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Batten College of Engineering & Technology, Old Dominion University

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WILLY WRIGGERS’ MODELLING LIFE

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As the semester progressed, we gradually began to host Prioritization Initiative. In October, we hosted a successful online ABET reaccreditation visit for four BCET programs (Civil Engineering, Computer Engineering, Electrical Engineering, and Mechanical Engineering). We further announced appointments of five new directors: Communications, Business and Administration, Outreach, Advising, and Assistant Director for Research and Graduate Programs, respectively, after various internal and external searches.

In November, we hosted an online Townhall meeting for faculty to discuss the College’s response to the Program Prioritization Initiative. As the semester progressed, we gradually began to host both online and in-person events on a limited scale. In December, we held a small reception for BCET faculty and staff, many of whom we hadn’t seen since 2020.

Old Dominion University’s reputation has continued to grow over the academic year. In December, we were awarded the prestigious R1 designation. In January, the top 2% of most-cited researchers in the world included 53 ODU faculty. Fifty of those were BCET professors and researchers.

In February, students, staff, and faculty were treated to a plethora of activities during Engineers Week. We offered pop-up advising, department panels, a student appreciation social, networking activities and lab tours. Sharon Monica Jones, a NASA director and ODU alumnae, was our guest speaker.

In March, nearly 50 admitted and current students attended Women Excelling in Engineering (WE2). Guest speaker and ODU alumnae, Sarah Golden, offered unique advice on navigating the world of engineering.

The 13th annual Virginia-North Carolina Alliance Research Symposium was hosted virtually by the College in April. It was our first time hosting the event since joining the Alliance in 2017.

ESPEX, the engineering student projects expo, was held at the Ted Constant Center in April and featured over 70 undergraduate and graduate research projects. The event was attended by students, faculty, staff, alumni, ODU administration, industry and community members with 200+ in attendance. Thanks to our sponsors, STIHL Inc. and William “Billy” Sykes, monetary awards were offered for the first time.

BCET continues to develop partnerships with university partners, industry and regional high schools. At the beginning of the year, we announced a new program offering dual enrollment at the Governor’s STEM and Technology Academy at Landstown High School. In February, we launched the first manufacturing engineering technology major in Virginia in partnership with the Institute for Advanced Learning and Research and Patrick & Henry Community College.

Work and research experience opportunities for our students continue to expand. We recently announced a new joint traineeship program in accelerator science for our graduate students and faculty. In February, Catherine Fischer, a mechanical engineering technology student, was awarded the Brooke Owens Fellowship. Only 51 students were chosen from more than 1,000 applications. She was the first student ever accepted from a Virginia university.

As the academic year ends, we celebrate the success of our students, faculty and staff. In May, four department chairs were announced – two are new appointments while the other two are reappointments. Vukica Jovanovic’s appointment as chair of these academic years was celebrated, and former female chair in the history of the department and the BCET are reappointments. In May, four department chairs were announced – two are new appointments while the other two are reappointments. Vukica Jovanovic’s appointment as chair of the Department of Engineering Technology will make her the first ever female chair in the history of the department and the BCET. We also promoted three of our female colleagues to the rank of full professor during this academic year.

We wish farewell to those retiring colleagues after many years of dedicated service. We look forward to a great future at the Batten College of Engineering and Technology. Please join me in welcoming the new dean, Kenneth Fridley, who will be joining us from the University of Alabama on July 1. It has been an honor serving as your interim dean.

Keynote speaker Sarah Golden inspired students during WE2 event

You won’t find this many women in a room when you’re working,” Sarah Golden told the crowd of female engineering students. “It’s just not going to happen.” Golden, keynote speaker for the 8th annual Women Excelling in Engineering (WE2) event, said people often ask her how she managed being the only woman at the table, in the room or on a team. “You can do anything you want to do,” she told the group of nearly 50 women. “Just set your mind to it and you can accomplish it. And if no one’s told you that, I’m going to tell it to you today. You can do it.”

