

Kerckhoff Marine Lab Newsletter

Winter 2022



2022 Brings a New Chapter to KML

It has been a busy year at the Kerckhoff Marine Laboratory. With new faces and construction, KML continues to evolve as one of the West Coast's longest running marine labs. We are excited for the opportunities ahead at KML.



Director's Note

Greetings and Happy Holidays. I am thrilled to have the opportunity to share our inaugural KML newsletter. As you browse through the pages, I draw your attention to several new and exciting developments at KML, starting with the hiring of our new KML lab manager, Stephen Ranson and the retirement of our beloved longtime KML caretaker Pat Leahy this past spring (featured on pg. 3). While Pat's official duties have ended, he is still very much a part of the KML spirit and we are grateful for his continued insights and engagement with us. Stephen joins us from the Washington Department of Ecology in the Pacific Northwest. His expertise in building marine aquarium systems, his talent and enthusiasm for science and outreach, and his childhood connection to Orange County makes Stephen a wonderful addition to the KML team. I am grateful to have him as my collaboration partner going forward as we revitalize the science, education, and public outreach programming on site.

This past year, we have initiated several new coastal research projects at KML. The project featured on page 4 investigates the microbiology and chemical transformations associated with our local subtidal seagrass species, *Zostera marina*. This represents a multi-institution collaboration between members of my microbial ecology lab at Caltech and ecologist Dr. Amber Stubler (Occidental College) and chemist Dr. Peter Willis (NASA Jet Propulsion Laboratory). We are fortunate to have a dense undersea meadow of *Zostera* right off of the KML dock, where we can employ new chemical assays, DNA sequencing, and microscopy to characterize the diversity and geochemical transformations by microorganisms (bacteria and archaea) living in sediments among the roots (a.k.a the rhizosphere) of *Zostera marina*.

We are also ramping up our efforts to connect with the local community and plan to develop additional hands-on educational opportunities on site. So far, we have involved high school interns, had visits by budding oceanographers in the Ocean Adventure Program, a long running Newport Beach summer camp for kids, given presentations at the Balboa Yacht Club, and an interview about KML for Newport Beach Television (NBTv). If you are interested in future events at KML or would like to support our revitalization efforts, I encourage you to join our mailing list (KML-info@caltech.edu). I'm looking forward to new scientific adventures and continuing to build our KML community in 2023. Enjoy the newsletter!

