NASA Awards Student Team $200,000 to Launch SPACE HAUC into Orbit

A small satellite designed and built by a team of more than 50 undergraduate students from UMass Lowell is set to be launched into orbit in 2018. It will circle the Earth every 90 minutes while traveling at about 17,000 miles per hour.

The project—named SPACE HAUC—is one of 47 university proposals chosen recently for funding by NASA in a nationwide competitive process under its Undergraduate Student Instrument Project. The space agency called SPACE HAUC a “top-notch student training program” and awarded the team the maximum amount of $200,000 over two years to develop and test a prototype satellite.

This program, says NASA, “Seeks to build science, technical, leadership and project skills among undergraduate students by offering them real-world experience in developing and flying science or technology experiments that are relevant to NASA’s missions.”

The SPACE HAUC satellite is based on the CubeSat model used worldwide for low-Earth orbit space research. A typical CubeSat is a miniature satellite that uses commercial off-the-shelf components. SPACE HAUC will have a total length of 12 inches and total weight of nine pounds. Four solar panels will be deployed in orbit to supply electricity to power the satellite’s electronics.

“The use of CubeSats as educational tools at universities has grown exponentially over the past decade due to their small size, low cost and short development time,” says Dat Le, a mechanical engineering senior and the project’s program manager.

The team’s goal is to demonstrate the practicality of communicating at high data rates in the X band using a phased array of patch antennas on a CubeSat. The antennas will operate at frequencies of 8.0 to 8.4 gigahertz from an orbit of about 450 kilometers.

“At this point, we don’t know yet the exact launch date for the satellite nor the launch vehicle that will be used,” says physics Prof. Supriya Chakrabarti, SPACE HAUC’s principal investigator and director of the Lowell Center for Space Science and Technology. “That decision is entirely up to NASA.”

Once the satellite gets launched, it will stay in orbit for about a year or more before it gradually loses altitude and falls back to Earth. As it re-enters the atmosphere, it will burn up harmlessly high above the ground.

Of the 51 members of the student team, 38 are from mechanical and electrical engineering and computer science, while the rest are from computer engineering, physics, chemical engineering and plastics engineering. Research collaborators include the university’s Raytheon-UMass Lowell Research Institute and the Printed Electronics Research Collaborative, as well as the Massachusetts Space Grant Consortium, Raytheon, BAE Systems and Draper Laboratory.
Writing Students Visit Lowell High to Learn and Inspire

Faculty Researcher Asks: What Effect Does Service Learning Have on Freshmen Achievement?

UMass Lowell freshmen—114 of them—taking College Writing II met with 60 students at Lowell High School in March to discuss college life and critique each other’s writing as part of a service-learning research project.

“When students connect their writing and research to work in the community, their horizons expand exponentially,” says English Department Lecturer Matt Hurwitz, who designed the study and piloted it this semester.

Hurwitz wants to find out if working with the high school students will translate into measurable improvements in academic outcomes for university students.

The UMass Lowell students visited Lowell High three times and exchanged their writing online—college application essays for the Lowell High students and reflective essays for the university students.

Some of the Lowell High students are in GEAR UP, a state-funded program that prepares students from low-income homes to become the first in their families to attend college. Wayne Currie, who works for GEAR UP at Lowell High, said most of the students are ambitious and self-motivated, but lack family support and financial resources. Many have never set foot outside Lowell, so connecting them with college students is important.

Hurwitz will continue the service-learning research over several years. His study is part of a broader push to get all College Writing II students out of the classroom, whether through service learning or another focused activity.

Center for Community Research and Engagement Helps Local Agencies

Graduate Students Benefit from Research Experience

The university’s Center for Community Research and Engagement builds bridges between the campus and city by bringing faculty, students and local agencies together to solve problems, whether it’s improving health care for under-served groups or helping at-risk youth.

Co-director Robin Toof and the center’s staff also help faculty members manage large grants and find community partners for their research, while also ensuring their research benefits the cities of Lowell and Lawrence. They train professors in how to teach service-learning classes and then match them with nonprofits.

The center also provides valuable research experience to select graduate students in the community social psychology, criminal justice and criminology and work environment programs.

Most recently, for the fifth year in a row, the center is serving as the Lowell Police Department’s research partner on a $564,000 state Shannon Grant to keep at-risk youth out of the criminal justice system, primarily by partnering with community groups that offer boxing, dance and basketball, tutoring and study spaces, job readiness training, outreach workers and summer camps.

This year, the center won a $60,000 partner grant to help the Lowell Police Department and its partners finish updating their strategic plan and measure their results.

Lights, Camera, Climate Change!

Students’ PSA Videos Are Screened at Lowell Eco-film Series

The patient lay dying on the operating table. The gray-haired doctor was ready to operate, only to stop abruptly and announce his retirement. He then turned the scalpel over to his replacement, a child no older than 7, who was suddenly responsible for performing the life-or-death surgery.

The scene wasn’t real, of course, but rather the plot of a one-minute public service video produced this spring by students in Environmental Biology Assoc. Prof. Juliette Rooney-Varga’s course Climate Change: Science, Communication and Solutions.

