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ESPEX 2018

ENGINEERING STUDENT PROJECTS EXPO

First-ever ESPEX a success

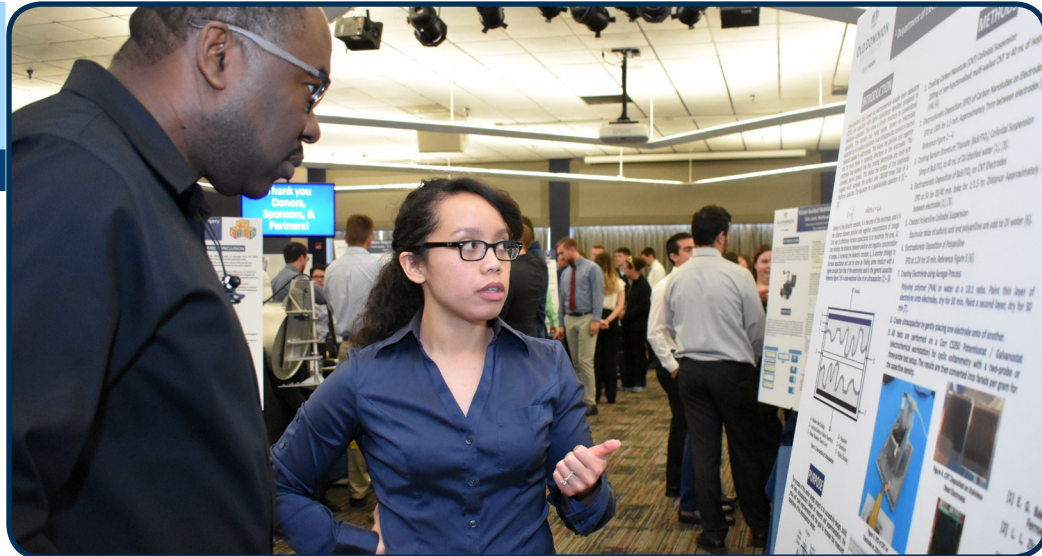
story and video by Keith Pierce

A hydrogen-powered engine. A robot that uses facial recognition to follow commands. An unmanned aerial vehicle able to avoid obstacles and hazards while navigating on its own. A student-built satellite that will soon orbit the earth. These are just some of the nearly 40 student designs and projects on display during the first-ever Engineering Student Projects Expo (ESPEX) in April.

"What stood out for me was the extraordinary use of technology," said Bob Burkholder, principal and operations director at Clark Nexsen, a Virginia Beach-based architectural engineering firm. "I was very impressed with the scale and the complexity of some of the designs and the research that went into them."

More than 300 students, faculty, alumni and visitors gathered in the North Cafeteria in the Webb Center to see innovative project demonstrations and to hear student teams explain the research behind their extraordinary designs. Some local industry leaders viewed the exposition as an opportunity to explore new products as well as to meet potential new engineering talent.

"This was a good opportunity to look for talent and get to see some of the products these new engineers are developing," said Thomas Cavanagh, project manager Lockheed Martin, who served as a judge for the projects.



Electrical engineering senior, Kaylee Arceo, describes her team project, "Development of Ultracapacitors for Energy Sources" to an ESPEX visitor

"There are actually a few projects here that we may have interest in."

"Our firm is a charter member of the unmanned systems of Virginia," said Burkholder. "I must have seen at least five different presentations on the use of unmanned systems, whether it was aerial, robotic or underwater. Very impressive."

Stephanie Adams, dean of the Batten College of Engineering and Technology, presented the People's Choice Award to Team CubeSat, part of a multi-university collaborative project building a constellation of three cubic satellites that will soon be deployed into Low Earth Orbit (LEO) to study phenomena that influence the varying density of the thermosphere.

See more in this brief video:



Stephanie Adams, dean of the Batten College of Engineering and Technology (far right), joined by associate dean, Rafael E. Landaeta, presented the People's Choice Award to Team CubeSat. Members include: Robert Bossinger, Jordan Byrd, Zachary Campbell, Mariano Chacon, Charles Chiou, Avery Corbett, Thomas Crouse, James Flynn, Justin Hernandez, Samuel Jensen, Garland Johnson, Christopher Life, Westin Messer, Susannah Miller, Cody Steele, Braxton Vangundy, Joseph Vogel, Kimberly Wright, Wade Yearly, Samuel Jensen Advisors: Dr. Robert Ash, Dr. Dimitrie Popescu



Batten College of Engineering and Technology

Inspired ambition



HUMBERTO ARREGUIN GARCIA

As the ODU civil engineering student graduates with honors, he sets his sights on yet another big dream

by Keith Pierce

To say Humberto Arreguin Garcia is ambitious might be an understatement. As the award-winning scholar prepares to graduate from Old Dominion University with a Bachelor of Science degree in civil engineering, he is visualizing a possible future outside of engineering.

