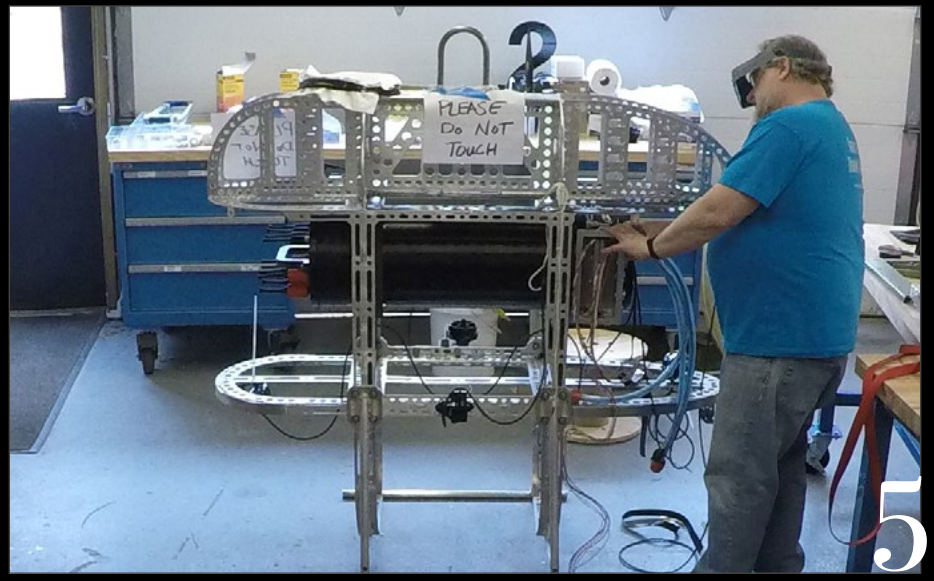
Ocean Twilight Zone

2019 Q1 REPORT

Key accomplishments

3

Took advantage of an unusual, late-breaking opportunity to **rapidly mobilize a research cruise** on M/V *Alucia*, with its 1,000-meter-capable submersible.



5

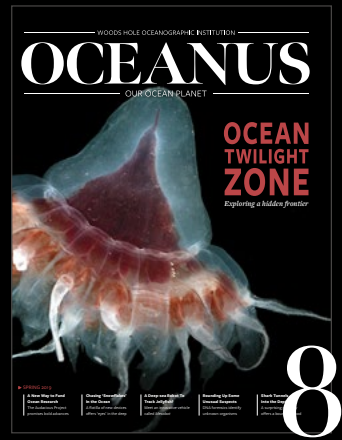
Began construction of *Mesobot* and tested critical systems on a **multi-institutional expedition** aboard the MBARI research vessel *Rachel Carson*.

6

Attended United Nations Biodiversity Beyond National Jurisdiction (BBNJ) negotiations to **raise the profile of the twilight zone among international policymakers**.

7

Partnered with OceanX, BBC, and the Avatar Alliance Foundation to build a stunning oceans **exhibit featuring the OTZ at the TED2019 conference** in Vancouver.

