

# OHIO Engineering

Russ College of  
Engineering and Technology  
Create for Good.

2025 EDITION



Russ Research Opportunity Center



Kokosing Teaching Laboratory

## New Facilities for the Russ College

➤ Investing in teaching and research excellence / 10



Digital Enterprise Collaboratory



New Airplanes for Flight Training Program

ROGET

OHIO  
UNIVERSITY





## Greetings from the Dean

Dear Alumni and Friends,

Welcome to the 2025 annual report for the Russ College of Engineering and Technology at Ohio University! Having served as dean of the college since 2023, I am delighted to share our latest news with you. In short, we have had much success and our college is in a strong position, charting an exciting future and providing leadership to the engineering and technology profession.

As featured on the cover of this report, new facilities are the big story of the year for the Russ College. In spring 2025, we held the grand opening for our new **Russ Research Opportunity Center (RROC)**. The RROC is a 60,000 square-foot, one-of-a-kind research facility in the Appalachian region of Ohio. The RROC provides state-of-the-art equipment and laboratory space for our research centers and institutes and support for several university-industry research partnerships.

The Russ College is delighted to celebrate the opening of the new **Kokosing Teaching Laboratory**, made possible through a gift from Kokosing of Westerville, Ohio, and located within the Charles R. and Marilyn Y. Stuckey Academic and Research Center. The Kokosing Teaching Laboratory will provide our civil engineering and construction management students with an unparalleled opportunity for hands-on experiential learning in construction field methods, such as the building of multistory structures, highway pavement sections, and buried drainage pipes.

We welcomed the arrival of six new **Cirrus SR20 airplanes** to our flight training program in the Department of Aviation. These aircraft will allow our students to be trained in the latest avionics, navigation, and safety systems, as well as provide a tiered instructional program where students advance from the more basic aircraft to the Cirrus aircraft as they complete their degrees. These new aircraft also provide significant additional capacity for our flight training program which has seen an unprecedented number of student applications in recent years.

In our Stocker Center headquarters, the Russ College recently held the ribbon cutting for a new **Digital Enterprise Collaboratory (DEC)**. The DEC is a training, collaboration, and innovation hub focused on using digital tools, including a new augmented and virtual reality studio, to enhance experiential learning and the development of manufactured products. The



facility operates in partnership with the University of Dayton Research Institute to drive innovation and prepare our workforce for careers in digital engineering.

These facilities are only some of the exciting new developments in the Russ College. We also recently created two degree programs in Cybersecurity and Artificial Intelligence, partnered with the National Academy of Engineering to award the 12th Russ Prize in bioengineering, launched the annual Raymon Fogg Distinguished Lecture, received a record annual level of external research funding for the college, developed a robust mentoring program for our junior faculty members, and launched a new and improved biannual career fair for our students in the Baker University Center. Another exciting development, we are in the process of creating the **Russ College Alumni Society (RCAS)** to provide a comprehensive platform for alumni engagement and activities, including networking, events, awards, and student mentoring. We also are continuing to improve our college communications program through our website, news releases, social media, and annual reports, and work with alumni to create visionary, transformative opportunities for philanthropy.

Thank you for your interest and support of the Russ College of Engineering and Technology. The following report provides more information on many of these and other exciting developments, including several new and promising research areas that highlight the many strengths of our college.

We are prospering here in Athens and proudly *creating for good* at Ohio University. Please stop by and visit us!

Patrick J. Fox, Ph.D., P.E., BC.GE, F.ASCE  
Dean, Russ College of Engineering and Technology

Create for Good.



## Groundbreaking diabetes management technology inventor receives 2025 Russ Prize

Established by Ohio University alumnus Fritz J. and Dolores H. Russ, the Russ Prize is one of the nation's top awards for breakthrough achievements in engineering and technology.

The National Academy of Engineering (NAE), together with Ohio University, awarded Dr. Ian A. Shanks, University of Glasgow, with the 2025 Fritz J. and Dolores H. Russ Prize on February 19, 2025, in Washington, D.C. The \$500,000 award, provided by Ohio University through a gift from the Russ family, recognizes an outstanding bioengineering achievement in widespread use that improves the human condition. Shanks is recognized "for the invention of the electrochemical capillary fill device (eCFD), which gives diabetes patients and caregivers accurate and timely blood glucose measurements for diabetes management."

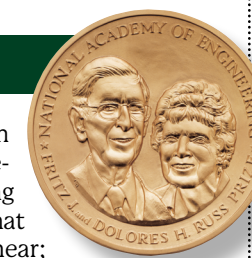
Diabetes is one of the fastest-growing global health challenges of the 21st century, and Shanks' remarkable bioengineering achievement offers a groundbreaking approach to managing it. The eCFD is an inno-



Dr. Ian Shanks

vative type of glucose monitor that requires only a small sample of blood from a fingerstick, making it possible to achieve accurate glucose monitoring on a timely basis. Shanks' widely adopted invention eliminates the need for arm blood draws at laboratory facilities, providing a quick, accurate, inexpensive, and simple way to measure blood glucose levels for diabetes diagnosis and management.

"It is an honor to support Dr. Shanks' incredible work through the Russ Prize," said Ohio University President Lori Stewart Gonzalez. "This year's award is particularly meaningful to us as a national research institution situated in the Appalachian region, where the prevalence of diabetes surpasses national averages. The eCFD exemplifies the potential impact of the interdisciplinary translational research we are working to foster at Ohio University's Russ College of Engineering and Technology and Heritage College of Osteopathic Medicine."



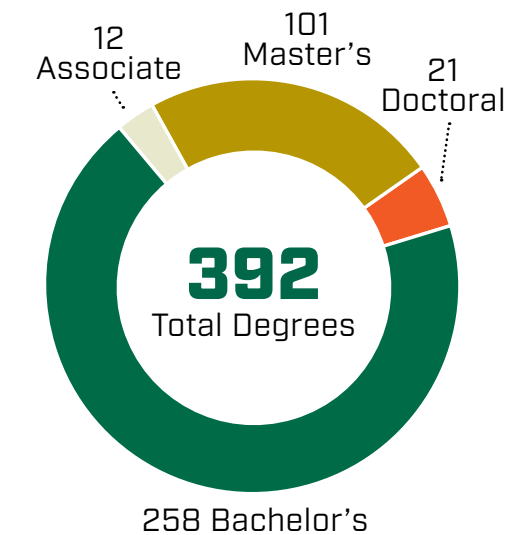
## About the Russ Prize

Fritz Russ, B.S.E.E. '42, H.O.N. '75, established the Fritz J. and Dolores H. Russ Prize in partnership with the National Academy of Engineering in 1999 to recognize outstanding achievement in an engineering field that is currently of critical importance and contributes to the advancement of science and engineering, as well as improves the quality of life and has widespread application. An auxiliary purpose of the Russ Prize is to encourage collaboration between the engineering and medical/biological professions.

Awarded since 2001, the Russ Prize has

recognized the team of five engineers responsible for creating cochlear implants that enable the deaf to hear; Dr. Leroy Hood for automating DNA sequencing that revolutionized forensic science; Dr. Willem J. Kolff for pioneering work on the creation of artificial organs, beginning with the kidney, and launching a new field that is benefitting millions; Dr. Earl E. Bakken and Dr. Wilson Greatbatch for the development of the implantable cardiac pacemaker; and many other world-changing inventions.

## Degrees Awarded in 2024-25



# 98%

## Job Placement

Carnegie R1  
University

Carnegie Opportunity  
College and University

# 295

Scholarships  
provided by  
our ASCENT  
industry  
partnership  
ecosystem

# 147

Patents  
(2014-2024)

# 16

GAANN  
Fellowships

# \$17.8 Million

## Research Expenditures

8 Research Centers  
and Institutes

84 Full-Time Faculty  
11 Research Scientists  
7 Postdoctoral Scholars

## Table of Contents

- 3 Announcements
- 10 Cover story
- 16 Research
- 26 Awards and recognition
- 29 Advisory boards
- 30 Academics
- 32 Partnerships
- 36 Alumni news
- 39 Student activities

## The Russ College of Engineering and Technology

Ohio University  
Stocker Center  
Athens, OH 45701-2979

Editor and writer: Amanda Marrs

Writers: Samantha Pelham, Alex Semancik, Carmen Szukaitis

Photographers: Rich-Joseph Facun, Ben Siegel

Comments or submissions may be sent to Amanda Marrs, Special Projects Coordinator  
Email: [marrsa@ohio.edu](mailto:marrsa@ohio.edu)

For more information, visit  
[ohio.edu/engineering](http://ohio.edu/engineering)

AUGUST 2025



DEPARTMENTS

AVIATION

Deak Arch, Chair

CHEMICAL AND BIOMOLECULAR  
ENGINEERING

Darin Ridgway, Chair

CIVIL AND ENVIRONMENTAL ENGINEERING

Guy Riefler, Chair

ELECTRICAL ENGINEERING  
AND COMPUTER SCIENCE

Avinash Karanth, Chair

ENGINEERING AND TECHNOLOGY  
MANAGEMENT

Zaki Kuruppallil, Chair

INDUSTRIAL AND SYSTEMS ENGINEERING

Tao Yuan, Chair

MECHANICAL ENGINEERING

Jason Trembly, Chair

RESEARCH CENTERS  
AND INSTITUTES

AVIONICS ENGINEERING CENTER

Director TBA

CENTER FOR ADVANCED MATERIALS  
PROCESSING

Muhammad Ali, Director

CENTER FOR ADVANCED SYSTEMS AND  
TRANSPORTATION LOGISTICS ENGINEERING

Felipe Aros-Vera, Director

CENTER FOR AIR QUALITY

Kevin Crist, Director

CENTER FOR SCIENTIFIC COMPUTING  
AND IMMERSIVE TECHNOLOGY

Director TBA

INSTITUTE FOR SUSTAINABLE ENERGY  
AND THE ENVIRONMENT

Jason Trembly, Director

INSTITUTE FOR CORROSION  
AND MULTIPHASE TECHNOLOGY

Srdjan Nesic, Director

OHIO RESEARCH INSTITUTE FOR  
TRANSPORTATION AND THE ENVIRONMENT

Issam Khoury, Director

Governor DeWine appoints  
Dickerson and Arnold to  
Ohio University Board of Trustees

Ohio Governor Mike DeWine has appointed Russ College alumni Richard D. Dickerson and Brigadier General Mark C. Arnold to the Ohio University Board of Trustees.



**Mr. Dickerson**, a registered professional engineer in the state of Ohio, has provided leadership through numerous energy-related capacities for more than 41 years. He served on the advisory board for the Department of Civil and Environmental Engineering and on the Board of Visitors for the Russ College, including as chair. “The Board is pleased to welcome Mr. Dickerson as a voting member of the Ohio University Board of Trustees,” said former Board Chair Steve Casciani. “I have known Dick for over 20 years, and I’m confident that his expertise and insight will continue to further the mission of our Board and the entire University.”



**Brigadier General Arnold** is a Trustee of the Ohio University Foundation Board, member and past chair of the Russ College Board of Visitors, former Board member and Secretary of the Army’s Retiree Council, and President of the Special Forces Association’s Ohio Chapter. “General Arnold’s remarkable career in military leadership, global business and public service reflects a lifelong commitment to excellence, service and innovation. As a proud Ohio University alumnus and decorated leader, he brings a rare blend of operational expertise, strategic insight and deep connection to the University’s mission. We are grateful for his continued dedication and look forward to the impact he will make as a member of the Board,” said Board Chair Matt Evans.



New Student Career Fair

The college launched a new student career fair last year where a total of 728 students visited with 94 companies in the Baker University Center Ballroom on October 3, 2024. A departure from our past practice of holding several smaller events in Stocker Center and the ARC, the larger venue allowed our students to meet with more prospective companies all at once, thus giving them better information with which to make their job decisions. The change has been well received by both students and company representatives. Our next college career fair will be held on October 2, 2025!



Raymon B. Fogg

Raymon Fogg Distinguished Lecture launched

The inaugural Raymon Fogg Distinguished Lecture, named in honor of alumnus Raymon B. Fogg, was held on October 25, 2024, in Stocker Center. Representatives from Kokosing Construction Co. and the Ohio Department of Transportation (ODOT) presented the new construction project for the I-70/I-71/SR-315 interchange in Columbus. The speakers were Andrew Opsitnik, District Construction Engineer, ODOT; Melissa Hoffman, District Construction Engineer, ODOT; Mitchell McCluskey, Project Manager, CTL; Marcus Durbin, Project Engineer, Kokosing; and Jeff Geisbuhler, Project Engineer, Kokosing. The event was well attended by Kathy Fogg, Ray’s daughter, faculty, staff, students, alumni, and friends of the college. The Raymon Fogg Distinguished Lecture will be held each year during fall semester and showcase new developments in civil engineering and construction management.

Raymon B. Fogg

After graduating from high school in Conneaut, Ohio, Raymon Fogg drove a friend to Athens and “just stayed.” A member of the Air Force ROTC, he served as president of the Ohio University Chap-

“Ray Fogg created a legacy of proud support for the Russ College of Engineering and Technology, and we are delighted to celebrate that legacy with this inaugural lecture in his name.”

— Patrick Fox, Dean, Russ College of Engineering and Technology

ter and the Ohio Student Council of the Ohio Society of Professional Engineers before graduating with his civil engineering degree in 1953.

He founded Ray Fogg Building Methods, Inc., an engineering, contracting and development firm in Cleveland, in 1959. Over six decades, the company has constructed more than 3,700 buildings in northeast Ohio including commercial, industrial, office and recreational properties, and led the development of several industrial parks.

A dedicated alumnus, Fogg was a Trustee of the Ohio University Foundation Board and always graciously generous with his time, talent and treasure to ensure the University continued to provide the transformative educational experience he was proud to have received.

Fogg received the Ohio University Alumni Association’s Medal of Merit in

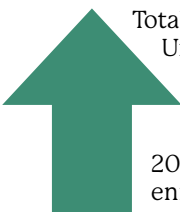
1997 and the Alumnus of the Year Award in 2017. He was also inducted into the Russ College Academy of Distinguished Gradates in 2000. His contributions to industry, community and the University were so significant that he was awarded an Honorary Doctor of Humane Letters degree from Ohio University in 2014.

However, it was in the Russ College where Fogg focused much of his attention, having served on the college Board of Visitors and the advisory board to the Department of Civil and Environmental Engineering.

Fogg’s commitment to service extended well beyond Ohio University to his local community where he engaged with organizations and volunteer boards, including the Greater Cleveland Growth Association, the National Benevolent Association, the Cleveland Inter Church Council, and many others. ■



## Faculty and student numbers are up

 Total enrollment for Ohio University in fall 2024, including regional campuses, was 29,838, up 4.6% from fall 2023. The Athens campus enrollment was 22,266 and above 22k for the first time since 2019. The Russ College had a strong incoming class of 429 new students and a total student headcount of 2,208, up 6.3% from the previous year. The corresponding number of full-time faculty in the college increased to 84. We are expecting further increases in both student and faculty numbers in fall 2025.

