

# illuminator

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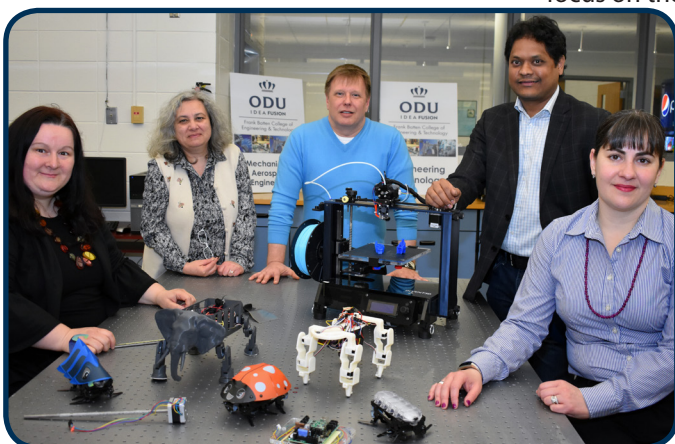
## Learning by “making”

College of Engineering and Technology awarded \$100K NSF grant to study veteran learning in a “maker” environment

by Keith Pierce

While many Navy jobs require the use of strong science, technology, engineering and math (STEM) skills to solve real-world problems, many Navy veterans choose non-STEM-related careers when they separate from the military. A new National Science Foundation (NSF) grant, involving “maker” education, aims to steer STEM-skilled Navy vets toward fulfilling the growing demand for engineers and scientists.

Commonly associated with STEM learning, “maker education” is hands-on, problem-based and project-based learning that often relies on collaboration to solve authentic problems. From idea and design to development and creation, maker education satisfies a natural human instinct to create. Thanks to affordable, yet powerful, technologies such as 3D printing, robotics, microprocessors, open-source software and the internet, making is fast becoming a buzzword for effective learning at all levels – K-12 on up.



Anthony Dean, Ph.D., (center), assistant dean for research in the Batten College of Engineering and Technology, leads the NSF project. The team also includes co-principal investigators, (from left to right) Vukica Jovanovic, Ph.D., Otilia Popescu, Ph.D., Krishnanand Kaipa, Ph.D. and Karina Arcaute, Ph.D.

Leveraging the rapid growth of the maker movement, the one-year, \$100,000 grant is aimed at addressing the nation’s need for a workforce equipped with the most current and emerging STEM skill sets. The Old Dominion University project, entitled “EAGER: Understanding the Impact of Making on Veterans in Pursuing STEM Degrees,” includes the development and delivery of two maker workshops for military veterans, designed to foster knowledge and expand interest in STEM careers.

“We plan to use these workshops to test the maker pedagogy and its potential for improving the effectiveness of learning for military veterans as it relates to STEM disciplines,” says Dean. “The workshops will provide training and awareness in engineering subjects and will include computer-aided design (CAD), rapid prototyping, 3D printing, and bio-inspired robotics”

Using data collected through surveys, as well as observations of teaching and related activities, the evaluations will focus on the before and after attitudes,

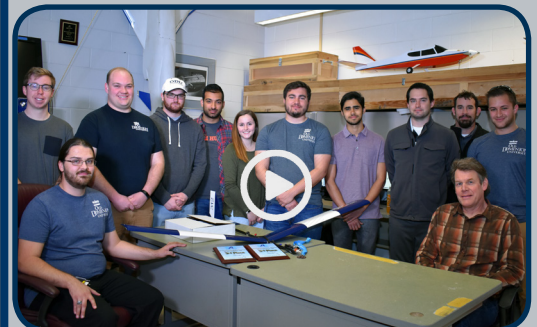
behaviors and skills of workshop participants. Results and resources will be disseminated through conferences held by a wide range of veterans’ organizations and the American Society of Engineering Education, as well as through relevant educational and professional journals. This will support the development of an educational model that can be replicated in veteran or adult student learning institutions across the country.

## MAE students win 3rd place in SAE Aero Design competition

Old Dominion University Mechanical & Aerospace Engineering students placed third among roughly 40 teams in an international SAE Aero Design competition.

The annual SAE (Society of Automotive Engineers) competition, which took place in Lakeland, Florida, is intended to provide undergraduate and graduate engineering students with a real-life engineering challenge. The ODU team, “The Flying Monarchs,” participated in the Micro Class competition, which required the team to design, build and operate an aircraft that would fit inside of a box no larger than 12 X 3.5 inches.

