



## High Schoolers Make Smart Move At UNH

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DURHAM, N.H. -- Not every high school kid gets to launch a balloon to measure changing levels of cosmic radiation as it wafts towards "near space" at 100,000 feet. But that's just what Sam Boynton and nine other sophomores and juniors from around New England did this July as part of their four-week Project SMART summer residential program at the University of New Hampshire.

The big weather balloon, which carried the science payload built by the students in a thin, picnic-cooler-sized gondola constructed of sheets of pink insulation, cardboard, tin foil, and lots of duct tape, hauled a little Geiger counter through the atmosphere and measured gamma rays and high-energy beta waves. Real-time data was transmitted back by an onboard microprocessor the group had cobbled together.

The experiment was, according to physics teacher Lou Broad of Timberlane High School, a "simulated satellite launch" in that it is similar to the building and launching of a satellite – only on a very different scale. The whole experiment cost less than \$1,000.

Broad, who, along with teacher Scott Goelzer of Coe-Brown Academy in Northwood and UNH space scientists, guided the students through four weeks of lectures and research, says, "At that altitude the sky is black and you're high enough to see the curvature of the Earth and a blue layer of the atmosphere. It has all the properties of space, the radiation environment gets pretty interesting, and the air pressure drops down to 1 percent. So this is a chance for them to see something very scientific."

The payload provided a successful measurement of the cosmic radiation and landed 25 miles off the coast.

The Science and Mathematics Achievement through Research Training (SMART) program brings faculty, staff, and students at the university, high school teachers from around the region, and talented 10th and 11th graders together to conduct research while introducing them to issues in space science, environmental and marine science, and biotechnology and nanotechnology. Altogether, SMART brought 39 high school students to UNH's Durham campus for the month of July. In each area of study, NASA research and application tools play a central role in the form of imaging technology, modeling, and visualization methods.

SMART is designed to help spur upper-class high school students into careers in science and mathematics. In Sam Boynton's case, the summer program was a smart move indeed.

"I have a long list of colleges and am really interested in physics, astrophysics in particular," says Boynton, a Newington, N.H., resident who will be a senior at Portsmouth High School

next year. Boynton applied to the highly competitive Project SMART residency specifically to help determine his future. "This has pretty much reinvigorated my interest in space science, all the lectures and research have sustained my interest and expanded my horizons," he says.

In addition to hands-on projects like the balloon, SMART students in the space science module attended lectures given by UNH professors and staff scientists at the UNH Space Science Center within the Institute for the Study of Earth, Oceans, and Space (EOS) and the Department of Physics. Students also paired up with scientists and took an active role in current research projects in topics ranging particle acceleration and planetary shocks to flux transfer events in Earth's magnetic field.

Broad, who with Goelzer has been involved with SMART since its inception in 1992, is a firm believer in the program's approach and lauds the UNH faculty, staff, and students who dedicate themselves to helping challenge and mentor the high school students.

"This is inquiry science, and it's the best way to teach science, especially at the high school level," Broad says. He adds, "The less canned a scientific project is the more ownership a student will get out of it." And the same can be said for the teacher, according to Broad. "The trick is finding projects that have a real sense of experimentation. The most fun I have as a teacher is when I'm doing a project where I'm not certain of the outcome, and the kids understand that failure is an option and that we can learn from our failures."

Succeed or fail SMART students Sam Boynton and Gabe Isman agree that the hands-on, inquiry-based, team approach to science fires the imagination and sparks a sense of discovery. "From reading textbooks and listening to lectures in high school you sometimes get the feeling that all the answers are known, but the teachers and professors here have made it pretty clear that there's a lot we don't understand that needs to be explored and figured out," Boynton and Isman say.

All of this year's Project SMART students presented results of their research and gave poster presentations last Thursday and Friday. The space science module students included Juniors Sam Boynton, Steve Wright-Eaton of Durham; Adrian Culver of Andover, Mass.; Aline Seekins of Searsport, Maine; and sophomores Matt Blake of Northwood; Gabe Isman of Hadley, Mass.; Sadie Lang of Hollis; Luis "Eddie" Maldonado of Concord; Matt Vaillancourt of South Berwick, Maine; and Marcus Hoffman of Pawtucket, Rhode Island.

Project SMART is funded through the New Hampshire Space Grant Consortium (NHSGC), the Office of the Provost, the College of Life Sciences and Agriculture, and student tuition. SMART was developed and implemented by UNH faculty and staff and is a program of UNH and NHSGC.

**Editors: A downloadable photo is available at:**  
<http://www.unh.edu/news/img/colsa/SpaceScience.jpg>

**Photo caption** ½ Left to right, front row: Aline Seekins, Sadie Lang, Gabe Isman, Marcus Hoffman, Matt Blake, Sam Boynton; back row: Eddie Maldonado, Matt Vaillancourt, Steve Wright-Eaton, Adrian Culver. Photo by Lisa Nugent, UNH Photo Services.

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