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illuminator

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volume 2, issue 7

CubeSat ready for liftoff

A satellite built by Old Dominion University students will be orbiting the earth within weeks

Story by Mary Sandy, Director, Virginia Space Grant Consortium
Photos and video by Keith Pierce

A team of Old Dominion University students took a giant leap toward space as they joined two other Virginia universities in delivering their CubeSats to NanoRacks in Houston on Feb. 26. The nano-sized cube satellites were successfully integrated into the company's commercially developed NanoRacks CubeSat Deployer (NRCSD) in preparation for launch on Northrop Grumman's Antares to the International Space Station. The launch is scheduled for April 17 from NASA's Wallops Flight Facility.

Kimberly Wright, a graduate student in Mechanical and Aerospace Engineering, serves as student mission manager

for ODU. She was accompanied by her teammates, Electrical Engineering master's students Westin Messer and Anthony Cappiello, as well as their faculty advisor, associate professor of Electrical and Computer Engineering, Dimitrie Popescu. Wright was thrilled to finally hand off ODU's CubeSat for this critical step in a multiyear journey.

"It's exciting to see that all of our hard work, all of the hurdles we had to overcome and all the long nights in

the lab has really paid off," she said. "In Houston, we said goodbye to our CubeSat for the last time."

The satellites are part of the Virginia CubeSat Constellation mission, a collaborative project of the Virginia Space Grant Consortium (VSGC) and four of its member universities: ODU, Virginia Tech, Virginia and Hampton University. Three nano-satellites, each about 4 inches cubed and weighing approximately 3 pounds, have been developed and instrumented (one each at ODU, Virginia Tech and Virginia) to obtain measurements of the properties of the Earth's atmosphere. As the orbits of the satellites decay due to atmospheric drag, satellite instruments will quantify atmospheric density.

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Several members of the CubeSat team volunteered numerous hours over the summer to continue working on the project. Seated: Mechanical and Aerospace Engineering professor, Robert Ash and Kimberly Wright. Standing from left to right: Anthony Cappiello, associate professor of Electrical and Computer Engineering, Dimitrie Popescu, Samuel Jensen and Westin Messer.



**Batten College of
Engineering & Technology**

National Engineers Week a great success



Siqin Dong, a Mechanical Engineering PhD student, provides a robotics demonstration to high school students visiting during Engineers Week.

Story and videos by Keith Pierce

Cookies and cocoa with the dean, associate deans and department chairs. Field day on a cold afternoon. A motorsports demonstration in a cold and wet parking lot. A girls night out where more than 100 middle and high school girls from throughout Hampton Roads experienced hands-on engineering activities and were inspired by female engineering role models. Engineering lab tours where more than 350 high school students explored labs ranging from robotics, motorsports, unmanned aerial vehicles and marine labs; to wind tunnel, biofuels, structures, cybersecurity, modeling and simulation and more. A windy and rainy dinner cruise sponsored by the ODU chapter of the Society for Women Engineers, aboard the Spirit of Norfolk. Despite cold and rain, the Batten College of Engineering and Technology took this year's National Engineers Week (EWeek) theme, "Engineers Invent Amazing," to a new level.

DiscoverE, the national organizer of EWeek, is a formal coalition of more than 100 professional societies, major corporations and government agencies, dedicated to ensuring a diverse and well-educated future engineering workforce by increasing understanding of and interest in engineering and technology careers among young students and by promoting pre-college literacy in math and science.

A big THANK YOU to all departments for opening up labs and hosting tour groups, as well as to our student ambassadors and volunteers for providing support for several activities. Special thanks to assistant dean, Carol Considine, who led a team of dedicated student, faculty and staff volunteers who helped make this year's celebration another incredible success! See and hear more in these great videos and photo galleries!



