

# *Mechanical & Aerospace Engineering*





In the Department of Mechanical and Aerospace Engineering at Mizzou, our researchers are constantly pushing the limits of innovation and uncovering new possibilities. This year, we made strides in cooling data centers, optimizing materials development and improving healthcare. We also became one of the few U.S. institutions to acquire a Quantum X Shape high-resolution 3D printer from Nanoscribe. This cutting-edge technology will significantly advance our research in areas like life sciences, microelectronics, advanced optics and more.

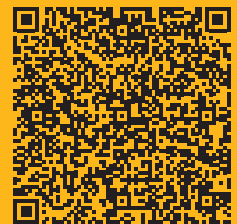
Our students are thriving as well. Two capstone teams partnered with Mizzou Athletics to design safer and more comfortable football equipment, showcasing the real-world impact of their work.

Our faculty continually are recognized for their excellence in research and teaching, earning prestigious awards and major research grants. Their achievements set an example for our students, demonstrating the value of dedication and innovation in engineering.

Thank you for your continued support of MAE at Mizzou!

**Bill Ma**  
**Chair, Professor**  
**Mechanical & Aerospace Engineering**

**Scan to learn more!**



**SCAN HERE  
TO TAKE  
A TOUR!**

Step inside Mizzou Engineering with our 360° virtual tour of our classrooms, labs and student spaces. Learn about our degrees, extracurricular opportunities and support resources from the comfort of your home.

# Show Me **THE NUMBERS**

**↑78%**

increase in  
undergraduate  
enrollment  
since 2019

**↑118%**

increase in  
research  
expenditures  
since 2019

*The University of Missouri Research Reactor is the highest-power university research reactor in the U.S., operating at 10 megawatts.*

## Research Areas-----●

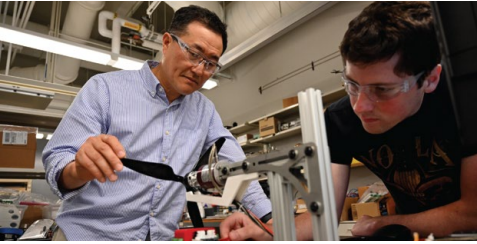
- **Aerospace Vehicle Flight Mechanics and Control**
- **Advanced Design and Manufacturing**
- **Dynamics and Vibrations**
- Fluid Power Systems
- Mechanics and Material Sciences
- **Micro/Nano Engineering**
- Thermal Sciences, Fluid Flow and Energy

## Research Centers-----●

- MU Materials Science and Engineering Institute (MSEI)
- Midwest Industrial Assessment Center (IAC)
- Multiphysics Energy Research Center (MERC)

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# Research HIGHLIGHTS



**Chanwoo Park** is devising a system to cool data centers down more efficiently and effectively by developing a hybrid-two-phase loop. He is leading a \$1.6 million project funded by the U.S. Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E) in collaboration with the National Renewable Energy Lab as part of a larger endeavor called COOLERCHIPS.



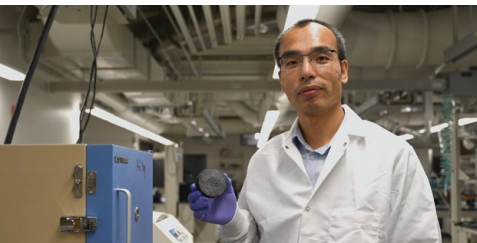
A **Nanoscribe Quantum X Shape 3D printer** - the fastest and most accurate 3D printer for high-end microfabrication tasks on the market - was purchased by Mizzou Engineering with a grant from the U.S. Army Engineer Research and Development Center. Mizzou is one of only a few U.S. organizations to have the printer and one of fewer than 100 around the world.



**Noah Manring** and collaborators have developed a way to measure cardiovascular stiffness - or the rigidity of arteries in your heart - based on data already being collected from traditional echocardiograms.



**Bujingda Zheng**, a PhD student, has developed a way to create complex devices with multiple materials, including plastics, metals and semiconductors, with a single machine called the Freeform Multi-material Assembly Process.



**Yingchao Yang** and other Mizzou researchers are creating a new biochar-based foam to reduce the use of harmful chemicals in controlling fires in research supported by U.S. Department of Agriculture Forest Products Laboratory.



**Ming Xin** is using Missouri's first autonomous tractor - Monarch ML-V - to better understand self-driving mechanisms and how those systems work with other technologies. Xin is co-PI on the grant with other researchers from the College of Engineering and the College of Agriculture, Food and Natural Resources.

# Student **SUCCESS**



Mechanical engineering students collaborated with the Mizzou football team to enhance player comfort through innovative equipment designs as part of their senior capstone projects. One group focused on developing a new cleat with high thermal resistance and an active cooling loop to keep feet cooler in summer by dispersing heat. Another group worked on improving helmets using heat transfer technology to reduce padding stiffness in cooler months.

## Engineering **ORGANIZATIONS**

The Mizzou Engineering Department of Mechanical and Aerospace Engineering sponsors several student competition teams, including the Mizzou AeroTigers, Mizzou Baja Racing, Mizzou Racing, Mizzou Space Program and the Torq'N Tigers. These teams regularly perform at a high level, achieving impressive results in national competitions and showcasing Mizzou's engineering talent on regional and international stages.



***Mizzou AeroTigers***



***Mizzou Baja Racing***



***Mizzou Space Program***



***Mizzou Torq'N Tigers***



***Mizzou Racing***

# MAE ACCOLADES



**Mushuang Liu** was awarded a 2024 Young Faculty Award from the Defense Advanced Research Projects Agency (DARPA), becoming the first Mizzou faculty member to receive the recognition.



**Alexandra Gillund** received the Hesburgh Scholarship for her accomplishments in Mizzou's general education program. It is given to one Mizzou undergraduate student from each academic class.



**Corey Valleroy** was named one of 12 recipients of the 2024 Award for Academic Distinction at the University of Missouri. The award is one of the highest honors MU offers based on academic distinction alone.



**Meftah Uddin** won first place among graduate students at the Show Me Research Week for his poster, "Occupancy-based HVAC operation and energy forecasting using neural network."



Alumnus **Walter Storr** (BS ME '66) established an endowment for Mizzou Racing, the College's first for a student organization. The funding will ensure students continue to have opportunities to design, build and race quarter-scale and electric formula cars.



Alumnus **Dale Klein** (BS ME '70, MS ME '71, PhD ME '77) received the 2024 Jefferson Club Golden Quill Alumni Excellence Award for demonstrating outstanding achievement in his chosen field and reflecting the university's core values of respect, responsibility, discovery and excellence.

## Alumni SPOTLIGHT



**The MAE Industrial Advisory Council**, made up of some of the department's most distinguished alumni, continues to support our students. Recently, it provided funding to five MAE student organizations and sponsored two \$5,000 scholarships for students toward graduate school.