~ Dr. Victoria Orphan



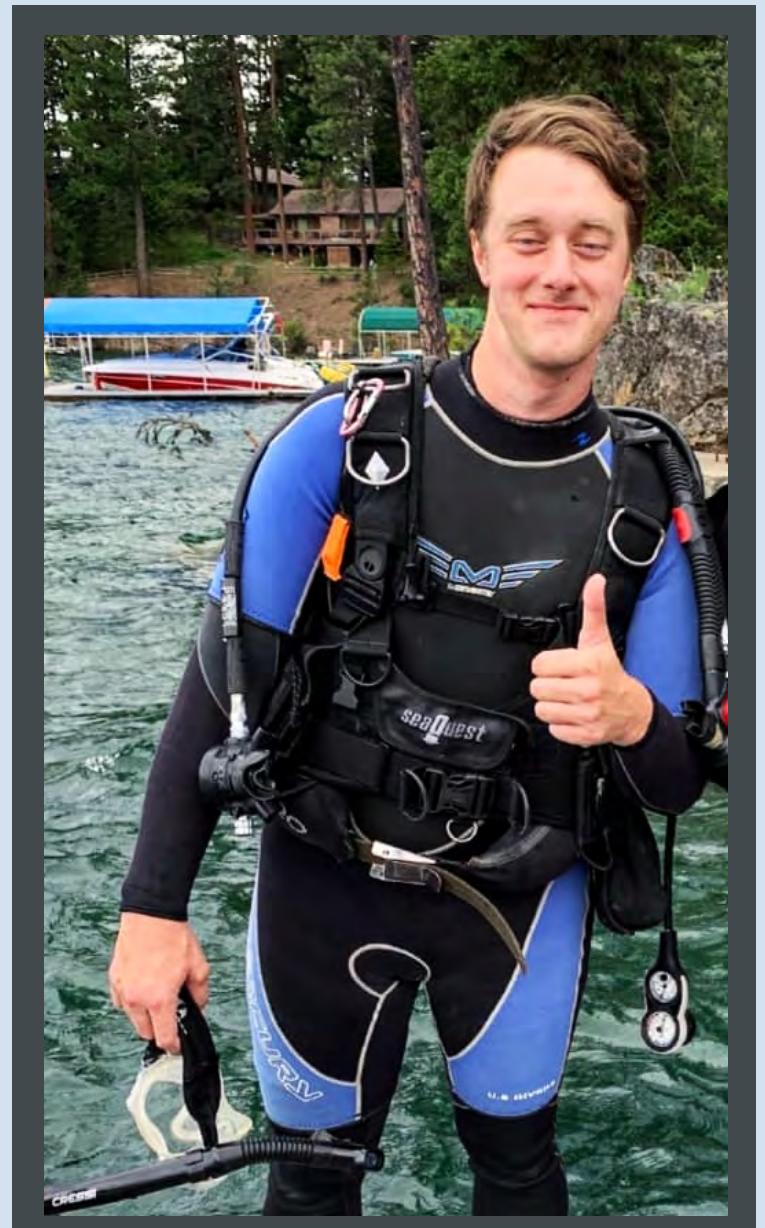
Changing of the guard...

Thank you Pat and welcome Stephen!



Patrick Leahy dedicated the last 45 years to Caltech serving most recently as the KML manager. While in grad school, Pat came upon an article in National Geographic highlighting some of the research of Wheeler North (previous Caltech faculty) and dreamed about the opportunity to work at this West Coast marine lab . A few years later he moved to California and accepted a position at KML which served as a catalyst for an amazing career. Over the decades, Pat served various roles at KML and was an integral part of the Eric Davidson research group efforts focused on the purple sea urchins . We thank Pat for his dedication to Caltech and KML and hope he enjoys retirement to the fullest!

We also would like to welcome our new manager Stephen Ranson! Since finishing grad school, Stephen has been dedicating his career to the marine sciences for the last decade. He worked for the State of Hawaii developing the state's first coral restoration nursery then traveled to the Bahamas, designing and building the world's first commercial coral restoration facility. He then worked in the Pacific Northwest as a state biologist focused on salmonid habitat restoration. Stephen grew up in Southern California and has a strong connection with the local marine environment and is excited to help KML grow and evolve for the years to come. Welcome to Caltech!



