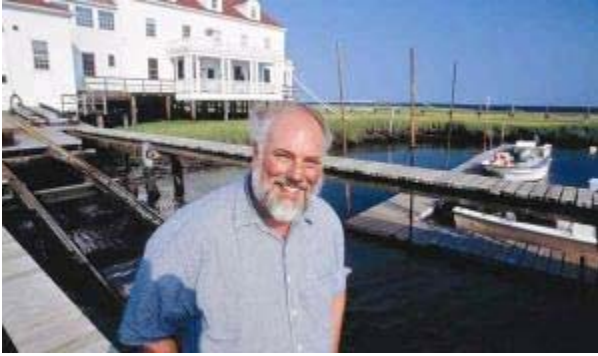




Posted on Wed, Feb. 18, 2009



J. Frederick Grassle of Rutgers , in Little Egg Harbor Township, led the first expedition to deep-sea vents near the Galapagos. Franklin Institute Awards for 8 trailblazers

By Sandy Bauers
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J. Frederick Grassle descended deep into the sea and found new life.

Sandra M. Faber looked far into space and discovered the secrets of distant galaxies.

Richard J. Robbins developed a better way to tunnel through the earth.

The Franklin Institute is announcing today that these three and five others will be honored in April as trailblazers in science, business and technology.

They will be in elite company. Previous recipients of the Franklin Institute Awards, which date back to 1824, include Albert Einstein, Thomas Edison, Orville Wright, Jane Goodall, and Marie and Pierre Curie.

Perhaps the most recognizable among this year's recipients is T. Boone Pickens, the Texas oilman who recently has become one of the nation's most vocal champions for renewable energy.

Pickens formed Pickens Fuel Corp., now known as Clean Energy, and in 2008 heralded the "Pickens Plan," calling for more use of wind energy, and natural gas to power cars.

Pickens also is a philanthropist who has given more than \$600 million to medical research, youth programs, education, athletics and wildlife conservation.

Pennsylvania State University's Stephen J. Benkovic is being honored for his work with enzymes, including those in DNA replication.

Other recipients have made advances in nanotechnology, robotics and "fuzzy logic."

For several days beginning April 21, the medalists will be at the Franklin Institute to participate in events open to students and the public.

Grassle, a Rutgers professor who until recently was the director of its Institute of Marine and Coastal Sciences, led the first biological expedition to newly discovered deep-sea vents near the Galapagos Rift, off Ecuador.

It was the mid-1970s. He and another scientist on the deep-sea submersible Alvin sat in the darkness for the 90 minutes it took to descend 1.5 miles to the ocean floor.

Turning on the lights, they saw a strange landscape of giant tube worms, huge clams and mussels around high-temperature vents that spew mineral-rich fluids heated by the still-hot oceanic crust.

Grassle, who has had 12 aquatic species named after him, did early research - 30 years later, mysteries remain - into how the organisms survive in that environment.

Grassle now is a leader in the Census of Marine Life, an international project to study biodiversity in the oceans.

He thinks society has never appreciated the planet's oceans enough because so few people have really seen them. "We just have to get more of them into the deep sea," he said.

When Faber, of the University of California at Santa Cruz, was a girl in Mount Lebanon, a Pittsburgh suburb, she had a choice: to study the smallest of worlds, such as fundamental particles, or the largest, such as galaxies.

Entering the dome of the 24-inch refractor telescope at Swarthmore College sparked "love at first sight."

She was one of a group of researchers known as the "Seven Samurai" who determined a new way to measure the distance to galaxies.

Her work is focused in part on "dark matter" - a still-unknown substance that does not absorb or emit light but exerts a gravitational effect on galaxies.

The single most mind-boggling thing she has learned, she said, is the fact that our huge home galaxy, the Milky Way, some 100,000 light-years across, started out as a flicker in the briefest of instants - a microscopic "quantum fluctuation" that occurred "10 to the minus 35 seconds" after the big bang.

While many view the cosmos as a mystery, to Faber "it all makes sense. . . . I can see that it's the same laws of physics that govern everything, including us. More than most people, I have a sense of oneness between myself and the rest of the universe. . . . That this is my home."

Robbins' work has taken him deep into the ground, below many of the world's great cities and water bodies.

He bores tunnels.

The Seattle businessman took over the family company, the Robbins Group L.L.C., in 1958, after his father died in a plane crash.

He continued to develop a technique his father pioneered, which is said to be faster, cheaper and safer than the old way of using explosives to cut through rock.

Today's Robbins TBMs - tunnel boring machines - use circular blades to pulverize rock. It is then transferred behind the giant, bullet-shaped machine - some so big they have crew quarters - and out the tunnel.

One of his biggest, 50 feet in diameter, is boring a 6.5-mile hydroelectric tunnel between an Ontario generating station and Niagara Falls.

His machines also created the way for the "Chunnel" under the English Channel between England and France.

In a life spent pitting machine against rock, the one thing that still awes Robbins is the rock - its colors, minerals, and patterns made as it formed. "It's beautiful."

Other Winners Of Franklin Award

George Whitesides, Harvard University:

For chemical research in molecular "self-assembly" and nanotechnology, both of which contribute to the fabrication of ultra-small devices.

Ruzena Bajczyk, University of California, Berkeley: For contributions to robotics and computer vision, particularly the development of methods to improve understanding of medical images.

Lotfi A. Zadeh, University of California, Berkeley: For developments in "fuzzy logic," a mathematical system that captures the ambiguity of the human language and thought; it has been applied to artificial intelligence and automation.

See more at the
awards' Web site via <http://go.philly.com/franklin>