## RETIREMENTS

The Ohio University community recently celebrated the retirement of two valued members of the Russ College of Engineering and Technology.



**Michael Wickham** retired after more than 20 years of dedicated service to Ohio University. His final appointment was as Success Advisor for the Russ College.



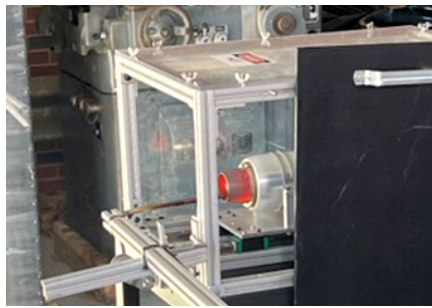
**Simbo Odunaiya** retired after 33 years of outstanding service as Senior Research Engineer in the Avionics Engineering Center. Congratulations Mike and Simbo!



The Avionics Engineering Center and Ohio University's Flight Team transported supplies for the Hurricane Helene relief effort.

## President Gonzalez honors hurricane relief action

President Lori Stewart Gonzalez took time out at the OHIO vs. UNC Asheville basketball game on November 9, 2024, to show appreciation for the Avionics Engineering Center and Ohio University's Flight Team for transporting relief supplies to victims of Hurricane Helene.



## Capstone course reaches milestone

A team of mechanical engineering seniors (Kaden Wandersleben, Joshua Smith, Chase Ford, Anthony Neesen and Anna Loehrke) designed a working variable nozzle for a mini jet engine that improves engine thrust at different throttle settings. They made a detailed review of the current design, including CAD models, manufacturing drawings, and fluid and thermal simulations. Finally, they manufactured and tested a prototype dynamic nozzle that was later demonstrated at Wright Patterson Air Force Base. The project was sponsored by the Air Force Research Laboratory (AFRL).



## Trembly gives lecture to Appalachian Ohio Manufacturer's Coalition

Focusing on the critical need to develop sustainable material supply chains to support growth in the U.S. and globally, Dr. Jason Trembly highlighted findings which underscored the role that carbon-based materials can play in meeting demand across construction, energy storage, and aerospace/defense applications. He also showcased successes in repurposing Appalachian coal and waste coal as feedstocks for manufacturing carbon products and building consortia of regional industry partners.



## Systems Manufacturing Automation Robotics Training

The Department of Engineering Technology and Management, under the leadership of Chair Zaki Kuruppallil and Professor Paul Deering, hosted a three-week Appalachia Systems Manufacturing Automation Robotics Training (SMART) program beginning June 2, 2025. Designed for middle school and high school educators, the program focused on core principles of robotics, automation, and system integration. By equipping teachers with this knowledge, they can introduce these concepts in their classrooms, giving students valuable, hands-on experience and enhancing their future career opportunities in technology and manufacturing.

Instructor Dwayne Humphrey worked with thirteen participants to introduce the fundamentals of FANUC robotics.



By the end of the training, educators have:

- increased their engagement with STEM programs,
- gained collaborative experience with industry leaders,
- enhanced their ability to incorporate technology into their curriculum,
- qualified to apply for four industry-recognized certifications.

## Ohio University Foundation Board tours new RROC building



A joint meeting of the Ohio University Foundation Board and Alumni Association Board of Directors was held on June 5, 2025, at the new Russ Research Opportunity Center. Faculty and staff members provided tours and enjoyed dinner with our guests.

## IN MEMORIAM



**Michael Braasch**, Thomas Professor of Engineering in the School of Electrical Engineering and Computer Science (EECS), passed away on September

22, 2024, at the age of 58.

Dr. Braasch was a graduate of Logan High School. He obtained B.S. (1988), M.S. (1989), and Ph.D. (1992) degrees in electrical engineering from Ohio University. In 1994, he joined EECS as an assistant professor, eventually becoming a Thomas Professor of Engineering. Braasch led a storied career as an expert in navigation systems and conducted extensive research with our Avionics Engineering Center.

A lifelong Bobcat, Mike was a beloved teacher and mentor both at home and abroad. He held the position of Arskine Visiting Fellow at the University of Canterbury in New Zealand, as well as guest lecturer at institutions in Russia, Switzerland, France and Singapore.



**Teresa Marie Tyson-Drummer**, of Rutland, Ohio, passed away on May 7th, 2025, after a short illness at the age of 70.

Since 2022, Teresa served as an Administrative Coordinator/Specialist for the Department of Civil and Environmental Engineering and the Department of Industrial and Systems Engineering. Her role there was the culmination of a 30-year career at Ohio University in similar positions. Throughout her tenure, Teresa demonstrated passion and dedication—not only to her work, but also to the departments, the faculty, and the countless students she supported over the years.

Teresa played a vital role in keeping the CEE and ISE Departments running smoothly. She was known for her work ethic, her warm presence, and her willingness to share engaging stories from her life in the country. Her connection with students and commitment to the university community left a lasting impact.



# Welcome

## OUR NEW FACULTY

**Dr. Trevor Bihl** - Visting Professor, Electrical Engineering and Computer Science



Dr. Bihl received his B.S. and M.S. degrees from Ohio University and Ph.D. degree from the Air Force Institute of Technology. He has written over 100 peer-reviewed publications spanning artificial intelligence, cybersecurity, controls, power, engineering, and operations research. As a former senior research engineer and program manager

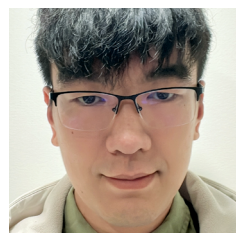
at the Air Force Research Laboratory, he led efforts spanning foundational research to fully transitioned and fielded AI solutions, recruiting and managing teams of over 100 researchers across \$44 million in sponsored projects.

**Gertrude Dilley** - Assistant Professor of Instruction, Engineering and Technology Management



Ms. Dilley is an Ohio University alumna with B.S.ETM and M.EM degrees. She provides knowledge and shares real world experience related to sheet metal fabrication and CNC machining, as well as other production, automation, and expansion projects. Gertrude spent the last 10 years working as a manufacturing engineer and most recently as an engineering manager. Much of her experience has been with the semiconductor industry, supplying high purity sputter targets to chip manufacturers such as Intel and Samsung.

**Dr. Xiangxu Lin** - Assistant Professor of Instruction, Electrical Engineering and Computer Science



Dr. Lin received his B.S., M.S., and Ph.D. degrees in computer science from Kent State University. Lin's research specializes in human-robot interaction, telerobotics, immersive interfaces, AI-assisted telemanipulation, AI education, and blockchain. His work spans soft exoskeleton control, multi-robot coordination, virtual reality systems for rehabilitation and education, and blockchain infrastructure for gaming and decentralized applications.

**Dr. Ahmed Tanvir Mahdad** - Assistant Professor, Electrical Engineering and Computer Science



Dr. Mahdad earned his Ph.D. degree in computer science from Texas A&M University under the supervision of Dr. Nitesh Saxena. His research focuses on security and privacy in authentication and side-channel threats across emerging technologies such as smart devices, AR/VR, and wearables. His work has been published in top-tier security and

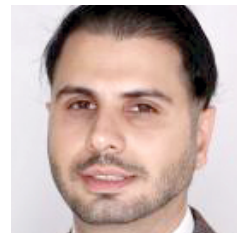
systems conferences and journals, including ACM CCS, IEEE S&P, ACM MobiCom, WWW, IEEE ICDCS, and ACM TOPS.

**Dr. Madhu Majji** - Assistant Professor, Chemical and Biomolecular Engineering



Dr. Majji earned a Ph.D. degree at the City College of New York, in chemical engineering, and completed two postdoctoral positions at the Massachusetts Institute of Technology and Stanford University. He earned a masters degree from the Indian Institute of Technology Bombay, a bachelor's degree from Nagarjuna University in India and worked for seven years in the nuclear power industry in India. His objectives include exploring fundamental principles and contributing to the development of technologies in areas such as energy storage, water treatment, and the oil and gas industry.

**Dr. Majid Mirzanezhad** - Assistant Professor, Electrical Engineering and Computer Science



Dr. Mirzanezhad earned his B.S. and M.S. degrees in computer science from Tehran Polytechnic (Amirkabir University of Technology) and Ph.D. degree from Tulane University. His research focuses on computational geometry, shape and image analysis, spatial systems, and transportation. Dr. Mirzanezhad has served as a Research Fellow at

the University of Michigan's Transportation Research Institute (UMTRI) and as a Research Associate at global policy think tank RAND Corporation, where he contributed to the design of community-centered commuting services.

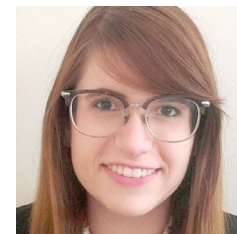
**Dr. Timothy Needham** - Assistant Professor, Electrical Engineering and Computer Science



Dr. Needham received his B.S., M.S., and Ph.D. degrees in electrical engineering from Ohio University. Prior to joining the EECS Department, Dr. Needham worked for Northrop Grumman in the research and development of integrated navigation systems. He has over 20 years of experience in academia and industry working with various aspects of

positioning, navigation, and timing (PNT) technologies.

**Dr. Cassidy Nelson** - Assistant Professor, Industrial and Systems Engineering



Dr. Nelson earned M.S. and Ph.D. degrees from Virginia Tech and a B.S. degree from the University of Kansas. Nelson was one of 13 nationally recognized IISE Future Faculty Fellows in 2023-24, an award given to promising faculty candidates. Her work is centered on human-computer interaction in the context of augmented reality

(AR). Current projects include exploring AR for supporting high-risk, cognitively demanding scenarios (like mass casualty incidents) and AR/VR's abilities to furnish deeper educational/training, medical/rehabilitative, and bias-busting experiences.

**Dr. Ahmed Oun** - Assistant Professor, Electrical Engineering and Computer Science



Dr. Oun received his Ph.D. degree from the University of Toledo and his M.S. degree from the University of Bridgeport. Prior to joining Ohio University, he held a faculty position at Ohio Northern University. He has held various positions in the oil and gas industry, including roles as a Gas Turbine Controls NPI Engineer and Operation

Control Room Supervisor, and served as a Project Manager at General Electric International.

**Dr. David Quiroz** - Assistant Professor, Mechanical Engineering



Dr. Quiroz earned his Ph.D. degree in mechanical engineering from Colorado State University. He specializes in sustainability assessment of novel technologies through life cycle impact assessment and techno-economic analysis, with a focus on bioenergy, desalination, resource recovery, and carbon capture. Dr. Quiroz is passionate

about interdisciplinary collaboration, data-driven sustainability, and mentoring the next generation of engineers.

**Dr. Ziyang Song** - Assistant Professor, Electrical Engineering and Computer Science



Dr. Song received a Ph.D. degree in computer science from McGill University. Song's current research focus is the development of trustworthy and explainable AI models to address critical biomedical challenges. In generative modelling, he focuses on time-series representation learning for biosignals, clinical measurements, and longitudinal

medical records, enabling health trajectory analysis and various clinical tasks. In probabilistic modelling, his work involves interpretable medical representations to improve clinical decision-making for electronic health records.

**Dr. Ismail Tirtom** - ASCENT/Stocker Research Assistant Professor in Semiconductors, Electrical Engineering and Computer Science



Dr. Tirtom holds a Ph.D. degree in mechanical systems and design from Tohoku University, Japan, and has received certifications in Deep Learning from the NVIDIA Deep Learning Institute. With over 20 years of combined experience in academia and industry, Tirtom specializes in advanced materials and manufacturing, computational

techniques, including finite element analysis, molecular dynamics simulations, and machine learning applications in engineering.

**Dr. Steven Wereley** - Professor, Mechanical Engineering



Dr. Wereley earned his Ph.D. degree from Northwestern University. He joined the Russ College from Purdue University, where he taught for 25 years. His expertise is fluid dynamics, with particular focus on microscopic systems, such as fluid flow through bacteria and human cells, as well as larger and faster systems, including diverse applications such as drone flight and oil spills. Steve has published several books and more than 100 journal articles on his research.





**“Create for good. That is what’s going on in this building and what will leave this center.”**

— Jim Tressel, Ohio Lieutenant Governor



Photos by Rich-Joseph Facun and Ben Siegel

# Grand opening

**The Russ Research Opportunity Center opens its doors to elected officials, university leadership, faculty, students and alumni.**

BY SAMANTHA PELHAM

**D**edicated to supporting research within the Russ College, the Russ Research Opportunity Center (RROC) is now home to several research centers and institutes, including the Institute for Sustainable Energy and the Environment (ISEE), the Center for Advanced Materials Processing (CAMP) and the Ohio Research Institute for Transportation and the Environment (ORITE).

The 60,000 square-foot RROC facility will support approximately 20 research groups who conduct more than \$4.5 million in annual research funding. The adaptive design within RROC laboratories allows for alterations to space and functionality in response to evolving needs.

Development of this state-of-the-art facility was made possible through the vision and generosity of Fritz and Dolores Russ. Transformed from a 1920s



**Joy Malaba, Analytical Research Scientist, gives a presentation to state and university leadership during the grand opening of the Russ Research Opportunity Center on April 17, 2025.**

West Union Street factory and then office center, the RROC represents thoughtful transformation and a commitment to advance our research enterprise.

“Today is a big day in the history of the Russ College as we celebrate the opening of the Russ Research Opportunity Center—a landmark for southeast Ohio, as this is a one-of-a-kind facility in this part of the state,” said Patrick Fox, Dean of the Russ College of Engineering and Technology during the grand opening ceremony.

The ceremony featured remarks from State and University leaders, including Ohio Lieutenant Governor Jim Tressel, Ohio University President Lori Stewart Gonzalez, Ohio University Board of Trustees member Dick Dickerson, OHIO alumnus and former State Representative Jay Edwards and Dean Fox.

Lt. Governor Tressel shared his pride in the faculty and students at Ohio University, and especially in the research they are conducting to improve the lives of people in the region and around the world. He emphasized the Russ College motto, “Create for Good,” noting that universities bring people together from different backgrounds and communities to learn and work, and when students



**Caleb Gula, graduate student, presents Russ College Board of Visitors member April Welshans with a token crafted from an engineered composite of recycled plastics and mining refuse.**



**Ohio University President Lori Stewart Gonzalez and Ohio Lieutenant Governor Jim Tressel.**

graduate from Ohio University they are ready to go out and create for good in the world.