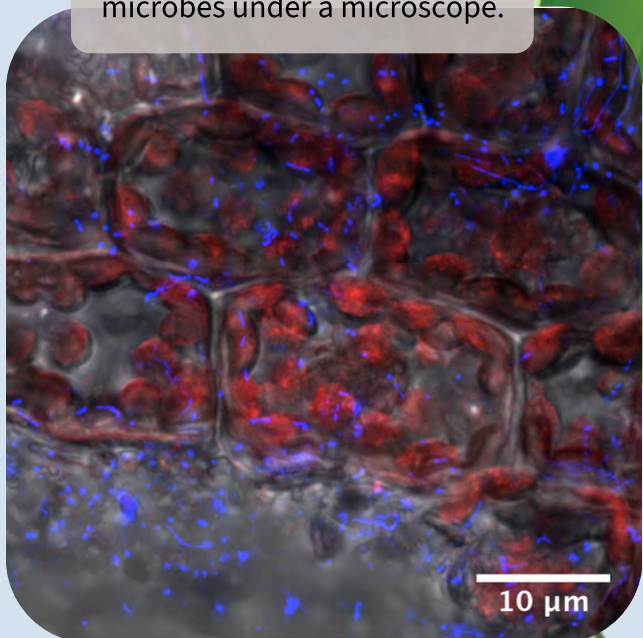
KML Happenings

Microbes and Seagrass

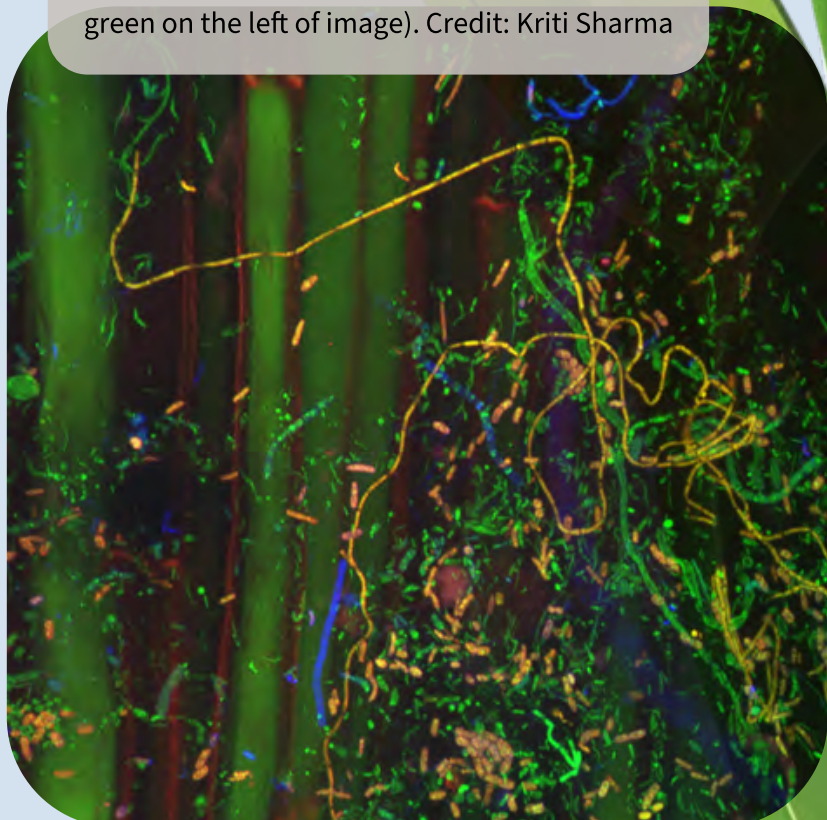


Dr. Amber Stubler (Occidental College) collecting eelgrass in China Cove

Eelgrass plant cells and microbes under a microscope.



Microscopy fluorescence in situ hybridization image of diverse bacteria (stained in orange, red, and green) in close association with a KML seagrass root (large vertical elongate cells in green on the left of image). Credit: Kriti Sharma



Undersea meadows of *Zostera marina*, also known as eelgrass, are prevalent in the Newport Harbor and Back Bay, representing an important coastal ecosystem. As a biodiversity hotspot, these meadows support numerous invertebrates and fish species and provide additional beneficial services through water quality enhancement, sediment stabilization, and contributing to sequestration of carbon through a process known as blue carbon burial. Distinct from seaweed, seagrasses are actually relatives of flowering plants (angiosperms) with an expansive network of roots within the underlying sediments. This root system, or rhizosphere, is densely populated by a diverse microbial community which is poorly understood at present. As with the rhizosphere for plants on land, these microorganisms likely drive important chemical cycling that benefits the plant and also contributes to the balance of carbon that is ultimately stored in the seabed.

We are fortunate to have access to a dense undersea seagrass meadow right off the KML dock, providing new opportunities for Caltech students, postdocs, and collaborators from local Southern California universities and the NASA Jet Propulsion Laboratory. Our goal is to establish a multi-disciplinary long-term monitoring program for our local seagrass using state-of-the-art molecular, imaging, and chemical analyses for understanding this dynamic hidden microbial world and their activities.



