2-2020

Illuminator, Volume 3, Issue 6

Batten College of Engineering & Technology, Old Dominion University

A monthly publication of the Batten College of Engineering and Technology

illuminator

volume 3, issue 6

PIONEERS OF PROGRESS

Are you ready to join the pioneers?

ENGINEERS WEEK

Begins Feb. 22 - details inside

ODU

Batten College of Engineering and Technology

PLUS:

* ODU student and professor create drone-detecting device * Student Spotlight: Cierra Hall * CEE alum named a top 25 engineering newsmaker * Aerospace Day

ODU REPRESENTATIVES ATTEND THE VIRGINIA AEROSPACE, AVIATION AND UAS DAY LEGISLATIVE RECEPTION

Above, ODU representatives wow Virginia Secretary of Transportation Shannon Valentine. Below, the group poses with Virginia House of Delegates Speaker Eileen Filler-Corn. ***Story on page 4.***

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Celebrating Engineers Week

Founded in 1951 by the National Society of Professional Engineers, (NSPE), and organized nationally by DiscoverE, Engineers Week brings engineering to life for K-12 students, educators and parents. With a goal to ensure a diverse and well-educated future engineering workforce, the weeklong celebration aims to increase understanding of and interest in engineering and technology careers, while recognizing the contributions engineers make to society and to quality of life.

From cookies and cocoa and lab tours to mentoring for girls in STEM and an evening of dining and dancing aboard the Spirit of Norfolk, the Batten College of Engineering and Technology will celebrate Engineers Week with events and activities related to the national theme: "Pioneers of Progress."

Highlights of the week include an overview of the Hampton Roads Bridge–Tunnel (HRBT) expansion project including a presentation on tunnel boring and "Girls Night Out," which both take place on Thursday, Feb. 20. Girls Night Out offers middle and high school girls with hands-on engineering activities, as well as the opportunity to meet and learn from engineering professionals from throughout the Hampton Roads area. Participating engineering organizations include:

- American Soc. of Civil Engineers (ASCE)
- American Water Works Association
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- Engineers Without Borders (EWB)
- Kimley Horn
- MJ Synergy Group
- Newport News Shipbuilding, Girls with Engineering Minds (GEMS)
- ODU Phi Sigma Rho
- ODU SWE Student Chapter
- Society of American Military Engineering (SAME)
- US Army Corp of Engineers
- Women's Transportation Seminar (WTS)

A full calendar with detailed information can be found at Tinyurl.com/EWeekODU20. Calendar highlights are listed below.

DATE	EVENT
Mon. Feb. 17 *(12 to 1:30 p.m.)*	**Cookies and Cocoa with Deans & Department Chairs:** *Kaufman Atrium* Engineering students can meet deans, associate deans, assistant deans and department chairs who will hand out cookies and cocoa.
Tues. Feb. 18 *(12 to 2 p.m.)*	**Exploring Engineering Majors:** *ESB Atrium & Studios* Freshmen engineering students explore engineering majors in the Batten College of Engineering & Technology.
Thurs. Feb. 20 *(12:30 to 1:30 p.m.)*	**Bridge & Tunnel Pioneering:** *ECSB Auditorium, Room 1202* Overview of the HRBT Expansion Project including a presentation on tunnel boring.
Thurs. Feb. 20 *(6:30 to 8 p.m.)*	**Girls Night Out (#GirlEDay):** Ted Constant & Convocation Center, Big Blue Room Engineering societies hosting hands on engineering activities with opportunities to meet engineering mentors
Fri. Feb. 21 *(9 to 12 p.m.)*	**Engineering in Practice: Lab Tours** (Kaufman, ESB, & ECSB) Tours of engineering laboratories by high schools. Registration required.
Sat. Feb. 22 *(7:30 to 10 p.m.)*	**Engineering Gala:** A night of dining and dancing on the Spirit of Norfolk. Sponsored by SWE. Tickets required.

