

Turn kids on to bioluminescence

By DOREE ARMSTRONG
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Most people know that fireflies have a glowing abdomen that looks really pretty at night, but did you know that the decapod shrimp actually vomits light into the face of predators so it can get away?

GLOW: LIVING LIGHTS

WHAT: Traveling exhibit on bioluminescence

WHERE: Pacific Science Center, 206-443-2001; www.pacsci.org;
www.glowexhibit.com

WHEN: Through Sept. 6

ADMISSION: \$10 adults, \$7 juniors (ages 3-12), \$8.50 seniors, free for children 3 and younger

That's just one of the fascinating tidbits children and adults will learn about the science of bioluminescence at Pacific Science Center's newest exhibit, "Glow: Living Lights."

"Glow" is on a 15-city tour, and it's the first museum exhibition to explore bioluminescence, an organism's ability to produce its own light. Since an estimated 90 percent of midocean animals produce light, whether to attract mates and prey, or escape predators, the study of bioluminescence is a rich one.

Dr. Edith Widder, curator of the exhibit, knows more about the phenomenon than just about anybody. She's a certified deep submersible pilot, having made more than 200 dives in the Johnson-Sea-Link submersibles, and has written two children's books on the subject -- "The Bioluminescence Coloring Book" and "Lucinda's Lamps: A Mermaid's Guide to Bioluminescence."

She made her first dive in a single-person submersible in 1984. It looks kind of like a big, puffy astronaut suit with heavy, bulky arms.

"I had to lift weights for a year to be able to qualify to dive," she laughs. "But, I got down and turned out the lights and said, 'Oh wow!' "

Widder is a senior scientist and principal investigator at Harbor Branch Oceanographic Institution in Florida. She is also a professor at several institutions,

including Johns Hopkins University, the Monterey Bay Aquarium Research Institute of Technology and Florida Atlantic University.

She has been chief scientist on 30 research cruises, and took many of the photos in the Glow exhibit. She was also the first person to shoot video of bioluminescence in the ocean.

Dinoflagellates are single-cell organisms that are the most common source of bioluminescence on the ocean's surface. Widder says if you're ever on a boat that flushes the toilets with seawater, you'll see them.

"You stumble to the head at night and you can think you're having a religious experience."

She tells of one dive where she came face to face with a chain of bioluminescent jellyfish about 30 feet long.

"This thing was so bright that it lit up all the dials and gauges inside the submersible," she says.

Widder's favorite bioluminescent animal is the black dragon fish, because nearly every part of it lights up -- the belly, undereye "flashlights" to help it see prey, and a chin barbel (a threadlike growth that is a touch organ).

Animals can use their lights as a "bioluminescence burglar alarm" to attract bigger predators to gobble up whatever is attacking them.

Widder began studying the subject for her Ph.D. Her interest in electrical engineering was extremely helpful (she originally had planned her master's degree in it), and when her professor got a grant to measure the colors of bioluminescent light sources, she became the lab's expert.

"I was intrigued by this ability to produce light," she says.

It's difficult to get sensitive instruments deep into the oceans, so she's spent a lot of time developing equipment to measure and quantify bioluminescence. She co-holds the patent on a device with the impossibly complicated name of High Intake Defined Excitation Bathypotometer, which the U.S. Navy uses to measure bioluminescence in the world's oceans.

Scientists can identify animals by the type of bioluminescence they produce. And that light-producing capability is being used to help find cancer cures, detect harmful bacteria and determine the presence of anthrax spores.

Diving in the ocean is a scary, exhilarating experience.

"It's a huge frontier, because we've only explored about 5 percent of it," Widder says. "Scientific curiosity takes you beyond any fear factor because you so want to see what's out there."