"Currently, I'm doing research for Eastern Virginia Medical School (EVMS). I was inspired through their apprenticeship program, their Medical Spanish service learning program and all the volunteering I've done at the clinics," says Humberto. "If I could learn the art of medicine, I wouldn't have to work a day in my life, because every day I'd be helping someone else."

Born in Michoacán, Mexico, Humberto came to the United States eighteen years ago. He excelled academically despite often having to change schools as his family moved around the country, living in several different states, because of his father's work in construction.

"I didn't mind moving around. It gave me the opportunity to meet all kinds of individuals," he said.

The high school honor student's academic success continued throughout his time at ODU. He is the only civil engineering student in his class to maintain a 4.0 grade point average, which earned him the civil engineering department's academic excellence award. Humberto's ambition and commitment also helped him earn the Old Dominion University Alumni Association Outstanding College Scholar award, which comes with the distinction of being the Batten College of Engineering and Technology flag bearer at graduation.

"No one really would have expected me to be in this position right now just because of where I come from in the country back in Mexico," he says. "My parents didn't have a lot growing up, but they made the best of what they were given. That inspires me. It inspires me to be the best that I can be."

A member of Chi Epsilon, the civil engineering national honor society, as well as the Society of Hispanic Professional Engineers (SHPE), Humberto's hard work continues to pay off. He walks away from ODU with a

secure job as an engineer with Wood PLC in Kentucky, an industrial firm where his father rose from construction worker to supervisor.

"I'm very proud of how hard my dad worked to move up in his company. Now here I am, his son, about to graduate with a degree in civil engineering and I'm going to come in as an engineer for the same company."

Humberto's success is something his parents believe has influenced his two younger siblings, a sister who is about to attend the University of Louisville in the fall and a younger brother who is a high school sophomore taking multiple AP classes.

"Because of all I have learned as the first of my siblings to go to college, my younger sister and brother are doing great," Humberto said. "My brother taking multiple AP classes is something I couldn't even consider back when I was a sophomore."

Humberto says he is grateful for the people that have helped him along the way, especially his parents.

"I want to give back to my parents in a way that will help them see that all of their sacrifices and everything they've done has meaning," he said. "I want to meet different people just so I can inspire them, like all the people who helped me growing up. I sometimes think that maybe I can encourage students in my situation to go to college and grow up and be the best that they can be."



Humberto pictured with his parents and younger brother at the recent civil and environmental engineering graduation banquet and ring ceremony

Warner and Kaine announce \$1 million in scholarships for ODU cybersecurity students

by Noell Saunders

U.S. Sens. Mark Warner and Tim Kaine recently announced the approval of \$1 million in federal funding from the National Science Foundation to help support high-achieving students with demonstrated financial need in Old Dominion University's cybersecurity program.

The National Science Foundation project is led by Chunsheng Xin, associate professor in the Department of Electrical and Computer Engineering; Wu He, associate professor in the Department of Information Technology and Decision Sciences; Brian Payne, Old Dominion's vice provost for Academic Affairs; Hongyi "Michael" Wu, director of the Center for Cybersecurity Education and Research and; Shana Pribesh, associate professor in the Department of Education Foundations & Leadership.

The funding will provide up to 18 scholarships as well as mentoring and

program activities. Each student will be supported for four years.

Old Dominion President John R. Broderick said, "This will help ensure Old Dominion attracts the best and brightest students to an important field with significant growth potential."

Hongyi "Michael" Wu, added: "The success of the project will substantially strengthen ODU's cybersecurity program, attract top students and boost the student retention rate, leading to transformative changes in the state of cybersecurity workforce preparedness."

In a joint statement, Warner and Kaine said: "Ensuring students have the support they need to pursue careers in cybersecurity is critical to building our federal workforce and defending the nation's economic and national security. We are thrilled that ODU and the National Science Foundation are partnering to help make that a reality for more students."



Warner is vice chairman of the Senate Intelligence Committee and co-founder of the Senate Cybersecurity Caucus, where he's called for the protection of consumers' personal information and timely disclosure of data breaches. He also has written legislation seeking to hold credit reporting agencies accountable for breaches.

Kaine, a member of the Senate Armed Services Committee, co-chairs the Senate Career and Technical Education Caucus and has advocated policies to prepare students for careers in cybersecurity and increase scholarships for them.

Engineering students take home awards in the first installment of the VDOT SmarterRoads hackathon and idea jam series

by Keith Pierce

Developers, planners, futurists, big data enthusiasts and problem solvers gathered to help address Virginia's greatest transportation issues through the use of open data sets, including Virginia Department of Transportation's (VDOT) SmarterRoads data portal.