Golden, who earned her bachelor’s degree in computer engineering from ODU in 1994, is principal owner, president and chief administrative officer of The GBS Group, an engineering firm with more than 140 employees with offices in Virginia Beach, Philadelphia, Washington, D.C., and San Diego. The company provides engineering services to the U.S. Navy, Military Sealift Command, NOAA and the U.S. Coast Guard, in addition to commercial maritime, rail and transport industries.

The Batten College of Engineering and Technology hosted WE2 with sponsorship from The GBS Group and student chapters of the Society of Women Engineers (SWE) and Phi Sigma Rho.

After Golden’s presentation, participants attended one of two concurrent panel discussions. In one panel, “Managing your Undergraduate Journey,” engineering students discussed networking, leadership opportunities and how long one should take to finish college. “Five years or four years, you are still going to graduate,” panelist Zaria Booth said. “Don’t stress yourself out trying to finish in four years. Take the number of credits that are comfortable for you.”

The second panel, “Pathways after Graduation,” provided advice from an industry and graduate student perspective. Panelists included professional female engineers and a doctoral student. Facilitator Mujde Erten-Unal, associate professor in the Department of Civil and Environmental Engineering, asked the panel, “What is the single most important piece of advice you could offer?” “Know your worth and be confident in the value you bring to the company,” said Amanda Caruso, an aircraft systems engineer at Garmin Ltd.

The event concluded with an interpersonal communication workshop facilitated by Pilar Pazos, associate professor in the Department of Engineering Management and Systems Engineering, and Karina Arcane, senior lecturer and director of First-Year Engineering Programs.

A thank-you note after the event summed up the general feeling. “The keynote speaker was very inspiring, and hearing from the panelists was an excellent opportunity to attain some advice from upperclassmen,” attendee Karissa Crawford said. “I am very thankful to attend a university that supports students and offers opportunities for women in STEM to excel!”

Inside News

ANNA LACY is the new transfer academic success advisor for the Batten College of Engineering and Technology. Lacy graduated from James Madison University in 2016 with a B.S. in psychology and received her M.Ed. from UNC Greensboro in 2019. Lacy has a background in residence life and advising and advocacy. She emphasizes student support, empowerment and advocacy in her work. Outside of work, she loves to travel, try new restaurants, and spend time with her two kittens, Milo and Lucy.

ASHLEIGH BLANCHETTE, the new fiscal operations specialist for the Business Services Center, graduated from ODU in 2007 with a B.S. in interdisciplinary studies and a minor in special education. Blanchette joins ODU with a background in customer service, including 17 years in retail management, four years in educational management and one year as a 911 dispatcher. Outside of work, Blanchette loves to travel, read, and enjoy time with family and friends.

Khan Mosharrafhossain, Ph.D.

Keynote speaker Sarah Golden inspired students during WE2 event
COMPUTER MODELING Is at the Heart of Willy Wriggers’ Research

By Sherry DiBari

As a young man, Willy Wriggers was fascinated by optical instruments. Childhood gifts of a microscope and a telescope led to a love of science, especially astronomy and biology. “I started studying water in dirt puddles outside and was interested in bacteria and also looking at the stars,” he said. “I learned all the star constellations when I was 8 or 9.”

Wriggers was active in his high school’s astronomy club, edited the club’s magazine, “Rosa Ursina,” and led tours and presentations on the cosmos. “That experience became sort of a blueprint for what I did later as a scientist and educator,” he said.

Today, his focus is on life at a molecular level. Wriggers, the Frank Batten Chair of Mechanical and Aerospace Engineering and Bioengineering at Old Dominion University, develops 3D-computer modeling techniques to help scientists refine and reconstruct electron microscopy (EM) images.

Wriggers has collaborated with Jing He, a professor in ODU’s Department of Computer Science since 2015. His contribution is the application and understanding of deep learning in the computational environment. The work will “help biological electron microscopists bridge a broad range of resolution levels from atomic to living organism-level,” Wriggers said.

Those images can help scientists explain the structure of biomolecular structures – complex assemblies made up of nucleic acids and proteins. “Trying to understand these structures at the atomic detail helps you understand the function of the biological machine – you understand how muscle works at the atomic level, you know how the metabolism of ATP (adenosine triphosphate, the “fuel” for all living things) drives complex cellular processes,” Wriggers explained in a recent interview. “How that is actually done with proteins is really fascinating.”

