SUMMER 2022 / ISSUE 38

BUCKEYE ENGINEERING

Teaming up to engineer EV solutions

THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

INSIDE /

EcoCAR team gears up for its next challenge

After wrapping up the EcoCAR Mobility Challenge in May, The Ohio State University EcoCAR team is gearing up for its next Advanced Vehicle Technology Competition. Beginning this fall, Ohio State will partner with Wilberforce University to compete against 14 other universities in the EcoCAR EV Challenge.

Sponsored by the U.S. Department of Energy, the four-year competition challenges teams to design, build, refine and demonstrate the potential of advanced propulsion systems, and connected and automated technologies in a 2023 Cadillac LYRIQ. Diversity, equity and inclusion will be incorporated into all areas of the competition to improve representation in STEM and higher education.

"The EcoCAR program has provided a unique opportunity for Ohio State students to have real-world experience in putting cutting-edge technologies to work in creating cleaner, more sustainable vehicles that are both

marketable to consumers and kinder to the planet," Ohio State President Kristina M. Johnson said. "The addition to our team of Wilberforce University will greatly increase the breadth and reach of its efforts and will make us even more competitive going forward."

Ohio State student teams have been participating in Advanced Vehicle Technology Competitions since 1990 and have placed in the top three in 13 of the last 14 years, including first place seven times. Although winning is a nice bonus, it's not faculty advisor Shawn Midlam-Mohler's primary goal.

"With EcoCAR, I'm not out to build the best car. I'm out to build the best students who will likely build a very good car," the clinical professor of mechanical and aerospace engineering said. "Even if we don't succeed in the competition, I can still build the best students who will go out and make a big impact in the industry when they graduate."

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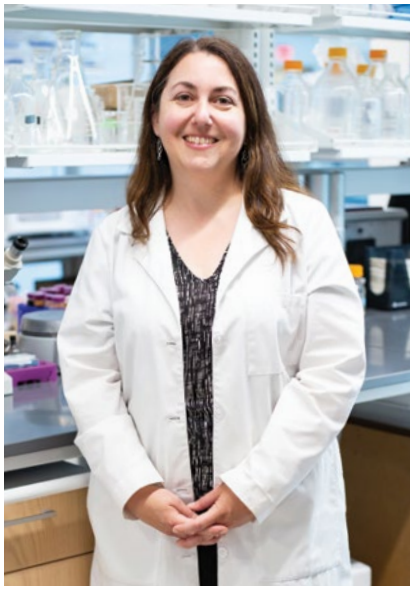
An entrepreneur's vision to help others see

Katelyn Swindle-Reilly is passionate about curing diseases and improving patients' lives. Since joining the university in 2016, her research has focused on using polymeric biomaterials to treat eye diseases and heal wounds.



"There are not many people focusing on the ocular drug delivery area, but I see a lot of challenging problems that could use the help of scientists and engineers," the assistant professor of biomedical and chemical engineering explained.

One of those problems—age-related macular degeneration (AMD)—is the third leading cause of blindness and has no cure. One treatment that helps patients with AMD maintain vision requires an expensive intravitreal injection directly into the eye up to 12 times per year.

Swindle-Reilly developed an extended-release capsule that, while still injected into the eye, has the potential to reduce the timing of injections to once or twice a year. Her technology has been licensed by startup Vitranu. She was also named Ohio State's 2022 Early Career Innovator of the Year for her efforts to commercialize university intellectual property.

"The research in my lab has shown that we can fine-tune our extended-release capsule to sustain drug release for at least six months to over one year," Swindle-Reilly explained. "My hope is that these drug delivery devices will also be able to be used for the other form of AMD and retinopathies, which currently have no cure."

The dedicated educator is also driven to ensure students consider entrepreneurship as a possibility—something she wasn't exposed to until after launching her career. "I never thought I would have a patent or invent things," she said. "It's really important to teach these skills and serve as a role model to show that there are other routes beyond the traditional one."

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Creating next-gen wearable health monitoring devices

A new study by Buckeye engineers suggests that a wearable sensor may be able to monitor the body's health by detecting the gases released from a person's skin.

"It is completely non-invasive and completely passive on the behalf of the user," said lead author Anthony Annerino, a graduate student in materials science and engineering.

