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Exploratorium's New Digs

MIRANDA C. SPENCER

In April, the pioneering Exploratorium science museum relocated and expanded to a much larger building on piers overlooking San Francisco Bay. The museum blends public engagement with opportunities for scientists to work in a unique environment.

Founded in 1969 by physicist Frank Oppenheimer, of Manhattan Project fame, the Exploratorium was one of the first museums to introduce participatory exhibits, which help visitors of all ages and backgrounds understand the natural, physical, and cognitive sciences by interacting with real lab samples, professional-grade equipment, and data sets that have been arranged in game-like displays that engage the senses.

Studies show that informal, direct experience is key to communicating science. "Experiential learning [is] the strongest method of introducing science to communities," explains Bud Rock, CEO of the nonprofit Association of Science–Technology Centers, who calls the Exploratorium "a model for our field as a whole."

"We let people learn about the world as scientists do," says Jennifer Frazier, project director and associate curator of the museum's nearly-12,000-square-foot East Gallery, "by making observations, asking questions, forming hypotheses, and then testing them, rather than just reading how something works."

The Living Systems Department, where she works, uses marine, cell, and plant biology to teach visitors through participation about the development and interdependence of life. Frazier says that the new facilities aim not only to allow visitors to engage with basic questions such as "What is DNA?" but also to "translat[e] basic research into a public experience"—that is, something visitors can literally and figuratively grasp. Increasingly, this research results in large data sets, which are "transforming most areas of biological sciences," she notes. "They allow you to see things you never could before: new phenomena, new patterns, new relationships."

The gallery features a wall of floor-to-ceiling windows that keeps the Bay in view and is anchored by the 2700-square-foot bio lab, where specimens such as fluorescent zebrafish embryos are cultured and exhibits developed and tested. The lab's glass walls (like a restaurant's open kitchen) are clear enough to allow visitors to watch the staff and visiting biologists doing bench work and low enough for visitors to peer over and ask questions.

"Our goal is to be as transparent as possible and still be able to do our work," says Kristina Yu, director of living systems at the museum and a cell biologist who led the collaboration to adapt professional microscopy equipment into what is now the Microscope Imaging Station.

The Exploratorium's new Plankton Populations exhibit, a visualization tool, is based on a physical and chemical model of the global oceans—created using super-size data sets—that has been used by the Darwin Project, a Massachusetts Institute of Technology (MIT) research group, to study the number, diversity, and behavior of plankton.

Working with experts from MIT and the University of California's UC Davis Center for Visualization, the Exploratorium team created an interface in the form of a large, color-coded table representing the global oceans that constantly changes as the seasons cycle over the course of a few minutes. Visitors experiment with a magnifying-glass-like viewer to explore questions about the four major groups of phytoplankton, such as when and where they survive.

Nearby is the Fisher Bay Observatory Gallery and the Wired Pier. Through placement of sensors and other instrumentation, the museum gathers and displays real-time information about environmental variables such as water temperature, salinity, and currents, explains Mary Miller, the museum's project director of public understanding of research. These open-source data will also become part of the US National Oceanographic and Atmospheric Administration's (NOAA) Integrated Ocean Observing System. The Exploratorium's partnership with the NOAA began in 2009, but starting in April, the museum became a "friendly port" where sample-bearing research vessels began docking periodically—a first for the agency, according to spokeswoman Jana Goldman.

Local scientists will also figuratively dock at the Exploratorium through an experimental series debuting this fall. "We get calls regularly from research communities that wonder if there is any way to make their work accessible," says Susan Schwartzenberg, senior artist and curator of the Bay Observatory. The program will let biologists share work in progress with the public through demonstrations, followed by conversations over lunch in the Observatory. In this way, she says, scientists will learn "how to be educators.… It creates a literacy in both directions."

The Exploratorium's expansion was funded through a $300 million capital campaign. The museum's core supporters include many individuals as well as foundations and corporate giants, among them the Gordon and Betty Moore Foundation, the Stephen Bechtel Fund, and Chevron Corporation. The museum also generates income from its new Global Studios program, which brings the Exploratorium's hands-on approach to governments and institutions around the world, including constructing an invent-it-yourself Tinkering Studio for a science festival in Al Khobar, Saudi Arabia.

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