KML Director, Dr. Victoria Orphan, and Dr. Shana Goffredi (Occidental College) examining specimens from the eelgrass tanks at KML.

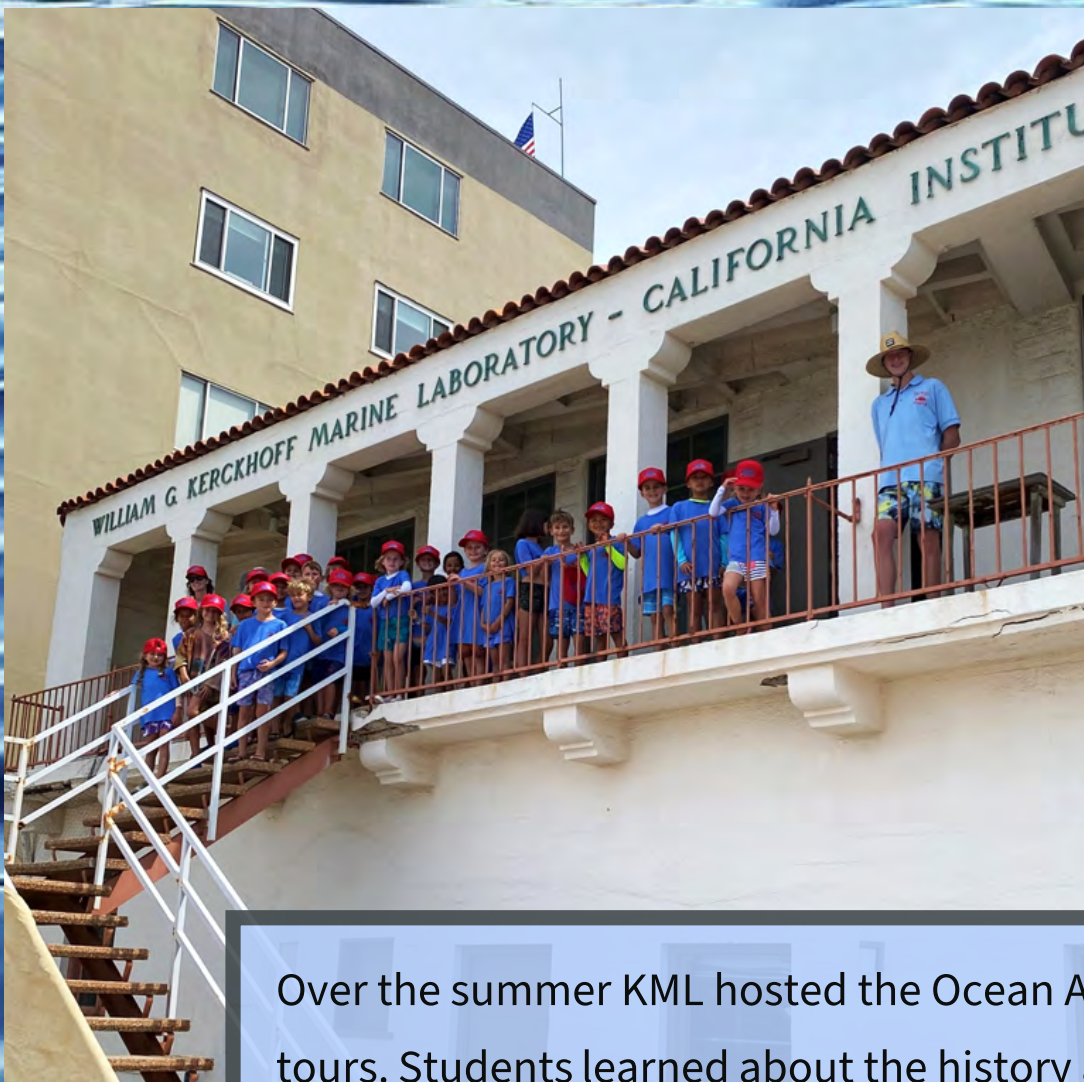


A group of Caltech researchers quickly disassemble cores and separate samples to be taken back to lab for geochemical and biological analyses.

