

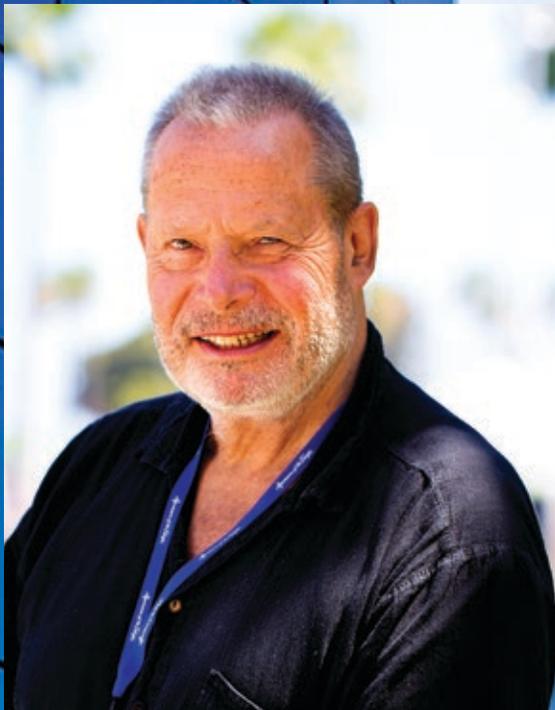
PACIFIC
Currents

Aquarium of the Pacific

FALL 2020

B I O L U M I N E S C E N C E
I N T H E O C E A N





ANDREW BETSINA

Dr. Peter Kareiva has presented lectures at the Aquarium, served on the science advisory panel for Pacific Visions, and was the Aquarium's 2017 Ocean Conservation Award honoree.

Dr. Peter Kareiva Joins Aquarium as New President and CEO

THE AQUARIUM WELCOMED DR. PETER KAREIVA as its new president and CEO on August 1, 2020. Dr. Jerry R. Schubel retired from the position on July 31, 2020.

Dr. Kareiva comes to the Aquarium from his position as director of the Institute of the Environment and Sustainability at UCLA. Prior to UCLA, Dr. Kareiva led a research group at the Northwest Fisheries Science Center in the National Oceanic and Atmospheric Administration, served as the vice president of science for The Nature Conservancy, and taught at several universities, including Brown University, University of Washington, Stanford University, and the Swedish University of Agricultural Sciences.

He holds a bachelor's degree in zoology from Duke University and a Ph.D. in ecology and evolutionary biology from Cornell University. His awards and appointments include a Guggenheim Fellowship, a Fellow of the American Academy of Arts and Sciences, and the Aquarium's Ocean Conservation Award. He is also a member of the National Academy of Sciences.

Previously Dr. Kareiva served as director of the Institute of the Environment and Sustainability at UCLA and vice president of science at The Nature Conservancy.

Dr. Kareiva has authored three books and over 200 research articles. His eclectic research has touched on everything from genetically engineered microbes, to wildebeest, to evidence of racism in conservation's origins. Projects in Mongolia, Argentina, and China convinced Dr. Kareiva that taking care of people and economic development are essential for conservation. Consequently, he has increasingly focused on K through 12 education, collaboration with corporations, and partnerships with social justice groups. He sees all of these as key to meeting the climate crisis in a fair and equitable way.

Dr. Kareiva's connection with the ocean started when he was a teenager in North Carolina, where he speared flounder, foraged for oysters, and worked on a fishing boat. He later spent a semester at Duke University Marine Lab and served as a technician on an oceanographic research vessel.

While computer modeling took over much of his research life, Dr. Kareiva never lost his love for our oceans. He was drawn to the Aquarium out of concern for the future of marine ecosystems and a conviction that environmental policies will thrive only if they are rooted in personal connections between people and nature. "The future of the world depends on the future of the ocean, and there is no better place than the Aquarium of the Pacific to help make sure that future is vibrant," he said.

Letter from the CEO

Dear Members,



YES, THAT IS A DIFFERENT FACE looking out at you than the fellow you have come to love over the last eighteen years. Sometimes clichés are exactly the right thing to say: **There is only one Jerry Schubel.**

I am eager to meet with you, even if it is only in a Zoom chat room. In the meantime, I want to share how the Aquarium is making the best of the pandemic shutdown and staying connected to the world of ocean-lovers and ocean-learners.

First, we will be elevating our Aquatic Academy and Guest Speaker Series by seeking thought-leaders who may have been unlikely speakers under normal circumstances because travel was an obstacle. In a virtual world what was once a two-day commitment for a speaker traveling from Boston is now only a two-hour commitment. We also intend to use our virtual platform to highlight diverse new voices and young innovators. The Fall Aquatic Academy class will be called *COVID Exposed: The Lessons We Need to Learn*. And with your support, we can make the lecture series more dynamic and diverse than ever before.

All of us are tired of the pandemic. All of us wonder when will it end. Some have suffered painful losses. Some are struggling with depression. Sense of community, connections to nature, and creative collaborations are well-known antidotes to depression. They will be what gets the world out of COVID. And they are what will save our oceans and the species that make the ocean their home. Most importantly, they are what the Aquarium will continue to provide as best we can. You can still visit the exhibits in our outdoor areas and imagine yourself as a shark (speaking for myself) or be amused by our quirky penguins. You can contribute by volunteering. Now, more than ever, philanthropy is needed. And by participating in our courses, festivals, and special days—even if virtually—you can help us strengthen the Aquarium community and the sense that we are all in this together.

COVID will push nations to improve their public health systems. But keep in mind, there is no such thing as long-term human health without healthy oceans and without turning down the planet's thermostat. Even if all of the world's nations meet the official commitments they have made for reducing greenhouse gas emissions, as much as 40 percent of our oceans' fish will be left in water too hot for their young to survive. And, sadly, none of the nations are on track to meet their rather meek commitments, much less what is really necessary. It is time to do more.

With your help and advice, I hope we can do a lot more than survive these COVID times. I hope we can embolden our city, our state, our nation, and the world to take steps, even risky or uncertain steps, toward a cooler climate future and a vibrant ocean future. This requires innovation and community action, and the Aquarium is all about new ideas and the nexus of community, people, and nature.

Please help us do our best—it matters.

Sincerely,

Peter Kareiva

Cover: Anglerfish
© WOODS HOLE OCEANOGRAPHIC INSTITUTION, L. MADIN



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Pacific Currents is published for members of the Aquarium of the Pacific. Please send your comments to our editorial staff at pacificcurrents@lbaop.org.

Our Mission: To instill a sense of wonder, respect, and stewardship for the Pacific Ocean, its inhabitants, and ecosystems.

Our Vision: To create an aquarium dedicated to conserving and building natural capital (nature and nature's services) by building social capital (the interactions between and among peoples).

Pacific Currents Staff: Editor/Writer: Claire Atkinson | Copy editor: Cecile Fisher | Designer: Andrew Reitsma | Contributing photographer: Robin Riggs | Proofreader: Alyssa Pacaut.

Aquarium Hours: Open daily from 9:00 a.m.–6:00 p.m. except December 25.

Membership Office Hours: 8:00 a.m.–5:30 p.m. daily

Phone Numbers (562 area code):

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Development..... 951-1605

Lost & Found..... 951-1733
Private Event Info..... 951-1663
Gift Store..... 951-1SEA (1732)



The Aquarium of the Pacific is a non-profit 501(c)3 institution. To provide exciting and innovative exhibits and educational programs, we rely heavily on the generous donations of individuals, foundations, and corporations.



Harbor Seal Shelby Returns to Main Seal and Sea Lion Habitat

Visit Shelby at the amphitheater overlooking the Seals and Sea Lions Habitat.

IN JULY Shelby the harbor seal was moved back into the main exhibit area in the Seals and Sea Lions Habitat for the first time since before her eye surgery in January. The surgery, which removed cataracts in her eyes, restored her vision to the extent that she can now participate in more husbandry behaviors and visually navigate her surroundings. Previously, Shelby was totally blind.

During this time, Shelby's pup Kaya, now 2 years old, moved behind the scenes to receive a regular medical exam and one-on-one training. She was joined by her father, Troy.



ROBIN RIGGS

Surgery restored Shelby's vision, allowing her to participate in husbandry behaviors and better navigate her surroundings.



ROBIN RIGGS

Millie is learning behaviors, including responding to a target pole and stationing, or sitting calmly.