The RROC is home to a wide range of research projects, and even the speaker

platform in the RROC building for the grand opening ceremony was constructed using decking boards made from new materials developed at Ohio University through a research project led by Russ

Professor and Mechanical Engineering Department Chair Jason Trembly.

During the grand opening ceremony, Mary Steinberg, daughter of Associate Dean for Research and Graduate Education Eric Steinberg, used True Pigments paints to create a painting of the RROC in real time. CEE Department Chair Guy Riefler was involved in the development of True Pigments using acid mine drainage from the region.

Ohio University is one of a select number of institutions recognized as a Carnegie R1 Research University. This new facility will help to maintain that distinction by supporting top-tier researchers and providing students with hands-on research opportunities.

The RROC facility will be used to conduct state-of-the-art research in key areas of energy, sustainability, transportation and semiconductors, and will strengthen Ohio University’s position as a Carnegie R1 Research University.

The facility currently features wet laboratories, analytical laboratories, a semi-clean room, a machine shop, chemical neutralization, a 3D printer and three-phase power throughout. The facility provides room for growth as the college adds additional research capability and further expands its portfolio. ■





Photos by Amanda Marrs

Marco Minaudo of Virtualware, Dr. Jesus Pagan of the Russ College and Omari Hitson, Ohio Chapter President of the ARVR Association, try out new virtual reality headgear at the ribbon-cutting for the Digital Enterprise Collaboratory on May 5, 2025. At right, Cody Pettit, Assistant Professor of Instruction in Mechanical Engineering, spoke with John Cunningham, President of Virtualware North America.

# Digital engineering

**Ohio University, HTC VIVE and Virtualware partner to accelerate Ohio's manufacturing economy.**

## STAFF REPORTS

Ohio University, HTC VIVE, and Virtualware have partnered to launch a new facility called the Digital Enterprise Collaboratory (DEC), which will provide infrastructure to power new digital engineering and workforce development programs to support the growing demand for advanced manufacturing in Ohio.

The partnership combines Ohio University's leadership in engineering education, HTC VIVE's industry-leading XR hardware and software technologies, and Virtualware's enterprise XR platform VIROO. The project will provide Ohio University with the technology infrastructure and capabilities needed to accelerate product development, research,

and workforce development by enabling real-time collaboration between various university, industry, government and department of Air Force Research Laboratory (AFRL) members using the latest digital engineering and immersive technologies.

The facility will also expand Ohio University's existing manufacturing training and certification programs to support the growing demand for new factory workers.

"This program represents a bold step forward in immersive digital engineering," said Scott Miller, Associate Dean for Industry Partnerships at the Russ College. "By integrating XR technology into our educational and research programs, we are preparing the next generation of engineers to think spatially, act collaboratively, and solve real-world problems. Manufacturing is Ohio's largest industry sector that is contributing 17.5 percent of the state's GDP and we need to prepare our local workforce for the new jobs in



Dr. Neil Littell



Scott Miller

advanced manufacturing."

"HTC VIVE is proud to be part of this initiative that puts immersive technology at the heart of innovation and education," said Daniel O'Brien, President Americas at HTC VIVE. "With these new labs, Ohio University is positioning itself as a leader in Industry 4.0."

John Cunningham, President of Virtualware USA adds, "The state of Ohio is home to many manufacturers and will soon be home to new advanced technology factories being built by Intel and Anduril, who need



Patrick Fox, Dean of the Russ College

an estimated 7,000 new workers. Ohio University has been asked by the State and manufacturing companies to find ways to help accelerate product development using digital engineering methods and to create workforce development initiatives using the latest technologies. Our VIROO platform integrated with HTC's XR solutions provides Ohio University with infrastructure that can be used

for many different purposes and for many years to come."

As a result of this collaborative partnership, the University's goal is to increase opportunities for engineers, researchers, and end users to collaborate in real time, and in 3D, while further bridging any gaps created by geographical distance.

The DEC infrastructure consists of two new laboratories located at the Athens Campus and at Ohio University's co-located space in Dayton, which is housed within the Digital Transformation Center (DTC). These labs are connected through the VIROO Enterprise XR platform and are equipped with virtual reality equipment and software tools. Users can collaborate, share projects, produce prototypes and even create digital twins in real time, either from within the labs or from remote desktops, classrooms or homes.

The University of Dayton Research Institute (UDRI) operates the DTC and has partnered with Ohio University to develop and launch the DEC's Dayton location, furthering the DTC's mission as a collaborative innovation hub that drives innova-



The DEC at the Digital Transformation Center in Dayton, Ohio.

tion, fuels workforce development, and fosters cross-sector collaboration among academia, industry, and government. ■



Unai Extremo, Virtualware CEO, shares a virtual wind turbine training session with a Russ College student.





Photo by Rich-Joseph Facun

# The future of construction education

**A new industry partnership is transforming construction education at Ohio University.**

BY DOUGLAS DENNIS

**K**okosing of Westerville, Ohio, has long recognized that skilled, experienced workers are key to successful construction projects. Their recent support of the Russ College demonstrates this commitment, leading to the naming of the Kokosing Teaching Laboratory—an exciting new facility for students in the construction management program.

Located in room 116 of the Charles R. and Marilyn Y. Stuckey Academic and Research Center (ARC), the laboratory is a spacious, two-story high bay with excellent visibility thanks to its proximity to the building's atrium. It is designed to provide students with the space and resources they need to gain practical experience with a variety of field construction materials and methods.

"Hands-on training is essential for developing real-world skills," says Bryce Burgett, co-CEO of Kokosing. "Having practical experience in a facility like the Ohio University training lab allows students to work with tools, equipment and programs that directly translate to a successful career in construction."

The Kokosing Teaching Laboratory enables

students to work on projects that simulate real-world construction, such as building a multi-story structure, laying a foundation or highway pavement slab, or installing an underground pipe. This facility ensures students will develop the skills necessary to succeed in the construction industry.

Kokosing's collaboration with Ohio University reflects the family-owned company's commitment to addressing the construction industry's evolving needs. "Our partnership with education programs allows for a shared focus on the current and future demands of construction," Burgett explains. "By aligning efforts, we are working toward the common goal of developing career-ready individuals."

Kokosing's core values of safety, quality and community involvement are reflected in its support for construction management education.

"Our passion for 'Safety 24/7' is central to everything we do," Burgett says. "By supporting education programs with the knowledge and tools to do the job safely, we are shaping the next generation of professionals who will directly impact safety at Kokosing and beyond. Operating with honesty and integrity is fundamental to Kokosing, and we are proud to partner with Ohio University, which shares these principles."

Experiential and hands-on learning opportunities are a cornerstone of an

Ohio University education. Thanks to Kokosing's support, students in the Russ College have advanced opportunities to develop skills needed to meet the workforce demands of the region and state.

"The Kokosing Teaching Laboratory will greatly enhance hands-on experiential learning for our construction management program, embodying the collaborative spirit between industry and education," says Patrick Fox, Dean of the Russ College of Engineering and Technology. "This partnership is vital in developing the skills and technical foundation our students need to succeed in the industry today."

Through this collaboration, Kokosing is helping to foster a new generation of construction professionals, equipped not only with technical skills but also with the integrity and safety practices essential for success.

"By providing students with the tools and knowledge to approach their work safely and responsibly, we're cultivating future leaders in the construction industry," Burgett says.

As students step into the Kokosing Teaching Laboratory, they're not just entering a classroom—they're stepping into the future of construction. With every tool they wield and every lesson they learn, they're building more than just structures; they're building a promising future. ■

## Prepare for takeoff

**Aviation program expands opportunities for students with six new airplanes.**

STAFF REPORTS

**T**he skies are looking brighter for students in the Russ College's Department of Aviation, as the University welcomes six brand-new 2025 Cirrus SR20 aircraft to its fleet. The over \$4 million investment marks a significant milestone in the program's continued growth and commitment to student success.

The new aircraft are not just additions to the flight training fleet but represent a strategic move to expand student opportunities, enhance safety and modernize instruction with the latest aviation technology. With these new planes, the University's flight program now operates 21 training aircraft, allowing for increased enrollment and providing students with access to industry-leading technology.

"These airplanes are an essential part of our flight training program growth," said Patrick Fox, Dean of the Russ College of Engineering and Technology. "This addition not only allows us to train with the best technology, but also to accommodate more students. We have a significant waitlist of accepted students, and we are growing our flight program in response to this demand."

Each of the four-seat Cirrus SR20s is outfitted with cutting-edge technology, including Garmin Pilot avionics, Synthetic Vision Technology on 10-inch displays, Sirius XM weather and audio, engine and fuel monitoring and autopilot systems. The aircraft also include the Cirrus Airframe Parachute System (CAPS), a whole-aircraft parachute designed to safely lower the plane in emergencies and a 4-point safety harness with airbags—making them among the safest training aircraft on the market.

The 200-horsepower aircraft will also allow students to fly cross-country while the seating provides space for observers in addition to the pilot and instructor.

"Flight school graduates nationally often struggle to adapt to advanced technology in the field," said Deak Arch, Associate Professor and Chair of the Department of Aviation. "By narrowing that



Photos by Ben Siegel



**"This addition not only allows us to train with the best technology, but also to accommodate more students. We have a significant waitlist of accepted students, and we are growing our flight program in response to this demand."**

— Patrick Fox, Dean, Russ College of Engineering and Technology

gap during training, we're giving our students a true advantage as they enter the workforce. Safety was another critical factor—we chose one of the safest and most advanced training platforms available."

The arrival of the Cirrus aircraft comes at a pivotal time in the aviation industry. With the flight program operating at full capacity

and demand surging, it was clear that expanding the fleet was essential to continue offering students a high-quality education. After an extensive search for used aircraft that met program standards turned up short, the decision was made to invest in new planes with the latest technology.

The demand for pilots is currently at a historic high, driven by a combination of factors including rapid airline expansion, an aging workforce and surging air travel post-pandemic. According to the Aircraft Owners and Pilots Association, the global aviation industry will require approximately 674,000 new pilots between 2024 and 2043 to meet these needs. In North America alone, the shortage is projected to reach 30,000 pilots by 2032. This shortage has led to increased competition among airlines, resulting in higher salaries and enhanced recruitment efforts to attract new talent into the profession.

Students will use the new aircraft primarily for advanced flight courses, transitioning to the Cirrus during their Commercial, Certified Flight Instructor (CFI), and Certified Flight Instructor Instrument (CFII) training. They'll begin their education in the program's Piper Warriors and Cessnas before stepping up to the high-performance Cirrus models as their skills progress.

"This purchase not only expands our capacity—it modernizes our fleet to reflect the evolving aviation industry," said Arch.

The Cirrus SR20s are the first major aircraft addition since 2008 and mark a new chapter for the aviation program—one where students are better equipped, better trained and more ready than ever to take flight in their careers. ■





Photos by Ben Siegel

Ph.D. student Joyce De Paula adjusts the shaft of a rotating cylinder electrode (RCE) within a custom glass cell experimental setup.

# World leader in corrosion

**Battling natural forces, advancing the industry and protecting the environment: Ohio University's Institute for Corrosion and Multiphase Technology remains a world leader.**

BY ALEX SEMANCIK

**O**n land, along the ocean floor and buried underground there are thousands of miles of pipelines all over the world. These carbon steel tubes form vast networks, braving the elements to transport oil, gas, carbon dioxide and chemicals to meet global energy demands—but like any metal, they are prone to corrosion.

Corrosion leads to a decay of infrastructure. Whether it results in a nuclear meltdown, a bridge collapse or an oil spill, failing infrastructure can cause catastrophic damage to people and the environment. Predicting and combating corrosion is essential in preserving infrastructure, protecting the environment and mitigating economic consequences.

Ohio University's Institute for Corrosion and Multiphase Technology (ICMT) has

been solving corrosion-based problems and advancing the industry since 1993. ICMT is a world leader in conducting corrosion research and the largest corrosion research facility of its kind in the world with a football field-sized laboratory.

With much of the U.S. oil and gas industry located in Texas, ICMT is a globally influential presence in Appalachia. It works directly with industry partners in the U.S. and around the world, allowing students to play key roles in advancing research in the field that has an immediate impact.

The institute is part of the Russ College of Engineering and Technology, and has been honored with numerous awards including the Association for Materials Protection and Performance (AMPP), formerly National Association of Corrosion Engineers (NACE) International, 2021 Distinguished Organization Award. This award recognizes outstanding contributions in



Dr. Srdjan Netic

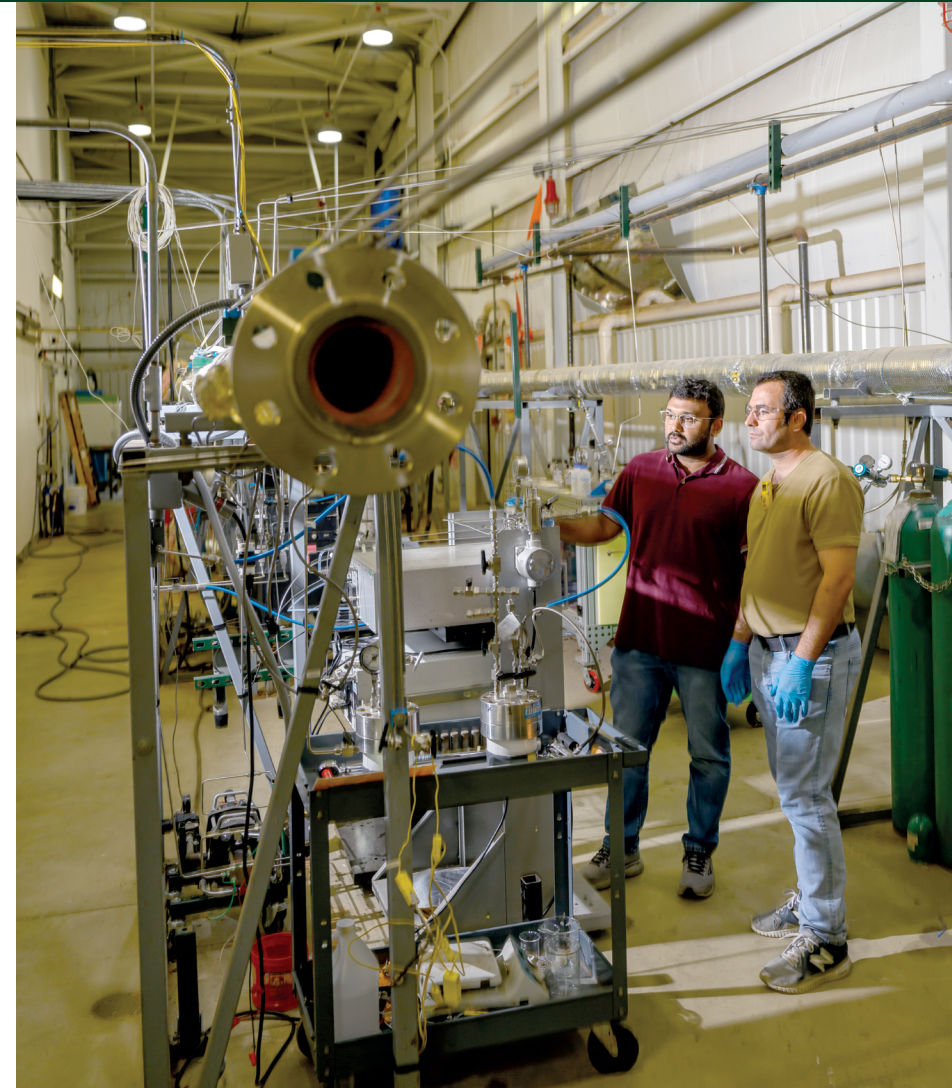


Dr. Marc Singer

the field of corrosion science or engineering over a sustained period.