In response, Wriggers developed Situs, a software package that could dock the low-resolution EM images to computer-generated 3D models. The program helped fill in missing artifacts caused by deficiencies in electron microscopes and to refine what Wriggers calls “noisy” imaging. “It put me on my map almost 25 years ago, and essentially drove my entire academic career,” he said.

AN INTRODUCTION TO COMPUTERS

Wriggers grew up in Ingolstadt, Germany, headquarters of the Audi car company. His father and grandfather had both worked there, and Wriggers, like many teenagers – worked there in the summers. That experience would lead to a life-long love for cars and machinery.

In college, Wriggers gravitated toward physics and emerging computer technologies. “People were just starting with computers, and I realized that computers could play a big role in physics,” he said.

In 1992, he left Germany for a yearlong exchange program at the University of Illinois at Urbana-Champaign. “The reason why I’m still here is because I didn’t exchange back,” he said with a laugh.

For Wriggers, it was an exciting time to be at Illinois. The physics department was just one floor down from the research and development arm of the National Center for Supercomputing Applications and they were in the process of developing Mosaic, the first commercially available internet browser, and the CAVE, a virtual-reality environment.

“It was really like the center of the universe to be at the Beckman Institute [UIUC] during that time,” he said.

Wriggers was one of the first researchers to implement virtual reality for 3D biological structures. It was innovative research for someone whose first experience with a computer was at age 21.

His dissertation focused on the first simulation of newly discovered motor proteins. It was all based on application – other people wrote the software – something Wriggers would eventually do as well.

Wriggers developed Situs as a post-doctoral student at the University of California, San Diego and then as an assistant professor at The Scripps Research Institute on the same campus.

FINDING A HOME AT ODU

When he was 32, he received a $1.2 million National Institute of Health grant. The funding has ensured that Wriggers’ work would continue – from California to the University of Texas Health Science Center at Houston, the Weill Medical College of Cornell University and now at ODU. The grant has been renewed continuously since 2001.

“Wriggers’ work is a model of the quality of research that weaves engineering and medicine here at Old Dominion University and at the College of Engineering and Technology,” said Khan Iftekharrudin, interim dean of the Batten College of Engineering and Technology.

“Wriggers’ work is a model of the quality of research that weaves engineering and medicine here at Old Dominion University and at the College of Engineering and Technology,” said Khan Iftekharrudin, interim dean of the Batten College of Engineering and Technology. “We value his contributions as a researcher, professor and friend.”

Wriggers left academia for a few years to participate in the development of the Anton supercomputer at D. E. Shaw Research in New York City. The privately funded team achieved the first millisecond length molecular dynamics simulation in 2010, which was a major breakthrough in biomolecular modeling.

Later, when he was looking for a university to renew his own NIH-funded project and lab, biomachina.org, life led him to ODU. “When I got this offer, I thought, ‘wow, they really believe in me.’” he said. “I’m really super grateful to ODU for enabling me to continue my independent research.”

Wriggers also welcomed the multidisciplinary opportunities at ODU – including the chance to work with ODU Motorsports, “I used to ride a motorcycle. I used to fly glider planes,” he said. “I liked everything that moved.”

“Coming here and seeing that there was an active motorsports lab in this building, I was really fascinated by that,” he said.

As an advisor, Wriggers worked with the students to install sensors on the cars and measure the vehicle’s parameters and dynamics. “We used that to improve lap times and better understand the performance of the vehicles,” he said.

For Wriggers’ next project, the sky’s the limit. “I hope to find time to go back to an aerospace or optical astronomy project where I can apply our computational tools,” he said. “I think that would be really exciting.”

“One of the great benefits of ODU is that there are no limits here in terms of what I can do.”

AWAY FROM CAMPUS

Wriggers lives at Chic’s Beach in Virginia Beach with his wife Hilary and two sons. The family plays various instruments. In his free time, you may find Wriggers and his sons performing at open mics and on the local blues jam circuit at venues like Froggies or Jerry’s Indian River.