Some wearable devices, like smartwatches or fitness trackers, are already capable of measuring pulse rates or temperatures. The Ohio State team's method would allow the technology to sense biomarkers related to metabolic disorders, like heart disease or diabetes.

"Discerning health issues through the skin is really the ultimate frontier," said study co-author Perena Gouma, professor of materials science and engineering.

The final product would be a small device that could be worn on low-sweat body locations, like behind the ear or on the nails. As more people use wearable devices in their everyday lives, Gouma expects technology and medicine to become even more intertwined, "We are developing a new generation of skin sensors and it will really be the new norm."

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Professor's commitment to K-12 outreach earns national award

Electrical and Computer Engineering Professor Betty Lise Anderson received the National Science Board's 2022 Public Service Award in recognition of her extraordinary efforts to inspire children to pursue a STEM education. Honored for exemplary service in promoting public understanding of science and engineering, Anderson joins the ranks of previous awardees such as Jane Goodall, Stephen Jay Gould, Craig Barrett and Alan Alda.

Since 2008, Anderson has led a program that has reached 35,000 students at over 100 different schools, libraries, after-school programs and scouting events. Staffed by Ohio State student volunteers, the free program delivers hands-on engineering activities—such as building electric motors, heart monitors and paper audio speakers—to K-12 students in central Ohio and beyond.

"Dr. Anderson exemplifies what this award is all about," said Maureen Condic, chair of NSB's Subcommittee on Honorary Awards. "Not only is she helping shape the next great minds of our STEM enterprise at the university level, she also enlists those minds to help cultivate and motivate young minds at a fundamental level. … She's invaluable."

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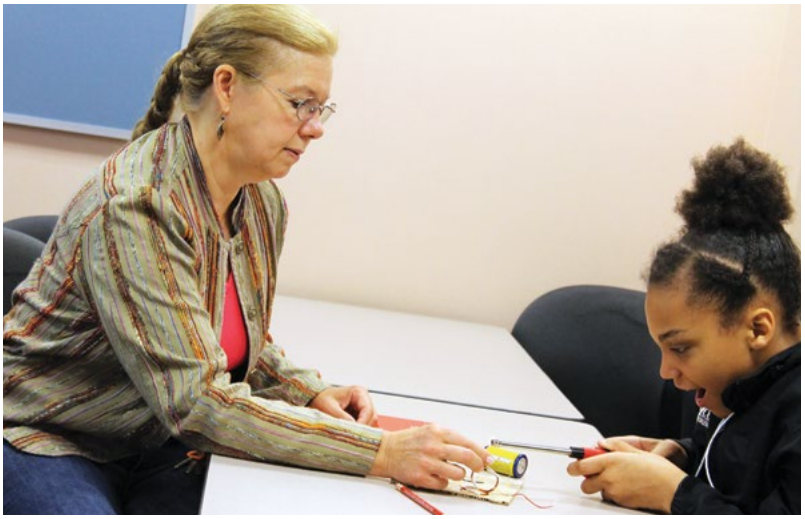

Engineering new tools to transform nursing education

In a new collaboration between Ohio State's Colleges of Nursing and Engineering, teams are using extended reality (XR), artificial intelligence (AI) and machine learning (ML) to revolutionize nursing education.

Funded by a $1.5 million grant from the American Nurses Foundation's Reimagining Nursing Initiative, the work will deploy technology-enabled learning tools across Ohio State's core nursing curriculum, enabling students to have virtual experiences tailored to their learning needs and practice increasingly higher skills in a low-stakes environment. The AI/ML tool can address critical points in patient care when decisive nurse interventions make life-or-death differences.

"This initiative is Ohio State in a nutshell. Two seemingly separate disciplines collaborating and converging to improve the human experience," said Engineering Dean Ayanna Howard. "We are seeing AI and machine learning already impacting health care in areas like drug delivery, imaging and diagnosis. Now it's time for nursing education to benefit."

Led by Integrated Systems Engineering Assistant Professor Mike Rayo, the College of Engineering partnership is a natural fit for the Cognitive Systems Engineering Lab. "We have been studying how well new technologies can be integrated into nurses' workflow for over two decades," he said.

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New scholarship opens doors

Thanks to the generosity of a complete stranger, computer science and engineering (CSE) major Benjamin Matos is pursuing his dream of a career in coding. Matos is the inaugural recipient of the Diversity in Computer Engineering Scholarship, which will fund his full tuition at Ohio State until he graduates.