Millie the Sea Otter Acclimates to Her New Home

Millie, age 4, is the Aquarium's youngest otter.

IN JUNE the Aquarium's husbandry staff moved all five of the southern sea otters into the Sea Otter Habitat together, a first since the addition of Millie, who came to the Aquarium early this year.

Millie was first introduced to the two older sea otters, Ollie and Maggie. The three got to know each other in the main exhibit for about three months. Next, Millie was introduced to otters Betty and Chloe through the gate separating the main exhibit from a smaller behind-the-scenes area. The three otters acclimated to each other for about two days before the gate was opened.

Millie, now the youngest otter in the group at 4 years old, is making progress in training on husbandry behaviors that allow staff members to safely interact with and monitor the health of the otters. The mammalogists that care for the sea otters are focusing on teaching Millie stationing, or sitting calmly in front of animal caregiver. They are also working with her to respond to a target pole, which enables a staff member to get Millie's attention and guide her around the exhibit.



ROBIN RIGGS

Silver sweepers can grow up to 6 inches long and form schools around reefs.

Exhibits Highlight Similar Habitats Across the Globe

The displays represent kelp forest habitats from Southern California and Australia.

THE AQUARIUM recently converted the exhibits previously known as Pacific Seahorses and Kelp Camouflage in the Southern California/Baja Gallery into exhibits representing kelp forest habitats in both Southern California and Southern Australia.

The Aquarium's weedy seadragons were moved from the Tropical Pacific Gallery upstairs into the Southern Australia Kelp Forest exhibit. These four young seadragons were raised in an aquaculture setting in Southern Australia and are approximately one year old. The exhibit also features pot-bellied seahorses, which are found in the same habitat in the wild.

The Southern California Kelp Forest exhibit is home to several animals found in local kelp forests, including sponges, anemones, sea cucumbers, surfperch, three species of kelpfish, sea stars, and algae.

These two exhibits allow visitors to compare and contrast the flora and fauna found in these two similar marine habitats around the world.

***Sula* the red-footed booby has been practicing free flight inside the Aquarium's Tropical Tunnel.**

To see a video, scan the QR code with your phone camera or visit pacific.to/flysula.



New Fish Added to Coral Restoration Exhibit

Silver sweepers are now in the Tropical Pacific Gallery.

IN JUNE the Aquarium introduced a species of small fish called silver sweepers (*Pempheris schwenkii*) to the Coral Restoration exhibit in the Tropical Pacific Gallery.

Native to the western Pacific Ocean, silver sweepers form tight schools in and around reefs or hide in caves by day. At night they float high above the bottom to hunt for zooplankton. They can grow up to nearly 6 inches (15 centimeters) long.



ROBIN RIGGS

The Aquarium's weedy seadragons are now in the Southern California/Baja Gallery.



ROBIN RIGGS

BIO-LUMINESCENCE

I N T H E O C E A N



AS SOUTHERN CALIFORNIANS were acclimating to safer-at-home orders in April and May 2020, nighttime waves along the coast put on a show, with brilliant blue-green bioluminescence on display from the Los Angeles area to Baja California, Mexico. The red tide that caused the glowing waves lasted more than a month and was perhaps the largest on record. Viral videos of dolphins trailing the bright blue glow and spectacular crashing blue waves made international news.

WHAT IS BIOLUMINESCENCE?

Bioluminescence refers to the ability of organisms like plants and animals to create their own light. Bioluminescence in the ocean is a widespread phenomenon, with 80 percent of animals living in the mesopelagic zone (between 650 and 3,200 feet deep), also known as the Twilight Zone, exhibiting bioluminescence.

SPRING 2020 RED TIDE

The bioluminescent waves seen this spring were caused by a red tide, an amassing of billions of microscopic algae called dinoflagellates. Like plants, they harvest energy from the sun during the day at the surface of the water. The red color in the water comes from the dinoflagellates' color.

At night, when the waves, the wake from boats, or even swimmers and surfers disturb the dinoflagellates, it causes a chemical reaction inside them that produces light. These tiny organisms use bioluminescence to distract and startle predators.

Red tides occur as a response to changing conditions. Because they require sunlight and nutrients, red tides thrive during seasons with longer days and warmer temperatures. Excess nutrients that feed a red tide are pulled to the surface when windy conditions stir them up from the deeper ocean or when they run off the land. Because ocean and weather conditions are constantly changing, a large plankton bloom like a red tide usually only lasts a matter of weeks.

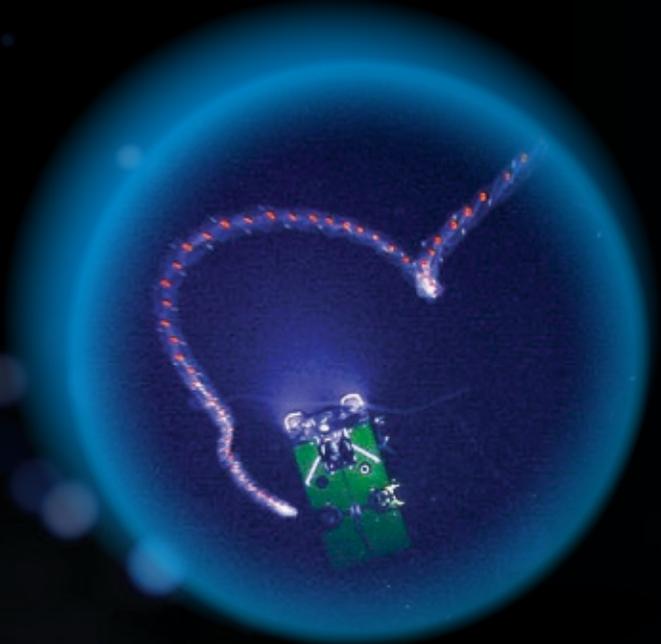
As the dinoflagellates die off after several weeks or a few months, their bodies decay and use up oxygen in the water, which can lead to other animals in the ocean dying off—and a nasty smell in the air. After this spring's red tide, the foul odors made local news across the Southland.

GLOWING MARINE LIFE

Many types of animals in the ocean produce bioluminescence, from bacteria and algae to sea jellies, worms, crustaceans, fish, and sharks. The most common color of bioluminescence in the ocean is blue, which is more easily visible underwater. Other colors' wavelengths cannot penetrate the water as deeply.

BIOLUMINESCENCE IN THE DEEP SEA

Bioluminescence is especially important in the deep sea, where little to no sunlight penetrates and up to 75 percent of animals produce their own light. Some use bioluminescence as a defense, like brittle stars and sea jellies. These animals can lose one of their arms and still survive, so the strategy they use is to drop a glowing arm and hope that the predator follows and eats the arm, allowing the animal to escape.



Images: Glowing waves: iStock.com/ianmcdonnell. Bobtail squid: iStock.com/David_Slater. Anglerfish: New Zealand-American Submarine Ring of Fire 2005 Exploration; NOAA Vents Program. Atlantic silver hatchetfish: SEFSC Pascagoula Laboratory; Collection of Brandi Noble, NOAA/NMFS/SEFSC. Right: Bioluminescent chained salps drift far above the Hercules ROV: IFE, URI-IAO, UW, Lost City Science Party; NOAA/OAR/OER; The Lost City 2005 Expedition. Bioluminescent plankton: iStock.com/PaweIG Photo.



Anglerfish use their bioluminescent lure attached to the long spine on their head to attract prey or a mate. Image: © Woods Hole Oceanographic Institution, L. Madin.

Hatchetfish and bobtail squid use bioluminescence as a way to blend in with their surroundings. The light organs on their bellies allow them to blend in with the lighter ocean surface above, so that a predator swimming below them has a harder time spotting them against the sun or moonlight.

Other deep-sea animals use bioluminescence to hunt their prey. The most commonly known fish to use this strategy is the anglerfish, which dangles a lure lit by glowing bacteria. This modified fin spine, called an esca, works like a built-in fishing rod to attract smaller fish as prey. Scientists also believe anglerfish use the lure to attract or communicate with potential mates.

FLUORESCENCE

Fluorescence also makes some marine life appear to glow in bright colors, but the phenomenon works differently than bioluminescence. Fluorescent plants or animals absorb a stimulating light like sunlight and re-emit it. This does not

involve a chemical reaction, like bioluminescence does, and the glow is only visible when the stimulating light is present.