## Forward-thinking sustainable solutions

Predicting and mitigating corrosion to protect the environment is something the Institute of Corrosion and Multiphase Technology has done since its inception. Through a new project centered around carbon transportation, ICMT has opened yet another avenue contributing



Dr. Kushal Singla (left) and Dr. Zahed Ghelichkhah (right), postdoctoral scholars, examine the operating procedure for the impurity injection system—used to introduce SO<sub>2</sub>, NO<sub>2</sub>, H<sub>2</sub>S, and O<sub>2</sub>—during dense-phase CO<sub>2</sub> corrosion experiments.

to sustainable solutions. The institute is one of just two laboratories in the world leading the research effort in corrosion in carbon dioxide (CO<sub>2</sub>) transmission pipelines.

According to the U.S. Environmental Protection Agency, carbon dioxide (CO<sub>2</sub>) capture, transportation and sequestration (CCS) is a set of technologies that can greatly reduce CO<sub>2</sub> emissions from new and existing coal- and gas-fired power plants and large industrial sources—reducing greenhouse gas emissions, while enabling low-carbon electricity generation. CCS is a three-step process that includes:

- Capture of CO<sub>2</sub> from power plants or industrial processes,
- Transport of the captured and compressed CO<sub>2</sub> (usually in pipelines),
- Underground injection and geologic sequestration (also referred to as storage) of the CO<sub>2</sub> into deep underground rock formations.

**“We recreate the chemistry of the fluids and gases inside the pipeline, and measure the resulting corrosion on steel. One relatively crude but effective method is to expose a piece of metal, directly cut out of carbon steel pipelines, to the corrosive gas or fluid inside our flow loops for a given time, and to inspect the effect that water can have on the integrity of metal. It’s amazing what even little droplets of water can do to steel in a few months.”**

— Marc Singer, Professor, Department of Chemical and Biomolecular Engineering and ICMT Associate Director for Project Development

## Large laboratory, big impact

Much of the Institute for Corrosion and Multiphase Technology's research revolves around the pipelines that transport oil and gas for energy and the pipelines that transport captured carbon dioxide for disposal. Most of these transport pipelines are made of carbon steel, a metal that is cheap to produce and easy to work with. Although cost effective, carbon steel pipelines are prone to corrosion caused by the presence of water in the produced fluids. Water and other contaminants, like carbon dioxide and hydrogen sulfide that are naturally present in oil and gas reservoirs, react with the pipeline's carbon steel internal surface, causing decay over time.

For nearly 30 years, researchers in the Institute for Corrosion and Multiphase Technology have been studying these natural forces that cause the corrosion of pipelines in their West State Street facility. The facility's large-scale, specialized equipment enables the testing and simulation of complex corrosion environments.

Netic says that the facility allows Ohio University researchers to create field-like conditions in a laboratory setting where



they can control critical variables while exploring causes of corrosion. The added control and stability of the experiments conducted in the lab lead to results and discoveries that are often impossible for oil and gas companies to attain in the field.

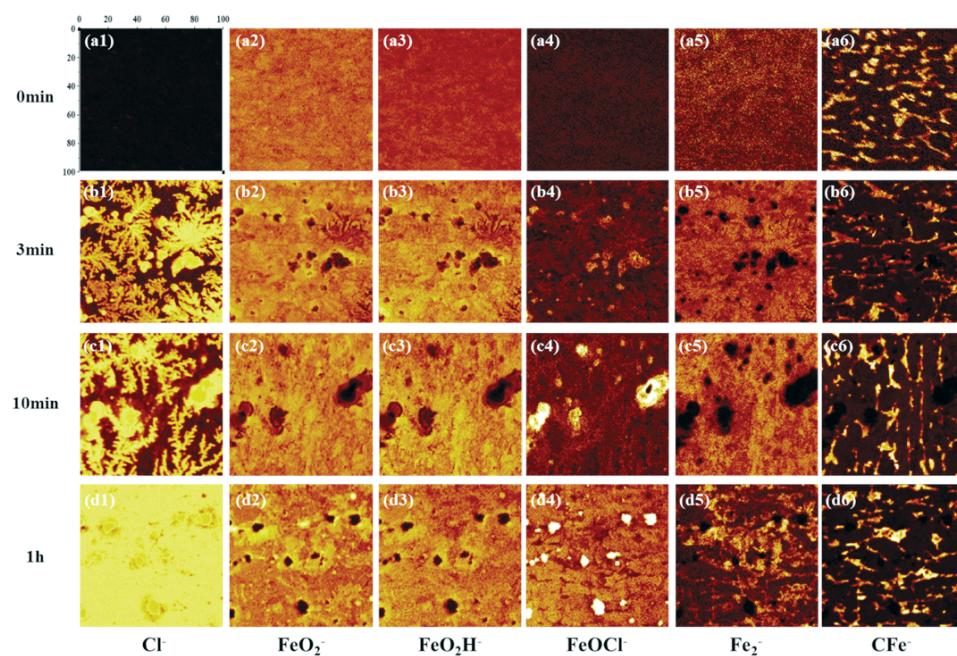
“That’s where we are unique—there’s no other lab that I know of that has such a large collection of pilot-scale equipment, where we can recreate the problems that they have in the field and study them appropriately,” said Nestic. “We have large lines, and high-pressure vessels, and we use complicated, often poisonous gases and acids, because that’s what they have in the field. Yet, we do it in a controlled, safe, research setting where we can get the answers in a way that those in the industry cannot.”

The largest, and some of the most important, equipment in the facility are four multiphase flow loops capable of various temperature changes, pressure changes and flow controls. These large-scale systems simulate the multiphase flow of fluids in a transport pipeline using a looped system that continuously circulates the liquid and/or gas contents. The piping of the flow loops is made of more durable stainless steel to increase their longevity as research equipment—pieces of carbon steel—are inserted through dedicated ports when testing for corrosion.

ICMT Associate Director for Project Development Marc Singer, Professor of Chemical and Biomolecular Engineering, says flow loops are ideal for a variety of research projects in the realm of oil, gas and carbon dioxide transportation.

“We recreate the chemistry of the fluids and gases inside the pipeline, and measure the resulting corrosion on steel,” explained Singer. “One relatively crude but effective method, is to expose a piece of metal, directly cut out of carbon steel pipelines, to the corrosive gas or fluid inside our flow loops for a given time, and to inspect the effect that water can have on the integrity of metal. It’s amazing what even little droplets of water can do to steel in a few months.”

The ICMT also houses an inclinable flow loop used to simulate vertical or angled pipelines as they would be positioned in the field. Additionally, the lab contains high pressure autoclaves capable of liquifying carbon dioxide, and several smaller rooms where conducting bench-scale experiments is done in support of the institute’s industrial-scale work. Analytical instrumentation such as scanning electron microscopy (SEM), energy-dis-



**Corrosion Test Results:** 24 images of 1018 mild steel before (0 min) and after (3 min, 10 min, and 1 h) immersion in 1% NaCl solution saturated with CO<sub>2</sub> and six secondary ions of Cl<sup>-</sup>, FeO<sub>2</sub><sup>-</sup>, FeO<sub>2</sub>H<sup>-</sup>, FeOCl<sup>-</sup>, Fe<sub>2</sub><sup>-</sup> and CFe<sup>-</sup>. Analyzed area = 100 × 100 μm<sup>2</sup>.

persive X-ray spectroscopy (EDS), X-ray diffraction, Raman microscopy, surface profilometry and a comprehensive range of electrochemical techniques allow the researchers to precisely measure the effects of corrosion.

The ICMT actively seeks collaboration with the most prestigious international electrochemical laboratories in the world. The latest of these collaborations was with two French laboratories: Dr. Phillipe Marcus’ group at the Institut de Recherche de Chimie Paris (IRCP) at CNRS / Chimie Paris Tech and Dr. Alain Pailleret’s group at the Laboratoire Interfaces et Systemes Electrochimiques (LISE) at Sorbonne University. A notable outcome of these collaborations involves the use of Time-of-Flight Secondary Ion Mass Spectrometry (ToF-SIMS) to study the anodic iron dissolution mechanisms of mild steel in chloride containing aqueous CO<sub>2</sub> environments.

### Cutting-edge research driven by industry needs

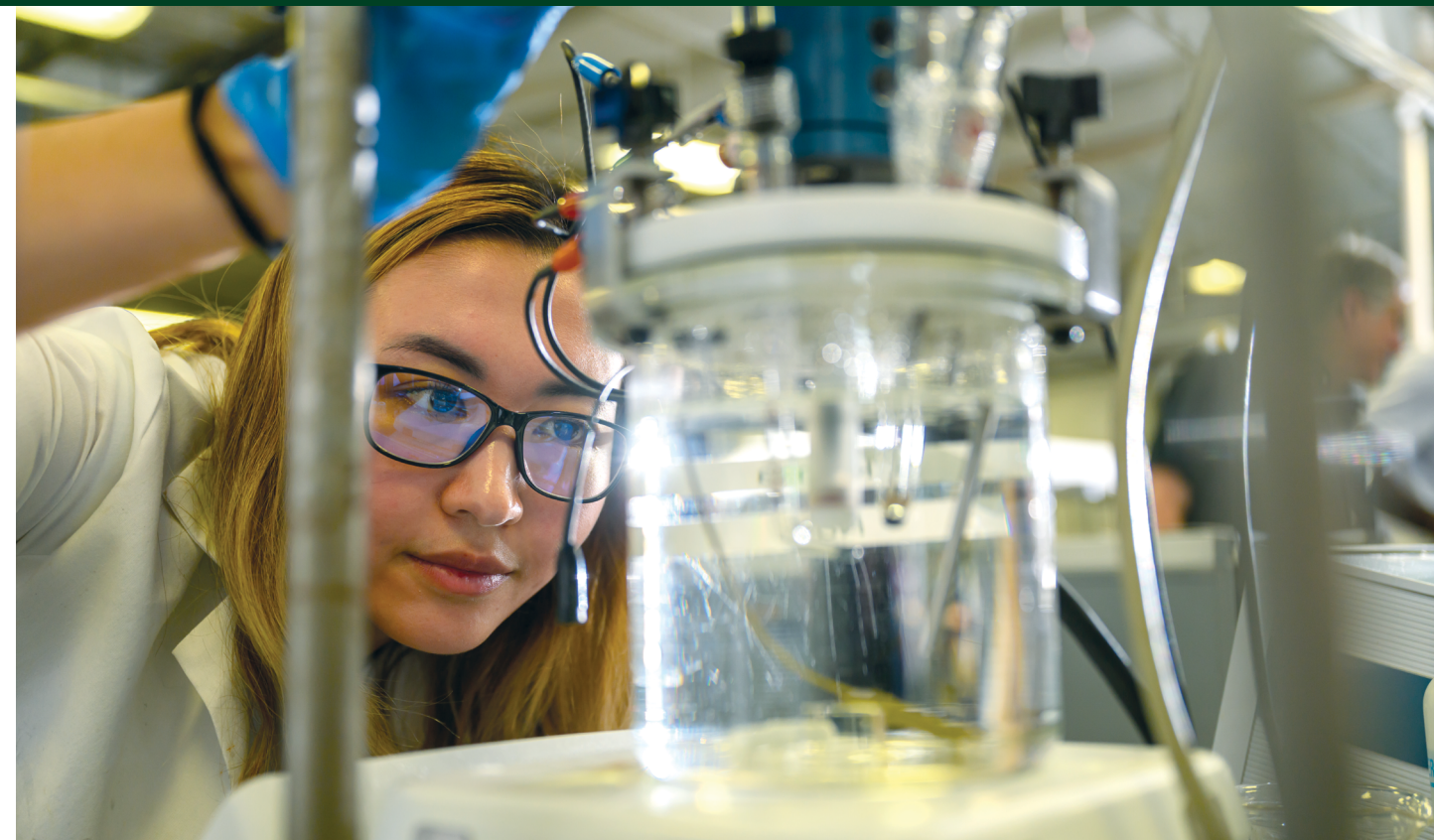
Beyond the state-of-the-art equipment found in its facilities, the Institute for Corrosion and Multiphase Technology’s close relationship with the industry also makes it unique. The problems that are solved through ICMT research come directly from the industry. Nestic says that doing research for industry partners can make the stakes higher, but the work is guaranteed to always be relevant.

“We are almost entirely funded by the industry, which is quite unusual,” emphasized Nestic. “With industry funding, if you don’t perform, you’re done. It’s hard to get industrial funding, and if you don’t do well, sponsors will never come back, but we’ve been successful on that front. We have major companies who have been funding us for 30 years, and that’s only because we’ve been doing work that’s relevant for them and delivering what we promise.”

Organizations from around the globe look to the ICMT to provide them with information and corrosion prediction tools to meet the demands of their business. The institute works with more than 30 industrial sponsors including most of the major oil and gas producers, chemical companies, steel manufacturers and service providers in the world.

Most of ICMT’s projects involve trying to understand the physical mechanism and corrosion processes, guiding industrial sponsors and educating them about potential issues in different environments and developing corrosion prediction software based on the research. The institute collaborates with both individual industry sponsors through proprietary research projects as well as consortia made up of multiple companies through joint industry projects.

Currently, the institute’s two main joint industry projects are the Corrosion Center JIP led by Dr. Bruce Brown and the



Ph.D. student Kamila Turganova examines a rotating disk electrode (RDE) experimental setup.

Corrosion in CO<sub>2</sub> Transmission JIP led by Dr. Yoon Seok Choi. The Corrosion Center JIP has been ongoing for nearly 32 years, studying the fundamentals of aqueous carbon steel corrosion including a variety of active projects, with several new projects being planned. The Corrosion in CO<sub>2</sub> Transmission JIP is a newer venture focused on CO<sub>2</sub> transmission, which Nestic says has generated a lot of interest from the industry.

