SUMMER 2023 / ISSUE 42

BUCKEYE ENGINEERING

Rankings on the rise

THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

INSIDE /

Graduate program ranks 14th among public universities

The Ohio State University College of Engineering's graduate program jumped three spots to number 27 in the latest *U.S. News & World Report* Best Graduate Schools rankings published in April. The program is ranked first in Ohio and improved to 14th among public universities.

Several departments within the college also placed among the top programs in the nation. The Department of Food, Agricultural and Biological Engineering increased its ranking to eighth among its U.S. university peers. Nine other engineering specialties also placed in the top 30: materials (15); nuclear (16); industrial/manufacturing (17); aerospace/aeronautical (18); electrical (23); mechanical (25); computer (26); chemical (29); and civil (29). For the *U.S. News* rankings of graduate programs, 220 engineering schools that grant doctoral degrees were surveyed.

During the 2022-23 academic year, 1,735 engineering graduate students

were pursuing one of 13 advanced degrees at Ohio State.

"We take great pride in recruiting the best talent to our graduate programs and preparing them to meet the needs of a rapidly changing world and workforce demands," said Associate Dean of Graduate Programs La'Tonia Stiner-Jones.

While overall engineering graduate school rankings are derived from a combination of nine quantitative and qualitative indicators, the publication's engineering specialty rankings are based solely on peer assessments by department heads in each area.

For the past two years, computer science program rankings have been included in *U.S. News & World Report's* Best Graduate Science Schools rankings. In this year's list, Ohio State jumped 10 spots to number 24.

"Our steady improvement in the rankings is attributable to extraordinary faculty and graduate students, and on-going commitments from industry and the State of Ohio," said College of Engineering Dean Ayanna Howard. "While individually, faculty are not focused on rankings, their innovation in the lab, classroom and community bolster our program's performance and reputation among our peers."

In last September's *U.S. News & World Report* 2023 Best Colleges issue, Ohio State's undergraduate engineering program again ranked first in Ohio and rose to 15th among public universities nationwide.

Eight Buckeyes earn NSF Fellowships

In a testament to the strength of the College of Engineering's educational and research programs, eight Buckeye engineers have been awarded a 2023 Graduate Research Fellowship from the National Science Foundation (NSF).

NSF's Graduate Research Fellowship Program supports graduate students who show immense promise as researchers and leaders in science and engineering. The fellowship provides three years of financial support, which includes a $34,000 annual stipend and $12,000 cost-of-education allowance to the graduate institution.

Two current graduate students and six recent grads were selected from more than 12,000 applications in 2023.

Graduate Student Recipients

- Bronson Frank, biomedical engineering
- Giacomo Melaragno, welding engineering

Alumni Recipients

- Jacob Belding '22
- Lia Gomez-Perez '23
- Elizabeth Guilfoyle '22
- Ada Kanapskyte '21
- Sophie Leanza '23
- Natalia Mendonca '23

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Alumni push industry forward with robotic innovations

Robotics and artificial intelligence (AI) are two rapidly evolving fields, enabling machines to perform everyday tasks with incredible speed and accuracy. Now, two enterprising Buckeye engineers are leveraging this technology to grow their promising robotics companies and disrupt the industrial status quo.

Mechanical engineering alums Simon Kalouche ’14 and Andy Lonsberry ’13 recently returned to Ohio State to share the trials and tribulations of starting a new business, along with some tips for success. The two entrepreneurs presented at April’s Dave and Margie Williams Distinguished Lecture.

Kalouche (pictured below, left) is the founder and CEO of Nimble Robotics, which engineers intelligent next-generation AI robotic fulfillment systems. Headquartered in San Francisco, Nimble’s vision is to build fully autonomous logistics so every brand can offer free delivery in two days or less.

“If you look at every fulfillment operation in the world today, from Instacart’s grocery picking all the way to the most advanced Amazon warehouses, there are still millions of people required to manually pick and pack and handle your online orders,” said Kalouche. “No one has been able to automate the picking and packing step at scale.”

Lonsberry is co-founder and CEO of Columbus-based Path Robotics, which creates manufacturing robots that autonomously scan, position and weld parts without the need for skilled welders or robot programmers.