The Aquarium's Glowing Reef exhibit features fluorescent and bioluminescent animals. Image: Robin Riggs

Some corals absorb blue and ultra-violet light and then emit fluorescent light. Scientists theorize that this effect might work like sunscreen to protect the delicate corals in shallow waters from intense tropical sunlight. This effect can be seen at the Aquarium at the Glowing Reef exhibit in the Tropical Pacific Gallery.

FLASHLIGHT FISH

Fluorescent corals and bioluminescent flashlight fish are featured in Glowing Reef, part of the *Coral Reefs: Nature's Underwater Cities* exhibit.

Flashlight fish live around coral reefs, often in groups of up to fifty. They spend time in coral caves, shipwrecks, and artificial reefs at depths of 590 to 1,300 feet (180 to 400 meters) during the day, then migrate to the surface to feed at night. This is called vertical migration. There are five species of flashlight fish throughout the Indo-Pacific region and the Caribbean, but they are most commonly found in the East Indies.

Flashlight fish are generally dark in color with large eyes that help them see in the dark. Most are small, averaging about 6 inches (15 centimeters) long. They have pouches under their eyes that contain bioluminescent bacteria. They can roll the pouches back to cover up the light source, allowing them to turn the light on and off like a flashlight.

There are a few theories about flashlight fish and how they use their lights. Scientists say the lights may help the fish communicate and form schools. They could also be used to help them see where they're going or to see their food while they hunt. Also, the flashlight fish might use their lights to confuse predators by swimming in one direction with their light on, then turning it off and swimming the other way.

RESEARCH AT THE AQUARIUM

In 2014 when she was 13 years old, Aquarium volunteer Caroline Edwards decided to focus her school science project on flashlight fish and study the frequency of their blinking lights. She recorded ninety-four five-minute videos of the flashlight fish exhibit to study activity during feeding, cleaning, sleeping, and various times of the day. Her study showed that the flashlight fish blinked more rapidly during feedings.

Recently scientists were able to confirm Edwards' findings with research that discovered that flashlight fish may be using their light organs to help in feeding. Their study showed that the light organs were open or "turned on" 90 percent of the time during feeding and appeared to be triggered by the presence of food.

PROTECTING OCEAN BIODIVERSITY

Bioluminescent animals are an example of the incredible biodiversity that can be found in the ocean. Scientists continue to make new discoveries about how bioluminescence evolved among marine species. Plus, much of the deep ocean remains unexplored. For these and many other reasons, it is important that we continue to conserve ocean ecosystems and habitats to protect marine life for future generations.

Images: Kelp canopy: iStock.com/Tammy616. Sharks swimming over reef: Ken Kurtis. Hawaiian bobtail squid: iStock/David_Slater. Flashlight fish: Andrew Reitsma. Anglerfish: © Woods Hole Oceanographic Institution, L. Madin.

SUNLIGHT ZONE

0 to 656 feet
(0 to 200 meters)

Most marine plants and animals live in these waters.

TWILIGHT ZONE

656 to 3,280 feet
(200 to 1,000 meters)

Sunlight is too dim for photosynthesis; most animals at this depth use bioluminescence.

MIDNIGHT ZONE

3,280 feet
(1,000 meters) or more

No sunlight penetrates the water at this depth.

* Member Events

Please join us for these select events just for our members and donors.

Member Month

■ Entire Month of November

Your membership support has always meant a lot, but we are extra thankful this year. That is why we are taking the entire month of November to show our appreciation and celebrate YOU, our loyal and dedicated members. Get ready for a month-long celebration full of fun.

Member Night

■ Thursday, November 12 6:30 P.M.-9:00 P.M.

Join us for an evening at the Aquarium for members only! You'll enjoy time with your favorite animal friends in one of your favorite places.

- Free for members (reservations required)
- Call (562) 437-3474 to reserve



ROBIN HIGGS

* Special Events

The Aquarium of the Pacific hosts a variety of performances, fundraisers, and other special events throughout the year. Check our website for more details and additional events.



HEATHER LENNON

Photographers Night

■ Sunday, October 4 5:30 P.M.-10:00 P.M.

This is your chance to take the photos you have always wanted at the Aquarium. Professional and amateur photographers are invited to capture the Aquarium's wildlife during exclusive "photographers only" hours.

- \$31.95 for members, \$34.95 for non-members
- Reservations required.

Seniors Day

■ Monday, October 5 8:00 A.M.-11:00 A.M.

The Aquarium will open its doors for free to people ages fifty and above.

- FREE to visitors ages 50 and over with a valid photo ID.
- Reservations required.

Sea Fare

■ Saturday, October 17 7:00 P.M.

Join us for the Aquarium of the Pacific's first-ever virtual Sea Fare fundraiser. Help the Aquarium recover and grow from the impact of COVID-19 by supporting the ongoing care of the 12,000 animals that call the Aquarium home. Proceeds will benefit the Aquarium Recovery Fund.

Scout Day

■ Sunday, November 1 9:00 A.M.-5:00 P.M.

Cub Scouts and Girl Scouts are invited to complete steps toward badges, utilizing self-led activity sheets that are specifically designed for scouts.

- Members: Free with reservation. Non-members: \$24.95 per adult, \$19.95 per child; must be reserved in advance on the Aquarium website.

Virtual NOAA and Our Planet Day

■ Saturday, November 7 10:00 A.M.-2:00 P.M.

Through this virtual event, streamed live at aquariumofpacific.org, find out what the National Oceanic and Atmospheric Administration (NOAA) does for you, our nation, and our world. Learn how NOAA, a government agency, works to understand and predict changes in Earth's environment to help protect people and property and to conserve and manage coastal and marine resources.

Please note that all events listed are subject to change pending health directives. Events may be canceled or modified or become virtual to accommodate the changing circumstances. Please check the Events page at aquariumofpacific.org or call (562) 590-3100 for the latest information.

Autism Families Night

■ **Sunday, November 8**
6:00 P.M.–9:00 P.M.

Spend a special evening at the Aquarium exclusively for families with adults or children with autism. The entire Aquarium, except Lorikeet Forest, will be open until 9:00 p.m. On this evening, guests can enjoy the tranquility of the Aquarium’s exhibits and meet 12,000 animals from the world’s largest ocean.

- Free for members, \$7 for non-members
- Reservations required.

Veterans Day

■ **Wednesday, November 11**
9:00 A.M.–6:00 P.M.

In celebration of Veterans Day, the Aquarium of the Pacific honors veterans and military personnel. They are invited to enjoy the Aquarium with free admission on Veterans Day.

- Free for veterans and military personnel with service I.D.
- Reservations required.

Aquarium Holidays

■ **December 5-23**
9:00 A.M.–6:00 P.M.

Throughout the month of December, the Aquarium will be decorated for the holidays, including inside the animal exhibits. Holiday-themed activities for kids and families will be featured. Visit aquariumofpacific.org/events for more details.

Aquarium Closed

■ **Friday, December 25**

* Festivals

Experience our community’s diverse cultures and their connections to the ocean and environment. Virtual festivals stream live at aquariumofpacific.org. Plus, celebrate holidays at the Aquarium.

Southeast Asia Day

■ **Saturday, October 10**
10:00 A.M.–3:00 P.M.

The Aquarium will celebrate its annual Southeast Asia Day virtually, highlighting the beauty and diversity of the cultures of Cambodia, Thailand, Vietnam, Myanmar, Laos, and Indonesia. Enjoy live performances, including music, dance, and cultural craft demonstrations.

Scarium of the Pacific

■ **Sat. & Sun., October 24-25**
9:00 A.M.–5:00 P.M.

Discover the creatures lurking in the depths at the Aquarium of the Pacific’s twenty-first annual Scarium of the Pacific—a fun and educational Halloween event for the whole family. Enjoy special Halloween programs, including the annual children’s costume contest and spooky decor.

- Reservations required.

Autumn Festival

■ **Saturday, November 14**
10:00 A.M.–3:00 P.M.

Virtually delve into the arts, cultures, and marine environments of Asia during the Aquarium of the Pacific’s annual Autumn Festival. This event highlights the traditions and cultures of Japan, China, Korea, and the Philippines through a day of learning opportunities and family entertainment celebrating the rich diversity of Asian and Asian-American cultures.

Holiday Treats for the Animals

■ **Saturday, December 5**
10:00 A.M.–3:00 P.M.