### A student-to-client pipeline

A large part of the Institute for Corrosion and Multiphase Technology’s mission is educating and training students who will go on to become leaders in the field of corrosion. Students are an essential part of both the proprietary research and joint industry projects—all the work is conducted by students and postdocs, supervised by project leaders under the direction of Nestic and Singer, and also younger faculty from the Department of Chemical and Biomolecular Engineering: Dr. Sumit Sharma and Dr. Madhu Majji.

ICMT currently has around 25 students, mostly made up of Ph.D. students with a few undergraduate students. With the institute’s strong industry ties, Nestic says that Ohio University students have a big advantage when entering any corrosion-related industry. The more than 80 ICMT students who have graduated have

all gone on to find success.

“We have graduated a large number of students who have made it, very successfully, most of them in the industry—10% in academia, 90% in industry,” said Nestic. “We prepared the students in a way that one cannot compete with, because our students learn how to interact, and how to perform in an industry setting, they meet their future employers early on, and they get jobs with those companies that they do research for. They’re doing really well, and we’re very proud of them.”

As part of their education, students also act as representatives of ICMT and Ohio University at semi-annual board meetings. Every six months, representatives from some of the most prominent oil, gas and carbon capturing companies in the world are invited to ICMT to review current research through presentations, tour the facilities and provide research direction for future testing. Students run these meetings, work directly with clients and present their research. Meeting with clients so frequently and learning from professors who advise them creates an incredibly effective synergy.

Nestic estimates that around a third of company representatives that come to the board meetings nowadays are ICMT alumni. He and Singer agree that this is a great dynamic, unique to the institute that is beneficial for students entering

the industry—a student-to-client pipeline.

“Students are put on these projects and develop strong interactions with clients. It’s very good for professional development,” emphasized Singer. “After graduation, our students typically end up joining the corrosion teams of our own clients. They know what we’re capable of, and often come back to Ohio University ICMT to help their new employer to solve their latest issues. This sounds like an effective business model.”

Ph.D. student Michael Hehemeku is currently working on the Corrosion in Carbon Dioxide Transmission JIP with a focus on studying the mechanisms causing corrosion in CO<sub>2</sub> pipelines and creating a model for them. Hehemeku agrees that conducting research at the ICMT is helping to prepare him for a successful career.

“You get to really know what is happening,” explained Hehemeku. “We have representatives from the companies sponsoring the project come here every six months to hear the progress of the research. They make sure that we are researching the particular conditions that they have in the field—temperature, pressure, pH, everything. So, we replicate what is happening in the field. I think that is a good way to know what is happening in the industry.” ■



# Utilizing coal and waste coal to create energy storage materials

**A**s concerns surrounding renewable energy, conservation, and sustainability continue to grow, engineers must also account for the challenges of job creation and economic impact. One innovation could be significant towards both. Utilizing coal and waste coal to create new energy storage materials provides an alternative use of coal that can address the decline of coal energy and the corresponding loss of jobs.

Dr. John Staser, Professor of Chemical and Biomolecular Engineering and Associate Director of the Institute for Sustainable Energy and the Environment (ISEE), is advancing the development of next-generation materials for a variety of electrochemical energy storage systems. Formerly focused on fuel cells and electrolyzers, Staser now concentrates on materials for diverse technologies—including batteries with various chemistries and supercapacitors—that support electric vehicles and renewable energy



Dr. John Staser



Dr. Jason Trembly

ite, the primary material for LIB negative electrodes, can be sourced either through mining (natural graphite) or synthesized from other carbon sources (synthetic graphite). However, the

storage.

ISEE is a recognized leader in advanced carbon materials research. Its first major application of these materials in energy storage was a Department of Energy (DOE)-sponsored project focused on developing graphite from coal for use in lithium-ion batteries (LIBs). Graphite, the primary material for LIB negative electrodes, can be sourced either through mining (natural graphite) or synthesized from other carbon sources (synthetic graphite). However, the

United States lacks a domestic supply of graphite, making it a critical material for energy security.

Given the nation's vast coal reserves and its ongoing transition away from coal-fired electricity, ISEE researchers are exploring methods to produce battery-grade graphite from coal. This approach could help resolve a key materials challenge and support domestic LIB manufacturing. Jason Trembly, Russ Professor and Department Chair of Mechanical Engineering and ISEE Director, leads the graphite synthesis efforts while Dr. Staser heads the development of batteries utilizing the coal-derived graphite. The project includes collaboration with industrial partners such as General Motors, CONSOL Innovations, American Electric Power, AmeriCarbon, Koppers, OMNIS Energy, and Engineered Profiles.

New projects sponsored by the DOE have continued to build on ISEE's momentum. Dr. Staser's project titled *Electrochemical Coal to 2-Di-*

*mensional Materials (e-Coal2D): A Process to Enable Renewable Energy Storage*, focuses on developing coal-derived graphene for use in supercapacitor applications. As the supercapacitor market continues to grow, nanoscale materials like graphene offer the potential to enhance device performance and energy storage capacity.

Graphene can be synthesized through a variety of methods, ranging from "bottom-up" to "top-down" approaches, many of which involve complex, energy-intensive processes that rely on chemicals that are not environmentally sustainable. Dr. Staser's research focuses on a more cost-effective and scalable alternative: electrochemical exfoliation of coal-derived graphite into graphene. This method holds promise for large-scale production with a reduced environmental footprint.

The innovation at the center of this project lies in the use of coal-derived graphite as a precursor for graphene synthesis. By electrochemically converting graphite sourced from coal and waste coal into nanoscale materials, the research could help establish domestic supply chains that repurpose the nation's coal reserves for use in supercapacitor energy storage. Additionally, transforming rural mining sites into sources of advanced materials could pave the way for new manufacturing hubs, bringing sustainable job opportunities to historically underserved communities. This project includes collaboration with CONSOL Innovations and Capacitech Energy (which manufactures flexible cable-based capacitors).

Dr. Staser also serves as Principal

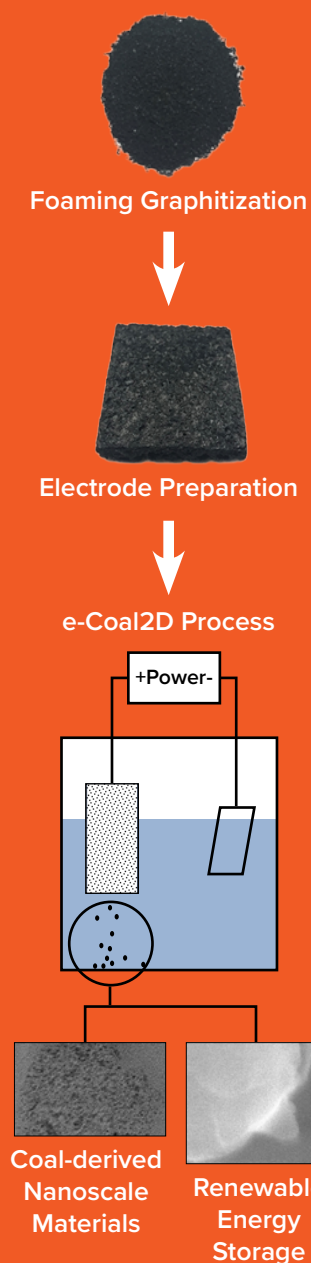
Investigator for a recently selected project funded by the DOE, titled *High-Performance Sodium-ion Batteries Utilizing Domestic Coal- and Waste Coal-derived Hard Carbon Anodes*. Sodium-ion batteries (SIBs) are emerging as a promising "beyond lithium" energy storage technology. Sodium is significantly more abundant and less expensive than lithium, and the United States holds vast reserves of soda ash—a key source of sodium. Unlike LIBs, which rely on graphite for their anodes, SIBs require alternative carbon materials. Graphite is unsuitable for SIBs, but other forms of carbon, such as hard carbon, offer viable and effective alternatives.

Hard carbon, an amorphous form of carbon, offers a potentially simpler and more cost-effective synthesis route compared to commercial graphite. This project aims to develop hard carbon electrodes derived from domestic coal for use in sodium-ion battery applications. Given the abundant U.S. reserves of soda ash and coal, SIBs could present a more affordable and locally sourced alternative to lithium-ion batteries, enhancing energy security and supply chain resilience.

Currently in its early stages, this project will progress over the next two years. The sodium-ion batteries developed will be assessed for their suitability in grid-scale energy storage and electric vehicle applications.

Together, these projects and others like it will position Ohio University as a leader in advanced domestic materials for energy storage applications. These collaborative projects sustain existing partnerships with academic institutions and industry while growing new ones. ■

## How it works





# NASA funds Ohio University to advance autonomous aircraft technology, industry standards

## STAFF REPORTS

**O**hio University and Reliable Robotics, a leader in safety-enhancing aircraft automation systems, received a funding award from NASA (the National Aeronautics and Space Administration) to advance autonomous aircraft operations. The project was awarded \$6 million through its University Leadership Initiative (ULI), which seeks to fund new, innovative projects that support the NASA Aeronautics Research Mission Directorate (ARMD) portfolio and the United States aviation community. The project team consists of university and industry partners including the Illinois Institute of Technology, Virginia Polytechnic Institute and State University and its Virginia Tech Transportation Institute, Tufts University, Stanford University, and Veth Research Associates LLC, with Boeing serving as a collaborator.

“NASA’s ULI program provides the opportunity for leading universities and top industry partners to leverage their collective expertise to drive advancements in aviation technologies. With a background of over 60 years of experience in the field and unique extensive flight-testing facilities, including an airport, the Ohio Uni-



Dr. Sabrina Ugazio

versity Avionics Engineering Center (AEC) can provide a substantial contribution to this project,” said Dr. Sabrina Ugazio, the project lead and principal investigator at Ohio University, Assistant Professor in Electrical Engineering and Computer Science, and AEC faculty member.

“The goal is to enhance autonomous aviation operations, primarily through advanced navigation technologies and with an emphasis on ensuring safety. Andrew Videmsek, Reliable Robotics engineer and Ohio University alumnus, collaborated closely with us on the proposal to define very specific technical challenges critical to autonomous flight,” Dr. Ugazio said.

A key outcome of the project is to advance industry standards around automatic taxi systems, such as those actively being developed by the Radio Technical Commission for Aeronautics (RTCA). RTCA is a nonprofit standards

development organization that drives industry consensus for standards, which are used as a means of compliance with regulatory bodies such as the Federal Aviation Administration (FAA). Ohio University, Reliable Robotics and other team members are involved in the RTCA working group SC-159 (Navigation Equipment Using the Global Navigation Satellite System) and working group SC-228 (Minimum Performance Standards for Uncrewed Aircraft Systems), with Reliable Robotics holding leadership positions in the latter.

“When it comes to aviation standards, industry consensus is key,” said Robert Rose, CEO and co-founder of Reliable Robotics. “This important university-industry collaboration funded by NASA will directly inform the automatic taxi standards being developed within RTCA and in turn help streamline the process to receive operational approval of these systems from regulatory bodies such as the FAA.”

The autonomous flight system developed by Reliable Robotics includes an “always on” autopilot designed to handle all phases of aircraft operation including auto taxi, auto takeoff and auto landing. In November 2023, Reliable Robotics flew a Cessna 208B Caravan with a remote pilot commanding the aircraft and handling all voice communications from 50 miles away, making aviation history.

As large uncrewed aircraft get closer to operating out of commercial airports, ad-



vanced navigation technologies are needed to automatically taxi aircraft without a pilot onboard. The funds will primarily be used by Ohio University and the partner universities to evaluate technologies that will enable aircraft to automatically position and navigate around the airport. These technologies will be selected based on guidance from industry experts like Reliable Robotics. The project will cover requirements development, technology maturation and flight testing, with the goal of achieving Technology Readiness Level 6, marked by a prototype or system model demonstration that can then

be quickly deployed. Much of the testing will take place at Ohio University’s Gordon K. Bush Airport, home of Russ College’s Avionics Engineering Center fleet of test aircraft.

“The research and flight tests will address navigation system integrity, improving safety and enabling the adoption of these technologies for safe, efficient autonomous aircraft operations,” added Dr. Ugazio. “While the focus is on autonomous aviation, this research is potentially setting the stage for future breakthroughs in both airborne and terrestrial operations.” ■





## Is a future with self-driving vehicles closer than we think? Russ researchers aim to find out

A collaborative project between DriveOhio, the Ohio Department of Transportation and Ohio University is determining how close we are to deploying autonomous vehicles and the impacts they will have on improving wellbeing and access.

BY SAMANTHA PELHAM

This collaborative research project wrapped up a significant four-year study on the viability of autonomous vehicles in rural settings, focusing specifically on the challenges and opportunities faced by communities in southeast Ohio. The rural Automated Driving Systems (ADS) project, which commenced in 2020 and concluded in June 2024, aimed to collect data on the performance of self-driving cars in less populated areas, where infrastructure can differ greatly from urban environments.

Led by Dr. Jay Wilhem, Associate Professor in the Department of Mechanical Engineering, the project involved a team of undergraduate and graduate stu-

dents from the University's mechanical engineering and computer science departments, as well as Dr. Issam Khoury, Associate Professor of Civil and Environmental Engineering and Dr. Julie Brown, Associate Professor in the College of Health Sciences and Professions. Together, they drove an autonomous vehicle along rural state roads, meticulously gathering data to evaluate how well the technology adapted to the unique challenges of the region, as well as performed community outreach to survey public perceptions of the technology and the potential benefits.

"Autonomous vehicles have predominantly been tested in urban areas with consistent infrastructure. Our goal was to assess their effectiveness in rural contexts, where access to essential ser-



Dr. Jay Wilhem



Dr. Issam Khoury

would be beneficial for those who live in these types of areas. According to Wil-

helm, southeast Ohio suffers from being a food and health care desert, where often times people have to travel to surrounding counties to get necessary needs taken care of or rely on family members or friends to drive them around.

"We found that a lot of people in this region don't have access to reliable transportation. It's normally family members coming to get them. In big cities, there are public transportation options and everything is more centrally located whereas in rural areas, these options aren't available," Khoury, who led the outreach efforts, added.

In addition to looking at the barriers that impact people in southeast Ohio, the team also emphasized how this technology could impact older generations. Khoury and Brown traveled across Ohio to rural regions with higher, older populations to gain insights about their perceptions.