Learn more in this brief video:



(Seated left): Christopher VanOstrand, (standing, left to right) Andrew Waller, Brian Duvall, Evan Norfolk, Ramtin Hosseini, Emma Field, Nicholas Bryant, David Lima, Sean Fishgold, Danial Guzman, Mitchell Heath, (Seated right): Dr. Drew Landman. (Team member not pictured): George Altamirano.



Batten College of Engineering and Technology

# Portion of \$463k EPA grant to help student-led team develop low-cost method to remove lead from drinking water

by Keith Pierce

Inspired by the water crisis in Flint, Mich., a student-led team of civil and environmental engineers at Old Dominion University just received a \$15,000 grant from the U.S. Environmental Protection Agency (EPA) for their research to improve drinking water.

The People, Prosperity, and the Planet (P3) grants program is part of more than \$463,000 in funding for 31 Phase I university student teams across the nation. The student teams are working to develop sustainable technologies to solve current environmental and public health challenges.

Part of a two-phase competition, the P3 grant will allow successful student-led teams to compete for more money towards research.

Using a filter with a substance called biochar, the ODU team is researching a natural, cost-effective method for filtering poisonous heavy metals from water.

“Our idea is to develop a low-cost biochar water filter that people can make themselves from scratch utilizing household materials and install it without any professional help,” says Pushpita Kumkum, an environmental engineering student and teaching assistant. “If an emergency like the water crisis in Flint, Mich. were to happen again, we’d want people to feel confident

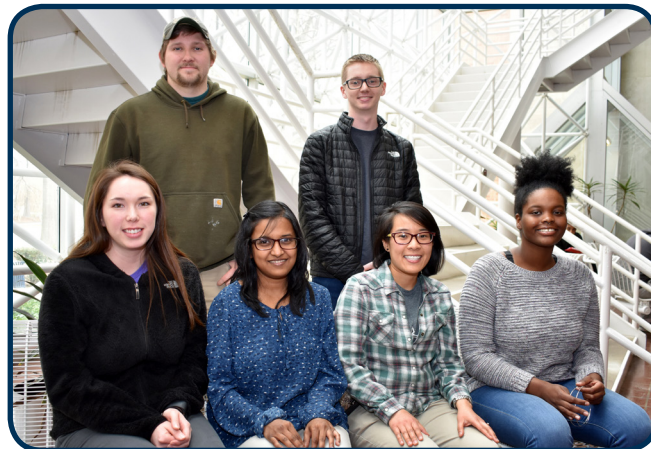
that their children are not being exposed to a high toxicity of lead that can cause brain defects or developmental delay.”

Biochar is essentially charcoal, and is made in the same manner. However, rather than just wood chips typically used to make charcoal, biochar is made from biomass decomposed in high temperatures. It is believed to be a cost-effective substitute to activated carbon in lead adsorption because of its absorbent structure, irregular surface,

“Our work shows that biochar can remove metals such as lead, cadmium and uranium from water,” said Sandeep Kumar, ODU associate professor of civil and environmental engineering and director of the Biomass Research Laboratory. “We also believe this project provides a good outreach opportunity for educating the public, especially K-12 students in the local community.”

According to the EPA, heavy metal contamination in drinking water is a growing concern due to its severe health effects in humans, especially children. Children exposed to lead in drinking water may suffer damage to the central and peripheral nervous system, and experience learning disabilities, shorter stature, impaired hearing, impaired formation and function of blood cells, and other adverse health effects.

The ODU team, along with other Phase 1 teams, will share their research at the National Sustainable Design Expo in Washington, D.C., on April 7-8. If the team successfully makes it to Phase 2, they will be awarded \$75,000 to further develop their Phase 1 research.

