

Montana State University scientists to get new cold lab

Half-million-year-old Antarctic ice, avalanche triggers, frost heaves in roads and the possibility of life in Martian ice caps are just a few of the research projects expected to find a home in a new cluster of labs planned for Montana State University.

Earlier this year, the university secured \$1.8 million in grants from the National Science Foundation and the Murdock Charitable Trust for what has tentatively been dubbed the Subzero Research Facility, a one-of-a-kind group of eight cold-research laboratories that has received support from scientists around the globe.

"I don't know of anything quite like this in the world," said MSU civil engineering professor Ed Adams. "The Japanese have some excellent facilities, including one very large cold chamber. The U.S. military has some excellent low-temperature wind chambers. However, this facility will be unique in that it will bring so many things together."

Adams, an internationally recognized avalanche and ice expert, along with MSU polar biologist John Priscu wrote the grant proposals that will fund the project.

The facility's eight rooms will be its main instruments, allowing researchers to precisely control humidity, light and temperature. The coldest room of the group will drop to minus 80 degrees Fahrenheit. The facility will be housed in 2,700 square feet on the first floor of Cobleigh Hall in MSU's College of Engineering. Adams and Priscu are hoping the labs will be up and running by early 2007.

Currently, research requiring cold rooms is scattered around MSU's campus in small and sometimes, ad-hoc laboratories. Priscu, known internationally for his work on microbes in Antarctic ice, has built his own sterile room for analyzing ice frozen for 500,000 years and cored from an ice field 2.5 miles deep.

"This is super-pure ice," Priscu said. "It contains about 10 cells per liter. An average liter of sea water contains more than one million cells."

However, Priscu is unable to cool his sterile room, which can reach 90 degrees Fahrenheit in the summer. His storage facility for holding ice cores is crowded and it can take hours to retrieve a single sample.

The Subzero Research Facility will include ample storage space and a refrigerated class 100 clean room. A class 100 clean room - the highest commercially available - contains no more than 100 microscopic particles per cubic foot of air. An average office contains 500,000 to 1,000,000 particles per cubic foot.

The facility will also house a cold observation lab, where students can watch sub-zero experiments through windows while still in the comfort of room temperature. In a structural lab various materials - such as highway concrete - will be stressed under cold temperatures. A wet lab where running water can be observed as it freezes will help researchers study rivers, lakes, wetlands and other bodies of water.

When Priscu and Adams started work on their grant proposals, they were looking at their own research needs. But as the process evolved they realized they could create a facility for researchers across MSU and the globe.

They received letters of support from cold-research labs in Switzerland, Japan and two of the most prominent ones in the United States: the Byrd Polar Research Center in Ohio and the National Ice Core Laboratory in Denver. Neither of the U.S. facilities approximates the MSU project. More than a dozen

MSU faculty members from various disciplines also supported the project.

Adams and Priscu hope the facility will be used by researchers looking at everything from frozen wetlands, to road de-icing, to the durability of electronics in icy temperatures.

"It turned out it was easier to write the grants because we were proposing bringing a lot of different people and disciplines together in one spot," Adams said. "I think we'll garner even more interest and research dollars working with people on campus and around the world once they see what we can do here."

Priscu is as optimistic: " I think this could alter the course of research on this campus," he said. "This is something for the whole university."

Source: Montana State University

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