“We focus on manufacturing, and specifically the first vertical manufacturing that we deployed into is welding. The reason being is there’s a massive labor shortage in the United States and globally, and it’s continuing to grow,” said Lonsberry. “Government statistics show that there will be a labor gap of 400,000 human welders in the U.S. by 2024. It’s roughly a $26 million market opportunity.”

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Partnership brings first construction 3D printer to Ohio

Ohio State's Center for Design and Manufacturing Excellence (CDME) is home to over a dozen 3D printers, but the latest arrival is the first of its kind in Ohio and one of fewer than 10 at universities worldwide.

The most widely used 3D construction printer—COBOD International's BOD2—was delivered to Ohio State in January as part of a collaboration with Pantheon Innovative Builders to accelerate growth of the construction 3D printing industry. The BOD2 prints residential and commercial structures up to 30 feet by 30 feet from concrete and other material mixtures.

The research partnership includes materials testing, experimental learning for students and a workforce development training curriculum.

"Construction 3D printing is a new and exciting technology that is revolutionizing the way civil structures are designed and manufactured," said Ben DiMarco, additive manufacturing technologist at CDME. "We knew we needed to bring this unique capability to CDME to continue to introduce new technology to our students and push the boundaries of additive manufacturing in the United States."

Additive manufacturing (AM)—or 3D printing—for construction can be faster, safer for workers and produce less waste than conventional methods. A multidisciplinary team of Ohio State experts is working together to address the specific challenges of concrete 3D printing, including researching construction materials and performance.

A two-story printed house in Europe.

"Ohio State provides a unique environment in which the wide array of partners and experts necessary to rapidly improve and accelerate deployment of the 3D-printed concrete technology to provide the greatest benefit to our communities can come together in one place," said Lisa Burris, assistant professor of civil, environmental and geodetic engineering at Ohio State.

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Primed for bright futures

Meet a few of the College of Engineering's 1,736 newest graduates who engineered a transformative education in and out of the classroom.

First-generation college student Moustapha Bal teamed with classmates to launch the Buckeye Solar Racing Team and is moving full speed ahead as a mechanical design engineer for Tesla. Stephen Chou will employ the lessons he learned while captain of the Ohio State Fencing sabre squad and an undergraduate teaching assistant as a software engineer at Bloomberg. Captain Tyler Korenyi-Both is applying the hypersonics research he conducted during his MS program to key Air Force priorities. A summer research experience inspired chemical engineer Sophie Leanza to pursue a PhD at Stanford, where she is supported by two prestigious fellowships. Biomedical engineer Nina Tang explored minimally invasive therapies for chronic low back pain while earning her PhD and is a postdoctoral fellow at the University of Washington in St. Louis.

After immigrating to the U.S. at age 23, Yessica Jimenez had to learn English before pursuing higher education. Thanks to scholarship support and her perseverance, she earned a bachelor's in materials science and engineering and is a quality engineer for Honda. "The pride that Ohio State makes you feel as a student, it's powerful. It makes you try harder to be better," Jimenez said. "Anything that you want to do in this university is possible."

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National Academy of Engineering adds three Buckeyes

Two Ohio State professors and a recently retired faculty member have been elected to the National Academy of Engineering (NAE) Class of 2023 in recognition of sustained excellence in innovation and education. Alan Luo, Judit E. Puskas and Longya Xu are among 124 new NAE members. Luo is an internationally recognized leader in lightweight materials and manufacturing, Puskas invented a lifesaving coronary stent coating and Xu is founding director of the Center for High Performance Power Electronics.

"One newly elected NAE member is a big deal for any institution, but three in one year is exceptional," said Dean Ayanna Howard. "I am delighted for Judit, Alan and Longya, but I'm even happier for our students, faculty and staff that have had the opportunity to learn from and collaborate with these exemplary engineers."

Since NAE was established in 1964, 16 Ohio State engineering professors have been elected, 11 of whom are active faculty.

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From left: Xu, Puskas and Luo

Green aluminum alloy innovation goes to market

Led by Engineering Professor Alan Luo, a research team that includes graduate students and postdoctoral researchers has developed a way to produce a recycled aluminum alloy that meets the high standards of structural die casting applications.

