

National Science Foundation Awards \$600K for *The Virtual FishTank* Exhibit

The National Science Foundation's Informal Science Education group has awarded the Museum a \$600,000 grant—the largest ever to the Museum—to develop *The Virtual FishTank*, scheduled to open in late 1997. The exhibit immerses visitors in a gigantic computer simulation of an aquarium, where they can create and interact with their own virtual fish, and gain new insights into how complex systems work.

In collaboration with the MIT Media Lab and the New England Aquarium, the Museum will build this virtual ecosystem using the latest techniques in 3-D computer graphics, Java programming, simulations, and artificial life. The *FishTank* will offer firsthand experiences in modeling real-world phenomena with sophisticated design and simulation tools and reveal how simple behavioral rules can produce surprising results.

“Building a model to simulate the real world is a powerful way to understand it,” says Mitchel Resnick, professor of research in education at the MIT Media Lab and *FishTank* project co-leader. “One of the best ways to learn is to make things. Here, you create rules for your own artificial creature and observe how it behaves. It’s an engaging experience—and also highlights important scientific ideas.”

The Experience

At 10 networked FishBuilder stations that are linked to the exhibit’s central fishtank, visitors design their fish, choosing physical traits such as coloration and body shape. They also select behavioral parameters such as food preference, reaction to light and response to other fish. The effects of their choices are displayed immediately on a computer monitor. When satisfied with their design, visitors tag their fish, and “launch” them into the *FishTank*.

Three 10-foot-by-12-foot projection screens surround visitors in the simulated aquarium, which is filled with computer-generated fish, plants, snails and coral. Here, visitors experience how a few simple rules embedded in the design of individual fish generate complex behaviors and patterns for the entire ecosystem. For example, a school of fish

may appear to have a leader, but actually local interactions among all the fish determine the orderly pattern. The exhibit will demonstrate that this phenomenon can apply not only to fish, but also to ants, birds, immune systems, highway traffic, market economies, fashion fads, and political moods.

Visitors can control the tank environment using various devices to program the presence of light and food.

“Everything in the ecosystem relates to everything else,” explains Resnick. “Visitors will see unexpected results. A visitor might program a fish to keep a certain distance from other fish, but it might end up dancing with other fish instead.”

In developing the *FishTank*, the Museum has convened a distinguished panel of advisors. They include Richard Dawkins, Oxford University; Marquita Jackson-Minot, Harvard University; Melanie Mitchell, Sante Fe Institute; Craig

Reynolds, Dreamworks; Charles Taylor, UCLA; Beth Warren, Technical Education Research Center; and Brian White, MIT.

Led by David Greschler, director of exhibits and project co-leader, the Museum is focusing on exhibit-related issues, while the Media Lab designs the software to run the *FishTank*, and the New England Aquarium assists with biology content development and formative evaluations. The *FishTank* will lend itself to structured educational activities that encourage visitors to predict the outcomes of a variety of manipulations of fish within the tank.

A second, traveling version of the *FishTank* is planned for spring 1998 to bring the exhibit to museums around the world. Sixteen museums and aquaria have expressed interest, including the Franklin Institute in Philadelphia and the Exploratorium in San Francisco. An online version, called FishNet, is also under consideration. The Museum is seeking further corporate and foundation support for this landmark exhibit.



This artistic rendering depicts visitors exploring *The Virtual FishTank* with Museum staff.

Copyright 1995 The Computer Museum
(drawing by Ann Powers)