VIDEO SPOTLIGHT: ODU MAKERSPACE & INVENTION CENTER

The excitement is building as the ODU Makerspace buzzes with activity. Located on the second floor of Monarch Hall (former education building), the center is already being used by students in training and will open to all engineering students beginning in the fall of 2020. This modern collaboration and prototyping space supports engineering problem-solving and idea-sharing with design-focused coursework that encourages entrepreneurship. The Makerspace will facilitate technological innovation among students and faculty, encouraging them to design, prototype, build and test innovative product ideas and inventions. ***Hear from a few students in this short video:***

ODU

Batten College of Engineering and Technology

ODU student and professor create drone-detecting device

by Sherry DiBari

With funding from an Old Dominion University Program for Undergraduate Research and Scholarship (PURS) grant, professor Sachin Shetty and student researcher Michael Nilsen have designed a drone-detection device. In October, Nilsen tested the equipment at two military testing ranges where he successfully detected and identified a drone from 1 kilometer away.

In 2016, Nilsen, a freshman majoring in Electrical and Computer Engineering, was in Shetty's cybersecurity class. "I thought it was the coolest thing ever," he said.

Shetty, whose research specialty is in cybersecurity, holds dual appointments as an associate director at the Virginia Modeling, Analysis and Simulation Center (VMASC) and associate professor in the Department of Computational Modeling and Simulation Engineering.

"Michael expressed interest in exploring that area of research and was very determined to learn and work without pay just to expand his knowledge," Shetty said. "I was impressed by his inquisitiveness, his resourcefulness and his curiosity. You can teach the technical skills, but you can't teach someone to be curious."

The PURS grant, sponsored jointly by the ODU Office of Research and the Perry Honors College, supports one-year pilot projects that provide research and scholarship experiences for undergraduate students under the mentorship of faculty.

"The PURS program has been very successful; we had a record number of applications this year and I think I know why," says David Metzger, dean of the Perry Honors College. "PURS enables faculty members who are remarkably student-centered to help students see where an ODU education can take them."

Morris Foster, vice president for research, echoes this sentiment saying, "The Office of Research is delighted to support the PURS program. Undergraduate student participation is a hallmark of ODU research, and something often lacking at larger doctoral universities."

With funding from the grant, Nilsen was hired as a student researcher under Shetty's guidance.

In 2018, they received funding for a second year for research focused on identifying drones in the field based on individual product radio frequencies.

"The Navy had been inundated with drones from rogue states that had been taking pictures and video of installations all over the world," Shetty said. "We looked at ways to combat this problem of detecting enemy drones."

New commercial drones are introduced to the market every week, creating an additional challenge for the military. Shetty and Nilsen's goal was to build a device that could, using machine learning, continuously scan and build a library of radio frequencies.

"Our project is detecting, not taking them out of the sky," Shetty said.

The project not only identifies the presence of a drone, but also its manufacturer. The equipment's main computational device uses software-defined radio (SDR) attached to an antenna and to a computer. This "emulates in software what old hardware antennas would do," Nilsen said. "It's about the size of a laptop."

Nilsen and Shetty built two versions; the larger one is the size of a cellphone, the second is about half that size. The device works with an open-source software called GNU Radio.

In addition to his positions at ODU, Shetty is an engineer at the Naval Surface Warfare Center (NSWC) in Crane, Indiana. Because of this connection, Nilsen, who has a security clearance, was invited to test the equipment at two military ranges.

Nilsen spent three days in Indiana at NSWC-Crane Division to collect data and test the machine learning models. The goal was to compare performances from field to lab. A week later, he was invited to Arizona for two days of testing at Yuma Proving Ground.

At Yuma, "about a kilometer out, I could tell that there was a drone present," Nilsen said.

"That's huge," Shetty said. "When that happened, that's when they realized that's not just an academic work between a faculty and a student. This has gone to something beyond ... something that they could use."

After the testing, Nilsen presented his work to the NSWC at a technical exchange meeting. "There were many seasoned professionals from places like the Johns Hopkins Applied Physics Lab, Northrup Grumman and Booz Allen ... folks who had been in the radio frequency field for decades," Shetty said. "He (Nilsen) was the only undergraduate student presenting."

The research is not necessarily limited to military use. The Federal Aviation Agency (FAA), for example, would benefit from this technology.

