SUMMER 2021 / ISSUE 34

BUCKEYE ENGINEERING

Celebrating women in engineering

THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

INSIDE /

Women who lead

In honor of International Women in Engineering Day, the College of Engineering premiered a video on June 23 featuring a conversation between President Kristina M. Johnson and Dean Ayanna Howard. The two accomplished academic leaders and entrepreneurs discussed representation in STEM fields, their experiences as women engineers and how engineers lead complex organizations.

While discussing how to increase the number of women and underrepresented minorities in STEM careers, Johnson highlighted the university's RAISE (race, inclusion and social equity) initiative, which will invest in hiring new tenure-track faculty whose research and creative expression address social equity and racial disparities.

"I'm a really strong believer that it helps to see it to be it," Johnson said. Howard agreed, stating that while the trajectory of women and underrepresented minorities in engineering is positive, one of her priorities for the college is increasing access.

"A lot of times students don't realize they want to be engineers until they get here and we do not yet have the structure to ensure that they can enroll and be successful, which I think is unfair," she explained. "It's about access and exposure, and I know we can fix that here."

The two engineers also emphasized the important role that Ohio State alumni can play in student success by sharing their experiences.

"Even today, we have students and young professionals that are still fairly isolated," Howard said. "So when you come back and say, 'Look, it's actually better on the other side,' it inspires. That's an easy thing, but we do need a lot more of that."

WATCH THE CONVERSATION: go.osu.edu/be34a

Driving the future of mobility

Mobility drives the progress of civilization, but our transportation systems are stuck in the past. Despite being a $2 trillion per year enterprise in the U.S., transportation is the last major industry that has not yet been fully transformed by information and communications technology.

Mobility must be reengineered to be smarter. Last summer, Ohio State launched its Smart Mobility Initiative to lead and integrate mobility-related research, innovation and education across campus.

"Ohio State's definition of smart mobility is 'transportation with a conscience,' where that conscience takes into account all of the burdens transportation places on society, while seeking to maximize the benefits," explained Smart Mobility Initiative Director Chris Atkinson.

Involving the use of advanced communications and computing to integrate and control multiple modes of transportation, smart mobility uses technology and connected infrastructure to enable safer, cleaner, more efficient, more equitable and more accessible travel. Ohio State is moving decisively in each of these areas, while systematically examining smart mobility.

While propulsion, wheels and wings remain critical, emerging key focus areas include data analytics, artificial intelligence, connectivity and cybersecurity. Human factors and public policy must also be woven into mobility research from the beginning, rather than analyzed in the rearview mirror. Advanced materials and new manufacturing methods will enable lighter, safer and more efficient vehicles.

Collaboration is critical to solve challenging issues like modernizing transportation. Ohio State engineers captain major projects for the Department of Transportation and the FAA, and sustain long-term research and workforce partnerships with transportation industry leaders.

"Mobility permeates every aspect of our lives," Atkinson said. "So it behooves us as an education, research and development institution to study it and work towards its betterment."

READ MORE: go.osu.edu/be34b

Technology ‘retrains’ cells to repair stroke damage

Most stroke victims don’t receive treatment fast enough to prevent brain damage, but Ohio State scientists have developed technology to “retrain” cells to help repair damaged brain tissue. It’s an advancement that may someday help patients regain speech, cognition and motor function, even when administered days after an ischemic stroke.

Researchers in the Colleges of Engineering and Medicine use a process created at the university called tissue nanotransfection (TNT) to introduce genetic material into cells. This allows them to reprogram skin cells to become something different—in this case vascular cells—to help fix damaged brain tissue.

“We can rewrite the genetic code of skin cells so that they can become blood vessel cells,” said lead researcher Daniel Gallego-Perez, an associate professor of biomedical engineering and surgery. “When they’re deployed into the brain, they’re able to grow new, healthy vascular tissue to restore normal blood supply and aid in the repair of damaged brain tissue.”

Researchers continue to study this approach and are also exploring other potential uses for this technology to treat brain disorders such as Alzheimer’s and autoimmune diseases.

READ MORE: go.osu.edu/be34c

Combustion pioneer helps advance engine design

Nearly 40 years after interning at Sandia National Laboratories as part of its graduate program, mechanical engineer Jacqueline Chen ’81 is now a senior scientist in the chemistry, combustion and materials division at Sandia’s Livermore site. Her work on fundamental turbulence-chemistry interactions in combustion has helped advance the design of automotive, gas turbine and jet engines. Chen also leads the Department of Energy’s (DOE) Exascale Computing Project on turbulent combustion, a multi-laboratory effort to improve the next generation of combustion application software optimized to exascale architectures for high-performance computing.

A mentor to dozens of researchers, Chen has received numerous accolades for her pioneering work in the field of advanced computational methods to understand combustion and chemical reactions relevant to engines. She is a member of the National Academy of Engineering, a Society of Women Engineers’ Achievement Award recipient and one of only eight researchers nationwide named a DOE Distinguished Scientist Fellow.

“The last 39 years have been great and went by quickly,” Chen said. “The work has been exceptionally interesting, coupling fundamental chemical science and turbulent transport with high-performance computing on computing resources at the cutting edge.”

