (emLab)

Designing climate resilient marine protected areas

Developing fisheries insurance that provides both ecological and economic benefits

Assessing the potential impacts of investment in the blue economy

The BEACH Lab + Sustainable Futures Initiative

A campus-wide effort focused on developing and deploying climate adaptation and resilience solutions that are just, pragmatic, and accountable

Innovation **Entrepreneurship** **Policy** **Markets** **Equity**

~~**1960s:** The **UC Transportation Research Centers** were funded by the state to help California address its most urgent challenge: **Growth.**~~

~~**2020s:** A new generation of **UC Research Centers** could help address California's most urgent challenge for the next 60 years: **Climate Adaptation.**~~

caylor@ucsb.edu

Kelly Caylor, Associate Vice Chancellor for Research

Earth, Environmental, and Sustainability Sciences