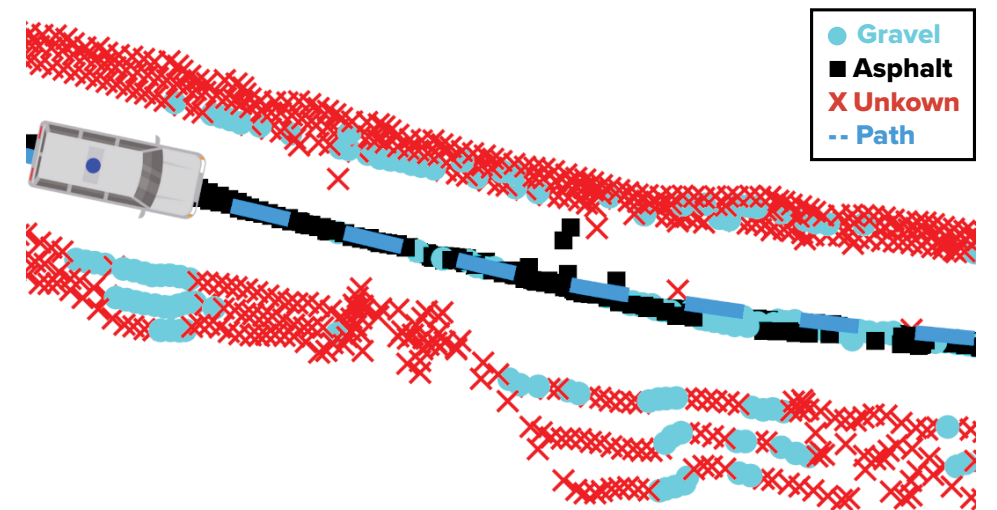
"Initially, many community members were skeptical about self-driving cars. However, after engaging in discussions about safety and the technology's capabilities, most shifted their views positively," Khoury noted.

According to Wilhelm, the way the autonomous vehicles worked was similar to having cruise control on. The safety "driver" would hit a button and the autonomy would take over, however, if at any point the autonomous portion of the vehicle stopped working, the safety driver would easily be able to take over.

The team faced various challenges, including GPS signal loss in remote areas and the detection of traffic signals. Despite these obstacles, they successfully identified critical areas for improvement, such as enhancing the vehicle's ability to recognize stoplights and navigate complex environments like uptown Athens, where pedestrian traffic is high.

The findings from this comprehensive study suggest that while the technology is advancing, significant work is still needed in both regulatory frameworks and technological infrastructure to support autonomous vehicles in rural areas. The research revealed a strong demand for improved cellular and GPS coverage, particularly in regions where services are spotty, which could hinder the effectiveness of autonomous driving systems.

Undergraduate and graduate students also had the opportunity to gain experience working on the project with many of them being the ones to operate the computer in the back of the vehicle, collecting data.



An example of LiDAR scans taken for the study showing the average spatial coordinates of each classified arc. The research focused on evaluating self-driving car performance in sparsely populated areas with infrastructure distinct from urban settings.

**"Autonomous vehicles have predominantly been tested in urban areas with consistent infrastructure. Our goal was to assess their effectiveness in rural contexts, where access to essential services like food and healthcare can be limited."**

— Jay Wilhelm, Associate Professor, Department of Mechanical Engineering

"Working with large amounts of data in Python and other data visualization platforms gave me a lot of valuable experience that will definitely be applicable to work later on in my career," said Tony Tonkovich, a recent Russ graduate who is now pursuing a master's degree. "The opportunity to work on a project with an autonomous vehicle is also a large step towards some of my career goals. Having this early experience working with autonomous systems is extremely valuable and will open future opportunities for very cool careers."

For the project, most of Tonkovich's work consisted of analyzing the various data (such as GPS and LiDAR) that was collected while their group was driving the autonomous vehicle around three planned routes in the greater Athens area. One of the specific things he fo-

cused on was studying the times that a driver had to takeover from autonomy to manually operate the vehicle.

"I was looking for trends and challenges that were specific to rural Appalachia in order to promote additional research to hopefully encourage future development of autonomous driving for rural communities," Tonkovich explained.

Tonkovich added that through working on this project, he went from knowing practically nothing about autonomous vehicles to the different systems that go into them and encourages students interested in researching these types of systems to reach out to Dr. Wilhelm for other opportunities.

As the demand for innovative transportation solutions grows, the findings from this study may play a pivotal role in shaping the future of mobility in rural Ohio and beyond.

"Some areas, especially in urban settings, are already doing this, however, the overall technology needs to improve before there can be demand and this can become a reality for those living in rural areas. I think five to 10 years down the line, we could see more autonomous vehicles starting out with corporate companies like Uber that could offer experiences for their customers before the demand expands to people being able to purchase one themselves," Wilhelm said. "But once we get there, the opportunities for a more accessible mode of transportation could be endless." ■



## Dean Fox receives Middlebrooks Award

Dean Patrick Fox has received the 2024 Thomas A. Middlebrooks Award from the American Society of Civil Engineers (ASCE) for the paper entitled “Analytical Solutions for Internal Stability of a Geosynthetic-Reinforced Soil Retaining Wall at the Limit State,” published in the *Journal of Geotechnical and Geoenvironmental Engineering*. The Middlebrooks Award is given annually for the leading geotechnical (soil) engineering paper published by ASCE. Fox also received the award twice previously, in 2008 and 2009.

The paper presents closed-form analytical solutions for the critical failure plane angle and the sum of maximum reinforcement loads for a geosynthetic-reinforced soil (GRS) retaining wall, a common type of wall construction method. The new solutions represent a next advancement of classical earth pressure theory and account for numerous design parameters, such as pore water pressure, reinforcement inclination, surcharge stress, seismic loading, and toe (of wall) resistance forces.



“With this paper, Fox has made a singular, seminal, and transformative contribution to our profession on the analysis of internal stability for geosynthetic-reinforced soil (GRS) retaining walls,” said Craig H. Benson, PhD, PE, NAE, in the nomination letter. “In summary, the paper presents the most significant new analytical solutions for stability of retaining

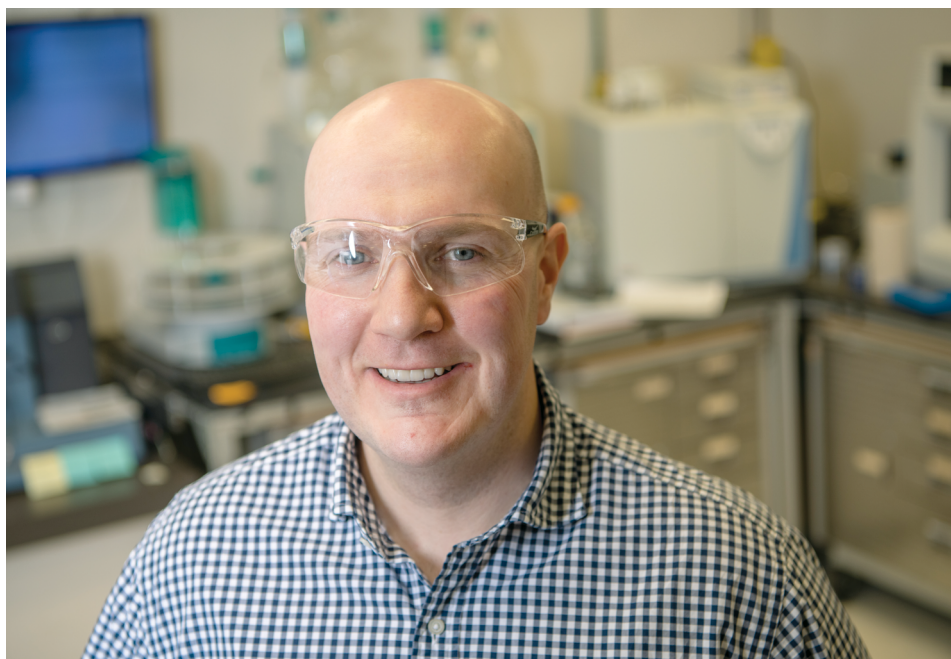
walls since the Mononobe-Okabe theory for pseudo-static seismic loading in 1929.”

The Thomas A. Middlebrooks Award, established by the ASCE in 1955, is a memorial in recognition of the outstanding professional accomplishments of Thomas A. Middlebrooks, A.M.ASCE. The award was presented in March 2025 at the ASCE Geo-Congress in Louisville, Kentucky.

## Dr. Jason Trembly receives AIChE Cecil Award

Jason Trembly, Russ Professor and Department Chair of Mechanical Engineering and Director of the Institute for Sustainable Energy and the Environment, has received the prestigious Lawrence K. Cecil Award in Environmental Chemical Engineering from the American Institute of Chemical Engineers (AIChE). Dr. Trembly was selected for pioneering scalable chemical engineering solutions that convert carbon and wastewater liabilities into low-emission products, advancing circular economy and environmental sustainability.

AIChE, the world’s leading organization for chemical engineering professionals with over 60,000 members from more than 110 countries, bestows this most prestigious environmental award. Established in 1972, the Cecil Award is given once a year, recognizing outstanding contributions and achievements in the pres-



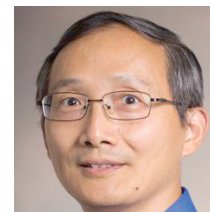
ervation or improvement of the environment. Nominations are received globally, and recipients are selected by a panel of distinguished academic researchers and industrial practitioners.

Dr. Trembly’s research interests include solid oxide fuel cells and electrolyzers, electrochemical capture of nutrients from waste streams, produced water remediation, and sustainable composite materials.

**Dr. Zhaohui Geng**, Assistant Professor in the Department of Industrial and Systems Engineering, received the Best Application Paper Award of the IISE Transactions for 2024 for his paper “Reconstructing Original Design: Process Planning for Reverse Engineering.” This was awarded by the Institute of Industrial & Systems Engineers on May 20, 2024. Dr. Geng’s research interests include advanced manufacturing, digital transformation, machine learning, knowledge engineering, and healthcare systems.



**Dr. Tingyue Gu**, Professor in the Department of Chemical and Biomolecular Engineering, has been named a 2025 Fellow from the Association for Materials Protection and Performance (AMPP). The ceremony was held on April 9, 2025, in Nashville, TN. AMPP recognizes outstanding and significant contributions of academic, mentoring, technical, and policy efforts in the field of materials protection and performance. Internationally known for his work on chromatography modeling and scale-up, Dr. Gu authored the chromatography simulation package Chromulator, used by dozens of university researchers in more than thirty countries, and by several major pharmaceutical and biotech companies. He also has carried out research in protein purification, as well as in fungal and bacterial fermentation.



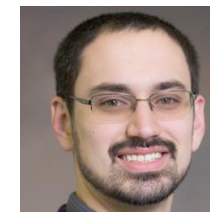
**Dr. Deborah McAvoy**, Associate Professor in the Department of Civil and Environmental Engineering, received Ohio University’s Chapman Clapp Outstanding Advisor Award for the 2023-24 academic year. Ohio University celebrates the important work of faculty and staff across the university whose strong advising makes a positive impact on students’ academic careers. Through shared responsibility and engagement, strong student-advisor relationships ensure academic success.



**Dr. Jay Wilhelm**, Associate Professor in the Department of Mechanical Engineering, has been named a 2025 Associate Fellow by The American Institute of Aeronautics and Astronautics (AIAA). The grade of Associate Fellow recognizes individuals “who have accomplished or been in charge of important engineering or scientific work, or who have done original work of outstanding merit, or who have otherwise made outstanding contributions to the arts, sciences, or technology of aeronautics or astronautics.” AIAA formally honored and inducted the class at the AIAA Associate Fellows Induction Ceremony in January 2025 at the annual SciTech conference. Dr. Wilhelm’s research interests include aerial robotics, energy neutral sensors, UAV design and testing, and flight simulation.



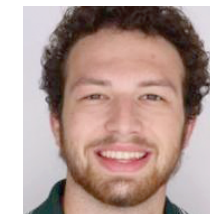
**Dr. Brian Wisner**, Assistant Professor in the Department of Mechanical Engineering, has received the 2024 Outstanding Graduate Faculty Award for Ohio University. Established in 1972, this award recognizes a professor who has demonstrated exemplary performance as an instructor, researcher, and faculty member. The award is bestowed annually with the recipient formally announced at the Graduate Commencement ceremony held each spring. Dr. Wisner’s research interests include nondestructive testing and evaluation, mechanical behavior of materials, additive manufacturing, composite systems, and microstructure-property-performance linkages.



**Lisa Fauber**, Success Advisor for the Department of Engineering Technology and Management, received Ohio University’s Innovative Advisor Award on May 7, 2025. Fauber has a long-standing reputation for implementing creative and innovative approaches to advising, such as utilizing new technologies and data, developing unique programs, and fostering valuable collaborations.



**Kavanaugh Frank**, a computer science major in the Russ College conducting research with Dr. Chad Mourning, received a first place presentation award at the 2025 Ohio Space Grant Consortium Student Symposium. Frank’s research seeks to ensure the safety of airplanes and passengers by developing software to integrate existing Digital Elevation Models from the United States Geological Survey (USGS) into Ohio University NAVAID Performance Prediction Models, multipath models developed at Ohio University and used in over 20 countries.



## Giving opportunities

Every gift to the Russ College of Engineering and Technology helps to create a world-class learning experience for our students. Our visionary donors have made unprecedented gestures of generosity to ensure the permanence and preeminence of a Bobcat engineering degree.

### Make a difference

Your gift, no matter the amount or type, will support the legacy of excellence for the Russ College. Examples include:

- Undergraduate scholarships that create life-changing opportunities for our students.
- Named professorships that allow us to hire and retain leading faculty members.
- Endowments to support world-class facilities for teaching and research.
- Endowments to support our student competition teams.
- Student emergency funds to help students facing an unexpected financial need.



Stone, Senior Director of Development, at stonet@ohio.edu

**Create for Good** by giving to the Russ College. Use the QR code or contact Tanyah





Debbie Burke was inducted into the Russ College Academy of Distinguished Graduates at the 2025 college awards ceremony. She joins fellow Distinguished Graduates (from left) Jack Myslenski, Dick Dickerson, Jim Edwards, Mark Arnold and Dan Squiller.

Russ College 2025 faculty, staff and distinguished graduate awards

The Russ College gathered with our Board of Visitors at the annual spring awards banquet on April 18, 2025, to announce the faculty, staff, and distinguished graduate awards. Congratulations to all our awardees!

