Particularly serene
iLab’s new moon jellyfish
by Jonathan Pishney, Head of Communications

Inspiration, almost by definition, can happen when you least expect it. On a 2007 visit to the New England Aquarium in Boston, Deb Bailey gravitated toward a special exhibit on jellyfish. Finally came to the forefront this spring. For months, members of the Museum’s Living Collections staff had been talking to her about the moon jellyfish they were raising on site, and how they wished they had somewhere to put them on display. Most recently, Bailey had sought to partner with educators at the Monitor National Marine Sanctuary to develop marine science courses, including one exploring the role of jellyfish in ecosystems in or near shipwrecks. Finally, with funding from longtime lab supporter Bogen Foundation, Bailey dove in, buying the tank and supplies necessary to house live moon jellyfish in her lab. The three “trial jellies” were an instant hit, almost to the detriment of Bailey’s teaching efforts, as students in her classes often had a hard time ignoring the jellyfish floated mere feet away. “I just try to work the jellyfish into whatever lesson I’m teaching at the time, then redirect the students’ attention,” she grins. “I don’t even try to compete.” In fact, she appears to have given in completely, telling the Living Collections folks to add as many as they want. They have been happy to oblige.

Working with Jellies
Tucked away in a nondescript room just outside the public eye lies an impressive jellyfish production line. Ten tanks of various shapes and sizes, linked by PVC and plastic tubing, help keep this homemade marine ecosystem flowing. At the head of this setup are Museum fish and invertebrate specialists Tom Fenske and Mary Cols. Bailey has 30 years of experience working with jellyfish. “Just a nerve net [very simple nervous system] that pulsates for swimming. But mostly they just ride around in the current.” Creating a circular current in the tank is a top priority for Fenske, as he wants to limit the jellies’ contact with the sides of the tank as much as possible. Even air bubbles in the tank can be dangerous, as a bubble trapped inside their bell will slowly pass right through, creating a hole or wound. Jellies are made up almost entirely of water – estimates range from 95 to nearly 99 percent. (When jellyfish die, they almost completely disintegrate. The only evidence that they have passed may be one less jellyfish in the tank.) The remaining percentage is devoted to reproductive organs and a digestive system. “They basically just gonads and guts,” quips Bailey. The guts are colorful, and more noticeable, immediately after feeding. They resemble a four-leaf clover at the center of the bell, and for the roughly two hours it takes to digest their meal of tiny crustaceans, the cloverleaf takes on the food items’ orange/pink hue. The area then returns to a milky white in between meals.

With a twice daily, 365-day-a-year feeding regimen, breeding the jellies’ live food on site is not only necessary but the task that Fenske and Cols agree is the most challenging, or at least the most time-consuming part of raising jellyfish. Near-microscopic rotifers (zooplankton), copepods and daphnia (small crustaceans), and copious amounts of tiny brine shrimp are all raised in separate tanks because these creatures are not only food for jellies, but in some cases for each other as well. Ultimately, Fenske and Cols’ goal is to produce well-fed adult medusae that can then be added to the jellyfish tank in the Micro World of iLab, while surplus jellies can be sent (as a courtesy) to other facilities, like the Greensboro Science Center and Florida Keys Aquarium Encounters in Marathon. Despite all the hard work that raising jellyfish (and their food) entails, the rewards are clear. “We’re showing something that a lot of people know about but only tend to see dead and washed up on the beach,” Fenske says. “This gives Museum visitors a chance to see moon jellyfish alive and in the water.”

A group of jellyfish is called a “smack.”

Fish and invertebrates Cruiser Mary Cols checks the tank filled with moon jellyfish polyps. Euphyra produced by the polyps rise to the surface and flow into the adjacent tank, where they continue to grow.

DID YOU KNOW?
Moon jellyfish may not have been to the moon, but they have been to space. As part of NASA’s first Spacelab Life Sciences (SLS-I) Mission in 1991, more than 2,000 moon jellyfish polyps traveled abeam the space shuttle Columbia. Astronauts induced these polyps to produce baby jellyfish then monitored their development to adulthood. Why? It seems jellyfish orient themselves to gravity in a similar fashion to humans. As a jelly grows from polyp to medusa, it forms calcium sulfates crystals around the margin of its bell that serve as gravity orientation sensors, much like otoliths in a human’s inner ear. The goal of these experiments is to identify if and how these crystals form when raised in the microgravity of a space ship, and how jellies born in space then adapt to life on Earth, and eventually to walk on the moon. The answer: not well. Results of a study published in 1994 showed that space-born jellies returned to their home planet displayed “pulsing and movement abnormalities, compared to their Earth-bound counterparts.” Basically, they had vertigo. Why is this important to NASA? Because as humans prepare for future long-term space travel and colony development, it’s safe to assume that one day human children would be born in similar microgravity conditions, on route. And then, how would they fare when placed back in normal gravity?