Judged on everything from uniqueness and originality to approach and impact, Old Dominion University's Transportation Research Institute (TRI) team, made up of civil engineering as well as modeling, simulation and visualization engineering students, won awards in the "Safety" and "Vulnerable Road Users" categories. The team developed and demonstrated innovative applications addressing congestion, safety, and transportation infrastructure challenges faced by VDOT.

The event seeks to engage the tech community, including developers, planners, big data, in two days of problem-solving and presentations. Using open data sets such as VDOT's SmarterRoads data

portal, participants use their expertise to raise awareness and help address some of Virginia's most pressing transportation issues. Automated vehicles and smart city technology development are key objectives.



From left to right: **Tara Reel**, transportation and transit planner, City of Virginia Beach, **Behrouz Salahshour**, civil engineering Ph.D. student, **Reza Vatani-Nezafet**, civil engineering Ph.D. student, **Murali Rao**, chief information officer, Virginia Department of Transportation, **Qingyu Ma**, modeling, simulation and visualization engineering Ph.D. student, **Mecit Cetin**, associate professor in civil and environmental engineering and director of the Transportation Research Institute, **Zhenyu Wang**, modeling, simulation and visualization engineering Ph.D. student, **Hong Yang**, assistant professor, modeling, simulation and visualization engineering and **Olca Sahin**, civil engineering Ph.D. student

Using blockchain to enhance health care security Old Dominion University and Sentara healthcare embark on three-year cybersecurity project

By Jon Cawley

Blockchain has attracted attention as the underpinning technology for emerging cryptocurrencies like Bitcoin. However, it can be used to provide security and privacy in a wide range of technology applications on distributed systems, such as cloud and Internet of Things (IoT).

Sachin Shetty, Ph.D., a cybersecurity researcher and associate professor at the Old Dominion University Virginia Modeling, Analysis and Simulation Center (VMASC), wants to develop security monitoring solutions to detect and identify the presence of rogue devices on cyber infrastructures. Shetty's proposal, "Blockchain Empowered Networked Device Identity Management," will enhance identity management of networked devices using blockchain's distributed ledger technology.

Based on Shetty's proposal, Old Dominion is partnering with Sentara Healthcare on a three-year project to develop a blockchain-empowered cybersecurity solution to monitor network activities of mobile devices and provide real-time alerts of unauthorized devices or communications. The project will involve developing and integrating a blockchain-based identity management solution within Sentara Healthcare's cyber infrastructure. The project team will also work on enhancing scalability and assessing the limitations of the blockchain platform.

"With ongoing work for the Air Force Research Lab, we have been able to come up with a proof of concept of how a blockchain-enabled data provenance system could help track data," Shetty said. "My interest was to see what type of case would be a good fit for health care. Can we use blockchain to detect any unauthorized entity accessing data? Can we use blockchain to detect a rogue device? The goal is to provide the ability

to track and report any unauthorized access or modification to data."

Morris Foster, vice president for research at Old Dominion, said the project is a great example of the University and a major regional employer working together on a practical challenge -- "in this case the privacy of health information that could solve an everyday problem and result in a new business line for Sentara."

Eric Weisel, executive director of VMASC, said the University is excited to partner with Sentara on groundbreaking research.

"The Sentara Healthcare collaboration will strengthen both the cybersecurity and health-care research portfolios at VMASC and engage students at the intersection of these critical fields," he said.

Dan Bowden, Sentara Healthcare vice president of information security and chief information security officer, sees this effort as one of several productive initiatives with ODU.

"The Sentara Healthcare cybersecurity program has benefited greatly from our broad association with Old Dominion University," Bowden said. "We're eagerly looking forward to working on this platform with Dr. Shetty's team. The platform will improve our overall cybersecurity posture and, being built on blockchain technology, we believe it will result in many yet-to-be-reaped opportunities in the future."

According to Mike Reagin, Sentara Healthcare corporate vice president and chief information officer, "Dr. Shetty's wealth of knowledge in cybersecurity, blockchain and cloud technologies have made him and Old Dominion University trusted consulting partners. We consider the Sentara-ODU relationship vital as we develop our interoperability strategies.



Sachin Shetty

About Sentara Healthcare

Sentara Healthcare, based in Norfolk, VA, celebrates more than 130 years in pursuit of its mission to improve health every day. Sentara is an integrated not-for-profit system of 12 hospitals in Virginia and North Carolina, including a Level I trauma center with Nightingale Regional Air Ambulance. The Sentara family also includes four medical groups, ambulatory campuses, post-acute care services, the physician-led Sentara Quality Care Network, the Sentara College of Health Sciences, Optima Health Plan members in Virginia, North Carolina and Ohio, and a team of professionals 28,000 strong. Sentara is strategically focused on continuous improvement in quality, safety, and the patient experience. Blockchain will be a key ingredient for achieving true health-care IT interoperability."

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

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