“...
DOOR TO SUCCESS

WILLIAM "BILLY" SYKES ’75 IS AN INVENTOR, ATTORNEY AND BUSINESSMAN

Chance meetings and opportunities can often change one's direction in life. For William "Billy" Sykes, this is certainly true.

Sykes, B.S.E.E. ’75, is an engineer, attorney, patent attorney, inventor and business owner. Soon, he hopes to add another title: college mentor.

Sykes grew up here in Norfolk, in a home on the corner of 48th and Colley Avenue. Right out of high school, he opened a surfboard shop in Virginia Beach. He made the boards himself. "I was surfing, and building and selling surfboards," he said. "It was perfect."

He ran the shop for a few years before the Vietnam War led to his first detour. Sykes joined the Navy Reserves in 1966 and went on active duty in 1968. He worked as a second-class electrician mate on a Navy destroyer based out of Norfolk. When his military service ended, Sykes took advantage of the GI Bill to attend ODU. As a student, he lived at home and worked third shift at the railyard. "Working full-time and going to school full-time – I think there was something wrong with me," he joked.

Sykes has a vivid memory of Professor Bob Ash, who recently retired. "I think it was Dr. Ash who said – and this was during the hippie times – ‘You know, you are the first engineer that’s ever come to my class barefoot.’" "It was summer and this was in the ’70s," Sykes said. "There were a lot of people at ODU that were barefoot, but they weren’t in engineering."

Sykes’ first job out of school was as a nuclear engineer at the Portsmouth Shipyard. That led to a 30-year career with the Department of Defense. A conversation led to another career, even before retirement. "A friend, a man who was my father’s age, said, ‘Billy, when you were young, you said you would like to be an engineer and an attorney.’" Sykes explained.

So, Sykes became an attorney. Not in the traditional way though. As an alternative to attending law school, the Virginia Board of Bar Examiners offers a self-study option called the Law Reader Program. Sykes worked every day, Monday through Friday, and spent every Saturday studying at the law library. He took the exam three times. "When I put my mind to doing something, I can usually do it," he said. "I’m not the smartest guy but I try real hard."

And then again, another conversation, another path. Attorney William Sykes tried a number of cases, but one subject kept coming up. "I found myself filing lawsuits against pest control companies because of moisture problems in the crawl space," he explained.

"A gentlemen with one of the big pest control companies told me, ‘Billy you’re crawling under here [the home], and you are telling me there’s ways that we could ventilate it and correct the problem. Why don’t you come up with products that would help us instead of suing us?’"

So, Sykes designed and built a crawl space door that could vent moisture out. "I haven’t filed a lawsuit against a pest control company ever since," he said. "They are our biggest customers."

The doors were so popular that Sykes created Crawl Space Door Systems Inc. "We are selling 45-foot containers full of them," he said. Sykes was now an attorney, engineer, inventor and successful businessman.

To patent his crawl space doors, Sykes had to hire an official patent attorney. It was an expensive and time-consuming endeavor. Only an engineer or scientist licensed as an attorney can become a patent attorney. A rigorous exam is required as well. So, he studied and passed the patent attorney test. "That test was harder than the bar exam," he said.

When FEMA mandated that all homes with flood insurance have flood vents, Sykes reworked his crawl space doors into flood vents. And of course, he patented them himself. His is one of only three flood vents nationwide approved by FEMA and tested by the International Code Council (ICC).

Overall, Sykes has about 20 patents and even more inventions on variations of crawl space doors, flood vents and UVC germ eliminators.

Recently, he has been thinking about retirement and focusing on CS Products, a Shark Tank-inspired company he founded to help new inventors.

Sitting still is not an option though. He and his wife, Frankie, tried to spend a recent Saturday doing nothing. "That lasted about two hours," he laughed.

Not too long ago, he sat next to Tom Koller at an ODU football game tailgate party. Koller, ODU’s director of corporate relations, suggested the Sykes visit the Engineering Makerspace and Invention Center (EMIC). He told them, "You are really going to like this." "And he was right," Sykes said.

Sykes was impressed with the 7,000-square-foot facility and with the students. He’s been thinking about doing some mentoring and offering patent assistance. "I think that I can really get in there and help them," he said. "If you could put engineering theory and practicality together, can you imagine what the students could turn out to be?"