VIDEO: Cookies & cocoa with deans & chairs (tinyurl.com/Day1EWeekODU19)



VIDEO: Field day (tinyurl.com/EWeek19-FieldDay)



VIDEO: Motorsports demonstration (tinyurl.com/EWeek19-Motorsports)



VIDEO: Girls night out (tinyurl.com/GirlsNight-EWeek)

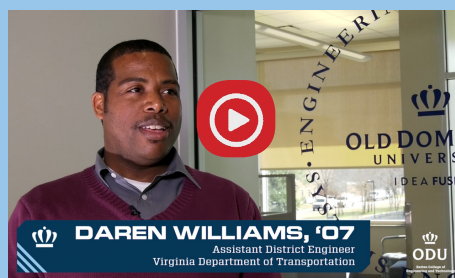


PHOTO GALLERY: Lab tours (tinyurl.com/EWeek19LabTours)



PHOTO GALLERY: SWE Gala (tinyurl.com/SWEGala2019)

EMSE alum drops by during EWeek



A former U.S. Navy nuclear engineer, Daren Williams, P.E. is the current president of the American Society of Civil Engineers – Virginia Section and holds a Master's in Engineering Management from Old Dominion University. He stopped by during the first day of Engineers Week and agreed to an impromptu interview. *Click image on left or watch now at tinyurl.com/EWeekDarenW.*

CubeSat

cont'

"Starting in undergrad, we were able to experience working across different universities, U.Va. and Virginia Tech, which both have great engineering programs," Wright said. "To be able to work with these two universities to build, deliver and integrate is really incredible, and I think it helps people recognize that ODU is becoming one of the big state schools for the space program."

The three CubeSats will be deployed via the NRCSD by astronauts aboard the International Space Station into orbit near-simultaneously so they can orbit together and function as a constellation. The ODU satellite, which has a drag brake to intentionally cause orbital decay, is expected to remain in orbit for at least four months. The other two satellites should orbit for up to two years at an altitude of 250 miles before burning up when they re-enter Earth's atmosphere. The satellites will communicate data to ground stations at Virginia Tech, U.Va. and ODU for analysis using a tool being developed by Hampton students from the Atmospheric and Planetary Science Department.

The handover brings the teams in sight of seeing their satellites readied for launch. Engaging students in real-world space missions offers them exciting educational opportunities that provide critical workplace skills. By taking on actual mission roles and going through NASA design and flight-readiness



Westin Messer takes a final look at the ODU CubeSat before it is closed into the deployer pod, not to be seen again before being in space.



Girl Power! The only three women on the CubeSat teams from each university happen to be the student leads for their teams. From left to right: Kim Wright, Old Dominion University, Erin Puckette, University of Virginia and Madison Broadnax, Virginia Tech.

reviews, students are learning how space missions are done and how to deal with the unique challenges of the space environment.

More than 140 undergraduate students have worked on the mission since June 2016 as a cross-institutional team. Undergraduate student leaders and team members from physics, electrical engineering, aerospace engineering, mechanical engineering and chemical engineering disciplines have made the mission a reality.

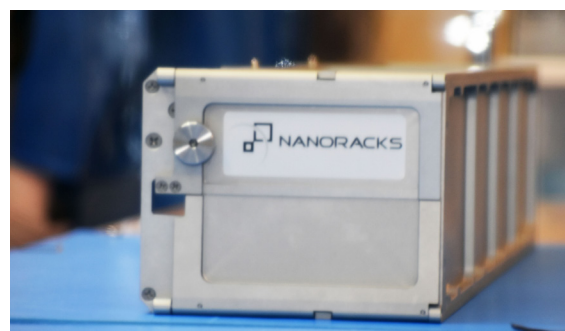
Students have been coached by faculty advisors and have benefitted greatly from advice from NASA, industry and academic advisors. They have also received excellent guidance from NanoRacks, the world's leading commercial space



Several members of the Virginia CubeSat Constellation team from ODU, UVA and Virginia Tech in their mission shirts at NanoRacks facility in Houston, Texas.



Kimberly Wright proudly holding the "remove before flight" tag, one of the safety measures that ensured the CubeSat remained off prior to being closed into the deployer pod.



All three CubeSats bolted in and ready for launch from NASA's Wallops Flight Facility on Northrop Grumman's Antares to the International Space Station.

station company. Doing technology demonstration and research in space is a great thing for students to have on their resumes.

The project is administered by VSGC, based in Hampton, and funded by NASA's Undergraduate Student Instrument Program, as well as VSGC. The project is managed for NASA by its Wallops Flight Facility on Virginia's Eastern Shore.