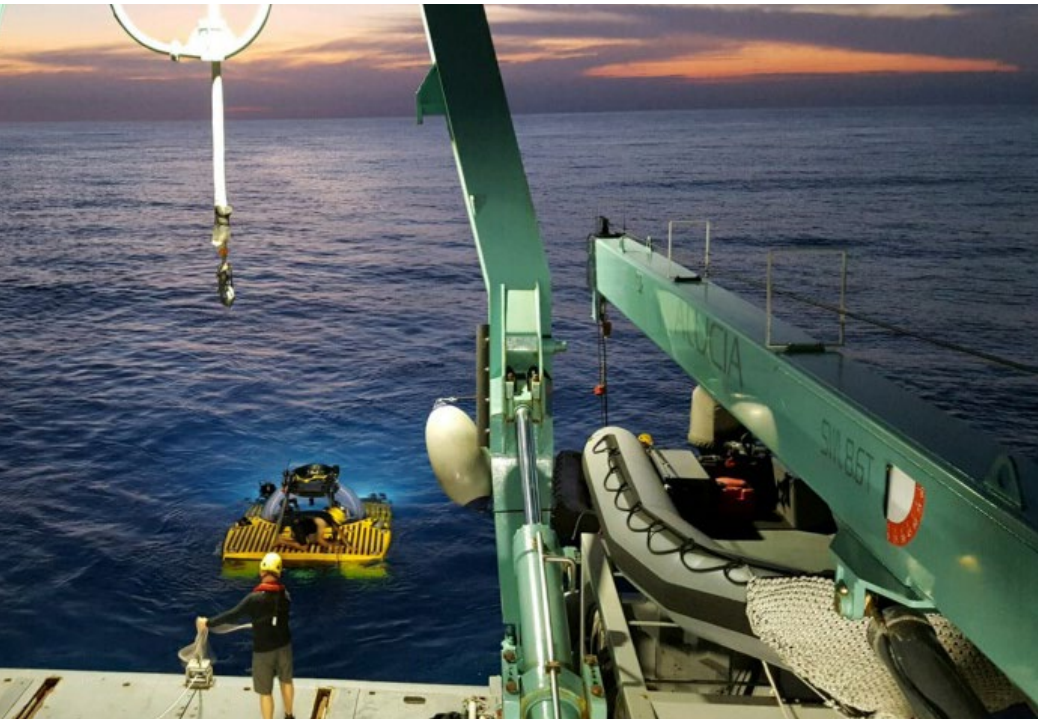


8

Published a **dedicated Ocean Twilight Zone edition** of *Oceanus*.

In the field

Accelerating the pace of OTZ science and engagement



The OTZ team took full advantage of an opportunity to conduct a rapid-response scientific expedition aboard M/V *Alucia* from March 10-19 after we learned of the ship's availability ten days before it sailed. Project lead Heidi Sosik and biologist Joel Llopiz served as co-chief scientists on the six-day mission in deep waters of the Tongue of the Ocean and the Sargasso Sea. We also augmented the expedition with a highly skilled team of outreach professionals from OceanX, Quartz Media, and WHOI, resulting in an impressive suite of high-quality photos and videos of ocean life and expeditionary science that we are now using to support the objectives of our OTZ Engagement Plan.

An Audacious Effort

Normally, planning and mobilizing for a mission like this would take months. But because WHOI is home to assets that include dedicated marine operations and seagoing technical teams, as well as scientists with extensive at-sea experience, we were able to pull together a mission plan and the necessary resources in record time.

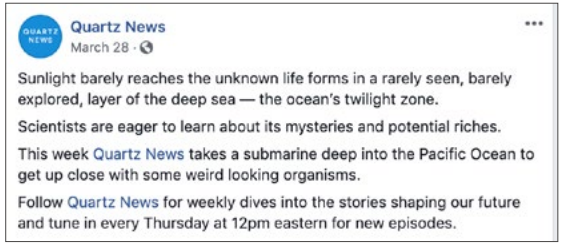
Preliminary Results

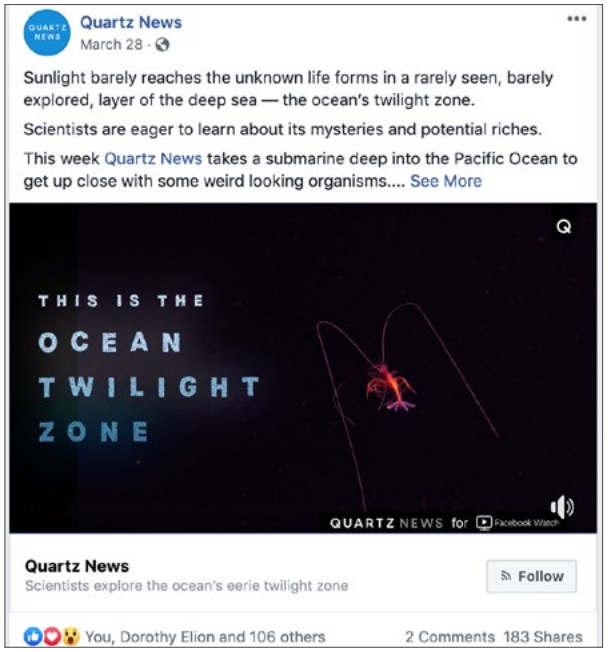
The results from this unanticipated mission have advanced our understanding of the twilight zone faster than anticipated and also expanded our exploration of the twilight zone into a new geographic region of the ocean.