READ MORE: go.osu.edu/be34d






From left, first row: Davis, Guisse, Laszakovits. Second row: Lenz, Maddela, Hopkins

Six grads of distinction

This spring the College of Engineering welcomed more than 1,600 new alumni into its ranks. Meet six members of the Class of 2021 who engineered a transformative education.

Landscape architect Makayla Davis was president of student organization SERVitecture and is currently pursuing a master's in city and regional planning at the University of Pennsylvania. First-generation college student Mouhamadou Guisse gave back as president of Ohio State's Organization of Black Aerospace Professionals, among other roles, and will join Northrop Grumman as an associate mechanical engineer. Now a post-doc at ETH Zurich in Switzerland, July Laszakovits mentored young researchers while conducting PhD research on reducing hazardous chemicals in treated drinking water. Katie Lenz received a 2021 Guiding Star Award for leadership of the Ohio State Society of Women Engineers and now works at HP as a hardware design engineer. Industrial engineer Raga Maddela scored internships at Tesla and Lyft, while also supporting social justice initiatives, and is a program manager at Microsoft.

Big Ten Distinguished Scholar Athlete Justin Hopkins also excelled as an undergraduate researcher. He is pursuing a PhD in chemical engineering at the University of Minnesota. "One of the best things about my Ohio State experience is the professors I had took an interest in what I wanted to do and were very helpful getting me where I wanted to be," he said.

READ MORE: go.osu.edu/be34e

New scholarship honors first woman Buckeye engineer

In 1893, Bertha Lamme became the first woman to earn an engineering degree from Ohio State and only the second female engineering graduate in the U.S.

In honor of her pioneering spirit and legacy, Bruce and Judy Lavash established the Bertha Lamme Endowed Scholarship Fund in Engineering with a $100,000 gift to support students who are members of student organizations whose missions focus on the advancement of women, such as Women in Engineering. The couple hopes the scholarship encourages the next generation of female engineers to embrace the "spirit of Bertha Lamme for achieving firsts."

"We feel it's an important thing to inspire women, to inspire men, to inspire anybody to be the first at something. I don't care what that is," said Bruce Lavash '77, '78, mechanical engineering. "Because if that happens, that person wins, the university wins and wherever they end up wins."

READ MORE: go.osu.edu/be34f

SUMMER STROLL

Enjoy these recent photos of the College of Engineering's north campus buildings. **SEE MORE: *go.osu.edu/be34g***

1) Mars G. Fontana Laboratories, and Chemical and Biomolecular Engineering and Chemistry Building (CBEC); **2)** Bolz Hall and Caldwell Laboratory; **3)** Peter M. and Clara L. Scott Laboratory; **4)** Hitchcock Hall; **5)** Knowlton Hall; **6)** Baker Systems Engineering Building and Dreese Laboratories

in a NUT SHELL

BLASTING OFF WITH BIOELECTROMAGNETICS

Electrical and computer engineering PhD student Allyana Rice won a prestigious NASA fellowship that will support her research on reconfigurable antennas for wearable space medical diagnostics.

For the full scoop, visit
go.osu.edu/be34n

SPEEDING UP MRI SCANS

An interdisciplinary team led by Professors Rizwan Ahmad and Philip Schniter received a $2.3 million NIH grant to develop faster, more accurate MRI methods that could cut MRI scanning time in half.

MULTI-CULTURAL COLLABORATION

Despite the pandemic, seven Ohio State engineering students collaborated with peers at Zamorano University to develop sustainable rainwater harvesting systems for a rural village in Honduras as part of a new service learning course.

DUST MAY HELP PREDICT COVID OUTBREAKS

A study led by Professor Karen Dannemiller demonstrates that dust in residences or work environments is another non-invasive avenue for monitoring buildings for COVID-19 outbreaks.

THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

122 Hitchcock Hall
2070 Neil Ave.
Columbus, OH 43210-1278

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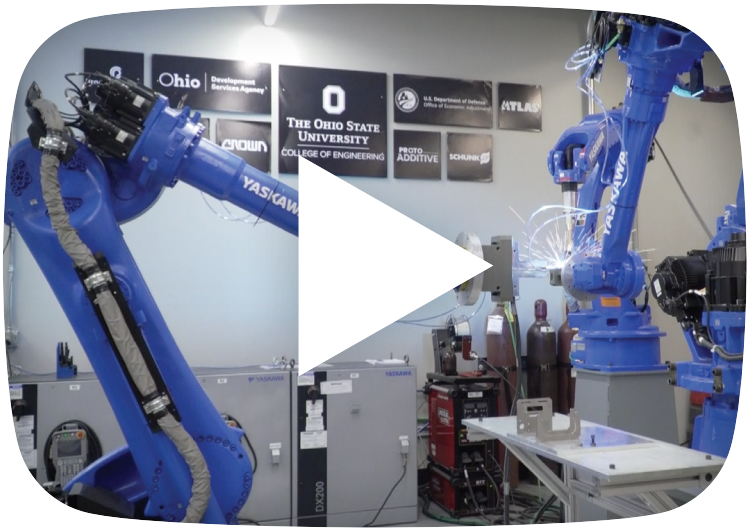

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