Under a new licensing agreement, Audubon Metals will advance commercialization of technology that could increase manufacturing usage of recycled aluminum alloys.

The automotive industry only uses primary aluminum produced from mining and smelting for structural applications; secondary aluminum alloys include contaminants like iron that can result in inferior mechanical properties. But secondary aluminum alloys are up to 50% less expensive and use only a fraction of the energy compared to mined aluminum.

Ohio State's technology neutralizes iron contamination common in typical scrap aluminum, exhibiting mechanical properties of primary alloys currently used in die casting, a high-pressure manufacturing process that forces molten metal into a mold to produce large, thin-wall components.

"This technology that we developed will have a positive impact on the manufacturing industry and our environment, so we call it a green alloy," said Luo (pictured above, left).

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Record gift launches software innovation center

A $110 million donation from the Timashev Family Foundation—the largest single gift in Ohio State's history—will establish the Center for Software Innovation. It will expand opportunities for students in entrepreneurship and advance education in software innovation, product management, sales and marketing.

The center will bring together the College of Engineering, Fisher College of Business and other partners in creative new ways, including through the creation of endowed professorships, cutting-edge academic offerings and hands-on industry experience for students. The Center for Software Innovation aims to catalyze efforts across the region to create a hub for innovation, entrepreneurship and product development activity.

"It is my privilege to give back to the Buckeye community, which has played a tremendous role throughout my life and career," said Ratmir Timashev, who earned his master's in chemical physics from Ohio State in 1996 and built two successful companies in Columbus. "Bringing together the best of academia and startup innovation will empower the dreams of future generations of students, and I look forward to helping bring this vision to reality for Ohio State and Columbus."

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$26M NSF research center will revolutionize manufacturing

Ohio State leads a multi-institutional National Science Foundation (NSF) engineering research center to develop revolutionary, intelligent autonomous manufacturing systems. It will develop next-generation manufacturing approaches to create jobs, train a diverse workforce and ease supply chain issues.

Ohio State is partnering with four universities and more than 70 industry, educational and technical organization collaborators to develop and implement new manufacturing technologies for agile, high-performance and high-quality components. The NSF is investing $26 million for five years in the center, with the ability to double that commitment. If fully realized, it will be one of the largest research investments in the last decade for Ohio State.

Glenn Daehn, the Mars G. Fontana Professor of Metallurgical Engineering, is the director of the Hybrid Autonomous Manufacturing, Moving from Evolution to Revolution (HAMMER) Engineering Research Center.

"We really want to develop what is a new industry based on hybrid, autonomous manufacturing," he said. "We have a team of nearly 40 of the best, most innovative academics in manufacturing, materials and artificial intelligence across five institutions, and over the past three years developed a vision of what is really a new way of manufacturing and developed plans to change the manufacturing industry."

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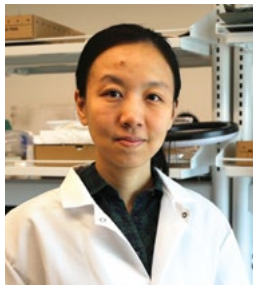
Ohio State Early Career Innovator of the Year

Jinghua Li, assistant professor of materials science and engineering, is Ohio State's 2023 Early Career Innovator of the Year. The award recognizes researchers who actively work to promote commercialization of university intellectual property.

Li's research focuses on advanced thin-film materials and electronic tools to develop solutions to medical challenges, such as the diagnosis and treatment of chronic neurodegenerative diseases.

"Our ultimate goal is to make a positive impact on human health and well-being through innovative materials research," she explained.

The human body produces a wide range of biophysical and biochemical signals that contain important information about the health condition and the progression of various diseases. But the rigid characteristics of conventional medical systems are not ideal to efficiently capture the signals. So Li's team is engineering flexible thin-film materials into wearable biomedical devices that bridge the gap between rigid machine and soft biology.



"Jinghua's work on flexible electronics has the potential to diagnose and treat various types of brain injuries," said Associate Dean for Research Andre Palmer. "She is a shining example of Ohio State's extraordinary convergence of engineering and medicine."

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Knowlton Foundation gift will help transform engineering campus

Continuing its namesake's commitment to education and his alma mater, the Austin E. Knowlton Foundation donated $15 million to finalize design and construction of the Biomedical and Materials Engineering Complex (BMEC) Phase Two, the Gateway to Engineering. Over decades, Knowlton and the foundation he established have generously supported architecture and aviation programs at Ohio State.

