



AMERICAN MUSEUM OF NATURAL HISTORY

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UNSEEN OCEANS OPENS AT THE AMERICAN MUSEUM OF NATURAL HISTORY

**NEW EXHIBITION HIGHLIGHTS THE LATEST ADVANCES IN OCEAN EXPLORATION,
THE RESEARCHERS AND TECHNOLOGIES BEHIND THEM, AND THE MYSTERIES THAT REMAIN**

**OPENS MARCH 12, 2018
PREVIEW DAYS FOR MEMBERS BEGIN MARCH 9**

Our world is truly an ocean planet. More than 70 percent of the Earth's surface is covered by oceans, yet surprisingly little of these vast realms has been explored. Now, with the use of 21st-century technologies like robotics, satellite monitoring, miniaturization, and high-definition imaging, that is beginning to change. In the American Museum of Natural History's new exhibition [*Unseen Oceans*](#), visitors will embark on a journey that takes them from the oceans' sunlit surfaces to their inky depths as they discover the latest ocean science and encounter the researchers and technologies that are revealing our blue planet as never before.

Unseen Oceans opens for a weekend of Member previews beginning on Friday, March 9, and will be on view to the public from Monday, March 12, 2018, through Sunday, January 6, 2019.

"All life on our planet depends on the oceans, yet they remain one of the last great frontiers," said Ellen V. Futter, President of the American Museum of Natural History. "Today, a new generation of marine scientists with a pioneering spirit of ingenuity and adventure, and an explosion of technological and imaging advances, are creating a golden age of ocean exploration, yielding astonishing discoveries at dark and mysterious depths. At the same time, threats from climate change and pollution, both brought on by human activity, are making their work more important and urgent than ever. With *Unseen*

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Oceans, visitors can join Museum scientists on their high-tech, high-adventure, high-impact fieldwork to see and discover magnificently beautiful, extraordinarily diverse, and enormously important creatures living at previously unseen ocean layers.”

In *Unseen Oceans*, visitors will explore a series of circular, media-rich galleries showcasing a range of marine environments and introducing the scientists who are using cutting-edge research tools and developing new methods to explore the oceans top to bottom. How do blue whales spend their day? (High-tech, removable tags on their backs provide the answer.) What’s going on in the deep waters surrounding Hawai`i? (Hint: Advanced sonar reveals a new island is set to emerge – in more than 100,000 years.) How can we identify the best locations for marine protected areas? (Fleets of small autonomous robots may offer important clues.) Visitors to *Unseen Oceans* will learn the answers to these exciting questions and explore other novel lines of inquiry that ocean researchers have only recently uncovered.

“Throughout the two decades that I’ve spent studying the world’s oceans, I’ve been continually astonished at the ingenuity of my fellow marine scientists as they’ve utilized and adapted the latest technologies to make discoveries that we could previously only dream of,” said John Sparks, curator in the Department of Ichthyology at the Museum and curator of *Unseen Oceans*. “For example, only recently did my colleagues and I reveal the widespread incidence of biofluorescence – the phenomenon by which organisms absorb light, transform it, and emit it as a different color – among marine fishes. Visitors to this exhibition will learn about that research and more as they meet the scientists who are quite literally illuminating the unseen frontiers of our ocean world.”

“I am wild about the oceans, and I believe that ocean exploration is as exciting and important as space exploration,” said Ray Dalio of the Dalio Foundation. “In *Unseen Oceans*, the Museum has elicited the thrill and awe, as well as the importance, of what ocean explorers are discovering today, and we’re proud to partner with the Museum to support this remarkable exhibition.”