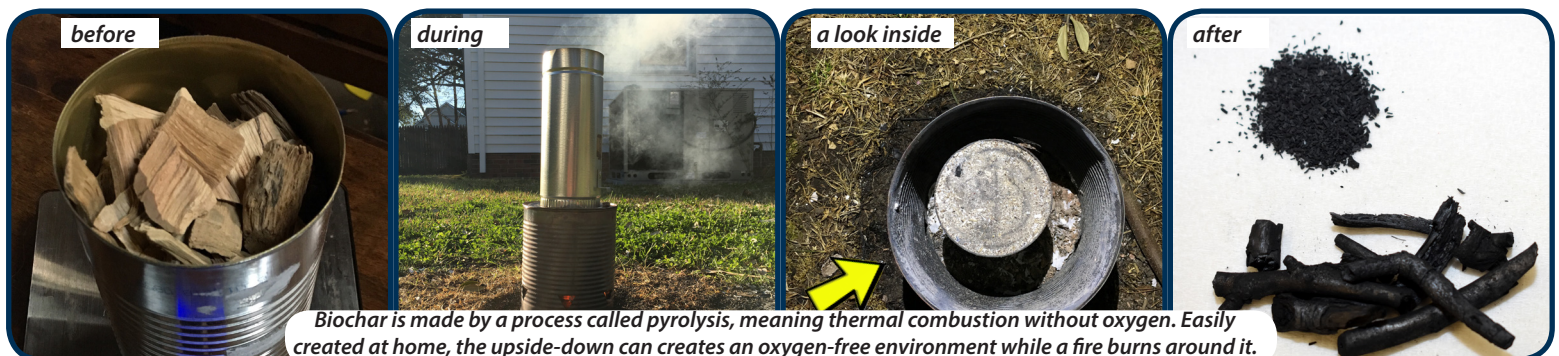


Student team from ODU's Biomass Research Lab (BRL) – seated from left to right: Catherine Sawyer, Pushpita Kumkum, Marilyn Auza, Kaija Wilson. Standing from left to right: Jason Fulcher and Benjamin Drew

and high surface to volume ratio.

The proposed biochar filter is an easy-to-use system easily installed in residential faucets. It is also effective in natural water conditions and does not require any pH adjustment. This user-friendly household water filter could be particularly beneficial to communities such as Flint, Mich., that are plagued by lead contamination in drinking water.

“This year’s P3 teams are applying their classroom learning to create valuable, cutting-edge technologies,” said EPA Administrator, Scott Pruitt. “This next generation of scientists is designing sustainable solutions that will help protect public health and the environment and ensure America continues to lead the world in innovation and science for decades to come.”



Biochar is made by a process called pyrolysis, meaning thermal combustion without oxygen. Easily created at home, the upside-down can creates an oxygen-free environment while a fire burns around it.

# International expert addresses optimal deployment problem

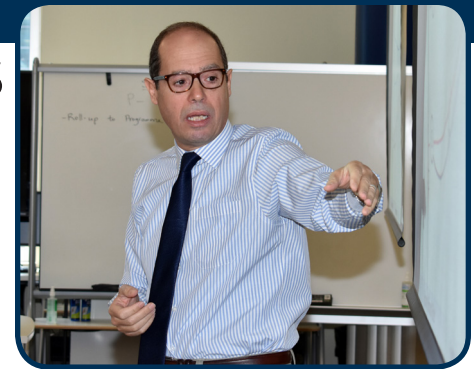
by Keith Pierce

Professor, Mohamed Haouari, Ph.D., a world-renowned industrial engineer and expert in operations research from Qatar University (located on the northern outskirts of Qatar's capital city, Doha), visited ODU to address students and faculty, as well as NATO leaders. Hosted by the Engineering Management and Systems Engineering Department, Haouari's talk, "Column Generation Approaches to the Optimal Deployment Problem (ODP)," focused on disaster preparation and response from a humanitarian logistics perspective – mainly transportation – a problem also common in military deployment.

"It is an enriching experience to have well recognized researchers such as Professor Haouari addressing an important and timely topic such as deployment optimization for humanitarian logistics, especially at a time we are witnessing

more and more natural and man-made disasters," said Ghaith Rabadi, professor, Engineering Management and Systems Engineering. "Several of our guests including students, faculty and NATO personnel saw great value in the presented research. We look forward to further collaboration with Professor Haouari."

Natural disasters – such as earthquakes, tsunamis, hurricane, floods, etc. – that cause severe casualties and major infrastructure damages, require emergency rescue and medical teams, as well as various survival and food supplies, to be urgently transported to the disaster location. We assume these teams and supplies are prepositioned at different scattered locations (i.e. source nodes). Transporting rescue and medical teams and supplies from a source node to a disaster location (sink node) can be achieved by using



Dr. Haouari

different transportation assets (e.g. helicopters, large military aircraft, trucks, etc.) that have also been prepositioned at the source nodes. Haouari presented optimal node deployment strategies for transporting all required teams and supplies to a disaster location in the shortest possible time.

"It was great to engage with faculty, students and other guests at ODU on the topic of deployment optimization," Haouari said. "I truly enjoyed the discussion and many of the comments and questions were insightful. I look forward to continued collaboration with Dr. Rabadi and other faculty and students at ODU."

# CEE students experience speed networking

story and video by Keith Pierce

After a satisfying meal and a little informal mingling, civil and environmental engineering students settled in for an evening of fast-paced, speed-dating-style conversations with industry experts who happened to also be Old Dominion University alumni.

"There are structural engineers, environmental engineers, transportation and construction professionals, government workers; you name it," said Ben Stuart, senior associate dean of the Batten College of Engineering and Technology. "One of the benefits of having such career diversity is that the students get to hear and learn about a wide array of engineering career paths."