The 124,000-square-foot Gateway to Engineering will reinvent how Ohio State inspires and educates future Buckeye engineers, and feature modern, efficient spaces for 21st century teaching and research. Located on the corner of Woodruff Avenue and College Road, it will provide STEM education-focused teaching labs, a new college leadership suite, and dedicated space for research on wearable health sensors, biomaterials and more. The Department of Engineering Education and its first-year engineering classes also will fill the space, providing a model for the classroom of the future.

Students and faculty will begin moving into the modernized facility in late summer 2025, completing the most significant capital investments in teaching, learning and discovery in the College of Engineering's history. The $90 million project is funded by state and college contributions in addition to philanthropy.

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Student teams excel in competitions

Eight teams of Ohio State engineering students earned awards in diverse international and national competitions in 2022. Their impressive achievements included bringing home gold in an agriculture design contest and earning third place and a $50,000 prize—the best finish of any U.S. participant—in Amazon's global challenge to advance conversational artificial intelligence.

"These fantastic accomplishments illustrate the passion and prowess Buckeye engineering students have for solving problems," said David Tomasko, associate dean for academic programs and student services.

Ohio State students earned a gold medal at the International Genetically Engineered Machine Grand Jamboree for the third year in a row and won the 2022 ASM Heat Treating Society Strong Bar Competition. The Buckeye Vertical team (pictured) also soared to first place in the Vertical Flight Society's national Design-Build-Vertical Fly collegiate competition.

Buckeyes cruised to second place in the EcoCAR Mobility Challenge's final year, the SAE AutoDrive Challenge II and NASA's 2022 Gateways to Blue Skies: Airports of Tomorrow Competition.

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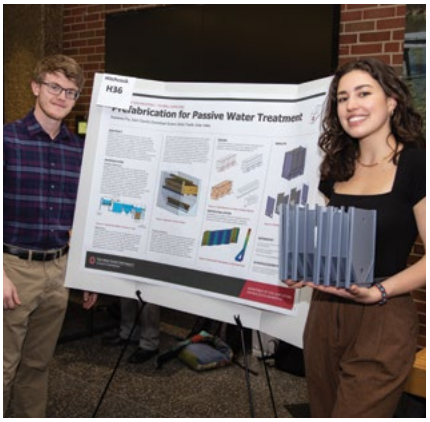
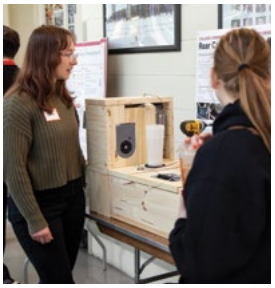
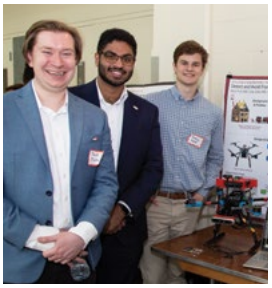
PROBLEM-SOLVERS

Nearly 1,000 undergraduates unveiled their innovative solutions to real-world problems during the 16th Annual Engineering Design Showcase. The event highlights students' collaborative senior capstone design projects. ***SEE MORE: go.osu.edu/be42m***







in a NUT SHELL

NEW ALLOY CAN TAKE THE HEAT

Engineering researchers collaborated with NASA to develop a new 3D printable alloy that can result in stronger, more durable parts for airplanes and spacecraft.

For the full scoop, visit
go.osu.edu/be42n

WELDING ENGINEERING PROGRAM TURNS 75

Since 1948, nearly 3,000 graduates have earned welding engineering degrees at Ohio State—the only U.S. institution that offers bachelor's, master's and PhD degrees in the discipline.

SPARKING A PASSION FOR STEM

As part of a unique research and outreach collaboration, our students are introducing middle-schoolers to the engineering design process in a fun, hands-on way.

Now at Ohio State

DEAN FEATURED ON NEW OHIO STATE PODCAST

Dean Ayanna Howard discusses the pros and cons of ChatGPT on the recently launched *Now at Ohio State* podcast.

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