"A great peace washed over me when I found out about this scholarship," he said. "My parents and I are worrywarts, so this is a big weight off [our] shoulders."

Easing financial strain was one of the primary motivations for donor Akshai Rajendran. Although not an Ohio State alum, Rajendran identifies with the Buckeye motto of paying forward. His gift supports a first-year CSE major from his hometown of Dayton, Ohio. The renewable scholarship is awarded to students with the greatest financial need, with special consideration given to those from underrepresented backgrounds.

"I've seen the kind of doors in the world that open for people with a strong computer science background," Rajendran said. "My hope was to motivate someone from Ohio to follow a similar path."

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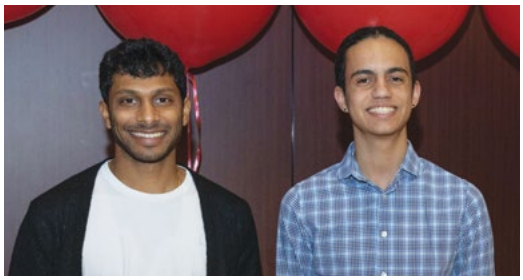


LAUNCHING LEADERS

The Ohio State College of Engineering not only prepares the next generation of Buckeye engineers to tackle the world's problems, it develops leaders who advance higher education and the engineering profession. As of August, 11 alumni serve as presidents, provosts or deans at U.S. colleges and universities.

Peggy Agouris

MS '88, PhD '92, geodetic science

Provost, William & Mary

Vijay Kumar

MS '85, PhD '87, mechanical engineering

Nemirovsky Family Dean of Engineering and Applied Science, University of Pennsylvania

Brian Rigling

MS '00, PhD '03, electrical engineering

Dean of Engineering and Computer Science, Wright State University

Suresh V. Garimella

MS '86, mechanical engineering

President, University of Vermont

Teik C. Lim

PhD '89, mechanical engineering

President, New Jersey Institute of Technology

Joseph Szakas

MS '95, PhD '97, geodetic science

Interim President, Vice President of Academic Affairs and Provost, University of Maine at Augusta

Mark Horstemeyer

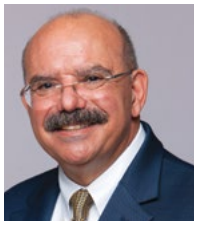
MS '87, engineering mechanics

Dean of Engineering, Liberty University

Mohamad S. Qatu

MS '86, PhD '89, engineering mechanics

Dean of Engineering and Technology, Eastern Michigan University



John L. Volakis

MS '79, PhD '82, electrical engineering

Dean of Engineering and Computing, Florida International University

Thawi Iwagoshi

BS '87, MS '90, ceramic engineering; PhD '96, materials science and engineering

Dean of Engineering, San Francisco Bay University

Lakshmi Reddi

MS '84, PhD '88, civil engineering

Dean of Engineering, New Mexico State University

Read more about these alumni:
go.osu.edu/be38g

in a NUT SHELL

RECENT GRAD RECEIVES NATIONAL HONOR

Trecia Cintrón ’22 was named the undergraduate 2022 National Olmsted Scholar—the premier leadership recognition for landscape architecture students—by the Landscape Architecture Foundation.

For the full scoop, visit
go.osu.edu/be38n

ENGAGING KIDS IN STEM

In order to share their love of STEM, the Underwater Robotics Team created inexpensive, build-your-own underwater robot kits and taught 25 middle-schoolers how to build and code their own ’bots.

UNIVERSITY HONORS FIVE

Five faculty and staff from the College of Engineering received 2022 awards from Ohio State in honor of their scholarship, teaching, innovation and achievements.

DEAN HOWARD TAPPED FOR NATIONAL AI COMMITTEE

College of Engineering Dean Ayanna Howard is one of 27 experts appointed to the National Artificial Intelligence Advisory Committee, which will advise the President and the National AI Initiative Office.

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College of Engineering Homecoming Tailgate

Saturday, October 1, 2022, 12:30-2:30 p.m.
Enjoy good food, fun and festivities for all ages.
Learn more & RSVP: ***go.osu.edu/be38p***