In celebration of the holiday season, Santa Diver will be delivering an ocean of gifts to the Aquarium of the Pacific for its animals, including penguins, sea otters, seals, sea lions, lorikeets, and fish. The Aquarium will also be decorated for the holidays and offer holiday shopping opportunities.

- Reservations required.



MADELINE WALDEN

For tickets and information, visit aquariumofpacific.org or call (562) 590-3100, ext. 0.

* Guest Speakers

Lectures are streamed on the Aquarium's website. Visit aquariumofpacific.org/news/lectures.

GRUNION GAZETTE
www.thegrunion.com

COURTYARD
BY MARRIOTT
LONG BEACH DOWNTOWN

New Series: Exploring Sustainable Seafood

■ Seafood for the Future will host this virtual panel series online this fall.

Choosing and supporting policies and practices that promote responsible seafood can have significant environmental and health benefits. But for many, finding and navigating through the sometimes conflicting information can be challenging. Overfishing and other harmful fishing practices, escapes and diseases from farmed seafood, and poor regulation of some seafood sources are just some of the many concerns that consumers face when choosing responsible seafood. All of these issues are important, but do they tell the whole story of seafood and the choices that are available?

This fall the Aquarium's Seafood for the Future (SFF) program will host a special virtual panel series to explore sustainable seafood. The series will feature scientists and experts who will discuss the big picture of sustainable seafood and its role in and relationship with climate change, nutrition, livelihoods, policy, society, and more. Panelists will also explore responsible seafood farming, or marine aquaculture, as a tool to sustainably expand our seafood supply.

The series will be pre-recorded. SFF will host a live Q&A session at the end of the series.



A farmer tends to mussels at Santa Barbara Mariculture in California.

SANTA BARBARA MARICULTURE

Video Release Dates

Dates and topics are subject to change. Please visit aquariumofpacific.org/news/lectures for up-to-date information and speakers.

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|---|--|
| <p>October 13 <i>Sustainable Seafood: The Head, the Tail, and the Whole Darn Story</i></p> <p>October 15 <i>Feeding the World in a Changing Climate: Is Seafood the Answer?</i></p> <p>October 20 <i>Seafood Farming and Climate Change: Friend or Foe?</i></p> <p>October 22 <i>Location, Location, Location! Can Location Choices Prevent Seafood Farming Catastrophes?</i></p> <p>October 27 <i>Will U.S. Regulations Prevent a Seafood Farming Apocalypse?</i></p> | <p>October 29 <i>Farmed Versus Wild: Will Farmed Seafood Push Fishers out of Business?</i></p> <p>November 3 <i>Not in My Backyard! How Communities Impact the Future of Seafood Farming</i></p> <p>November 5 <i>Seafood Farming: Not Just for Salt Water</i></p> <p>November 10 <i>How Science and Innovation are Improving Seafood Farming</i></p> <p>November 12 <i>Who's Responsible for Putting the 'Sustainable' in Sustainable Seafood?</i></p> <p>November 19 <i>Live Q&A</i></p> |
|---|--|

Visit our website for new lectures added throughout the fall.

Hazel Wong | *Dispelling Conservation Myths About Communities of Color*

■ **October 8**
7:00 P.M.–8:00 P.M.

Hazel Wong from The Nature Conservancy will contrast the voting patterns of communities of color versus white communities when it comes to environmental issues. She will then ask, why despite our planet’s climate and biodiversity crisis, the environment still has negligible influence on election outcomes.

Jon Gertner | *Ice at the End of the World*

■ **October 15**
7:00 P.M.–8:00 P.M.

Journalist and historian Jon Gertner will discuss his book, *Ice at the End of the World: An Epic Journey into Greenland’s Buried Past and Our Perilous Future*. The book provides an account of the explorers and scientists working to understand the rapidly melting ice sheet in Greenland, a dramatic harbinger of climate change.

Beth Firchau & Chris Corpus | *Florida Coral Rescue: A Great Adventure Story*

■ **October 22**
7:00 P.M.–8:00 P.M.

Beth Firchau, the Association of Zoos and Aquarium’s Florida Reef Tract Rescue Project coordinator, and others from her team including Dallas Zoo Conservation Programs Manager Chris Corpus will share the story of rescuing corals in Florida. The story is being written by scientists, field biologists, and public aquariums across the country. It features exotic places, a cunning villain, a host of colorful characters, and heroes: a team working together to save the day.

Mark Walton & Michelle Marvier | *The Future of GMO Salmon*

■ **November 19**
7:00 P.M.–8:00 P.M.

In the future will genetically engineered farmed salmon be the most sustainable and healthy “meat” you can buy at your

supermarket? Mark Walton, chief technology officer for AquaBounty Technologies Inc., will discuss this question, followed by a conversation with biologist and environmental risk assessment expert, Professor Michelle Marvier of Santa Clara University.

Peter Kareiva | *A Bridge to the Future: People Rediscovering Their Connection to Nature*

■ **December 15**
7:00 P.M.–8:30 P.M.

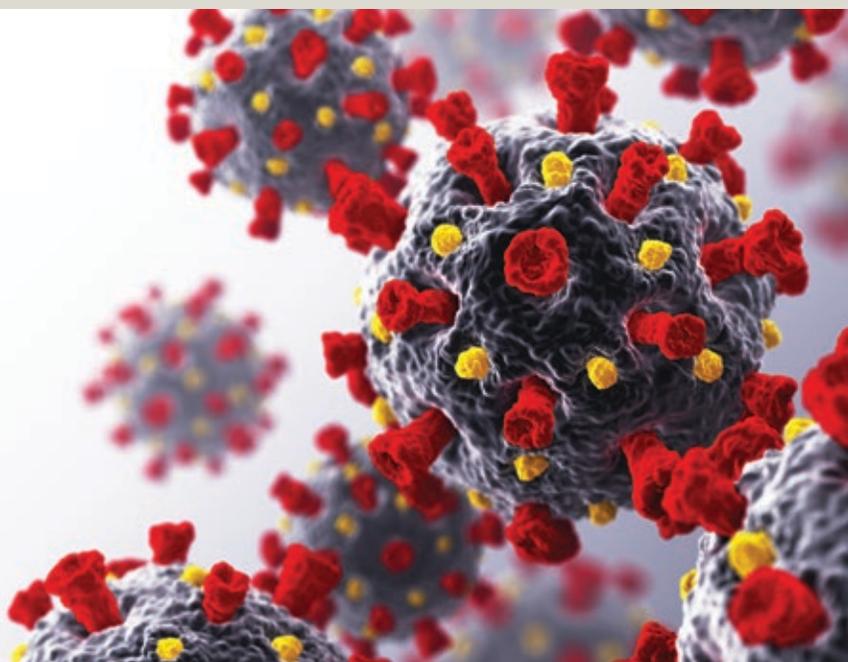
Aquarium President and CEO Dr. Peter Kareiva will examine the climate and social crises we face and potential interventions. He will argue that our failure to get beyond the environmental tropes of the 1960s is hindering our ability to bridge to a vibrant and sustainable future. According to Dr. Kareiva, the key is a melding of science’s commitment to data and evidence with who we are as a species and the realization that it is “all hands on deck” in the next few years—or else “the deck” will be at the bottom of the ocean with no survivors.

AQUATIC ACADEMY COURSE
COVID-19

WEDNESDAY EVENINGS
November 4 – December 9
7:00 p.m.–8:30 p.m.

**COVID Exposed:
The Lessons We
Need to Learn**

The Aquarium will host a five-week virtual course on the COVID-19 global pandemic. Sessions will cover the public health response around the world, intersections with social justice and healthcare discrimination, how officials and the media have communicated information to the public, and what the future may look like regarding a vaccine. Speakers will also address the impacts on education, the economy, travel, and more.



Visit aquariumofpacific.org/events/info/aquatic_academy for details.





Copper the green sea turtle is a new resident of the Aquarium's Tropical Reef Habitat. He was added to the exhibit for the opening of *Coral Reefs: Nature's Underwater Cities*.

*Aquarium
of the Pacific*



ADD-ON EXPERIENCES

Online Learning Resources

The Aquarium offers a library of free virtual resources to engage Aquarium members from home. Check out the following opportunities to connect with the Aquarium.

Children's Classes

Tune in to the Aquarium Online Academy for live and interactive programming for kids of all ages. Visit aquariumofpacific.org/news/aquariumacademy for current scheduling. In addition to live programming, the Aquarium Online Academy offers a large library of pre-recorded sessions on the Aquarium's YouTube channel.