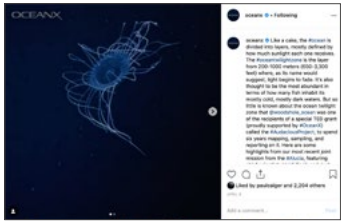
Other Recent Accomplishments

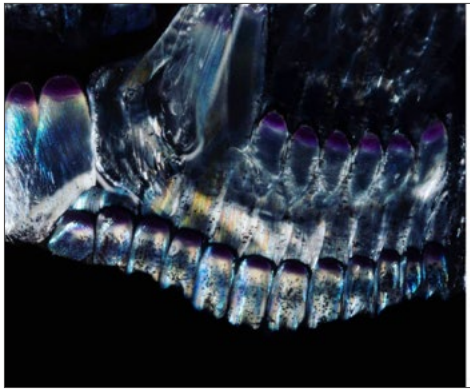
- Preliminary eDNA analyses complete
- Fish and other organisms from *Bigelow* cruise completely dissected
- Working to identify pathways for near-real-time analysis of acoustic data
- Isotopic analysis of marine snow complete from 2018 EXPORTS cruise

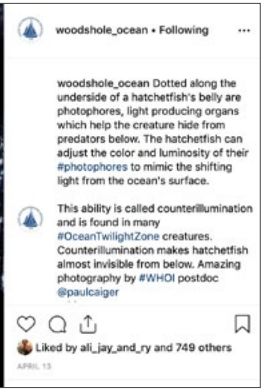
M/V Alucia cruise social media



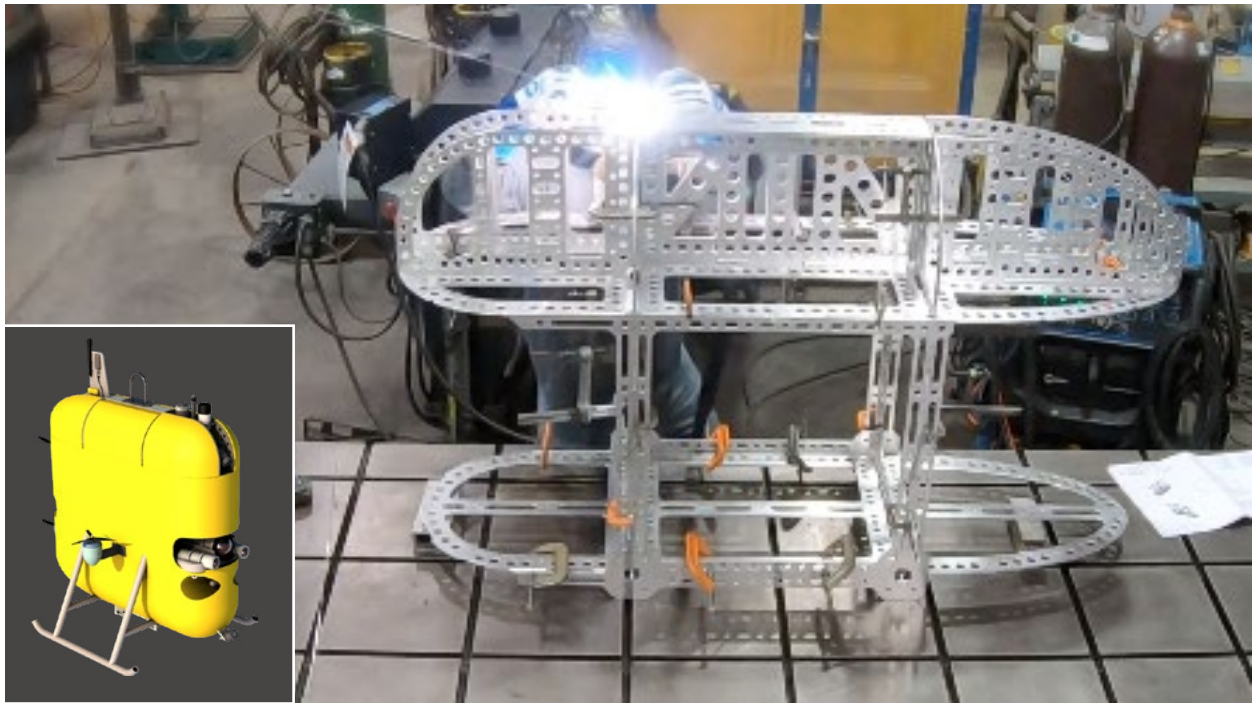








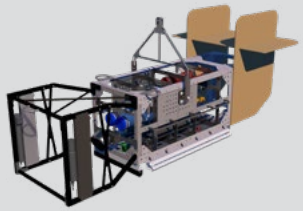
Advancing technologies



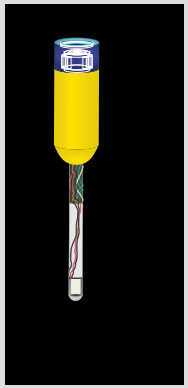
Accelerating Mesobot

Our latest audacious innovation, *Mesobot*, is in the final stages of construction. Even as it was being assembled at WHOI, OTZ engineer Jonathan Howland was in the Pacific on board the research vessel *Rachel Carson* with scientists and engineers from the Monterey Bay Aquarium and Research Institute and Stanford University to test *Mesobot's* lights, cameras with tracking software developed by our collaborators. Using one of MBARI's remotely operated vehicles, the team demonstrated the vehicle's ability to track zooplankton for several hours using only dim red light that minimizes disturbance to the animals. This next quarter will also see the first ocean test of the *Mesobot*, likely back on board the *Rachel Carson*.

TECH UPDATES



Deep-See is receiving a complete overhaul and upgrade based on its first successful expedition in August 2018. Its camera system is greatly improved, the acoustic sensors are synced, the entire electrical system has been rebuilt, and the processors that upload data have been improved. The vehicle will be reassembled and well tests will begin in June.



MINIONS—small floats that measure sinking rates of marine snow to help us understand how carbon moves through the twilight zone—are well on their way to becoming a reality, with continued development of the sensor and tracking modules, as well as a shift to an all-glass housing. Prototypes have been made to fit the new housing with anticipated field tests as early as the OTZ summer cruise of 2019.

Policy *Making the case for the ocean twilight zone*