Sponsored by the ODU alumni association and the civil and environmental engineering alumni, the event was held in the alumni center.

"I loved it!" said civil and environmental engineering senior, Kimberly Bethea.

"I'm interested in construction and environmental restoration, and I was able to network with people who gave me more information as to what career path I could take, versus them just telling me what they've already done."

Recent ODU graduates like Daniela Gonzales, class of 2016, a transportation engineer for Clark Nexsen, were nearly as excited as the students to take part in the event.

"It's just really cool to hear what kind of senior design work the students are doing, what kind of work they're interested in and to hear them ask really great questions," said Gonzales. **See more in this brief video:**



Civil & Environmental Engineering Students Experience Speed Netw

## ECE professor among seven ODU faculty selected as 2018 Entsminger Fellows



Shirshak Dhali

Congratulations to Shirshak Dhali, Ph.D., professor of Electrical and Computer Engineering, who was elected as one of the 2018 Entsminger Fellows of Old Dominion University. These select faculty will be lead entrepreneurship advocates within their respective colleges and/or departments and collaborate with the newly created Division of Entrepreneurship and Economic Development (DEED).

See more here: [tinyurl.com/Entsminger](http://tinyurl.com/Entsminger)

# Discovery of a smartphone vulnerability wins ECE student prestigious award



Rui Ning

Congratulations to, Rui Ning, a Ph.D. student in electrical and computer engineering, who received the Mark Weiser Best Paper Award. Presented at the Institute of Electrical and Electronics Engineers (IEEE) International Conference on Pervasive Computing and Communication, the extremely

competitive award goes to an individual who has shown creativity and innovation in pervasive computing research.

Ning's paper is a joint work with electrical and computer engineering associate professors, Chunsheng Xin, Jiang Li and Cong Wang from the College of Sciences (Department of Computer Science), as well as Hongyi Wu, director, Center for Cybersecurity Education and Research.

The paper reports on a newfound vulnerability on smartphones due to the malicious use of sensor data, where the attacker can sniff mobile apps. With accuracy as high as 98%, the vulnerability allows attackers to detect what apps have been installed on a user's mobile device and when they are opened, subsequently allowing hackers to capture the username and password. This discovery lends tremendous credibility to ODU's ever-evolving cybersecurity research, which is continuously offering solutions to some of the nation's greatest threats.

# Promoting Modeling, Simulation & Visualization Engineering

The Batten College of Engineering and Technology at ODU is the only engineering program in the country that offers an undergraduate degree in modeling and simulation engineering. "Engineering is about problem solving and modeling and simulation is problems solving on steroids," says Rick McKenzie, Ph.D., professor and chair of the Modeling, Simulation, and Visualization Department at ODU. From object-oriented programming, artificial intelligence, computer communications and computer graphics, to probability and statistics, data analysis and modeling human behavior, modeling and simulation is one of the fastest growing and most exciting fields in engineering. *Learn more in this great new video:*



Learn more in this brief video:



Women Excelling in Engineering

story and video by Andrea Luna

The first annual Women Excelling in Engineering (WE2) workshop was a great success. Current and aspiring women engineers gathered at the Webb Center at Old Dominion University for informative panel discussions and inspirational talks by professional guest engineers. ODU alum, Sarah Golden, chief administrative officer of The GBS Group, gave a powerful keynote address about overcoming the hurdles many engineering students – especially females – face. Jessica Gomez, director of engineering at Huntington Ingalls Industries-Newport News Shipbuilding, provided the opening session talk.

Other ODU alumni served as moderators or panelists, including Terri Hall, '94, president of Clark Nexsen, a well-known architecture and engineering firm headquartered in Virginia Beach; Janet Webster, '95, senior

# First 'WE-2' event a great success

project manager, also at Clark Nexsen; Thomasina Wright, '89, director of program production trades at Huntington Ingalls Industries-Newport News Shipbuilding; Dawn Panaguiton, '10, a civil engineer at Whitman, Requardt & Associates, LLP in Virginia Beach; and Morgan Speight, '14, a structural engineer at Speight, Marshall & Francis PC, also in Virginia Beach.

WE2 aims to promote STEM professions among women to help meet the growing demand for engineers and scientists.

Several faculty members also served as moderators and panelists including, Mujde Erten-Unal, associate professor of civil engineering, Vukica Jovanovic, assistant professor of engineering technology, Karina Arcaute, assistant professor of STEM education, Bonita Anthony, director of engineering success, and TeCarla Moore, ODU senior admissions counselor.

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

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