- Grades PreK-12



The Pacific Pals Show

After creating nearly forty episodes of *The Daily Bubble* from home, the Pacific Pals are in studio at the Aquarium creating new episodes of *The Pacific Pals Show*. Join your favorite Pacific Pals on the Aquarium's social media channels weekly to see more educational storytelling.

- All ages

Webcams

Want to check in on your favorite Aquarium animals from your living room? Seven different webcams placed in six exhibits allow your family to visit the Aquarium virtually. Now, you can take webcam exploration even further with the Aquarium's Webcam Resource Kits (available at aquariumofpacific.org/teachers/webcamkits). These kits include lesson plans and videos that provide guided exploration of the Aquarium webcams.

- Grades K-8



Online Academy classes for PreK to twelfth grade students, on topics ranging from marine biology to how the staff works with animals at the Aquarium, can be found at youtube.com/aquariumofthepacific.

Career Connections

Introduce your teenager to a variety of STEM careers through the Aquarium's Career Connections series. By exploring the careers of scientists working at the Aquarium, you will learn more about current research and career opportunities. The series is available at aquariumofpacific.org/teachers/career_connections

- Grades 6-12

Conservation Series

Explore current conservation projects and meet the professionals who have dedicated their lives to conservation. Visit aquariumofpacific.org/teachers/conservation_series for videos, discussion guides, and activities related to conservation and sustainability.

- Grades 6-12

Cruises

Explore our local ocean on board Harbor Breeze Cruises' boats with an Aquarium educator who narrates the journey and helps identify marine life and local landmarks.

Whale Watching and Dolphin Cruises

Fall Season

Take a voyage with Harbor Breeze Cruises in search of whales, dolphins, sea lions, sea birds, and other marine animals. Learn about these fascinating animals in our local waters from an onboard Aquarium educator. Read about recent sightings by following the Aquarium's whale watching account @OceanWatchLB on Twitter.

- Visit aquariumofpacific.org for current pricing.
- 2 to 2.5 hours



Harbor Tour

Year Round

Tour the Long Beach/Los Angeles Harbors with Harbor Breeze Cruises for a 45-minute narrated cruise around one of the most active ports in the world. See the downtown shoreline, ocean vistas, ships from around the world, and even sea lions. Tours are offered daily throughout the day. Meet 15 minutes prior to departure at Dock #2. This program is led and staffed by Harbor Breeze Cruises.

- Visit aquariumofpacific.org for current pricing.
- 45 minutes

Penguin Encounters

Daily

8:30 A.M.-9:00 A.M.

Learn about and meet a penguin up close during a Penguin Encounter. Sit next to a penguin as it waddles around outside its exhibit before the Aquarium opens! Meet with our staff, and learn all about these fascinating birds during this 30-minute program.

Aquarium admission to open areas included. Minimum 2 people, maximum 4 people. Limited to one household group.

- \$135 per member, \$150 per non-member
- Call (562) 590-3100, ext. 0 to register.



Seal and Sea Lion Experience

Sundays

8:30 A.M.-9:00 A.M.

Join our animal husbandry staff before we open as they feed and care for our seals and sea lions. This exclusive experience gains you early access to outdoor areas before the Aquarium open to the public. Watch from the amphitheater seating area outside the exhibit as our seals and sea lions start their day, enjoy their morning meal, and undergo their daily health checks. Animal care staff will discuss each animal, how we care for them, and answer your questions. After the presentation, you will have 15 minutes to begin exploring our outdoor areas before they open to the public at 9:00 a.m. Limited to 20 guests total, and minimum group size is four and maximum is six people. Reservations required 24 hours in advance.

- \$25 per member, \$40 per non-member
- Call (562) 590-3100, ext. 0 to register.



AXL SAYS:

Help the Pacific Pals find their way out of the DEEP SEA !

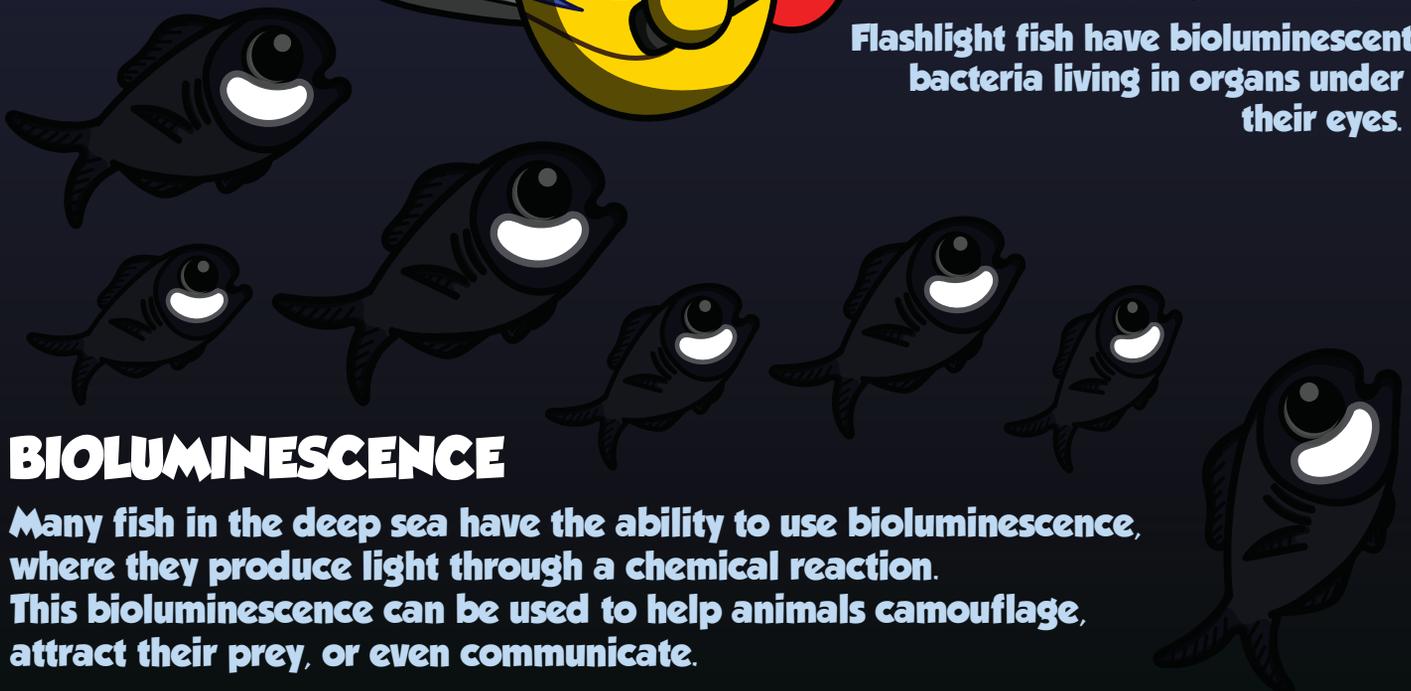
Follow the flashlight fish through the maze to higher water.

BEWARE of DEEP SEA PREDATORS !