THE OCEANS’ INHABITANTS, AT ALL SCALES

Unseen Oceans welcomes visitors with a familiar sight: **a projection of waves lapping**

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at their feet and a vista of the water's surface. It is that sunlit zone—the upper few hundred feet of the ocean—that is inhabited by the organisms that sustain nearly all marine life: plankton. These tiny organisms drift with the currents and are vital to life on Earth. Phytoplankton, photosynthesizing microscopic organisms that include bacteria, algae, and protozoans, are the ocean's primary energy producers. They rely on light to grow and are so numerous that their blooms can be seen from space. Feeding on the phytoplankton are small animals called zooplankton, including the larvae of familiar marine animals like the mighty bluefin tuna and ocean sunfish. Despite their small size, planktonic forms are remarkably diverse and the complexity of these extraordinary organisms is only beginning to be understood. In this section of the exhibition, visitors will encounter **larger-than-life models of unusual and beautiful planktonic species**, view organisms that are found in a drop of seawater **at interactive microscope stations**, and try to match the planktonic and adult forms of a variety of marine species in a **"Find My Baby Picture" game**.

On the other end of the size spectrum, Earth's oceans have been home to giant animals for hundreds of millions of years. **Visitors will encounter giant fossils from Earth's past—from ammonites to ichthyosaurs**—and stand in awe of the immensity of the largest animals that inhabit our blue planet today at a **180-degree, high-resolution screen where animations of blue whales, giant squid, and manta rays swim by visitors at true-to-life scales**.

Despite their size, until a decade ago we knew surprisingly little about the lives of whales. **Biologists Jeremy Goldbogen of Stanford University and Ari Friedlaender of the University of California, Santa Cruz**, have been working to change that through the development of a new generation of non-invasive, pop-off tags they attach to whales in oceans throughout the world, providing a glimpse into the behavior of these enigmatic giants. The data the tags record—including how fast and deep a whale dives, how it moves through space, and even the sounds that surround it—allow scientists to better understand whales' feeding and migratory behavior and, in turn, support conservation efforts in increasingly crowded and urbanized waterways. Visitors to *Unseen Oceans* will learn how ocean scientists experiment and refine their research tools as they view the different **versions of whale tags** that have been developed over the years.

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ILLUMINATING MARINE MYSTERIES WITH NEW TECHNOLOGIES

Sinking deeper into the ocean, daylight fades, most colors disappear, and life is bathed in blue. But diving at night with specially-designed lights and cameras, **Dr. Sparks and Museum Research Associate David Gruber** have discovered that a wide variety of fishes and other marine animals are fluorescent, glowing in startling shades of red, orange, and green when illuminated with high-energy blue light. The researchers' investigations into this phenomenon began with a serendipitous observation of a fluorescent eel in the Cayman Islands, after which they embarked on a high-tech, global search for other species that exhibit this remarkable trait. Unlike bioluminescence, which is light made by an organism through a chemical reaction, biofluorescence involves the absorption and re-emission of light by special molecules in an animal's body. Visitors to *Unseen Oceans* will learn about the potential functions of fluorescence in the ocean and how a biofluorescent fish looks under different lighting as well as through the lens of **the specialized underwater cameras** that Sparks and Gruber developed for their research. They will also encounter **a floor-to-ceiling array of model fishes and turtles that biofluoresce as they would in life, as well as live scorpionfish, eels, seahorses, and sharks** that display this characteristic.

The ocean floor is another world. Only about 10 to 15 percent of the seafloor has been mapped with accuracy, meaning that we know the surface of Mars much better than the submerged landscapes of our own planet. But today, with the use of sound waves, radar and lasers, **scientists like Oregon State University's Dawn Wright** are beginning to construct extraordinarily detailed images of these environments. In *Unseen Oceans*, visitors will encounter a gallery that features **a scientifically-accurate re-creation of an undersea landscape from the Galápagos seamount chain** as well as **models of some of the hidden parts of our ocean planet—including a local "landmark":** the Hudson Canyon, a spectacular underwater feature only 100 miles from New York City. Additional attractions include an **animated three-dimensional map of the world's deep, slow-moving current system known as the Global Conveyor Belt** and an **interactive projection sand table** where visitors experience a hands-on lesson about ocean topography as they dig trenches and create islands.

