

UNH News Release: High Schoolers to Launch Balloon to Outer Space at UNH Summer Institute



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High Schoolers to Launch Balloon to Outer Space at UNH Summer Institute



The umbrella-shaped, student-built balloon payload is launched in last year's Project SMART balloon experiment. Photo by Kristi Donahue, UNH-EOS.

DURHAM, N.H. — On Monday, July 23, 2012, high school students and their University of New Hampshire Project SMART mentors plan to launch a balloon tethered to a one-of-a-kind reentry vehicle that carries a miniaturized scientific payload designed to measure cosmic rays. The team hopes the student-built reentry vehicle made of pink Styrofoam and cardboard will ride to the edge of outer space at 100,000 feet and, after the balloon bursts, waft safely down to Earth without aid of a parachute. Such a landing would be a first.

The weather-dependent launch is currently slated for 11 a.m. from the Vermont Agricultural Business Education Center in Brattleboro, Vt. The experiment is part of students' four-week Project SMART (Science and Mathematics Achievement through Research Training) summer residential program at UNH, which concludes at week's end. The program, now in its 21st year, is designed to help spur high school juniors and seniors into careers in science and mathematics. Students work with faculty in three disciplinary modules: space science, marine and environmental science, and bio- and nanotechnology.

For the space science module, each summer N.H. physics teachers Lou Broad of Timberlane Regional High School in Plaistow and Scott Goelzer of Coe-Brown Northwood Academy guide the students through four weeks of lectures and research in conjunction with UNH Space Science Center/Department of Physics faculty and staff. The balloon project and launch is the culmination of the summer's activities.

Broad notes that the balloon experiment is a "simulated satellite launch" in that it mocks the building and launching of a satellite, only on a very different scale; the whole experiment costs less than \$1,000 and the process takes just a few weeks from start to finish as opposed to the years required to design, build, and launch a satellite. Of the unique reentry vehicle built by the students, Broad says, "This represents a paradigm shift for the whole small ballooning community. I've never seen anybody else use anything but parachutes."

The dish-shaped reentry vehicle—three feet in diameter and weighing just over two pounds, the Federal Aviation Administration limit—will carry a payload composed of a miniscule Geiger counter and altimeter, two temperature sensors, and three video cameras, two of which are the size of a pack of gum. During the flight the students hope to obtain real-time measurements of changing levels of cosmic rays and atmospheric temperatures. The video images, should all go according to plan, will show the balloon bursting under pressure, the curvature of the Earth, and the blackness of outer space.

Students participating in this year's space science module include junior Malcolm LeClair of Tenafly (N.J.) High School, junior Emerson Montano of Rolling Hills Preparatory School outside of Los Angeles and senior Andrew Mahn of the Sant Bani School in Sanbornton.

Mahn, an aspiring aerospace engineer, says, "The Project SMART experience has exceeded my expectations. I like that we're working on a research project with a clear goal and that resembles a real satellite project on a much smaller scale."

For the space science module, besides the hands-on balloon projects, students focus primarily on active faculty research projects being conducted by scientists at the Space Science Center within the UNH Institute for the Study of Earth, Oceans, and Space.

"These students are working on some very advanced and sophisticated research projects," notes research professor Charles Smith, the UNH faculty advisor for the space science module. Smith has one student who is "mining" a large dataset from the Voyager spacecraft, which were launched over 30 years ago and are still sending back data from the very edge of our solar system.

Says Smith, "The students are analyzing data from the Voyagers to better understand the dynamics of interplanetary space."

Smith notes that the balloon experiment provides some hands-on, gee-whiz science. "Launch day is just pure fun," he says adding, "And the week after they get the chance to analyze data - temperatures, the changing cosmic ray counts - and plot them out to get a good sense of what's going on up there. This year they are working with micro-controllers that have greatly extended the functionality of the experiments and lightened the payload at the same time."

Says Subhash Minocha, director of Project SMART and UNH professor of plant biology and genetics, "The summer institute provides the opportunity for a diverse group of students from all across the U.S. to learn the interdisciplinary nature of the various scientific fields and how math and computers converge with scientific research. Students also study and discuss the applications and implications - economic, social, environmental, legal, ethical and moral - of scientific advancements to society."

Minocha adds that student diversity and broad representation has become a major goal of his over the past four years and, as a result, this summer's crop "was one of the most diverse in terms of geographic, ethnic, racial, and economic backgrounds, thanks to financial support from the Liberty Mutual Foundation, the USDA Forest Service, NH EPSCoR, and small donations from various companies."

The bio- and nanotechnology module included projects in genetics and genetic engineering, cloning, gene therapy, and patenting of living organisms, while the marine and environmental science students study climate change and environmental issues related to aquatic and terrestrial systems, including overnight trips to the White Mountains and the Isles of Shoals.

The Project SMART Summer Institute is jointly sponsored by the College of Engineering and Physical Sciences and the College of Life Sciences and Agriculture, with additional support from the NH Space Grant Consortium, NSF Career Grants to faculty, and donations of cash and/or supplies from several biotechnology companies. For more on Project SMART visit <http://www.smart.unh.edu>.

The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea, and space-grant university, UNH is the state's flagship public institution, enrolling 12,200 undergraduate and 2,300 graduate students.

**Photographs to download:** [http://www.eos.unh.edu/newsimage/smart\\_balloon\\_lg.jpg](http://www.eos.unh.edu/newsimage/smart_balloon_lg.jpg)

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**Captions:** The umbrella-shaped, student-built balloon payload is launched in last year's Project SMART balloon experiment.

High school physics teacher Lou Broad works with Project SMART students Emerson Montano (center) and Malcolm LeClair.

Project SMART student Andrew Mahn at the UNH Space Science Center's small satellite test laboratory.

Photos by Kristi Donahue, UNH-EOS.

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*Media are welcome to attend the launch. For details and potential post-launch photos/video, contact David Sims at (603) 862-5369 or [david.sims@unh.edu](mailto:david.sims@unh.edu).*

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