Outstanding Technical, Administrative, and Classified Employee Awards

- These individuals were nominated by their peers for exemplary leadership and contributions to the college:
- Outstanding Technical Employee: **Kody Wolfe**, Research Engineer, ISEE
  - Outstanding Administrative Employee: **Paula Linscott**, Assistant Dean for Student Services
  - Outstanding Classified Employee: **Valerie Pettit**, Assistant to the Dean

White Teaching and Research Awards

Established by Marvin and Ann White in 1998, each department selects two outstanding faculty members based on its own criteria, one for excellence in teaching and one for excellence in research. The teaching awards go to:

- **George Armann**, AVN
- **Deborah McAvoy**, CEE
- **Darin Ridgway**, ChBE
- **Daniel Allwine**, EECS
- **Daniel Sheets**, ETM
- **Zhaohui Geng**, ISE
- **Brian Wisner**, ME

and the research awards go to:

- **Issam Khoury**, CEE
- **John Staser**, ChBE
- **Jundong Liu**, EECS
- **Mustafa Shraim**, ETM
- **Felipe Aros-Vera**, ISE
- **Jay Wilhelm**, ME

Russ Teaching and Research Awards

In 1981, Fritz Russ, BSEE '42, H.O.N. '75, and his wife, Dolores, generously established an endowment to support two annual awards for teaching and research. Since that time, a new instructional faculty teaching award was also created. The following faculty members were recognized with these special awards:

- **Kenneth Walsh**, CEE, received the 2025 Russ Outstanding Research Paper Award for his paper entitled "Adaptive Passive Seismic Isolation System for Mitigating the Acceleration Response of

Floor-Mounted Equipment" published in the *Journal of Structural Engineering*.

- **Daniel Che**, CEE, received the 2025 Russ Outstanding Undergraduate Teaching Award.
- **Sam Malakoutikhah**, ME, received the 2025 Russ Outstanding Undergraduate Instructional Faculty Teaching Award.

**Academy of Distinguished Graduates Award**

**Deborah Burke** (BSCHE, '85) has been inducted into the Russ College Academy of Distinguished Graduates, the highest honor the college bestows on its alumni. As a student, Debbie was actively engaged in the Society of Women Engineers and the American Institute of Chemical Engineers. After graduation, she was the first woman promoted to engineering manager for NiSource/Columbia Gas of Ohio and Columbia Gas of Kentucky. Debbie has served as a member of the Russ College Board of Visitors for more than 20 years, including previously as its chair, and also serves as the inaugural President of the new Russ College Alumni Society (RCAS). Debbie joins a group of 43 other members of the Academy of Distinguished Graduates who have been recognized for their career and lifetime achievements. ■

RUSS COLLEGE BOARD OF VISITORS

<b>Mark Arnold</b> BSISE '81, MBA '88	<b>James Edwards</b> BSCHE '70	<b>Daniel Squiller (Chair)</b> BSEE '79, MA '84
<b>Allie Gabbard Bell</b> BSETM '20, MS '23	<b>Paul Gydosh</b> BSEE '74	<b>Charles Stuckey</b> BSME '66, H.O.N. '05
<b>Angie Buckley</b> H.O.N. '20	<b>Slave Jovanovski</b> BSCS '07	<b>Jeffrey Sturgis</b> BSAP '88, AAS '88
<b>Deborah Burke</b> BSCHE '85	<b>Jerome Lavelle</b> BSISE '84, MS '86	<b>Lex Tisdale</b> BSISE '85
<b>Cynthia Calhoun</b> BSEE '88	<b>Thomas Moehring</b> BSME '06, MS '09	<b>April Welshans</b> BSCE '07
<b>Gretchen Dietrich</b> BSIT '90	<b>Jack Myslenski</b> BSIT '73	<b>Phillip Yoder</b> BFA '68

RUSS COLLEGE ALUMNI SOCIETY BOARD OF DIRECTORS

Officers

<b>Deborah Burke</b> President BSCHE '85	<b>Todd Ebert</b> Vice President BSEE '92	<b>Carrie Saunders</b> Secretary BSEE '00, MS '06
--	---	---

Members

<b>Kyle Balzer</b> BSIT '09	<b>Cody Pettitt</b> Faculty member BSME '14, MS '16	<b>Ross Wagner</b> BSISE '97
<b>Adam Barber</b> BSME '12	<b>Ethan Quastler</b> BSAVN '16	<b>Julianna Watrobski</b> Graduate student member BSChBE '25
<b>Sean Calhoun</b> BSEE '01	<b>C. Joanne Shaner</b> BSCE '94, MS '96	<b>Mollie Whitacre</b> BSCS '18



Did you know?

The Russ College's Stocker Center (left), designed by Trautwein & Associates of Worthington, Ohio, bears a striking resemblance to Philadelphia's historic Independence Hall (right). Originally built in 1965, the building formerly known as Crook Hall was a dormitory. In April 1986, it was rededicated as the C. Paul and Beth K. Stocker Engineering and Technology Center, marking its transformation to our college headquarters.





# New BS degree programs in Artificial Intelligence and Cybersecurity

## STAFF REPORTS

**O**hio University continues to lead in cutting-edge technology education with the launch of two forward-looking programs: a Bachelor of Science in Artificial Intelligence and a Bachelor of Science in Cybersecurity Engineering. Both programs were launched in the last two years and are housed within the Russ College. These programs are designed to prepare students for the rapidly evolving demands of the digital world.

### Artificial Intelligence Engineering: Building the solutions of tomorrow

The new Artificial Intelligence (AI) degree equips students with the knowledge and skills to thrive in AI, machine learning, and data science. The program emphasizes transforming large datasets into actionable insights through AI theory, machine learning algorithms, and data optimization strategies.

“AI has increased in importance over the last 10-15 years, and this was the genesis of the program,” said Dr. David W. Juedes, Associate Dean for Academics and Professor of Electrical Engineering and Computer Science. “We aim to prepare our students for the challenges and opportunities in this field.”

Students will complete foundational computing courses alongside specialized AI classes such as Concepts of Artificial Intelligence, Statistical Learning, and Foundations of Deep Learning. A two-semester capstone project allows students to design and build practical AI systems, applying their knowledge to real-world challenges.

The curriculum also integrates psychology to help students understand human behavior and cognition—critical for developing user-friendly AI applications. This interdisciplinary approach culminates in senior projects that explore AI’s impact across industries.

### Cybersecurity Engineering: Building the digital defenses of tomorrow

For students drawn to the technical side of protecting vital information technology infrastructure from attack, the Bachelor of Science in Cybersecurity En-



**Dr. Chang Liu, Professor of Electrical Engineering and Computer Science, with graduate student Mansour Rezaei in the Software and AI Applications Lab at the RROC.**

gineering degree offers a deep dive into digital defense. This program focuses on the nuts and bolts of cybersecurity—from designing secure systems to defending against advanced threats.

Students gain hands-on experience in:

#### ■ System security and encryption:

Building robust systems that protect sensitive data using advanced encryption techniques.

■ **Embedded system security:** Securing low-power systems like microcontrollers and IoT (Internet of Things) devices, with a focus on supply chain vulnerabilities.

■ **Simulated environments:** Practicing real-world defense strategies using industry-standard tools in virtual labs.

Imagine being part of a team that prevents a ransomware attack on a hospital—like the one that targeted the Ascension Health Care System in May 2024—ensuring patient data remains secure and systems stay operational. This program prepares students to make this kind of real-world impact.

### Career opportunities in AI and Cybersecurity

Graduates of both programs will be

well-positioned for high-demand roles across sectors including business, health-care, government, and academia.

AI career paths include:

- Machine learning engineers
- Data scientists
- NLP specialists
- AI software engineers
- AI consultants and strategists

Cybersecurity career paths include:

- Security engineers
- Embedded systems analysts
- Threat intelligence specialists
- Incident response coordinators

“Our new AI and cybersecurity programs are a testament to Ohio University’s commitment to lead in technology education and innovation,” said Patrick Fox, Dean of the Russ College of Engineering and Technology. “We’re preparing students not just to code, but to think critically about how technology can solve real-world problems.”

Both programs are designed to evolve with technological advancements, ensuring students graduate with the most current and relevant skills in their fields. ■





## ASCENT Ecosystem supports, trains next generation of workforce – opens doors in southeast Ohio

**Through the Appalachian Semiconductor Education and Technical (ASCENT) ecosystem, Ohio University is cultivating the next generation of skilled technical professionals for Ohio's emerging semiconductor industry and regional advanced manufacturing.**

BY ALEX SEMANCIK

**S**emiconductors are everywhere. Most electronics, including phones, laptops, cars, smart appliances and even essential medical equipment rely heavily on semiconductors.

In the U.S., semiconductor manufacturing has traditionally been confined to the western part of the country, but the majority are made overseas. In an effort to become more self-reliant, the CHIPS and Science Act of 2022 has led to an increase in American semiconductor research, development, production and a reshoring of advanced manufacturing in the U.S., including Ohio.

In 2022, Intel awarded Ohio University \$3 million in grant funding to serve as the lead institution for the Appalachian Semiconductor Education and Technical (ASCENT) ecosystem, a program that has created an inclusive workforce development and training to cultivate the next generation of skilled technical professionals for Ohio's emerging semiconductor industry, starting with K-12 students and extending all the way to graduate-level programs. The ecosystem has now drawn in a total of more than \$20 million including Intel's initial investment.

### The impact of semiconductor manufacturing in southeast Ohio

Intel is currently in the process of building the first of eight planned facilities in New Albany, Ohio, and the impact is expected to be felt in the southeast portion of the state. Scott Miller, Associate Dean for Industry Partnerships and Outreach and Director of the ASCENT program, says the semiconductor industry coming to Ohio is the state's largest economic development project ever with \$28 billion in federal and private funds invested thus far.

"As Intel moves into this region, into the state, they are investing in educational institutions such as Ohio University and our partners to grow the workforce that will then help operate those new facilities," Miller said. "They will need a total of up to 3,000 fully qualified technicians, operators, engineers and scientists to run that facility."

Miller went on to say the ripple effect of Intel moving in will likely create even more jobs through various suppliers and spin-off companies—similar to the economic impact semiconductors had in Arizona. In fact, Intel's Semiconductor Education and Research Program (SERP) holds Ohio University as a model for do-



Scott Miller



Christopher Quolke

ing similar work across the nation due to the cohesiveness of the ASCENT ecosystem, the effectiveness of Ohio University reaching out to rural populations and the strength of relationships with its partner institutions.

"We're building out a workforce in a rural setting not just for Intel, but that whole supplier network, and that really hasn't been done much before, especially in an area like rural, southeastern, Appalachian Ohio," Miller explained. "What we're doing is a model to push this out further into the Appalachian region of not just Ohio, but the whole central Appalachian region, including West Virginia, Kentucky, Pennsylvania, Virginia, Tennessee and so forth."

To build this workforce, the ASCENT ecosystem has created semiconductor-related inroads tailored to every educational level.

"We're building a pathway for students to go from the high school level to a one-year certificate, to a two-year degree, to a four-year degree and an advanced de-

gree," said Miller. "So, we have the entire complement of degree pathways and certifications that you can get and that make us unique—we're also the only program in the state that has included career centers in our development efforts."

### Supporting development

To further support students preparing for a career in Ohio's high-tech industries, Ohio University is offering ASCENT scholarships. These scholarships are included in the Intel grant which provides up to \$400,000 in scholarships through the ASCENT partnership each year. ASCENT has offered 295 scholarships to date with 50 more on the way soon—this number will far exceed the initial goal and only represents half of this academic year.

Additionally, ASCENT worked with the Dean of Students Office and the Division of Student Affairs, including the Student Emergency Fund, to ensure something like an electricity bill or flat tire won't derail students from achieving their educational goals.

"We also recognize some of the other challenges and obstacles that students from our region face while pursuing a higher education degree," said ASCENT Project Manager Christopher Quolke. "So, we also have taken a portion of our funds and added to the University's barrier fund to help students who have a one-time cost that may otherwise disrupt their academic trajectory to get funding to overcome that so they can stay and complete their degree."

Because of the relationships Ohio University has made in the semiconductor environment, the University has already hosted several industry professionals on campus to connect with students and share career pathway opportunities with students.

"Recently, we hosted a semiconductor supplier who came to campus and was very interested in meeting with some of our students and faculty," emphasized Quolke. "We pretty much filled the room with students, graduate students and staff. Those kinds of industry-student pairing and professional development op-



ASCENT student interns, Aiden Schmoll (center) and Bidhan Khatiwada (right), help with STEM outreach activities at the Eastland-Fairfield Career and Technology Center in May 2025. These summer camps will educate hundreds of K-12 students over the duration of the project.

portunities are only some of the things we can deliver because of the relationships we've made and the scope our work."

### Laying the groundwork for the next generation

Another part of the ASCENT ecosystem is a strong emphasis on recruiting K-12 students into high-tech, advanced manufacturing career fields. This past summer, Ohio University student interns helped with 15 different summer camps across southeast Ohio, reaching more than 2,500 students in the process.

"That's transformative," said Miller. "In fact, our number alone through the ASCENT project exceeded Intel's statewide goals for STEM outreach."

Student interns supported activities at career centers, school districts and on campus. During the Kids on Campus event, Ohio University students provided two weeks of STEM programming that alone reached 80 participants. Quolke said this was one of the best opportunities for students as they got the chance to devise and deliver activities that they would have

wanted to go to when they were that age.

"I think our students truly sell the Ohio University experience better than any employee I've ever met, just from taking students out into rural communities this summer and setting them up with the demonstrations," said Quolke. "Our students come in as near-peers where rural community members, who often don't have access to a young adult demographic, really respond positively because they don't get the opportunity to meet many younger adults who are passionate about studying a STEM field."

Miller added that part of the outreach is introducing rural K-12 students and communities to these new advanced manufacturing career paths that either didn't exist or weren't accessible before.

"These are career pathways that haven't existed, or if they did, they existed in very small numbers, so parents don't tell their children to go into these kinds of high paying, high tech, advanced manufacturing kinds of career fields. But they're going to, and they're going to in large numbers," he said. "And so, we're starting to lay the groundwork in our K-12 outreach." ■



**Newly Named Research Laboratories:** The Russ College sincerely thanks our industry partners CONSOL Cares Foundation of Canonsburg, PA, and American Electric Power (AEP) Foundation of Columbus, OH, for their generous support in the naming of two research laboratories at the Russ Research Opportunity Center (RROC). Both located within the Institute for Sustainable Energy and the Environment, the CONSOL Innovations Carbon Innovations Lab and the AEP Foundation Process Electrification Lab reflect a shared commitment to advancing sustainable technologies and fostering student-led research.





## Russ College awarded \$2.25 million contract to train southeast Ohio secondary and post-secondary educators

STAFF REPORTS

**T**here is a large need for U.S. workers with the skills to manage complex technological and business challenges. Many jobs are available in these areas, but fewer people have diverse skills in engineering and technology, especially in automation and robotics, to meet the demand. A partnership between the U.S. Department of Defense and Ohio University through defense contractor ARCTOS Technology Solutions will help meet this demand by educating the next generation in STEM fields and beyond at the college and high school levels.

The Department of Engineering Technology and Management (ETM) was awarded a contract with the U.S. Air Force through ARCTOS. As part of the agreement, ETM received \$2.25 million to promote education at Ohio University and throughout high schools in southeast Ohio. The funding will enhance the ETM curriculum, fund new lab equipment and provide free training in robotics, programmable logical controllers and automation integration to southeast Ohio's secondary and post-secondary teachers and future educators.