While some OTZ members were at sea, others were promoting the importance of twilight zone sustainability on land—at the United Nations (UN). Much of the twilight zone lies in the "high seas"—waters beyond national jurisdiction where relatively few laws or international agreements apply. With exploratory fishing activities by several nations already underway, ensuring that the twilight zone is included in all ocean policy discussions is one of the OTZ Project's highest priorities.

From March 20 to April 5, OTZ marine policy expert Porter Hoagland and his student Aria Ritz Finkelstein attended the 2nd Session of the Intergovernmental Conference on the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction (BBNJ) at the UN in New York City. They distributed the dedicated OTZ edition of WHOI's flagship magazine, *Oceanus*, with a cover letter outlining how the twilight zone is directly linked to BBNJ objectives.

In addition to one-on-one meetings introducing the twilight zone to delegates, Finkelstein gave a statement to the entire BBNJ plenary about the importance of the twilight zone. These efforts laid the groundwork for emerging twilight zone science to inform the treaty negotiations focused on the governance of marine biodiversity outside of any nation's exclusive economic zone.

"It's clear that delegates are getting the message, that it's not just about the surface fisheries or deep seabed mining," said Hoagland. "There's a vertical dimension to the ocean and a big part of that is the twilight zone. It might be out of sight, but we'd like to make sure that it's not out of mind."

Diving deeper at TED

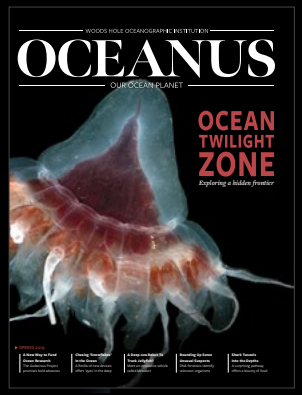
After Heidi Sosik's successful TED talk last year, we wanted to make sure attendees of the 2019 conference kept the ocean as a whole, and the twilight zone in particular, forefront in their minds. With support from the Avatar Alliance Foundation and the Dalio Foundation, WHOI teamed up with OceanX and the BBC to create an immersive ocean experience at TED2019 in Vancouver (April 14-19). The installation included a massive video wall consisting of five, 14-foot pillars showcasing stunning underwater footage, as well as displays that represented the breadth and depth of WHOI's effort to expand human knowledge about the ocean.

The exhibit reached thousands of conference goers, with hundreds stopping to explore and engage with participating OTZ team members—Heidi Sosik, Andy Bowen, and Sam Harp. Building strategic partnerships is a key OTZ engagement goal and the contacts we established at TED2019 will considerably broaden our reach.