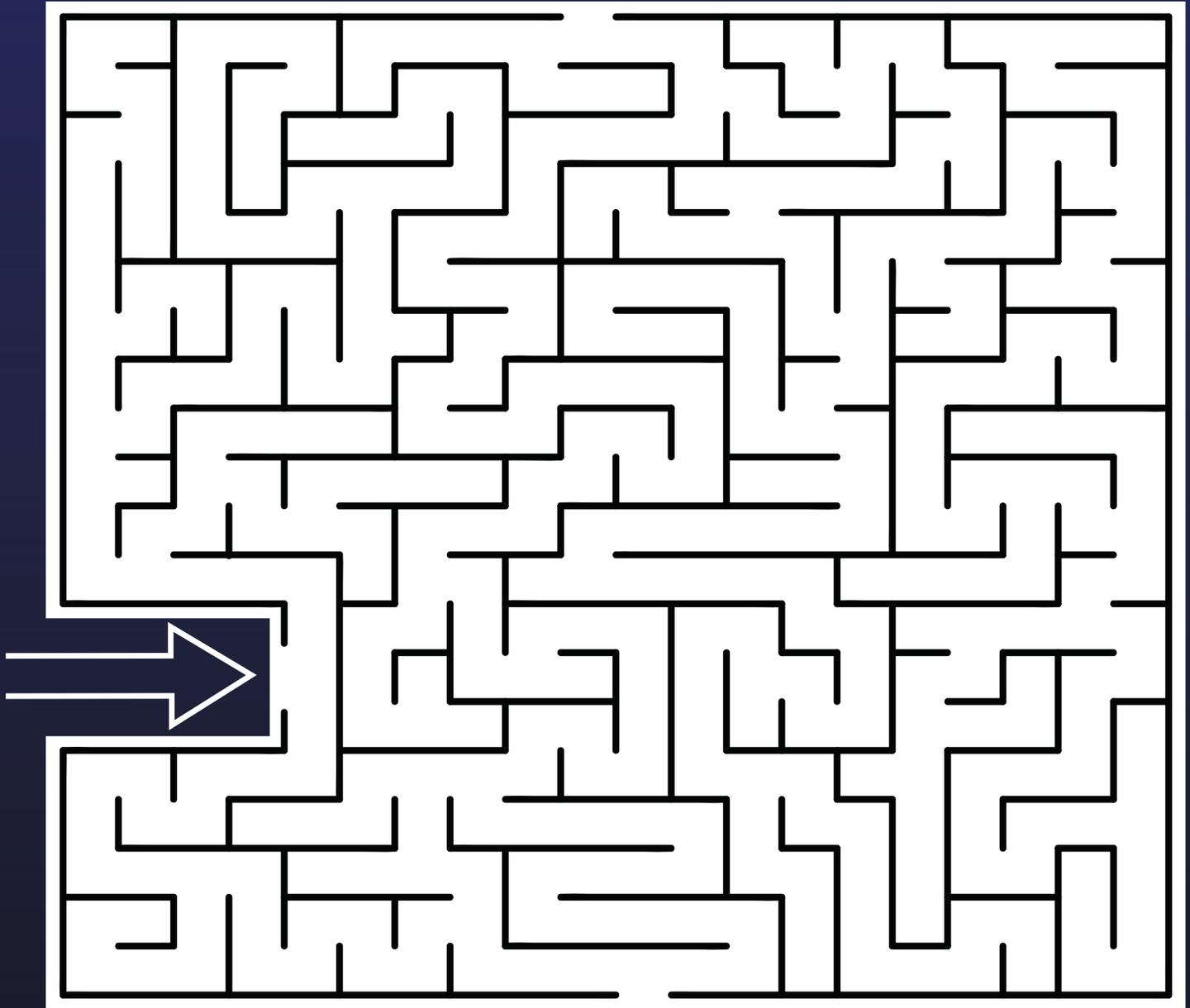
FLASHLIGHT FISH

Flashlight fish have bioluminescent bacteria living in organs under their eyes.



BIOLUMINESCENCE

Many fish in the deep sea have the ability to use bioluminescence, where they produce light through a chemical reaction. This bioluminescence can be used to help animals camouflage, attract their prey, or even communicate.



ANGLERFISH

The female anglerfish uses its lure to attract its prey, as well as male anglerfish. The much smaller male anglerfish attaches permanently to the female, where it lives the rest of its life as a parasite.

Animal Facts



ARCHERFISH EXHIBIT | HARBOR TERRACE

Pacific Cleaner Shrimp

Lysmata amboinensis

Pacific cleaner shrimp are 2 to 2.5 inches long and have ten legs and long antennae. They play an important role in coral reef ecosystems. They set up a cleaning station on coral or a rock and wait for fish to stop by. The shrimp then feed on dead tissue and parasites, cleaning the fish. This species of cleaner shrimp lives at depths of 16 to 130 feet in the Indo-Pacific Ocean and Red Sea.

AMBASSADOR ANIMAL

Blue-Tongued Skink

Tiliqua scincoides

Blue-tongued skinks are large lizards native to Australia. Averaging 18 inches long, they live in a variety of habitats, including forests, coastal areas, and cities. They have adapted well to living in urban and suburban areas. They eat fruit, berries, flowers, fungi, insects, snails, and dead animals. They are not aggressive, but if disturbed they will stick out their blue tongues, puff up their bodies, and hiss loudly. If a skink loses its tail, it can regrow a new one.



ROBIN RIGGS

AMBER FOREST | SOUTHERN CALIFORNIA/BAJA GALLERY

California Moray

Gymnothorax mordax

Despite its snake-like appearance and lack of fins or scales, the California moray is a fish. It has a unique adaptation, a second set of jaws inside its throat that spring forward to help it to swallow food. They grow up to 5 feet long. California morays are found along the U.S. West Coast from Point Conception in California to Baja California, Mexico.



ANDREW REITSMA



Jerry Schubel Retires After 18-Year Tenure as President and CEO

DR. JERRY SCHUBEL retired from his position as president and CEO of the Aquarium of the Pacific on July 31, 2020, ending an eighteen-year career in the role. He was succeeded by Dr. Peter Kareiva on August 1, 2020.

“Dr. Schubel was the driver of the Aquarium’s vision, to create an aquarium that builds and conserves natural capital—nature and nature’s services—by building social capital, the connections between and among people,” said Board Chair Kathleen Eckert. “His numerous efforts to connect the public with ocean science and the issues facing our planet, using the arts, technology and more, created an institution that sets the standard for the future of aquariums.”

Dr. Schubel led the development, construction, and opening of Pacific Visions, the Aquarium’s first major expansion. Pacific Visions represents a departure from conventional Aquarium expansions, combining cutting-edge multimedia technology and immersive experiences to focus on humans’ relationship with Earth and explore pathways to a more sustainable future.

“Dr. Schubel leaves a lasting legacy that will benefit the Aquarium for years to come. He has been a visionary leader, has made the Aquarium one of the most innovative and successful aquariums in the world, and has helped put Long Beach on the map as a cultural and educational center,” said Board Vice Chair Doug Otto.

During his tenure at the Aquarium Dr. Schubel created the Aquatic Forum that brings together scientists, policymakers, and stakeholders to explore ways of dealing with important,

complex, and often controversial environmental issues facing California and the nation. Dr. Schubel also directed the Aquarium’s Marine Conservation Research Institute, which hosts many of these forums and engages in research and policy work on the local and national level.

Dr. Schubel also developed the Aquarium’s Aquatic Academy, a series of evening courses for adults that fosters dialogue on issues related to the ocean and environment. These courses bring together experts in science, business, conservation, policy, and academia to share their knowledge and experiences with attendees.

Under Dr. Schubel’s leadership, the Aquarium developed partnerships with numerous agencies and organizations, including the National Oceanic and Atmospheric Administration (NOAA), NASA, XPrize, Conservation International, the Annenberg Foundation and Annenberg Space for Photography, GIS mapping firm Esri, and the ArtCenter College of Design, and with scientists at many universities and institutions, including Woods Hole Oceanographic Institution and Scripps Institution of Oceanography.

Through these partnerships, Dr. Schubel sought the expertise of scientists and other outside experts for the development of Aquarium exhibits and programs. He and his wife, Margaret Schubel, wrote all of the scripts for the films the Aquarium produced, which have won a total of forty-seven international Telly Awards over the years.

Prior to joining the Aquarium of the Pacific, Dr. Schubel served as president and CEO of the New England Aquarium and from 1974 to 1994 and was dean of Stony Brook University’s Marine Sciences Research Center. For three of those years he served as provost of the university. Dr. Schubel was also a research scientist and associate director of Johns Hopkins University’s Chesapeake Bay Institute.

Dr. Schubel formerly served on the Board of Governors of the Savannah Ocean Exchange and as a member of NOAA’s Science Advisory Board. He chaired the National Sea Grant Review Panel; the National Research Council’s (NRC) Marine Board; and the Ocean Research and Resources Advisory Panel. He has served on numerous NRC committees, is a former member of the Environmental Protection Agency’s Science Advisory Board, the Census of Marine Life U.S. National Committee, and the National Science Foundation’s Education and Human Resources Advisory Committee. In 2015 Dr. Schubel was appointed to the Board of Trustees of the California Ocean Science Trust. He is also a member of the Science Advisory Panel for California’s Ocean Protection Council.