Dr. Zaki Kuruppallil, Professor and Chair of the Department of Engineering Technology and Management, is leading the partnership as the principal investigator. Kuruppallil and fellow ETM Professor and co-principal investigator Dr. Paul Deering attended robotics and automation training programs for educators at another Ohio school beginning in 2021. While attending this program for a few summers, Kuruppallil and Deering developed relationships with ARCTOS and proposed how they could improve the program and create a more compact, holistic training at Ohio University.

When more funding became available from the U.S. Department of Defense, Kuruppallil and co-principal investigators Deering and ETM Professor Todd Myers wrote a proposal which was accepted by ARCTOS. Along with the training for educators, the team proposed advancements for the curriculum and equipment of the ETM department.

"We are taking this to the next level of what the industry wants," said Kuruppallil.

The new equipment will be installed at



Department of Engineering Technology and Management Professor Paul Deering (left) and Chair Zaki Kuruppallil (right).

**"This initiative is particularly for southeast Ohio and will benefit the community. It will give a new dimension to what we offer at Ohio University."**

— Paul Deering, Professor, Department of Engineering Technology and Management

the Athens Campus during the first phase of the contract, and utilized towards modified ETM curricular lab activities as well as "train-the-trainer" programs in the areas of robotics and automation. In a later phase, the contract will also support the purchase of equipment for an additional Ohio University Regional Higher Education campus to replicate some of the automation and robotics certificates offered currently at the Lancaster Campus.

"This initiative is particularly for southeast Ohio, and will benefit the community," said Deering. "It will give a new dimension to what we offer at Ohio University and in southeast Ohio."

Robots, programmable logical controllers and other equipment arrived for the start of the fall 2024 semester. The equipment helps establish two new state-of-the-art labs in Russ College's Stocker Center. A robotics and integration lab utilizes

10 new FANUC industrial-scale robots and 11 new Allen-Bradley programmable logical controller (PLC) kits along with conveyors and other accessories. Additionally, a new PLC lab will be used to teach PLC and mechatronics courses and train educators during the summers. This lab will include 12 new Amatrol PLC trainers which also have Allen-Bradley PLCs.

Kuruppallil says the equipment will give students entering the workforce an edge and make them more valuable to future employers.

"Students will also have the opportunity to earn FANUC and Allen-Bradley credentials using the new equipment," he said. "Students with automation, robotics, integration and mechatronics skills are in high demand with manufacturing reshoring to the United States."

Additionally, the contract will help:

- Modify five existing ETM courses to include enhanced automation and integration, and combine them to make an advanced automation certificate which will be built into the ETM curriculum and accessible to other majors.

- Create a new program on Ohio University's Chillicothe campus based on the automation and mechatronics certificate program at the Lancaster campus.

- Fund new equipment at Ohio University's Chillicothe campus.

- Analyze what digital thread means to the industry by defining it through surveys and a literature review. ■



## Russ College and Washington State College expand partnership to prepare students for workforce

STAFF REPORTS

**T**he Russ College of Engineering and Technology is strengthening its collaboration with Washington State College of Ohio (WSCO) by expanding engineering opportunities for local students, building on existing transfer agreements between the two institutions.

The engineering transfer program, which launched in fall 2024, aims to create enhanced pathways for students pursuing careers in engineering. The transfer program allows students to start their college career at WSCO and then transfer to Ohio University to complete a Bachelor of Science Degree in Industrial and Systems Engineering (ISE).

"Ohio University is excited about this partnership with Washington State College of Ohio, with the expanded ability to provide students a smooth pathway to our Bachelor of Science Degree in Industrial and Systems Engineering" said Patrick Fox, Dean of the Russ College of Engineering and Technology. "This program offers a high-caliber opportunity for students to achieve their engineering goals while addressing the regional demand for skilled engineers."

While at WSCO, students will complete general education courses and foundational engineering courses, such

**"Industrial and systems engineers solve complex problems of the world, with special attention to productivity, cost, quality, and human factors in production, health care, supply chain and information. This pathway will provide students an exciting opportunity to join this rapidly-growing ISE profession."**

— Tao Yuan, Professor and Chair, Department of Industrial and Systems Engineering

as Solid Modeling with Additive Manufacturing, Engineering Materials, Statics, and Strength of Materials. Upon transferring to Ohio University, students will spend the following years completing higher-level engineering courses, including Industrial Computer Simulation, Information Systems Engineering, Applied Systems Engineering, Human Factors Engineering, and Engineering Programming.

The transfer program between WSCO and Ohio University directly responds to the community's increasing demand for skilled industrial engineers.

According to Jared Voldness, Director of Engineering and Business at WSCO, the launch of this engineering transfer pathway will allow the two institutions to work together to create a pipeline of skilled engineers who are rooted in the community.

"We recognize the urgent need for local engineers to support our industries, and this pathway ensures we can grow our own engineers locally to meet that demand. It's an investment in the future workforce of our community," Voldness said.

The transfer pathway allows students to attend WSCO for two years before transferring to Ohio University to complete their bachelor's degree. This streamlined approach provides high school students with an exceptional opportunity to begin their engineering education at WSCO and seamlessly transition to Ohio University to complete their degree.

"For high school and College Credit Plus (CCP) students, this transfer pathway presents a unique chance to explore engineering, reduce the overall cost of their degree and fast-track their entry into the engineering profession," Voldness added. ■





BIG NEWS!

Join the Russ College Alumni Society

The Russ College is launching a new Russ College Alumni Society (RCAS) to provide a comprehensive platform for alumni engagement, including activities with faculty, staff, students, and other alumni. The RCAS will greatly enhance alumni networking, mentoring, and support to the college.

RCAS membership is free to all Russ College degree holders.

The RCAS provides many opportunities for Russ BOBCATS:

- Be up to date on college activities and research
- On-going connection with current engineering students
- Benefits of philanthropy and industry engagement
- Contribute time and talent to college and alumni activities
- Alumni connections: professional, social, personal
- Take a stroll down memory lane
- Support and connect with your alma mater!

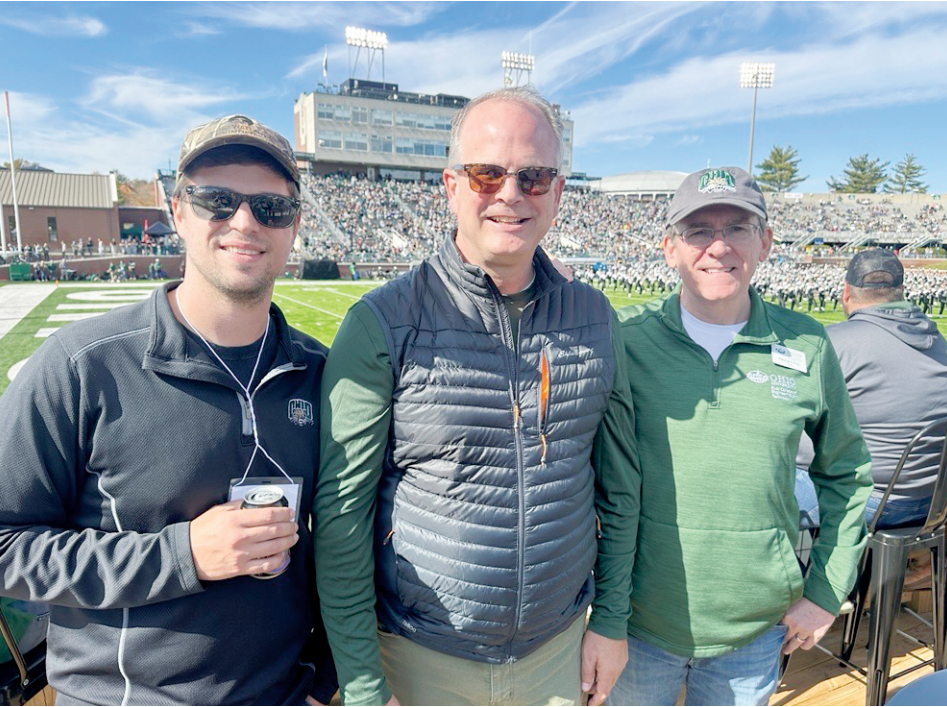
REGISTER NOW!

- Scan the QR code
- Go to [ohio.edu/engineering/alumni](https://ohio.edu/engineering/alumni)
- Email Amanda Marrs at [marrsa@ohio.edu](mailto:marrsa@ohio.edu)



Russ alumni event at Rock & Roll Hall of Fame

Alumni from the northeast Ohio area enjoyed a fun get together with Dean Fox and the Russ College Board of Visitors at the Rock & Roll Hall of Fame in Cleveland on October 13, 2024. Over 80 guests in attendance enjoyed tours of the Rock Hall and a reception with the college.



OHIO vs. Buffalo football game

Members of the CEE and ORITE advisory boards joined Dean Fox and friends for a sunny afternoon of football and game-day eats on Oct. 26, 2024, and watched the Bobcats win over Buffalo 47-16 at home!

Bell honored with SME 30 Under 30 Award



Allie Bell (BSETM '20, MS '23), a senior manufacturing engineer at Lockheed Martin (a position typically held by professionals with 20+ years' experience), was honored with the 30 Under 30 Award by the Society of Manufacturing Engineers (SME) at the age of 25. While at Ohio University, she was an SME President, a Learning Community Leader (Engineering Honors) and a member of National Society of Leadership and Success. Allie currently serves on the Russ College Board of Visitors.



Cleveland Guardians game

College alumni cheered for the Cleveland Guardians from a luxury suite on August 4, 2024, as they took on the Baltimore Orioles, making for a memorable day at the ballpark. The college also hosted similar events during summer 2024 to watch the Reds in Cincinnati and the Clippers in Columbus.







Photos by Milton Lindsay

Ida and Doug Sellars (left), along with Louie Manyak (right), enjoyed the Joan E. Mace Memorial Reunion dinner on April 20, 2024, at the Ohio University Airport.

## Aviation alumni celebrate their history

Russ College aviation alumni gathered in celebration for the Joan E. Mace Memorial Reunion, held just weeks after completion of the record-breaking Century Mission—a round-the-globe flight where a small aircraft covered 26,000 miles across 11 stops with two of the five crew members aboard being OHIO aviation graduates. The reunion welcomed 114 alumni and guests, honoring both the legacy of aviation excellence and the spirit of exploration. In addition to commemorating the Century Mission achievement, the event raised funds for the Joan Mace Russ Vision Aviation Scholarship. Highlights of the reunion included a Q&A panel discussion and a closing dinner in the Avionics Hangar featuring alumnus Connie Tobias as the keynote speaker.



**Joan E. Mace** began her career in aviation in 1942, building Helldiver aircraft for the Navy during World War II. Pursuing her passion for flying, she became one of the first instructors for Ohio University's flight training program in 1963. Twenty years later, she was named Chair of the Department of Aviation, becoming the first woman to hold the position. As chair, she established the Aviation Advisory Board, brought to campus the national honorary aviation fraternity, and oversaw the construction of the Francis Fuller Student Aviation Flight Training Center. Holding the highest FAA license given, the Multiengine Air Transport Pilot Certificate, Mace received the FAA Wright Brothers Master Pilot Award and the Ninety-Nines Award of Achievement for Contribution to Aviation and is a member of the National Association of Flight Instructors Hall of Fame.



## Society of Automotive Engineers Baja

The SAE Baja Competition Team designs, builds and competes with a single-seat, off-road vehicle. This is an exceptional experiential learning opportunity for team members to develop their skills and create meaningful connections. The participating students also have greater opportunities for summer

internships and job placement after graduation.

All students who are interested in motorsports are welcome. During the competitions, vehicles are judged on engineering process, design and overall performance, including a four-hour endurance race.



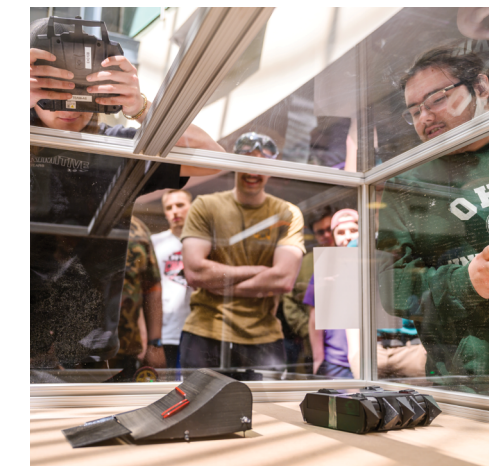
## Russ College Engineering Ambassadors

The Karol A. and Jo Ondick Engineering Ambassadors, led by Dr. Zaki Kuruppallil, Professor and Chair of the Department of Engineering Technology and Management, play a vital role in student engagement and recruiting efforts. They actively participate in key events such as OHIO Discovery Day and lead campus tours for prospective students and their families, answering detailed questions about the engineering and technology majors, the Russ College, and student life at Ohio University. Beyond recruitment, the ambassadors serve as judges for professional competitions such as the Design

of Future Cities and Math-Counts, and they gather feedback from current students to present to the Dean of the College. During the past academic year, they were instrumental in managing tours at the new Russ Research Opportunity Center. Each year, the ambassadors select the recipient of the Outstanding Russ Teaching Award through a structured interview process and host the annual faculty/staff awards banquet. They also engage in professional development activities, including etiquette dinners and leadership training events such as the Low Ropes course.

## American Society of Civil Engineers Steel Bridge

The Ohio University Steel Bridge Team allows students to compete in the ASCE Eastern Great Lakes symposium. Students learn how to design, fabricate, and build a 20-foot-long steel bridge to minimize weight and deflection. They design in AutoCAD during the first semester while holding weekly build practice sessions using last year's bridge to gain hands-on experience. The bridge is then fabricated during the second semester and the team practices putting it together, leading up to the competition.



## Russ College BattleCats

This team designs and manufactures fighting robots for competitions, and invites all university students who are passionate about robotics to join. BattleCats strives to create a dynamic environment that encourages creativity and innovation, where students of all backgrounds and skill levels can collaborate and contribute to the thrilling process of building and competing with a Battlebot.

## Association for Computing Machinery

The student chapter of the Association for Computing Machinery, an international professional society dedicated to advancement and excellence in computing, serves as Ohio University's general computer science club and consists of students who are studying or interested in computer science. Students participate in events such as hackathons, capture-the-flag, and conferences across the region. The chapter also supports a competitive programming team that competes at the International Collegiate Programming Competition each year.



Russ College of  
Engineering and Technology

Office of the Dean  
1 Ohio University  
Athens, OH 45701-2979

**Create for Good.**

**OHIO**  
UNIVERSITY

Russ College of Engineering and Technology

