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NSF Grant Goes to Biology Professor

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BLOOMINGTON, Ill. - Illinois Wesleyan University Associate Professor of Biology Will Jaeckle is part of a team awarded a National Science Foundation (NSF) grant to study deep-sea invertebrates in the Gulf of Mexico and the Caribbean. The four-year project will provide student research opportunities inside and outside of the classroom for IWU students.

Jaeckle, who conducted similar research in Antarctica in 2004 and again this year, is teaming with scientists from the University of Oregon and its Oregon Institute of Marine Biology (OIMB) in the grant project, which will include three cruises to the Gulf of Mexico and the Bahamas. The group will study organisms dwelling on the ocean floor and their microscopic developmental stages (called larvae) that live in the overlying water column. The \$72,000 NSF grant award will offer Illinois Wesleyan students the opportunity to participate in the research cruises and to study collected and cultured larvae that will be reared in IWU labs. Details about how many students will be involved or the date of the first cruise-in spring or summer 2007-are yet to be finalized.



Will Jaeckle

The grant research will examine how the free-living larvae, which develop deeper in the ocean than light can penetrate, get their food. The adults live at depths as great as 3,000 feet (or 1,000 meters); if their larvae manage to ascend to depths above 1,000 feet where single-celled plant-like organisms are available for food, how are they getting the energy to fuel that trip?

"It's a long way to travel, vertically, for a small larva," Jaeckle says. "There's simply very little information about the feeding biology of developmental stages of deep-sea animals. We want to study aspects of their biology by addressing such questions as 'Can they capture food, if so, how do they, and what forms of food are exploited?'" Because the larval stage is the most vulnerable time in an organism's life cycle, anything that happens during this developmental period influences the size of the next generation, Jaeckle says.

"I'm really lucky to be able to work with animals from unusual environments -- animals that are rarely seen. The extremes of their environment-it's dark, it's cold, there's not predicted to be a lot of food-offer some interesting questions about how these little guys make their living, and how they've adapted to such an environment. That's what we're trying to find out."

While later cruises will involve the use of submersible vessels to collect adult species from the ocean floor, next year's cruise will collect larval forms at 100-meter depth intervals by towing a specially designed net. The device is called a "multiple opening closing net environmental sampling system," whose acronym MOCNESS sounds enough like Loch Ness, the fabled underwater monster, to suggest marine researchers' sense of humor.

Jaeckle's previous research has included cruises to study similar animals in Antarctica, and his excitement about the Bahamas work isn't based on its warmer climate.

"Deep-sea and Antarctica are both very interesting environments. In some ways, the larvae have similar challenges, because there is little food in the water in the winter in Antarctica, because the days are so short and the sea is covered by ice. In the same fashion, below 1,000 feet, there's very little light penetration to support what we call phytoplankton, or single-celled plant-like organisms. It would be very interesting to see if we could find common morphological adaptations or even common physiological adaptations" among invertebrate larvae in both Antarctic and deep-sea environments.

Jaeckle's collaborators on the project are principal investigator Craig Young, director of the OIMB; Richard Emlet, professor of biology at the OIMB; and Michelle Wood, professor of biology and director of the Center for Ecology and Evolutionary Biology at the University of Oregon.