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MODERN SUBMERSIBLES ENABLING SCIENCE AT NEW DEPTHS

When only human eyes will do, scientists and their submersible pilots brave darkness and crushing pressure to observe the amazing life forms that inhabit the deep. In 1934, American undersea explorer William Beebe dove more than 3,000 feet in an early submersible known as the bathysphere. In the years that followed, the development of equipment for exploring this hidden world was largely in the hands of industry and the resulting submersibles were noisy, equipped with bright lights, and outfitted with rigid sampling arms that could damage fragile sea life. Ocean scientists initially adopted that equipment but grew concerned that they were actually scaring away the deep-sea life they sought to understand. At a microrobotics lab at Harvard, **Kaitlyn Becker, David Gruber and Robert Wood** are part of a team addressing that problem through the development of soft, quiet grippers called “squishy fingers,” with hydraulically-controlled padded fingers that conform gently around organisms at any depth. Exhibition visitors will be able **to see a prototype of the latest soft robotics** that engineers like Becker are developing to help marine biologists sample and analyze inhabitants of the deep sea with minimal damage.

The oceans’ diversity is most noticeable as one dives from their upper layers to the seafloor, encountering the different species that inhabit each level of the water column. In an **immersive submersible theatre**, exhibition visitors will experience a thrilling, virtual ride from the surface to inky depths with a media presentation that **features BBC footage captured during filming of the popular nature series BBC AMERICA’s *Planet Earth: Blue Planet II* and the giant screen film *Oceans: Our Blue Planet*, co-produced by BBC Earth and OceanX Media.** A **partial replica of a Triton submersible** will also be on view, providing a great photo opportunity for those with their cameras at the ready.

PRESERVING THE FUTURE OF OUR OCEAN PLANET

There are limits, even in the oceans – and we’re pushing up against them. As the human population has exploded, the demand for seafood has surged and destructive, wasteful fishing practices have caused the number of fish to plummet by 50 percent since 1970. *Unseen Oceans* highlights the many urgent threats to the oceans’ vital abundance – including overfishing and habitat degradation – as well as the conservation scientists and

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forward-thinking governments that are making progress toward protecting the rich diversity of living things in the sea. In places where strict fishing limits are enforced and sustainable fishing methods are used, fish populations are stabilizing. Exhibition visitors will learn about the conservationists working to address destructive fishing methods and overfishing in today's oceans, such as **Wildlife Conservation Society's (WCS) Nyawira Muthiga**, who is training local communities in Kenya to modify their traditional fishing gear and to manage their fisheries sustainably.

Human activities don't just drive down the number of fish; they also destroy the habitat where marine animals live. Many countries are setting aside safe places for fish and other organisms to breed and grow, where fishing, mining and polluting are restricted. In Bangladesh, **WCS researcher Rubaiyat Mansur Mowgli** is pushing the government to establish a 200-square kilometer area that's home to eight species of dolphins and whales. Exhibition visitors will gain an experiential understanding of marine protected areas at an **interactive digital media installation that features schooling fish that react to visitors' movements**. As a visitor approaches a group of fish displayed on the floor, the fish swim away and begin to diminish in numbers. But if a few people join together, and in effect, make a protected area, the fish multiply.

When creating these protected areas, conservationists must know not only where the animals live as adults, but also where they spend their larval stage. On display in the exhibition will be **mini-autonomous underwater explorers (m-AUEs)**: ingenious, cost-effective devices developed by **Scripps Oceanography Engineer Jules Jaffe** that are deployed in swarms to track the movements of plankton and help scientists figure out the best places to protect.

The oceans are already being profoundly affected by climate change. By burning coal, oil, and gas, humans have added hundreds of billions of tons of greenhouse gases to the atmosphere, creating an environmental crisis on a global scale. In *Unseen Oceans*, visitors will learn about the work of climate scientists who are searching for strategies to help wildlife cope with a warming world, including **Ruth Gates from the Hawai'i Institute of Marine Biology**, who uses scanning electron microscopes and DNA sequencing to determine which coral species will be best able to acclimatize.