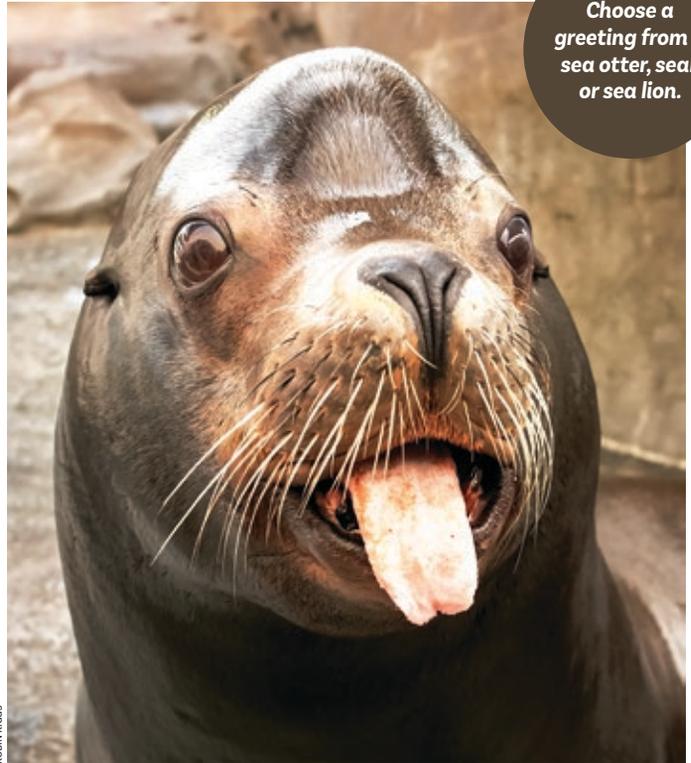
Dr. Schubel plans to continue his work relating to ocean and environmental issues.

*During his tenure,
Dr. Jerry Schubel
created the Aquarium’s
Aquatic Forum and
Aquatic Academy
programs and led
the development
of Pacific Visions.*



Applicants will pursue programs in ocean education, animal husbandry, microbiology, facilities, or business administration.

ANDREW REITSMA



Choose a greeting from a sea otter, seal, or sea lion.

ROBIN RIGGS

Funds raised through Cameo support the Aquarium's animal care, education, and conservation programs and help support the Aquarium during COVID-19.

Aquarium Announces New Scholarship

ON JUNE 8, WORLD OCEAN DAY, the Aquarium announced a new scholarship. Kathie Eckert, chair of the Aquarium's Board of Directors, made the announcement on behalf of the Aquarium, its Board of Directors, and staff in a video. The new scholarship program will award at least \$50,000 each year to African American students who express interest in the aquarium field. Applicants will pursue programs in ocean education, animal husbandry, microbiology, facilities, or business administration. "Through this program, the Aquarium hopes to bring meaningful opportunities to African American students in these areas and for all of us to benefit by bringing together diverse minds to solve the issues facing our ocean planet," Eckert said.

Applications will be accepted beginning this fall for the spring semester of 2021. Applications and required materials must be submitted by 12:00 midnight on October 15, 2020. Award recipients will be selected by a committee of Aquarium staff members and members of the community. Recipients will be notified by December 31, 2020. For full application details, visit pacific.to/africanamericanscholar.

Applications must be submitted by October 15, and recipients will be notified by December 31.

Send a Personal Greeting from an Aquarium Animal with Cameo

THE AQUARIUM HAS JOINED CAMEO, an app that allows you to request a customized personal message from a celebrity or public figure for a friend or loved one. Using the talents and personalities of the Aquarium's sea otters, seals, and sea lions, Cameo users can send a greeting, shoutout, virtual birthday wish, or pep talk to someone special.

Funds raised through Cameo and the Aquarium's other paid programs support the Aquarium during the closure due to COVID-19.

Visit cameo.com/aquariumofthepacific for seals and sea lions and cameo.com/seaotters for greetings from sea otters.

BOOKING 2021 DATES



A Unique Setting for Your Event

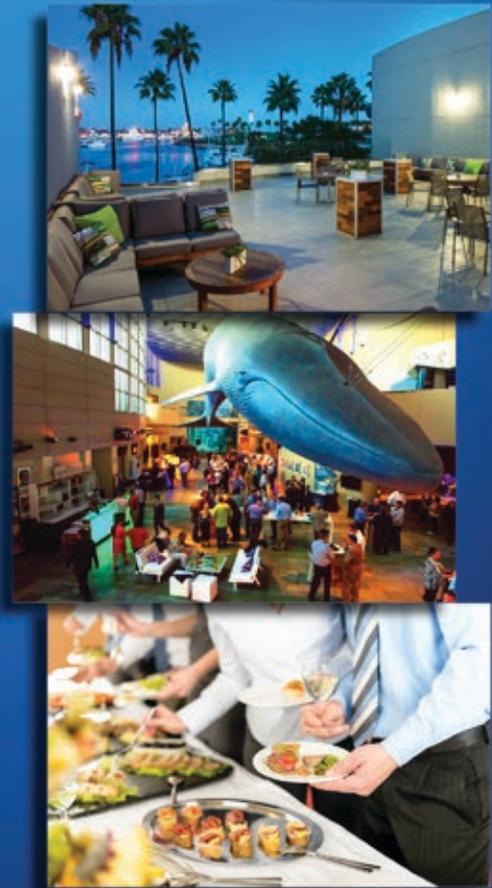
The Aquarium of the Pacific's new award-winning Pacific Visions wing provides a unique venue for private events. Host a picnic on the front plaza with the backdrop of the stunning glass biomorphic building. Hold a reception or sit-down dinner in the new art gallery surrounded by a coral wall, projections of ocean life, and a virtual waterfall. Or choose from a variety of other spaces, including the rooftop Veranda, Great Hall, Shark Lagoon, or even the adjoining Shoreline Aquatic Park. Whether it is for picnics, formal receptions, or sit-down dinners, the Aquarium offers a variety of venues that immerse you in the beauty of the ocean and will create lasting memories for your guests.



yourevent.aquariumofpacific.org

562-951-1663 AOPCatering@longbeach.cc.com

100 AQUARIUM WAY LONG BEACH, CA 90802



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Fundraising Highlights

The Aquarium of the Pacific spotlights recent stories of supporters who have helped further our mission and vision.



Supporters Make a Difference

OVER THE PAST SEVERAL MONTHS, the Aquarium has received messages from members and supporters in the community sharing what inspires them to give. Many have expressed how the Aquarium Online Academy, webcams, social media content, and animal care stories have helped connect them to the Aquarium's mission in new ways.

Below is a just a sample of the messages we received in recent months. The Aquarium wishes to express its appreciation for these kind words and for supporting us as we further our mission in new ways. To support your Aquarium and share what inspires your giving, consider making a gift by visiting [pacific.to/donate](https://www.pacific.to/donate).

"Watching your webcams of penguins and tropical fish has provided some relaxation and enjoyment during these stressful times. Thank you!"

"Your webcams have been so helpful in keeping my toddler entertained while he's home from daycare. I appreciate the work you do!"

"Thank you so much for allowing us to have a glimpse into the lives of these very special birds."

"I became a member online earlier this year. Your social media and online programs are outstanding. Thanks also for these reminders/opportunities to do more to help. Thank you for being there for the animals in your care."

"Thanks to all of the staff working so hard to take care of the aquarium and provide fantastic streaming content during the stay-at-home order! My 7- and 10-year-old love it!"

"Thank you for providing online learning during this time of uncertainty. My daughter is learning a lot at home."

"Thanks for online cameras for feeding times of the penguins. Very informative. This donation is for Floyd and his friends."

"We live in Seattle. I don't know if we'll ever visit you in person. But we have derived many, many hours of pleasure, happiness, relief, and peace from your Tropical Reef Aquarium live stream. Especially during these challenging times, thank you."

#GivingTuesdayNow Success

THE AQUARIUM OF THE PACIFIC

participated in #GivingTuesdayNow, a global day of philanthropy, on May 5, 2020. #GivingTuesday is usually held the Tuesday after Thanksgiving, but an additional day of giving was added in May to recognize the serious impact the pandemic has had on the world's nonprofit institutions.

The day-long virtual event included live programming on social media with an insider's look at the Aquarium Online Academy and enrichment sessions with sea lions and penguins. It inspired philanthropy from paid and volunteer staff, Trustees of the Pacific, members, Board members, and other supporters who contributed to the day's success.

The Aquarium exceeded its goal and secured over \$48,000.

The Aquarium extends a special thanks to Frank and Margie Newell for their \$25,000 gift on the morning of the event and to the Don Temple Family Charitable Foundation for a matching gift of \$5,000.



