

LSU gets to the bottom of things -- in Antarctica

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Antarctica has long held secrets of the earth's history locked in its icy depths, and until recently, there has been very little information on the environments that have been sealed beneath miles of ice for millions of years. Now, a team of researchers from nine institutions - including LSU - have been funded to the tune of \$10 million dollars by the National Science Foundation, or NSF, to get to the bottom of things - literally. These scientists will drill through the West Antarctic Ice Sheet and Ross Ice Shelf in Antarctica to directly access a subglacial lake and the cavity below the ice shelf.

WISSARD, the Whillans Ice Stream Subglacial Access Research Drilling project, will investigate the physical, chemical and geobiological interactions in subglacial environments poised at the interface of the Antarctic cryosphere, geosphere and global ocean. LSU will primarily be responsible for one phase of WISSARD known as GBASE, or GeomicroBiology of Antarctic Subglacial Environments, which will focus on the microbes that call this extreme environment home.

"We expect to find novel [microbial species](#) and ecosystems in the subglacial hydrological system beneath the Whillans Ice Stream that thrive in permanent cold and darkness," said Brent Christner, LSU assistant professor of biological sciences and a principal investigator for the GBASE program. "Our recent work supports the notion that Antarctic subglacial environments are a habitat for life. The WISSARD project will allow us to study these systems in an unprecedented way."

The overarching scientific objective of WISSARD is to assess the role of water beneath the Whillans Ice Stream in interlinked glaciological, geological, microbiological, geochemical and oceanographic systems. GBASE will examine distinct, but hydrologically-related, subglacial environments, assess the biodiversity there, reveal how these environments function in constant cold and no sunlight and determine the importance they play in delivering nutrients to the ocean.

Environmental stewardship is a foremost priority of the WISSARD project. "To ensure that surface [microbes](#) and chemicals are not introduced during sampling, we will spend the next year rigorously testing the procedures and equipment that will be used to drill into and access these pristine subglacial environments," said Christner. "A special hot water drill is currently being built that will use heat, filtration and an ultraviolet treatment to sterilize the water that will be used to drill to the base of the ice sheet and prevent contamination."

The other two WISSARD components, LISSARD, Lake and Ice Stream Subglacial Access Research Drilling, and RAGES, Robotics Access to Grounding-zones for Exploration and Science, will allow GBASE to cast its results in a holistic ecosystem perspective. The three projects are connected scientifically through common interest in coupled fluxes of ice, subglacial sediments, nutrients and water. WISSARD provides the opportunity to collect direct observations that will elucidate fundamental scientific questions pertaining to past and future marine [ice sheet](#) stability, biodiversity in the cryosphere and how the biology of these systems mobilizes major nutrients to the ocean.

As part of the WISSARD program, GBASE will investigate what may be one of the last unexplored aquatic environments on Earth, which represents a plausible analogue for extraterrestrial life habitats that may exist on Europa and Mars.

"This is the largest and most exciting project I've ever been a part of," said Christner. "Subglacial exploration will be at the forefront of polar research in the future, and I'm confident that the years to follow will prove to be a very interesting time of discovery."

Source: Louisiana State University ([news](#) : [web](#))

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