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UNSEEN FRONTIERS

Before exiting the exhibition, visitors will be able to experience the thrill of marine exploration at **digital interactive submersible stations**, allowing them to take the joystick of a virtual submersible, navigate around seamounts, and make discoveries of their own. This final section will also highlight the newest generation of explorers who are continuing to expand our view of marine ecosystems and working to uncover the many mysteries that still remain in our ocean planet.

EXHIBITION ORGANIZATION

Unseen Oceans is curated by John Sparks, curator in the Museum's Department of Ichthyology in the Division of Vertebrate Zoology. Sparks has overseen several major exhibitions, including *Creatures of Light: Nature's Bioluminescence*, which explored the diversity of organisms that produce light; and *Life at the Limits: Stories of Amazing Species*, which focused on organisms with surprising abilities, including species that thrive in extreme habitats, on which he served as co-curator.

Unseen Oceans will be open from Monday, March 12, 2018, through Sunday, January 6, 2019. Members will be able to preview the exhibition starting on Friday, March 9, through Sunday, March 12.

The exhibition is designed and produced by the American Museum of Natural History's award-winning Exhibition Department under the direction of Lauri Halderman, vice president for exhibition.

Lead funding for *Unseen Oceans* and its educational resources is provided by **OceanX**, an initiative of the **Dalio Foundation**.

The American Museum of Natural History gratefully acknowledges the **Richard and Karen LeFrak Exhibition and Education Fund**.

Unseen Oceans is generously supported by **Chase Private Client**.

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The American Museum of Natural History, founded in 1869, is one of the world's preeminent scientific, educational, and cultural institutions. The Museum encompasses 45 permanent exhibition halls, including those in the Rose Center for Earth and Space and the Hayden Planetarium, as well as galleries for temporary exhibitions. It is home to the Theodore Roosevelt Memorial, New York State's official memorial to its 33rd governor and the nation's 26th president, and a tribute to Roosevelt's enduring legacy of conservation. The Museum's five active research divisions and three cross-disciplinary research centers support approximately 200 scientists, whose work draws on a world-class permanent collection of more than 34 million specimens and artifacts, as well as specialized collections for frozen tissue and genomic and astrophysical data, and one of the largest natural history libraries in the world. Through its Richard Gilder Graduate School, it is the only American museum authorized to grant the Ph.D. degree, and, beginning in 2015, the Master of Arts in Teaching (MAT) degree, the only such freestanding museum program. Annual visitation has grown to approximately 5 million, and the Museum's exhibitions and Space Shows are seen by millions more in venues on six continents. The Museum's website, mobile apps, and MOOCs (massive open online courses) extend its scientific research and collections, exhibitions, and educational programs to additional audiences around the globe. Visit amnh.org for more information.

Hours

The Museum is open daily, 10 am–5:45 pm. The Museum is closed on Thanksgiving and Christmas.

Admission

Museum admission is free to all New York City school and camp groups.

Pay-what-you-wish admission is available only at ticket counters, where the amount you pay is up to you.

General Admission, which includes admission to all 45 Museum halls and the Rose Center for Earth and Space but does not include special exhibitions, giant-screen 2D or 3D film, or Space Show, is \$23 (adults), \$18 (students/seniors), and \$13 (children ages 2–12). All prices are subject to change.

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General Admission Plus One includes general admission plus one special exhibition, giant-screen 2D or 3D film, or Space Show: \$28 (adults), \$22.50 (students/seniors), \$16.50 (children ages 2-12).

General Admission Plus All includes general admission plus all special exhibitions, giant-screen 2D or 3D film, and Space Show: \$33 (adults), \$27 (students/seniors), \$20 (children ages 2-12).

Public Information

For additional information, the public may call 212-769-5100 or visit the Museum's website at amnh.org.

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