Astrobiologist helps IMAX director film

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Graduate student Kevin Hand explores the potential for life on Europa, an icy moon of Jupiter, for his doctoral work in geological and environmental sciences. Like most astrobiologists and planetary scientists, Hand must do his research from afar. He can't ride a rocket 365 million miles to Europa, drill into the ice-capped ocean and scuba dive to find signs of life. Recently, however, film director and exploration enthusiast James Cameron (Titanic, Aliens) gave Hand a chance to search for "alien" life a bit closer to home - a mere 2 miles below the ocean surface - as part of Cameron's IMAX documentary, Aliens of the Deep, which opens Jan. 28. The communities studied by Hand and presented in the film are as close to alien as anything on Earth. "We can then begin to understand the task ahead of us as we search for life beyond Earth," Hand says.

Funded and distributed by Disney, the film takes audiences to the ocean floor for a glimpse at the bizarre creatures living near hydrothermal vents—gushing underwater hot springs powered by the volcanic activity underlying mid-ocean ridges. Serving as a planetary scientist alongside Kelly Snook of NASA, Hand made eight trips in a submersible rover to six vent sites. Logging dives in both the Pacific and the Atlantic to spots with names like "Lost City" and "Snake Pit," he spent up to 15 hours at a time in the tiny vessel, slowly descending toward the ocean floor to capture stunning images of 6-foot tubeworms, blind white crabs and incredible masses of white shrimp that can "see" heat.

But what do these curious creatures have to do with the search for extraterrestrial life? In short, the harsh conditions near hydrothermal

vents mirror those found on other planets and moons, so life that exists at vents may tell us what to look for in space.

"This perhaps reflects the most important lesson learned from the discovery of the vents back in the late 1970s," explains Hand. The surprising existence of life "caused the biological community to scratch its head and rethink things."

Scientists had assumed that nothing could live in the extreme environment, where scorching 345 degree Celsius temperatures, strange water chemistry and zero sunlight cannot support a typical ocean food web. Consider that a cloudy black flare of iron, copper, zinc and hydrogen sulfide sustains the ecosystem. It's an upside-down power plant where microbes eat scalding exhaust. Will a similar or equally extraordinary system be discovered under the Europan ocean or in the Martian fossil record? If so, it will probably resemble simple microbial life on Earth and nothing more, Hand says. But these aliens of the deep prove it's always worth checking.

A National Geographic companion book and a guide for educators wishing to incorporate the material into their curricula are available to accompany the spectacular film footage. Says Hand: "The target audience is third graders, though I think [James Cameron] and his team have done a nice job of making it great for all ages."

Source: Stanford University (by Kenneth M. Dixon)