by Catherine Brown

***Shimmer* by Rebecca Rutstein is almost as tall as a seven-story building.**

Artists at Sea

ILLUMINATING THE MYSTERIES OF OCEAN SCIENCE

At the Georgia Museum of Art, visitors can experience being submerged in the deep sea.

The large installation there by artist and ocean explorer Rebecca Rutstein has steel hexagonal shapes inspired by hydrocarbon structures found in the Guaymas Basin in the Gulf of California. Rutstein explored the basin with marine scientist Samantha Joye. LED lights change as visitors move through the space. These changing, shimmering lights represent the siphonophore, a bioluminescent organism that separates when disturbed, creating flashes of light that can be seen when entering the water column during the more than 7,000-foot (2,200-m) descent into the deep sea.

Very few people will experience bioluminescence in real life, and that's exactly why Rutstein created the installation. "I'm trying to share places and processes hidden from view to connect people with the beauty [and] complexity of the deep ocean," she says.

Exploring New Frontiers

For centuries, artists have accompanied explorers to depict new discoveries. When the famed Captain Cook traveled to the Pacific Ocean in the late 1700s, for instance, he brought along several artists. Some sacrificed their lives in their quest to visually represent a world few from home would ever see.

As scientists explore a new frontier today—the deep ocean—many are bringing artists working in a variety of media to visually interpret and share their findings.

Rutstein is one of many artists to explore the ocean with scientists. In addition to working with Joye, she has explored the deep sea with the Ocean Exploration Trust's Science Communication Fellow program aboard the Exploration Vehicle (E/V) *Nautilus* in a mapping expedition from the Galapagos Islands to California. She also participated with the Schmidt Ocean Institute's Artist-at-Sea program. There she joined scientists on the Research Vessel (R/V) *Falkor's* sonar mapping expedition from southern Vietnam to the island of Guam and on an expedition on the R/V *Atlantis* off the coast of Costa Rica.

Artists Who Love Science

Both Artist-at-Sea programs have provided opportunities for many artists to accompany scientists and crew along deep-sea expeditions. The Schmidt Ocean Institute alone has had 32 participants since 2016, fostering cooperation between artists and scientists. "The artists participate like the science party, conducting science and collaborating with them," says Carlie Wiener of Schmidt Ocean Institute. "It's inspiring for the artists, and it inspires the scientists to be more creative."

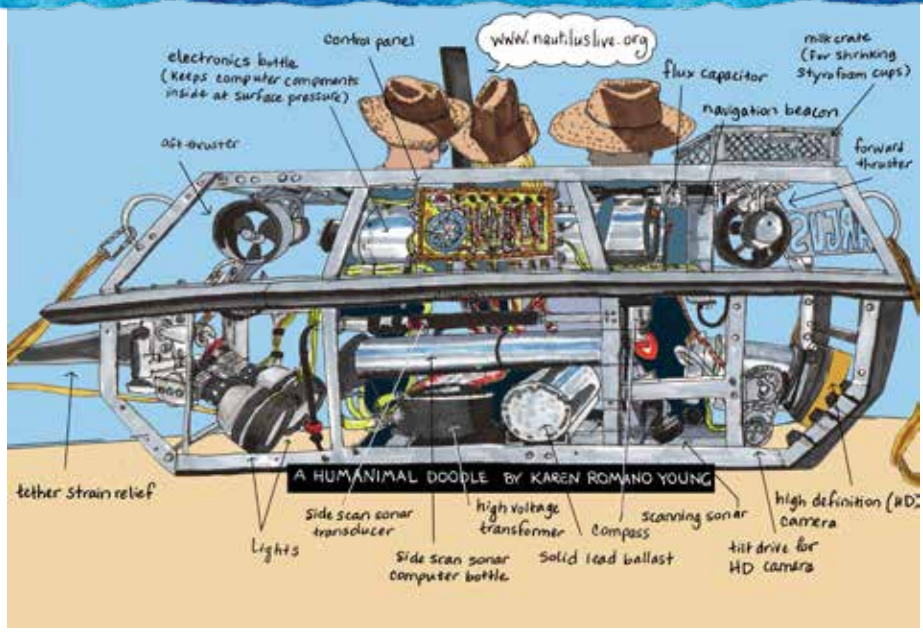
The Institute doesn't require artists to have extensive background in the sciences but rather a passion for learning. "We look for artists who