KML Past and Present

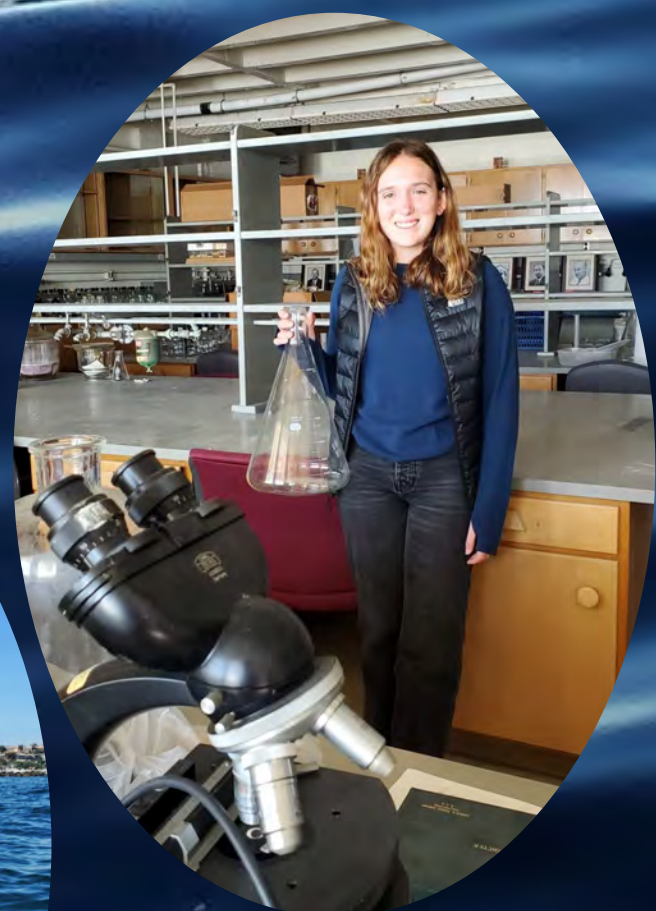


KML Outreach



Over the summer KML hosted the Ocean Adventure Program for laboratory tours. Students learned about the history and ongoing research at KML. The program is based out of the Corona del Mar Community Youth Center and incorporates hands-on learning and field trips for the budding marine biologists of Southern California.

KML has also recently been hosting volunteers. Brooks Ji (seen left) assisted with the daily maintenance required at KML and helped reconfigure our wet lab. Brooks has a strong connection to the local fishing community and hopes to pursue an education in fisheries. Evelyn Kosoff (seen right) has been assisting with lab inventory and maintenance. Evelyn plans to carry out her high school research project on site at KML examining eelgrass growth. We really appreciate our volunteers and look forward to hosting more as the facility continues to grow.



KML History

Thomas Hunt Morgan (1866-1945)