"Although we developed this technology for the Navy, from an academic perspective we always saw this technology as a detection and identification capability that could not only be used for offensive purposes, but also defensive purposes," Shetty said. "We can provide those real-time alerts and detect the presence of a drone within a matter of seconds. A geofence could be created to warn airport security that a drone is in the area."

According to Shetty, this could also apply to oil refineries, nuclear power plants and other sensitive locations. Homeland Security or FEMA might also use the technology in search-and-rescue operations during national disasters to prevent drones from "impeding their work."

Nilsen, who graduates in May, has already accepted a job at Johns Hopkins Applied Physics Lab in Laurel, Maryland, where he will be working with groups who do research in the SDR field.

Shetty and Nilsen credit the availability of the PURS grant for their success.

"I am a big believer in undergraduate research experience early on," Shetty said. "Most of the time the curriculum, for better or worse, emphasizes theoretical knowledge, but coupling that with realistic, sustained, hands-on experience that goes beyond the 15-week semester is critical. It's about learning by doing."

Daniel Campbell from the ODU Office of research contributed to this story.

STUDENT SPOTLIGHT: CIERRA HALL

Staying afloat

Huntington Ingalls Scholarship helps a military spouse and non-traditional student in more ways than one

by Matty Madden '21

Cierra Hall has found a clever way to spend time with her husband when he returns home from his Navy deployment. While his ship undergoes maintenance at the shipyard this summer, the Computational Modeling and Simulation Engineering (CMSE) major will be interning there thanks to the Newport News Shipbuilding and Huntington Ingalls Scholars Program Endowment.

Through a partnership with Old Dominion University, the scholarship aims to attract a new generation of high-tech shipbuilders. Hall is one of several students who received up to $5,000 per semester through the program.

"I'm a returning adult student, so the financial support could not have come at a better time. But it's about more than the funding," she said. "Huntington Ingalls is one of the biggest employers in the Hampton Roads area and has a close working relationship with ODU, so this is a great opportunity."

The program includes a summer internship as well as an opportunity to be mentored by a Huntington Ingalls executive throughout the semester.

Hall admits that having the opportunity to work close to her husband is also a bonus.

"It's so convenient that when I start my internship at the shipyard this summer, my husband's ship will be in the yard. It's perfect timing," she said.

Hall started her academic career at the University of Richmond where she earned a Bachelor of Science degree in paralegal studies with a minor in global leadership. The military wife then moved to Norfolk when her husband was stationed here.

"In Richmond, you have federal government, state government, and local government as far as job opportunities," Hall explained. "There's not as much down here other than military and government jobs, so I decided to go back to school when I was 26."

Upon returning to school at Tidewater Community College (TCC), Hall was persuaded by a friend to pursue a career in engineering.

"I signed up, just to see if I was going to like it. I loved it," she said. "At TCC, one of my friends told me that if I did modeling and simulation, jobs are almost guaranteed when you leave and there are scholarship opportunities. So, I switched my major to modeling and simulation once I transferred to ODU."

Hall says she loves the small classes, the opportunity to really get time with professors and the fact the ODU's modeling and simulation program is unique.

"One of the things that's cool about our program is that we're the only [undergraduate] modeling and simulation program in the country. If you want to pursue this field anywhere else, you have to do it at the graduate level," Hall said.

At ODU, Hall also feels at home as a military spouse.

"I love our connection with the military," she says. "The things that I do and the things that I work on at Huntington Ingalls directly impact what my husband does in the Navy, especially because he's stationed on an aircraft carrier."

Being a CMSE student is already paying dividends for Hall. She recently attended a job fair held in the Webb Center where she was exposed to dozens of opportunities and even received a few job offers. At an engineering conference, she even received an offer to work overseas in Italy. Hall turned this offer down because she aspires to work for the military after graduation and later hopes to earn her Ph.D. and become a professor.

"My long-term goal is to get my Ph.D. and become a professor," she said, "I want to be a role model for women and minorities, so they can see me and know they too belong in the tech space."