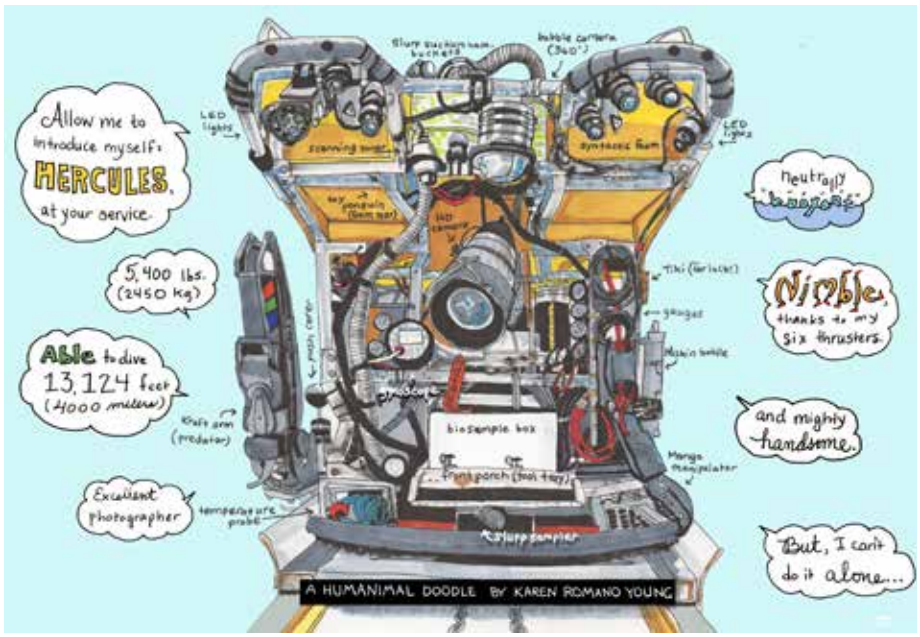
are interested in communicating about oceans and want to learn about scientific processes and data," says Wiener. That describes Rutstein, who took classes in geology in college and considers herself an enthusiast rather than a scientist.

Artists Depicting Scientists

Karen Romano Young, a children's book author and illustrator, has traveled with the E/V *Nautilus* as well as on expeditions to Antarctica. At times she considered becoming a scientist, but she knew she would miss writing and art too much. Instead, she uses words and pictures to teach kids about ocean science. "Of the 28 people on a ship, only eight to ten are scientists or graduate students studying science," Young says. "If you're passionate about ocean science, you can find your own way in."

While participating in research cruises, Young draws the vessel and its equipment to try to understand how it all works. "I could draw and start to learn about it and then sit down with the engineer and ask him what everything is," she says. She spent much of her time creating detailed drawings of the vessel, equipment—including Hercules, the remotely operated vehicle aboard the *Nautilus*—scientists, and crew on a long piece of paper taped down on





On a research cruise, Karen Romano Young drew the vessel and its equipment.

Adam Swanson painted activities aboard the R/V *Falkor.*

the counter. Those illustrations were used as outreach to educate the general public on the expeditions and for conferences about deep-sea science. In 2021, they will appear in Young's nonfiction graphic novel *Deep Sea Dragons.*

Painter Adam Swanson accompanied the R/V *Falkor* for several weeks as a Schmidt Artist-at-Sea participant in 2018, when a robot cruised the ocean floor looking for methane plumes. Swanson set up a small studio space in the wet lab, where, as he says, "researchers were consistently swirling around." Swanson created eight paintings of the activity happening on board the vessel and even took part in helping collect and record data. "In some cases, I mixed sea mud into my very paint to create the lively texture and color of the ocean floor," says Swanson.