The video, in which the patient represents Earth and the child represents future generations inheriting the problem of climate change, was one of six student productions screened at the “Eco-Film Series: Night of Shorts!” on April 26 at the Lowell National Historical Park Visitor Center.

Rooney-Varga, director of the UMass Lowell Climate Change Initiative, began the class project in 2010 after receiving funding from NASA for the Climate Education in an Age of Media Project.

Besides engaging students to learn about the science of climate change, Rooney-Varga says the project teaches them media literacy and empowers them to bridge the gap between science and the public’s understanding of the problem.

From left, Robin Toof and Melissa Wall of the Center for Community Research and Engagement, and graduate student Liz Eljaffe confer with Lowell Police Supt. William Taylor at a Shannon Grant meeting.

Students in the course Climate Change: Science, Communication and Solutions edit their public service video in the O’Leary Media Lab.

Lowell High School student Rifat Islam, left, jokes around with his friends at the final celebration of the service-learning project.
Music Professor Makes Music Count

Gena Greher Joins National Initiative to Link Music, Math and Science Education

Gena Greher has always believed music is valuable in teaching other core subjects. She is in good company.

The music education professor found herself in Washington, D.C., recently, among a cast that included jazz legend Herbie Hancock, to officially launch the MathMusicScience.org, a project that offers educators a variety of web-based tools and programs to help them use music to teach math and science.

In a “whirlwind” 24-hour trip, Greher joined U.S. Secretary of Education John B. King Jr. and other music education experts from around the country to unveil the initiative.

MathMusicScience.org is a collection of eight separate programs that use music to teach the concepts of science and math to students in kindergarten through grade 12. The programs were commissioned by the Thelonious Monk Institute of Jazz in conjunction with UNESCO (United Nations Educational, Scientific and Cultural Organization).

Greher collaborated with Jeanne Bamberger of MIT and University of California Berkeley, to develop “Making Music Count,” a program that teaches concepts of proportion, ratio, fractions and common multiples through music. Students use the Impromptu programming language (a tool designed for composers and artists), to listen to music and “hear the math,” according to MathMusicScience.org.

Greher, who worked with teachers to ensure they were comfortable with the concepts and technology being proposed, stressed the real-world application of math concepts, and teachers noted the program, would be ideal for students who have different learning styles.

Students Help Young People with Disabilities Master Bike Riding

Exercise Physiology Students Instill Confidence, Motivation

Exercise Physiology senior Hailey Tompkins ran alongside 9-year-old Declan Wilkins of Lowell, giving him tips as he cautiously pedaled his bicycle.

“My rider was extremely timid, but by the end of the week he was able to go bursts of time where he was riding his bike without any help,” says Tompkins, one of 52 exercise physiology students who recently volunteered to teach children, teens and young adults with disabilities how to ride a bike.

Run by the non-profit organization iCan Shine, the one-week bike camp is the service-learning component of the advanced study course taught by Exercise Physiology Asst. Prof. Yi-Ning Wu.

“This experiential learning reinforces how to interact with individuals with special needs and their caregivers during exercise.”

The students applied their exercise physiology skills by making assessments on the spot and giving advice.

“They were not just learning to ride a bike,” says student Ashley Michals. “They were learning how to be independent and face their fears in other aspects of their lives as well by learning a skill that they had struggled with before.”

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University’s Largest Graduating Class Celebrates Achievements, Looks to Future

Chancellor Jacquie Moloney, the first woman to preside over commencement in the university’s nearly 125-year history, congratulated the largest graduating class ever on its distinguished achievements and challenged grads to continue making a difference in their lives and careers.

“It is an honor to celebrate this important milestone with you,” Moloney told the Class of 2016 during ceremonies at the Tsongas Center. “As a class, you have been a part of one of the most remarkable transformations of any public university in the country.”

The graduating class of 3,720 set a record for the ninth consecutive year. Moloney noted that more than 1,100 of those students graduated with honors and 99 had a perfect 4.0 GPA. They hailed from 43 states and 97 countries.

Woodruff, who was presented with an honorary doctorate of humane letters, told graduates, “What matters is, are you going to do what you really want to do? Are you going to be able to contribute in a way that fulfills you? I’m going to make the bold prediction that you will, because of your experiences here at UMass Lowell.”

Boston Pops Conductor Keith Lockhart, who was also presented with an honorary doctorate of humane letters, addressed students from the Francis College of Engineering, Kennedy College of Sciences and the Manning School of Business, as well as intercampus programs, in the afternoon ceremony.

“This is a triumphant day but also a frightening one. My No. 1 advice to you is don’t panic. College is not a bow and you are not an arrow. No one’s life, at least not one you’d care to live, is a straight line,” said Lockhart.

In the afternoon ceremony, an honorary doctorate of humane letters was presented to John Kennedy ’70, the retired president and chief financial officer of Nova Ventures Corp., and namesake of the Kennedy College of Sciences. Donald LaTorre ’59, ’07 (H), president of L&G Management Consultants, received the Distinguished Alumni Award.