Sykes recently gave a donation to the EMIC and provided the top undergraduate research project prize at ESPEX, ODU’s engineering student projects expo. He is humble about giving though. "You almost have to," he said. "If I didn’t have a college that I could walk to, and that I could work third shift at the same time, I wouldn’t have been an engineer. I wouldn’t have been a patent attorney. I might have been an inventor, but I would not have been as successful as I am."
Old Dominion University launched Virginia’s first four-year major in manufacturing engineering technology (MfgET) at its Norfolk campus and at the Institute for Advanced Learning and Research (IALR), in Danville.

The new major will be offered in the existing bachelor of science in engineering technology degree program and will be housed in Old Dominion’s Batten College of Engineering and Technology’s Engineering and Technology department.

“The Engineering Technology department is excited to be a part of such an exciting initiative and to continue our ongoing partnership with our community college partners so that we can ramp up this much needed workforce pipeline,” said Vukača Jovanović, associate professor and chair of ODU’s Department of Engineering Technology.

IALR will host third- and fourth-year undergraduate level classes for the MfgET program of ODU on its Danville campus. The classes will be offered with on-site, virtual and hybrid options, leveraging the advanced manufacturing lab space of IALR.

Patrick & Henry Community College (P&HCC), based in Martinsville, will launch a corresponding associate degree in manufacturing engineering technology that will serve as a pipeline to both the workforce and pathway to ODU’s program. P&HCC currently offers a general engineering technologies and industrial electronics technologies associate degree, as well as several manufacturing certificates.

The two-year manufacturing engineering technology degree will eventually be available to all colleges within the Virginia Community College System.

“This partnership strengthens the educational pathways and options for Virginia’s community college students while providing a much-needed manufacturing engineering workforce for our military and maritime industries,” said Khan Iftekharrudin, interim dean of the Batten College of Engineering and Technology.

“Patrick & Henry Community College is proud to be part of this critical initiative which will allow us to help fill local, state, and federal workforce manufacturing engineering pipelines,” said J. Gregory Hodges, president of P&HCC.

“In particular, this initiative will help our nation remain competitive on the global stage as we prepare talent who possess the skills, knowledge and competencies that are essential for 21st-century manufacturers.”

Students in Southern Virginia can enter the program from multiple paths, including community colleges; the Academy for Engineering and Technology resourced by IALR; career and technical dual-enrollment programs; and incumbent workers.

The bachelor’s and associate programs are part of the Virginia Maritime Industrial Base Consortium’s “Talent Pipeline Initiative,” which aims to develop job-ready talent for defense and industrial base employers through an enhanced K-12-to-university training pipeline. The program has the support of industry partners, who will offer guidance and experiential work opportunities to ensure students graduate well-prepared for the work.

“This partnership reinforces Old Dominion University’s commitment to workforce development and leadership in the maritime industry,” said ODU President Brian O. Hemphill, Ph.D. “Students across Virginia will be able to gain the necessary skills to fill essential defense jobs, aligning talent with opportunity.”

The training pipeline will increase manufacturing capacity, capability, resiliency and diversity in the maritime defense industrial base.

Read the full story online.
FELLOWSHIP IS A FIRST FOR ODU

Although Catherine Fischer applied for a highly competitive fellowship working in the aerospace industry, she was certain she wouldn’t be selected.

The competition was tough. Only 51 students would be chosen from more than 1,000 applications, and no student had ever been accepted from a Virginia university.

After making it through the first few rounds and an intensive interview process, Fischer was still surprised when she was offered the Brooke Owens Fellowship. “I’m still in disbelief about the whole thing,” she said. “The kid in me is doing backflips every time I think about it!”

Fischer, who graduated from Old Dominion University’s mechanical engineering technology program in December, will spend 12 weeks as a strategic operations intern at Ball Aerospace in Washington, D.C.

The fellowship, named after space industry pioneer and accomplished pilot Dawn Brooke Owens (1980-2016), provides paid internships and executive mentorships for undergraduate females and gender minorities in aerospace disciplines. Fischer, a Springfield Center, New York, resident, already had a master’s degree in teaching and experience in the field before heading back to school as a distance-learning student.

