



**“WHAT LIES BENEATH: EXPLORATIONS UNDER THE ROSS ICE SHELF
WITH ANDRILL”**

FRANK RACK

ANDRILL Science Management Office/University of Nebraska-Lincoln

Monday, April 8, 2013

3:30 PM

Room 1202, Engineering and Computational Sciences Building

Abstract

Extensive field surveys were conducted at several sites on the Ross Ice Shelf in Antarctica from November 2010 through January 2011 as part of the ANDRILL (ANtartic geologic DRILLing) Coulman High Project. The ANDRILL hot water drill (HWD) system was used to melt 10 to 60 cm-diameter access holes through 250–275 meters of ice shelf at each site to deploy a variety of sediment coring tools, cameras, oceanographic instruments, and a remotely operated vehicle (ROV) named SCINI (Submersible Capable of under-Ice Navigation and Imaging). The ROV was deployed down a ~30 cm-diameter hole at two sites to explore the underside of the ice shelf while conducting operational testing of the ROV for twenty-nine hours spaced over fourteen dives. This was the first time to our knowledge that an ROV was deployed through an ice shelf in Antarctica and the results were phenomenal. SCINI cameras discovered and explored a unique biological community dominated by anemones living inside burrows in the lower surface of the ice shelf and the ROV recovered many biological samples using an improvised suction sampler. The unexpected biological discovery highlights the importance of serendipity in science and points to the significant opportunities that interdisciplinary investigations can provide in these remote environments. Dr. Rack will also share some insights about the Whillans Ice Stream Subglacial Access Research Drilling (WISSARD) Project’s successful entry into Subglacial Lake Whillans in January 2013 using a new hot water drill system developed by UNL for this project, which traversed 625 miles across the Ross Ice Shelf and melted through ~800 meters of ice to provide access to the lake for scientific instruments and sampling devices.

Biography

Dr. Frank Rack is the Executive Director of the ANDRILL Science Management Office at the University of Nebraska-Lincoln (UNL), with primary responsibility for the overall management, strategic planning, project development, research, education and outreach, and administrative oversight of the U.S. ANDRILL Program. Dr. Rack is an Associate Professor in the Department of Geosciences at UNL. He participated in the ANDRILL McMurdo Ice Shelf (MIS) Project deployment to Antarctica in 2006, led the ANDRILL Coulman High Project site surveys on the Ross Ice Shelf in 2010-2011, and is the PI for the development of the hot water drill system used by the WISSARD (Whillans Ice Stream Subglacial Access Research Drilling) Project in 2012-2013 to achieve the first clean entry into a subglacial lake in Antarctica. Dr. Rack earned a B.S. degree in Natural Resources from the University of Rhode Island and a Ph.D. in Geological/Geophysical Oceanography from the College of Geosciences at Texas A&M University. He also served as a postdoctoral scholar and research scientist in the Ocean Mapping Group of the University of New Brunswick (Canada).

Reception before seminar at 3:00 PM