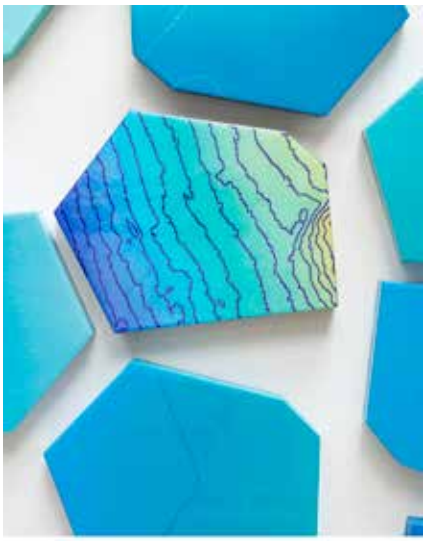
Artists Teaching About Science

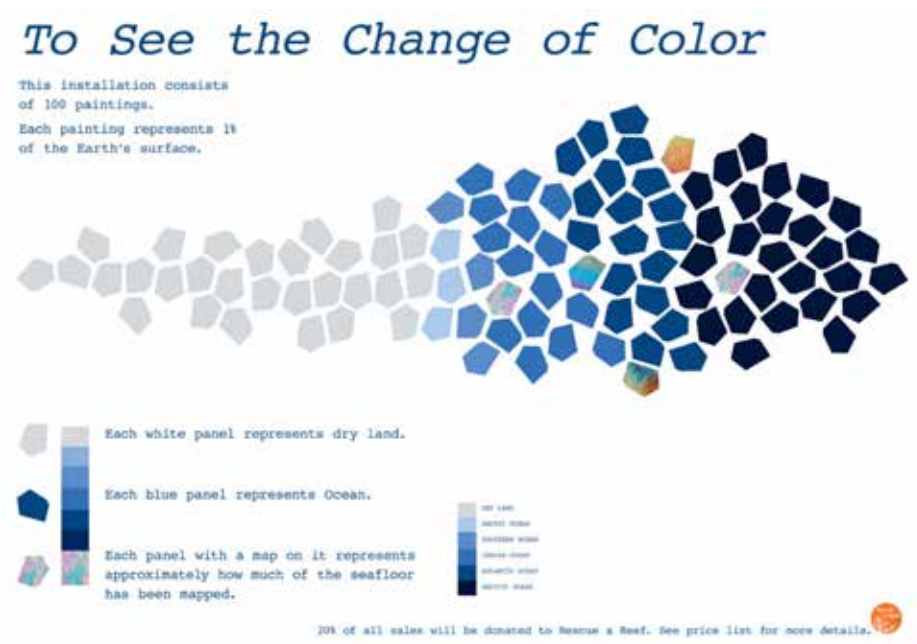
When Lizzy Taber completed her voyage aboard the R/V *Falkor*, she couldn't stop thinking about how scientists have mapped less than 10 percent of the ocean floor. The oceans cover 71 percent of the planet, so that means much of the planet has yet to be mapped. When Taber returned to her studio, she created an installation with 100 paintings. Twenty-nine were white, which represented dry land. Seventy-one were blue to represent the ocean, and only a few incorporated maps. "I wanted a simple way to visualize that single fact."

Art can represent data in both simple and complex ways. When scientific illustrator and fiber artist Michelle Schwengel-Regala traveled from Honolulu to Tahiti on board R/V *Falkor*, the scientists were collecting water samples from oxygen-deficient zones to better understand biogeochemical processes there. After seeing the data on graphs on computer screens in the ship's Control Room, Schwengel-Regala decided to visualize it using knitting and embroidery techniques.

For her "data textile" series, Schwengel-Regala knit flat squares and embroidered graphs representing water temperatures, oxygen levels, and light levels at

Lizzie Taber's installation of 100 paintings shows how much of the ocean has yet to be mapped.





various depths to compare the differences between water columns at each location.

Because the researchers frequently talked about "wire time"—the sessions when the ship would stop at a location and send water-sampling equipment into the water using a long wire—Schwengel-Regala created a series of 3D sculptures using aluminum wire as the yarn. "This large-scale wire knitting was a novel technique I developed only because of the Artist-at-Sea experience," explains Schwengel-Regala. "These sculptures help us visualize the amount of each 'invisible' thing being measured, all from a seemingly clear sample of water."

Schwengel-Regala's works were displayed at the 2017 Honolulu Biennial. When two scientists from her voyage saw her first sculpture, they immediately identified the exact location from which the researchers on the *Falkor* collected samples based on her knitted data.

Michelle Schwengel-Regala visualized water sample data using knitting and embroidery.

Why Do Scientists Need Artists?

With videography and photography so accessible, why do scientists need artists on board an exploratory or research vessel? Can't they just take photos?

Yes, but, as Young explains, artists can do what photographs can't: reveal all the details and find the story. "I couldn't always see into the shadows when taking photographs for later work," she says. "With drawing, I can illuminate the shadows, pull something out and make it clear, highlight relationships, and take things out that don't matter."

Because artists can find the story, they can help communicate scientific knowledge in remarkable ways. "Artists have an amazing role as communicators that scientists can't necessarily fill," Rutstein explains. "The deep sea is obscure and magical. I hope to transport the viewer through visual and immersive experiences."

Artists can help reveal these hidden worlds, as Rutstein did in *Shimmer*, or present data in compelling ways, as Schwengel-Regala did in her knitted works. They can help audiences learn and care about what they are unable to see in real life. "Since humans are visually oriented creatures, seeing science-themed art can be a bridge to spark interest in the natural world," says Schwengel-Regala.

It's not just about artists communicating scientists' thoughts and research, though. The collaboration can work both ways. Samantha Joye, the marine scientist who collaborated with Rutstein, talked about the benefits she gets from working with Rutstein in an article published by the University of Georgia: "I knew she would 'see' things I didn't because she has a different frame of reference. Experiencing the deep sea with her made me shift my reference point; it opened my eyes and generated a different experience."

Both artists and scientists have unique perspectives on the world that can inform one another. Both constantly ask questions while innovating and creating. "Although the end products created by artists and scientists can be very different, both seek to understand the world around them. Art and science is the most magical connection there is," says Taber.

Writer **Catherine Brown** finds the idea of exploring the deep sea both exhilarating and terrifying. Because she likely will never accompany scientists on a deep-sea expedition, she appreciates that these artists are able to convey the experience in such compelling ways.