“I was drawn to ODU’s impressive academic rankings, research projects taken on by departmental professors and accessibility for distance-learning students,” she said. She found one professor, Orlando Ayala, particularly motivational. “Dr. Ayala has been absolutely integral to my success so far,” she said. “He has gone above and beyond in ensuring my academic success in my coursework, as well as partnering with me to complete my senior design project.”

“His guidance, advice and encouragement has pushed me to think more critically about my designs, which has led to an enriching experience at the University.”

Ayala, associate professor in the Department of Engineering Technology, was in turn complimentary about Fischer. “Catherine is a great student and a much better human being,” he said. “She is passionate about engineering, and this passion makes our teaching job effortless.”

Ayala noted that Fischer is determined to use her engineering knowledge to “protect our planet and help humankind.” “We are currently working on her senior design project in which we are trying to make 3D-printed synthetic soil that will allow better control of nutrient supplements to the roots of plants while minimizing water use and energy consumption,” he said. Read the article online.

SHERIF ISHAK, professor and chair of ODU’s Department of Civil and Environmental Engineering, was recently named a fellow of the American Society of Civil Engineers (ASCE).

The fellow designation is a prestigious honor held by only 3% of ASCE’s 150,000+ members. Candidates must hold a Professional Engineer (PE) or Professional Land Surveyor (PLS) license and have at least 10 years of continuous membership.

“ASCE fellows have made celebrated contributions around the world,” said Ishak. “I am honored to be recognized by this prestigious organization.”

“The Batten College of Engineering and Technology celebrates the accomplishments of Dr. Ishak and we congratulate him on this great honor,” said Khan Hekmatuddin, interim dean of the College.

Read more online.

HAPPY RETIREMENT!

When ISAO ISHIBASHI first came to ODU in 1986, Ronald Reagan was president, gasoline was 86 cents a gallon and the top Billboard song of the year was “That’s What Friends Are For” by Dionne Warwick and Friends.

Thirty-six years later, Joe Biden is president, the top song is Wait For U by Future, featuring Drake and Tems and the price of gas – we won’t talk about that.

And, after a long and storied career, Ishibashi, professor in the Department of Civil and Environmental Engineering, is retiring. Read the article online.

JOHN SOKOLOWSKI has already retired at least once.

In 2001, he retired from the Navy after serving 27 years as a submarine officer.

On June 1, he will officially retire again – this time from his position as associate professor of computational modeling and simulation engineering at Old Dominion University. Read the article online.

FACULTY NOTES

Thanks to a Fulbright Scholarship, XIXI WANG, professor in the Department of Civil and Environmental Engineering, will spend four months in Australia collaborating with researchers from the Center for Applied Water Science at University of Canberra (CAWS). Wang, whose research focuses on hydrology, hydraulics and water resources, had already developed a dryland ecohydrologic model that can simulate water-soil-vegetation interactions as influenced by climate variation and livestock grazing.

He will work with researchers on the application and refinement of the model based on the Australian dryland ecosystem. “Most of the Australian territory consists of drylands with a drying trend resulting from climate change and anthropogenic activity, making it vital to investigate interactive mechanisms of dryland water-soil-vegetation processes and develop a similar model for water resources management decisions,” he said. Read the article online.

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Researchers to Study Human Drivers’ Role in Automated Vehicles

The Batten College of Engineering and Technology’s Multidisciplinary Research Seed Grant was awarded to a team of researchers who will develop a networked driving simulation platform. They plan to study drivers’ responses to safety-critical events, such as merging into highways and conflicts at intersections in vehicles with different levels of automation.

The project team includes Kun Xie, assistant professor in Old Dominion University’s Department of Civil and Environmental Engineering, Sherif Ishak, professor and chair of the Department of Civil and Environmental Engineering, Hong Yang, associate professor in the Department of Computational Modeling & Simulation Engineering and Yusuke Yamani, associate professor in the Department of Psychology. Read the article online.

ENGINEERS WEEK

In February, the Batten College of Engineering and Technology celebrated National Engineers Week (EWeek) with in-person activities. The event showcased BCET’s programs and brought awareness to the engineering profession. See the video online.