ROBIN HIGGS

Aquarium Partners Provide Key Support for Online Academy

THE AQUARIUM IS GRATEFUL FOR THE GENEROSITY OF OUR CORPORATE AND FOUNDATION SUPPORTERS who have made it possible to provide these engaging educational resources to students across the region and around the world. On behalf of the staff, we would like to extend our gratitude to a number of donors, including Windsong Trust, The Robert and Lisa Margolis Family Foundation, and Bank of America for their ongoing support of our educational programs.



Marine biologists install the MARRS reef system at Moore Reef on the Great Barrier Reef.

Creating a Better Underwater World with the Support of Mars Fishcare and the API® Brand

In July and August the Aquarium welcomed a new sponsor, Mars Fishcare and the API® brand, to help us bring the wonders of the aquatic world to families at home through their support of our Online Academy. Mars established its Mars Assisted Reef Restoration System (MARRS) to demonstrate

its commitment to increasing coral reef resilience and stewardship.

To help rebuild coral reefs, MARRS uses a network of underwater steel structures that provide a stable platform for young corals to grow. To date, more than 19,000 structures called Reef Stars covered with more than 280,000 coral fragments have seen coral cover increase from 10 percent to over 60 percent in two years and fish abundance and biomass increase by 114 percent across the Pacific, Indian, and Atlantic Oceans.

Healthpeak Properties, Inc. Supports Aquarium Programming for Learners of All Ages

To help bring the Aquarium to students, families, and community members of all ages during this time, Healthpeak Properties, Inc. recently provided key support to the Online Academy. In addition to science courses for grades PreK to 12, the Online Academy also includes climate change courses and a library of archived lectures by notable authors and scientists for adults and seniors.

Healthpeak Properties, Inc. is a real estate investment trust owning and developing healthcare real estate, including senior housing. The company is a long-standing Aquarium supporter, sponsoring Seniors Day, an event that welcomes thousands of seniors to the Aquarium with free admission and special programming each fall.

American Honda Motor Co., Inc. Continues Long-Standing Support of Education

Throughout more than two decades of partnership as a founding sponsor of the Aquarium, American Honda Motor Co., Inc. has supported a diverse array of projects, from providing solar panels that bring sustainable energy to our June Keyes Penguin Habitat to its naming of the Honda Pacific Visions Theater that tells dynamic stories about humans' impact on the planet. Through American Honda's long-standing support, the Aquarium is able to continue providing dynamic programming that educates the public and inspires diverse audiences to want to be good environmental stewards.

Do You Have a Home Aquarium?

Check out this free resource from API® to track the health of your habitat.

apifishcare.com/aquaspin-advise

MARS Fishcare | API

Aquarium Accolades

Below are the awards presented and received by the Aquarium this past spring and summer.



Aquarium Films Win Telly Awards

In May the Aquarium received Telly Awards for two of its original films.

LEVERS, which plays in the Pacific Visions culmination gallery, won the Silver Telly Award in the Non-Broadcast: Editing category. *Bangs Island Mussels*, part of the Aquarium's *Ocean to Table* series produced by its Seafood for the Future program, won the Silver Telly Award in the Online: Editing category and Bronze in the Online: Videography category.

Levers addresses the levers we can move to make a global change in our choices regarding food, energy, and water and the fulcrum the levers rest on: the internet and social media, which provide opportunities to form global communities for action.

The *Ocean to Table: Stories of Food, Farming, and Conservation* series brings together responsible seafood farmers, scientists, and chefs from around the country to share their stories. Each video showcases a different ocean farm and different types of seafood. The *Bangs Island Mussels* episode covers the largest rope-grown mussel farm on the U.S. East Coast, the important role responsible marine aquaculture plays in supporting the global food supply and local communities, and simple tips for buying and cooking mussels.

The Telly Awards honor excellence in video and television on a variety of platforms. The Aquarium has earned forty-six Telly Awards since 2008 for its original short films.

Aquarium Announces Urban Ocean Poetry Contest Winners

The contest's theme for 2020 was *Living Lighter on Earth in the Anthropocene*

THE AQUARIUM OF THE PACIFIC announced the winners of its 11th Annual Poetry Contest in June as part of the Urban Ocean Festival. The contest's theme in 2020 was *Living Lighter on Earth in the Anthropocene*.

We live in the Anthropocene, the most recent geologic epoch, the one in which humans are affecting Earth processes on a global scale for the first time in our 200,000 years of history. We have accelerated the pace of change and degraded nature so that many species cannot keep up. This year's poetry festival entrants were asked to focus on how we can slow the pace of change to reduce the environmental burden of humans on Earth.

Prizes were given in the following age categories: middle school (grades 6 to 8), high school (grades 9 to 12), young adult (ages 18 to 25), and adults (26+). The winners of the poetry contest for 2020 are:

MIDDLE SCHOOL:

First: Samantha Perez
Second: Evelyn Castellanos
Third: Emanuel Meredith

HIGH SCHOOL:

First: Matthew Quach
Second: Andrea Garcia
Third: Cody Luong

YOUNG ADULTS:

First: Thanh Le
Second: Gerlhen Perez
Third: Kaylee Doan

ADULTS:

First: Michelle Tio
Second: Taylor Kreidel
Third: Elizabeth Hickman

Aquarium Board of Directors

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president and CEO
- **Mr. Anthony T. Brown**,
VP of Finance/CFO
- **Ms. Cecile Fisher**, VP of
Marketing/Corporate Secretary

Board of Directors

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- **Mr. Karl Pettijohn**
- **Mr. Kurt Schulzman**
- **Mr. Michael Sondermann**
- **Mr. Donald "Tip" Tippet**
- **Mr. Thomas Turney**
- **Mr. Stephen Young**

(as of September 1, 2020)
aquariumofpacific.org

Preserving Marine Protected Areas

THERE ARE SEVERAL types of marine protected areas in U.S. waters, all of which set aside areas in the ocean for special protection. Serving a similar function to our state and national parks and forests on land, marine protected areas restrict some human activity to protect the diversity and abundance of marine life, the habitats ocean animals depend on, and the integrity of marine ecosystems.

Today some of these protected places are facing changes that could negatively impact ocean conservation. Aquariums in the U.S. are coming together to ensure their continued protection.

What are the Different Types of Protected Areas?

Marine Protected Areas

Marine protected areas (MPAs) are designated through local, state, or federal government agencies in response to proposals. California has 124 MPAs off its coast covering 852 square miles.

National Marine Sanctuaries

Under the National Marine Sanctuaries Act, first passed in 1972, the U.S. Secretary of Commerce may designate and protect areas of the marine environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or esthetic qualities. These sanctuaries are managed by the National Oceanic and Atmospheric Administration's Office of National Marine Sanctuaries. There are currently fourteen national marine sanctuaries encompassing more than 600,000 square miles in U.S. waters.

Marine National Monuments

Marine national monuments are designated by Presidential Proclamation via the Antiquities Act to protect these areas' marine life, facilitate exploration and scientific research, and promote public education.

Benefits

Current research is showing that protecting some areas in the ocean not only benefits marine life, but also recreational and commercial fishing. There is evidence that saving space in the ocean for fish to mature and reproduce while protected from human activity can increase the overall fish population.

A paper published in the journal *Nature Communications* in February 2020 reported that the expansion of marine national monuments in the Pacific Ocean did not cause overall economic harm to Hawaii's longline tuna fishing industry. Instead, the study showed that the fleet actually caught more fish after the expansion and revenue went up by 13.7 percent.

The Future of Marine National Monuments

In July the Aquarium of the Pacific, along with seventeen other U.S. aquariums, signed onto a letter drafted by the Aquarium Conservation Partnership that was sent to Congress supporting the continuing protection of marine national monuments. The public can help by learning more about MPAs and expressing their support to their government representatives.



Explore Marine National Monuments in the Pacific Ocean

Take a virtual journey to explore the four marine national monuments in the Pacific Ocean using an interactive map created by GIS mapping firm Esri. Visit arcg.is/10Tqz9 to read about the location, size, and unique features of each location.

PACIFIC
Currents



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Help us recover and grow from the impact of COVID-19 by supporting the ongoing care of over 12,000 animals that call the Aquarium home.

DONATE TODAY

[PACIFIC.TO/DONATE](https://pacific.to/donate) | (562) 951-1701