Matty Madden is a junior majoring in public relations

CEE alum named a top 25 engineering newsmaker

Danny Speight, P.E., '86

Old Dominion University alumnus **Danny Speight, '86** was recently named a Top 25 Newsmaker by Engineering News-Record (ENR). The civil engineering graduate was recognized for his role in executing a bold, untested plan to straighten a 3,250-ton building in Norfolk.

Commonly known as the "Leaning Tower of Granby," the more than 110-year-old historic building was a jewelry store and a prominent hotel in its heyday and later home to Bankers Trust. The 21-inch lean in the nine-story building, which was noticeable from the street, was nearly as old as the building.

Despite concerns and warnings that the building was unsafe, Speight, a Virginia Beach-based structural engineer, believed the building to be structurally stable despite the lean.

Speight, president of Speight Marshall & Francis P.C., worked with Hourigan Construction on the project. After more than 15 years and 70 sheets of drawings for each step of the process, 21 custom-made, 200,000-pound hydraulic-powered jacks and a ton of courage, the building now stands superbly straight as Savoy Apartments honoring its vibrant past and boasting a bright future.

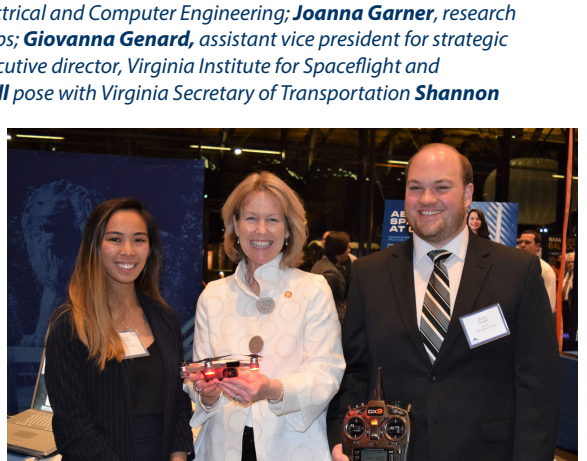
Speight's innovative design earned him several engineering awards.

Not only is Speight's wife Michele an ODU graduate who earned a nursing degree in 1984, but his daughter Morgan is also an ODU alum who followed in her father's footsteps. She earned a degree in civil engineering technology in 2014 and is a structural engineer in her father's firm.

Read the full ENR story here.

ODU representatives attend Aerospace Day at the Virginia State Capitol

*(Above left to right): **Brian Duvall,** ODU engineering graduate student; **Marty Kaszubowski**, executive director institute for innovation & entrepreneurship; **Robert Wojtowicz**, vice provost and dean of the Graduate School; **Paul Olsen**, executive director, programs and partnerships in the office or research; **Drew Landman**, professor and associate chair, Mechanical and Aerospace Engineering; **Abigail Stedman**, ODU engineering graduate student; **Dimitrie Popescu**, associate professor of Electrical and Computer Engineering; **Joanna Garner**, research associate professor, Center for Educational Partnerships; **Giovanna Genard,** assistant vice president for strategic communication & marketing; and **David Bowles**, executive director, Virginia Institute for Spaceflight and Autonomy. Below, **Abigail Stedman** and **Brian Duvall** pose with Virginia Secretary of Transportation **Shannon Valentine**. (Photos by Emily Pavlik)*



Old Dominion University Professors Drew Landman and Dimitrie Popescu, along with students Abigail Stedman and Brian Duvall, from the Batten College of Engineering and Technology demonstrated engineering projects at the Virginia Aerospace, Aviation and Unmanned Aerial Systems (UAS) Day Legislative Reception. They were joined by eight other ODU faculty and staff.

Aerospace Day offers representatives from Virginia's aerospace industry a chance to meet with state legislators in Richmond to highlight industry contributions and encourage participation in aerospace and aviation-related legislation.

The ODU team exhibited two projects related to UAS; a radio signal analysis used to detect drones and a new safety algorithm for autonomous unmanned aircraft.

The reception, hosted by the Virginia Aviation Business Association and the Virginia chapter of the Aerospace States Organization, is one of the largest receptions held during the legislative sessions. ODU was an educational partner for the reception.

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

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