

# What's under the Antarctic Ice Sheet?

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Credit: Subglacial Antarctic Lakes Scientific Access (SALSA)

A unique method created by a USF associate professor to determine radiocarbon ages will be central to an expedition expected to transform the way we view the Antarctic continent.

Brad Rosenheim, Ph.D., associate professor of geological oceanography in the USF College of Marine Science (CMS), is a principal investigator of the SALSA (Subglacial Antarctic Lakes Scientific Access) project, which aims to better understand Antarctica's subglacial environment.

Rosenheim and his Ph.D. student, Ryan Venturelli, will be employing Ramped PyrOx (pyrolysis-oxidation) <sup>14</sup>C dating on sediments sampled from the bottom of Mercer Subglacial Lake. His radiocarbon dating method, performed with an apparatus affectionately called the 'Dirtburner' in CMS's Marine and Environmental Chemistry Facility, uses heat up to 1000 °C to gradually break [organic carbon](#) free from the sediments in a way that simplifies interpretation of sediment age. This process helps indicate the timing of ice sheet changes that have affected global sea level.

"To participate in highly-[interdisciplinary research](#) that is truly exploratory is exhilarating in and of itself," said Rosenheim. "But the work we will do has more importance than simply proving we can access these unique lakes. We will be investigating ways in which carbon older than 10,000 years may support life in these extreme environments with no sunlight. We will also gain insight into how and when the West Antarctic Ice Sheet changed over the last ~10,000 years, and potentially longer. The whole team (scientists, drillers, and camp support staff) will work through the holidays to take advantage of Antarctic summer – the potential magnitude of these rare samples outweighing our collective ties to family and home during this time of year."

Rosenheim, as part of a team of 50 scientists, support and technical staff will establish a remote field camp roughly 500 miles from the South Pole using specialized tractors, sleds, and ski-equipped aircraft. There, they will undertake a large-scale expedition to explore Mercer Subglacial Lake, a [lake](#) twice the size of Manhattan that lies beneath West Antarctica's Whillans Ice Plain, a fast-moving stream of ice three-quarters of a mile thick.

They will use a hot-water drill to bore through nearly 4,000 feet of ice to gather uncontaminated samples of lake water, basal ice, and sediment. The team will minimize microbial contamination through a process of

ultra-filtration, ultraviolet light exposure, and pasteurization to clean the drill water and science instruments.

Rosenheim and Venturelli arrive in Antarctica December 6th and are expected to return to Tampa Bay in mid to late January. The SALSA project is funded by the National Science Foundation.

Provided by University of South Florida

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