



July 26, 2004

Contact: Tim Stephens (831) 459-2495; stephens@ucsc.edu

UCSC scientist Jonathan Zehr receives major award from Moore Foundation for marine microbiology research

The Gordon and Betty Moore Foundation has selected Jonathan Zehr, professor of ocean sciences at the University of California, Santa Cruz, to receive more than \$4 million over the next five years as a Gordon and Betty Moore Foundation Investigator in marine science. The award will support Zehr's groundbreaking research on microorganisms that "fertilize" the oceans by converting nitrogen gas into a form that other organisms can use (a process called nitrogen fixation).

The funding for Zehr and a handful of other investigators is part of a 10-year, \$145 million Marine Microbiology initiative launched by the Moore Foundation this year. Marine microbiology (sometimes called microbial oceanography) is a rapidly expanding field that is commanding increasing attention as scientists learn more about marine microorganisms and the ways in which they influence the global environment.

Zehr's discovery of nitrogen fixation by certain kinds of marine microbes, for example, has implications for everything from the ecology of the open ocean to global warming. Because nitrogen is one of life's essential nutrients, nitrogen fixation helps determine how productive ocean waters can be. And because nitrogen stimulates the growth of marine algae, which absorb carbon dioxide from the atmosphere as they grow, nitrogen fixation is an important factor in determining how the ocean regulates and responds to global warming.

The new grant from the Moore Foundation will enable Zehr to increase his research efforts in this area.

"This is a particularly interesting area of research for me, and it has spawned a lot of general interest among other scientists because of its broad implications," Zehr said.

He added that the award will relieve him from the need to write grant proposals and allow him to focus more on his research activities. "It's certainly going to change my life for awhile," he said.

In a study published in the journal *Nature* in 2001, Zehr and his colleagues used molecular screening techniques to identify several strains of single-celled organisms

called cyanobacteria that are active nitrogen fixers. These microbes, isolated from a monitoring site in the Pacific Ocean near Hawaii, are abundant enough throughout the world's oceans that they may account for as much nitrogen fixation as all previously known nitrogen-fixers. Zehr said he suspects there are even more nitrogen-fixers waiting to be found in the open ocean.

Zehr has plans to use new approaches, including genomics and remote sensing technology, to gain more insights into microbial processes in the open ocean. The introduction of new instrumentation and powerful new molecular techniques has been an important factor behind the growing interest in marine microbiology, he said.

"We have already learned a lot about marine microorganisms from genomics, and it has become a very high profile area of research. I expect to see general interest in this area continuing to grow as more discoveries are made," Zehr said.

One of Zehr's collaborators, David Karl of the University of Hawaii, has also been selected as a Moore Foundation Investigator, along with two researchers at the Massachusetts Institute of Technology, Sallie Chisholm and Edward DeLong (who recently moved to MIT from the Monterey Bay Aquarium Research Institute).

David Kingsbury, director of marine science at the Moore Foundation, said that it was the foundation's goal to not only support the top scientists in marine microbiology, but to stimulate close collaborations between these scientists to even further accelerate progress in this key area of ocean research.

In addition to supporting these individual investigators, the Moore Foundation has provided a grant to the Institute for Biological Energy Alternatives to support a marine microbial sampling expedition in the Atlantic Ocean. The institute, headed by genome sequencing pioneer Craig Venter, is using techniques developed for sequencing the human genome to explore microbial diversity in the oceans.

The Gordon and Betty Moore Foundation launched its 10-year Marine Microbiology initiative in April 2004, with the goal of attaining new knowledge regarding the composition, function, and ecological role of microbial communities in the world's oceans. Funding strategies include supporting Moore Foundation Investigators, linking scientists in related fields, establishing intern programs, and supporting select research projects that will affect ocean science as a whole.

The foundation was established in November 2000 by Intel cofounder Gordon Moore and his wife Betty to create positive outcomes for future generations. The foundation funds outcome-based grants and initiatives to achieve significant and measurable results. Grant making supports the foundation's principal areas of concern: environmental conservation, science, higher education, and the San Francisco Bay Area.

Note to reporters: You may contact Zehr at (831) 459-4009 or zehrj@ucsc.edu.