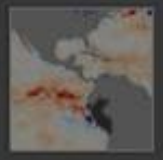
Mountains & Minds

MSU students get NASA experience sending experiments to the edge of space

Two groups of MSU students launched research projects aboard a weather balloon that traveled to 100,000 feet on Thursday. The students were members of the Balloon Outreach, Research, Exploration and Landscape Imaging System (BOREALIS) Project and part of the NASA Exploration System Mission Directorate Higher Education Project. READ MORE.



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MONTANA STATE UNIVERSITY

MSU News Service

MSU students get NASA experience sending experiments to the edge of space

July 21, 2011 -- Melynda Harrison, MSU News Service

Two groups of students, staff and faculty from Montana State University and the Montana Space Grant Consortium gathered on a plateau overlooking the Yellowstone River east of Livingston on Thursday morning. Some checked the rigging on what looked to be cardboard and Styrofoam boxes--their modest exteriors belying the high tech equipment inside. Other team members filled a giant latex balloon with helium.

The two groups were working on launching their experiments into near-space, 100,000 feet above the Livingston airport runway where the groups met. The hands-on summer projects are giving Montana students an opportunity to engage in real world science and build their resumes.

Members of the Balloon Outreach, Research, Exploration and Landscape Imaging System (BOREALIS) Project, part of the MSGC, sent temperature and pressure sensors, still and video cameras, and a "command center" used to control the release of a parachute and send GPS coordinates, into the sky. Under the direction of Berk Knighton, BOREALIS flight director, the nine undergraduate interns, three from Tribal Colleges, and one high school student, from across Montana, spent 10 weeks designing and building experiments for several balloon flights.

"It's a chance for these students to be involved in science," said Randy Larimer, deputy director of the MSU Borealis team. "It's a hands-on experience that prepares them for a future in the STEM disciplines: science, technology, engineering and math."

MSU engineering students launch a high altitude balloon Thursday in Livingston. The students are part of an interdisciplinary program at Montana State University sponsored by NASA to study radiation at high altitudes. MSU photo by Kelly Gorham.

The other group included six undergraduate female engineering students who were part of a program aimed at developing the technology for exploration, things like rockets and satellites.

As part of the NASA Exploration System Mission Directorate Higher Education Project they spent eight weeks designing part of the payload, or the cargo, the BOREALIS balloon carried.

"This is the first time most of these women get to work on an interdisciplinary team, which is an important skill for them to have as they move forward in their careers," said Brock LaMeres, assistant professor of electrical and computer engineering and principle investigator on the NASA project. "They are exposed to a real

systems engineering and aerospace project, which is what NASA does. And they get to work with other women engineers and be exposed to that dynamic."

The ESMD payload carried a radiation sensor developed at MSU as part of another research effort sponsored by NASA under the direction of LaMeres to build fault tolerant aerospace computers. The ESMD students designed and built a box that the sensor could be carried in, wrote a computer program and figured out how to power the computer system for the duration of the flight. The entire payload had to function in temperatures ranging from -76 to 140 degrees Fahrenheit and buffer the sensor when it parachuted back to earth. The team also developed the peripheral electronics to run the sensor. And it all had to weigh less than six pounds.

The ESMD program aims to involve universities in NASA research and engage underrepresented groups, such as women, in science, technology, engineering and math. NASA wants to train and develop the highly skilled scientific, engineering, and technical workforce of the future. That's where the MSU summer program comes in.

"I learned a lot about embedded systems at a hardware, rather than software level, during this project," said Stephani Schielke an MSU computer science senior from Bozeman. "In addition to that, working with an interdisciplinary team of women has been awesome and I have a better understanding of what other majors do now."

"We used a lot of what we learned in our classes and expanded on that," said Katie Schipf, a senior in mechanical engineering from Highwood. "It's helpful to work with other majors and compromise on certain things, depending on what they need for their part of the project."

Part of the ESMD summer experience included a role model series. Once a week the women would meet with professional women, including MSU Provost Martha Potvin, MSU BOREALIS Director Angela Des Jardins and MSU President Waded Cruzado, to learn about their careers and their career paths.

"It was really valuable to see the different tracks these women took to get into their professional positions," Schielke said.

Back at the Livingston airport, high on the plateau, the teams slowly launched the balloon, the three payload boxes hanging below. With the foothills of the Absaroka Range in the background, the payload spun in big lazy circles beneath the 10-foot diameter balloon. The teams cheered and commented on how impressive it was to see their work rising in the sky above them. The balloon grew as it climbed into the atmosphere and inflated to about 40 feet, rendering it visible, even at 100,000 feet.

After nearly two hours, it popped, the parachute unfolded and the payload dropped back to earth in just half an hour. It landed northeast of Big Timber near Sweet Grass Creek.

"It was a great experience to actually build something, rather than just read about it," said Schipf. "And it is so fun to see it actually working."

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