



Photo by Kip Evans

Jacques Cousteau's grandson undertakes the longest undersea mission in history

By [Lara Ehrlich](#)

Oceans make up more than 70 percent of our planet, account for 99 percent of its living space—and remain largely a mystery to us. Scientists have explored less than 5 percent.

Extended dives are as complex as our space missions, says Fabien Cousteau, aquanaut and grandson of famed ocean explorer and three-time Academy Award–winner Jacques Cousteau. Both require physical and mental preparation and a significant investment of funds and equipment. But in the United States, we spend 150 times more money probing outer space, and that's a problem, says Cousteau ('89, MET'91).

"The ocean is our lifeblood," he says. "It dictates climate change, viability, fresh water, cultivation, farming, and energy—all the things we depend on. We have a lot of reasons to look a little bit deeper, a little bit longer, and a little bit further. Without more knowledge of our ocean world, we really don't know much about ourselves."

In summer 2014, Cousteau brought international attention to ocean stewardship by undertaking Mission 31, a monthlong scientific expedition that broke his grandfather's record (30 days) for living below the ocean's surface.

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The 81-ton Aquarius is the only underwater habitat in the world. Outfitted with a small kitchen, a lab, and six bunk beds, it was home to Cousteau and his team for 31 days. *Photo courtesy of Fabien Cousteau*

Cousteau's crew and a team of researchers from Florida International University, Northeastern University, and the Massachusetts Institute of Technology lived along a coral reef in Florida International University's [Aquarius Reef Base](#) (Aquarius) habitat 60 feet below the surface of the Atlantic Ocean. Aquarius is the only underwater habitat in the world, an 81-ton "dinosaur, an ancient robot chained to the bottom, this Leviathan," Cousteau said in a TED talk.

The accommodations were as high-tech as they were cozy. Roughly the size of a school bus, Aquarius is outfitted with a small kitchen, bathroom, lab, and six bunk beds, as well as hot water and air conditioning. WiFi gave the team the ability to live stream their experience 24/7 and to Skype with 70,000 students on six continents every day.

From a boat, scientists can undertake just two or three 45-minute dives at this depth per day, because of the need to decompress, or slowly reacclimate to surface pressure. When living on Aquarius, however, the oceanographers were able to accomplish 10- to 12-hour dives, which "gave us a huge luxury of time you simply can't get any other way from an undersea habitat," Cousteau says. His team completed three years' worth of scientific research on issues like climate change and pollution, and they are in the process of publishing at least 10 articles on their findings.

Highlights include the discovery that corals respond rapidly to environmental stresses like changes in water temperature and sediment level, and that their sponges (which act as filters), react to these stresses by shutting down their pumping activities. This is significant because sponges keep the reef's water clean and farm nutrients critical to its resident animals and plants, says Mark Patterson, professor of marine & environmental sciences at Northeastern University. An ongoing experiment is testing whether hydrocarbons and dispersants from the 2010 BP Deepwater Horizon oil spill are still emanating from the Gulf of Mexico.



During Mission 31, Cousteau's team completed three years' worth of scientific research on issues like climate change and pollution.
Photo by Kip Evans

Cousteau intends for Mission 31 to be the first of many undersea explorations and hopes we will soon realize his grandfather's dream of establishing an underwater habitat to learn more about our oceans. He points to Jacques Cousteau's undersea village [Conshelf II](#), constructed in the Red Sea in 1963, as the closest we've come to what's possible: self-sustaining communities that are not dependent on the surface for resources like power, air, food, and water.

"Technologically speaking, it's absolutely feasible," to construct such a place, Cousteau says, but the design, construction, and upkeep would be expensive. Still, the benefits—including the discovery of precious resources, renewable energy, and medical cures—would far outweigh the costs. As Cousteau said in a TED talk, "If we're going to explore the final frontier on this planet, we need to live there."



In this TED talk, Fabien Cousteau reveals why a deeper understanding of our oceans is necessary to our survival.

Cousteau is in the process of creating an IMAX documentary about Mission 31.