Increasing awareness of the Ocean Twilight Zone Project

The Ocean Twilight Zone Project headlined three high-level events this past quarter with great success.

- Phil Renaud and Ken Buesseler presented updates about the OTZ Project to the Robertson Foundation staff and to its Board of Directors.
- Heidi Sosik told the OTZ story and shared some early results with WHOI's New York Chapter at the New York Yacht Club.
- After Larry Madin returned from the research cruise on M/V *Alucia*, he updated a Trustee and Friends reception in Florida at the Sailfish Club about the OTZ Project's recent successes.



WHOI published a dedicated Ocean Twilight Zone edition of *Oceanus* magazine. This issue had a distribution of 12,000 print copies and over 15,000 views of related web content.

Media and social media highlights

FEATURED MEDIA

QUARTZ MEDIA

7,000,000

GOTHAMIST

700,000

OVERALL STATS

300+
EARNED MEDIA STORIES

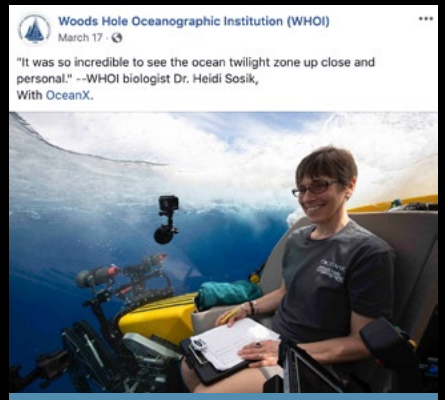
130,000,000
POTENTIAL REACH

175
SOCIAL MEDIA POSTS

2,000,000
SOCIAL MEDIA REACH

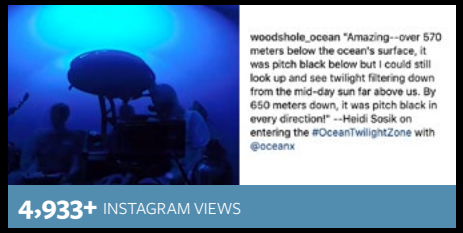
15,330
WEB VIEWS

TOP POSTS

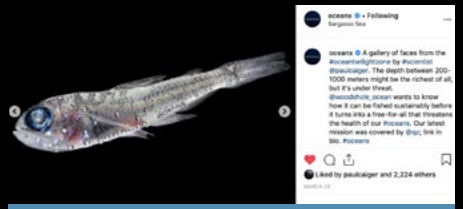


1,500+ FACEBOOK REACTIONS

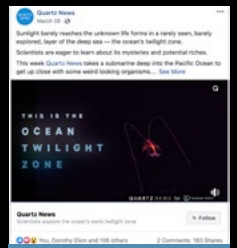
452 FACEBOOK REACTIONS



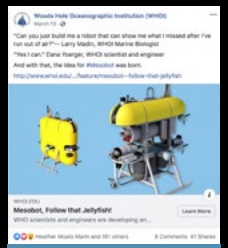
4,933+ INSTAGRAM VIEWS



2,225 INSTAGRAM LIKES

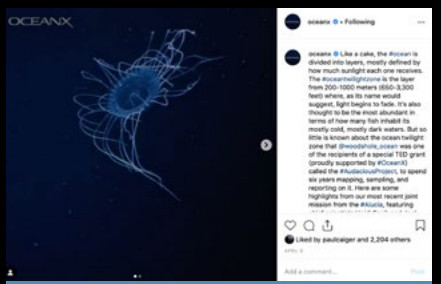


393 FACEBOOK REACTIONS



211 FACEBOOK REACTIONS

4,161 RETWEETS **95** RETWEETS **214** LIKES



2,205 INSTAGRAM LIKES

1ST QUARTER SOCIAL MEDIA STATS - COMPARISON OF REACH FROM LAST QUARTER

15,335 ENGAGEMENT ▲ 177%

273,138 REACH ▲ 263%

2,543 ENGAGEMENT ▲ 580%

413,867 REACH ▲ 672%

5,002 ENGAGEMENT ▲ 111%

47,201 REACH ▲ 83%

The Ocean Twilight Zone Project is embarking on a journey to explore and understand one of our planet's hidden frontiers—the ocean twilight zone. Our project will combine exacting science, innovative technology, and broad engagement to turn knowledge into actions that improve understanding of our planet and how to live sustainably on it.

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