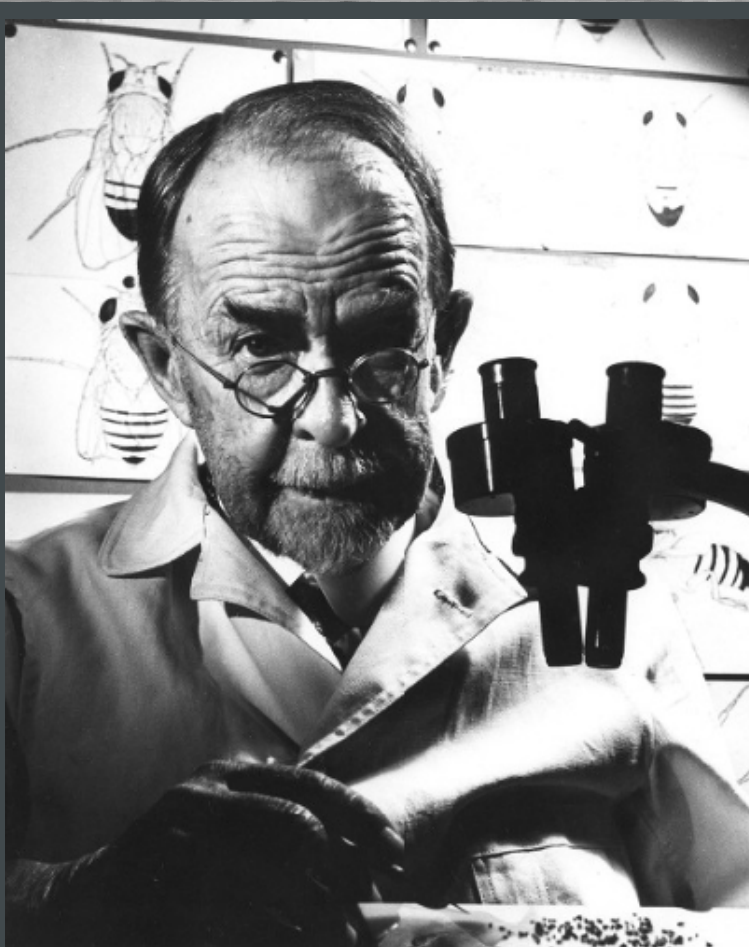
Morgan joined the Caltech faculty in 1928 to found the Division of Biology (now BBE) and served as its first Chair. His work established the fruit fly *Drosophila* as the primary model organism for studies of genetics and heredity. Moreover, based on his studies with *Drosophila*, Morgan proposed a theory of linear arrangement of genes in chromosomes, and he showed that genes are how traits are passed between generations. His work underlies modern genetics. In addition to his work in genetics and heredity, Morgan was extremely interested in experimental embryology. He earned a PhD from Johns Hopkins in 1890, but much of his graduate work took place at the Marine Biological Laboratory at Woods Hole, where he studied the embryology of sea spiders (Pycnogonids).

His interest in marine science and experience at Woods Hole and the Stazione Zoologica in Naples, Italy (where he spent 1894 and several subsequent summers) influenced his desire to establish a marine laboratory at Caltech. When the Balboa Palisades Club boathouse came on the market after the stock market crash in 1929, Noyes and Morgan purchased it for the Institute with funds given by the industrialist William G. Kerckhoff, and the Kerckhoff Marine Laboratory was born.

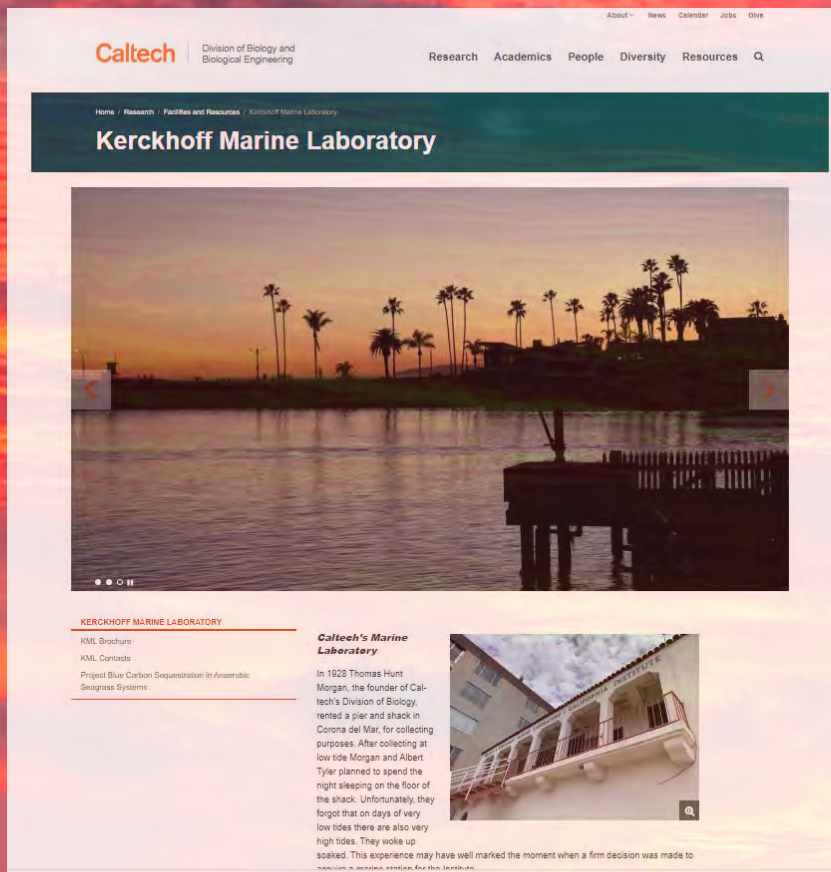
Morgan moved to Caltech in 1928, established KML in 1930, and in 1933 was awarded the Nobel Prize in Physiology or Medicine, "for his discoveries concerning the role played by the chromosome in heredity", the first of several Nobel Prizes to people working at Kerckhoff Marine Laboratory.