Learn more in this short video:



tinyurl.com/CubeSatODUTX



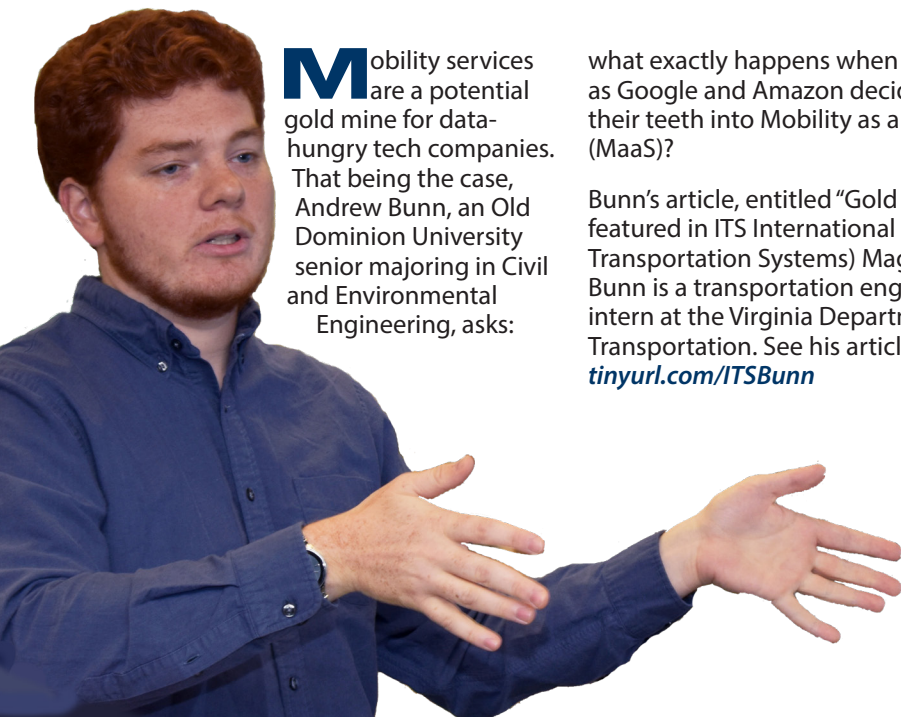
KIMBERLY WRIGHT

Graduate Student, Mechanical & Aerospace Engineering - ODU CubeSat Lead



STUDENT SPOTLIGHT: ANDREW BUNN

CEE senior writes feature for trade magazine



Mobility services are a potential gold mine for data-hungry tech companies. That being the case, Andrew Bunn, an Old Dominion University senior majoring in Civil and Environmental Engineering, asks:

what exactly happens when giants such as Google and Amazon decide to get their teeth into Mobility as a Service (MaaS)?

Bunn's article, entitled "Gold Diggers" is featured in ITS International (Intelligent Transportation Systems) Magazine. Bunn is a transportation engineering intern at the Virginia Department of Transportation. See his article here: tinyurl.com/ITSBunn



Give2ODU campaign offers chance to give directly to engineering and technology students

From energy to hunger; pollution to cancer; security to natural disaster, engineering holds the key to solving the world's greatest challenges. Great engineers are practical dreamers, methodical thinkers and imaginative

problem-solvers with a vision of a better world. Our job as educators is to nurture the ideas and dreams of future engineers.

By providing engineering students with access to advanced resources, new technology and research-based learning innovations, we help them face and solve society's greatest challenges with confidence. The Batten College of Engineering and Technology is well-equipped to meet this challenge, but we need your help to continue building on the momentum we've created.

A gift to the Batten College of Engineering and Technology will help the college attract a talented and diverse student body; enhance the student experience through a purposeful and experiential-based curriculum; attract and retain the finest faculty; upgrade laboratory and teaching facilities; and provide seed funding for novel research initiatives.

Your investment will not only ensure the level of excellence of our incoming students for years to come, but will also help provide an education for the next generation of Monarch engineers. **Help us lead the charge on Tuesday, March 19th!**



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The **illuminator** is a publication of the Batten College of Engineering & Technology

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