Seen left: Thomas Hunt Morgan in lab, date estimated 1945.

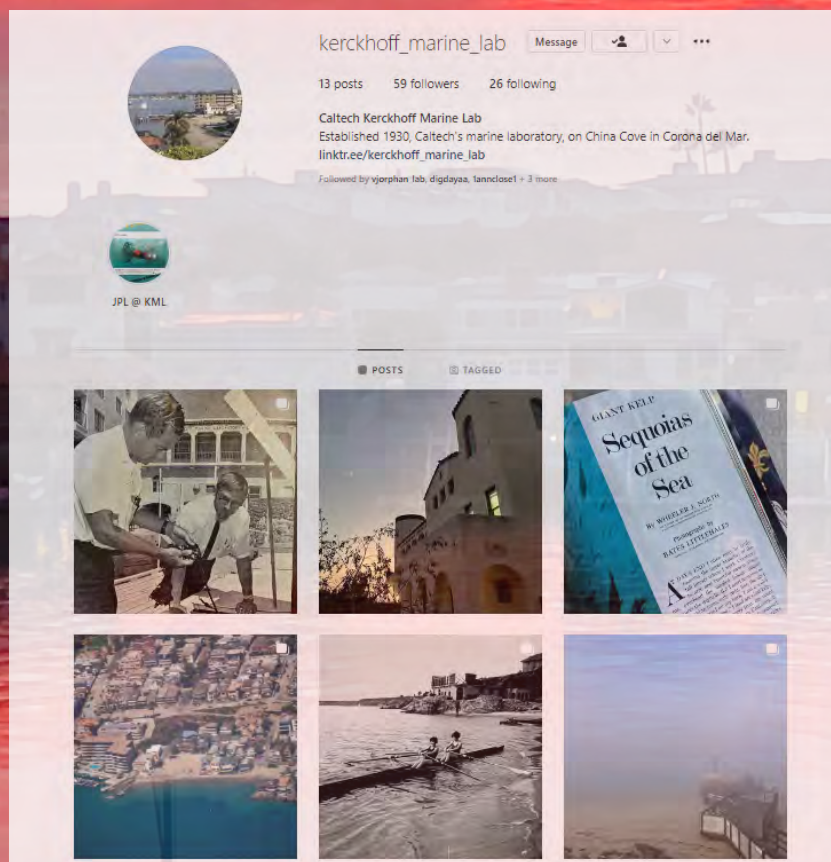
Seen right: Thomas Hunt Morgan and group at Kerckhoff Marine Laboratory, 1930s.



For More Info



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<https://kml.caltech.edu>



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For inquiries about how to access or support
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