SHEVAUN WILLIAMS

OU is exploring the endless possibilities and ethics of AI while pioneering more than 220 research projects.

DISPATCHES FROM THE EDGE OF THE ARTIFICIAL INTELLIGENCE FRONTIER

BY SARA MORRELL COWAN

Hunter Heyck, Peter Froslie and Kimberly Marshall are reshaping conversations around the use of AI in the humanities.

Kimberly Marshall, director of OU's Arts and Humanities Forum

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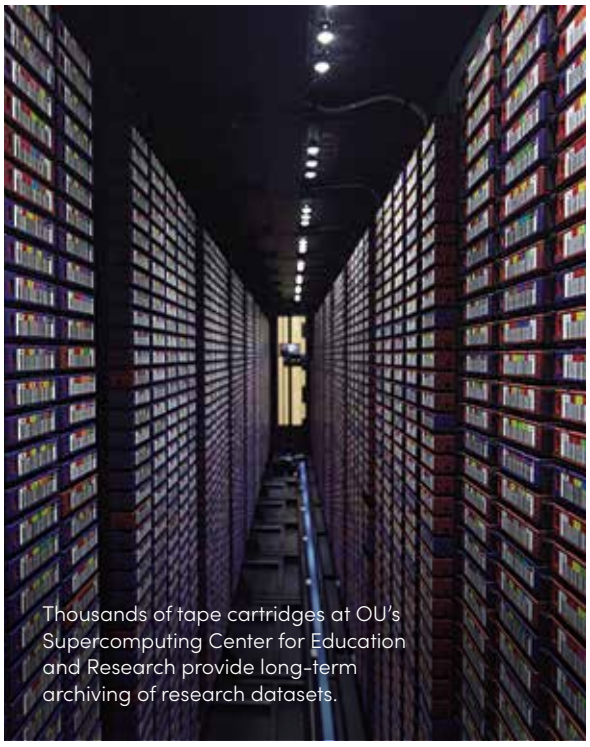

Thousands of tape cartridges at OU's Supercomputing Center for Education and Research provide long-term archiving of research datasets.

TRAVIS CAPERTON

ARTIFICIAL INTELLIGENCE supports daily innovations in fields from neuroscience to urban planning at the University of Oklahoma. Even so, Kimberly Marshall knows what to expect when she invites colleagues to roundtable discussions on the topic.

"Almost everyone we talk to is skeptical about AI," says Marshall, director of the OU Arts and Humanities Forum. She has learned to rephrase her invitation. Now she asks, "Are you interested in a conversation about authenticity? Are you interested in a conversation about creativity and human potential?"

Regardless of the human emotions surrounding it, AI is reshaping the landscape of research and innovation. And OU is establishing itself as a leader in this rapidly evolving field.

At the heart of OU's data-driven innovations is the Data Institute for Societal Challenges (DISC), a hub of interdisciplinary collaboration launched in 2020 as part of the university's strategic plan. Leveraging the power of AI, machine learning and big data, DISC brings together experts from an ever-increasing range of fields, locally and globally.

With projects in areas ranging from hydrology to presidential political ads to opioid research, DISC is constantly expanding its scope, supporting hundreds of projects funded by over $80 million in federal grants.

Exploring AI's Role in Creativity and Authenticity

ONE OF THE MOST GROUNDBREAKING initiatives underway at OU is the Center for Creativity and Authenticity in AI Cultural Production, the first of its kind in the nation. Supported by a nearly $500,000 grant from the National Endowment for the Humanities, the center explores the ethical and societal implications of AI's intersections with creativity and culture.

"We're here to galvanize relationships across campus," says Marshall, who also serves as co-principal investigator of the new center. "This is about bringing people together around interdisciplinary conversations." The center unites 20 faculty members from six colleges, fostering collaborations that didn't exist before.

One of the center's key focuses examines the implications of AI on creativity and Native American arts and cultures. OU is home to the nation's only Ph.D. program in Native American art history, making it a natural leader in Native-led discussions on AI.

PAIGE OWENS

At OU's Sooner Advanced Manufacturing Lab, AI empowers 3D printing to modernize aging military aircraft components.

"ALMOST EVERYONE WE TALK TO IS SKEPTICAL ABOUT AI."

—KIMBERLY MARSHALL

Alicia Harris, an OU Native American art history assistant professor and member of the Fort Peck Assiniboine and Sioux Tribes, leads the Native American Arts Theory team for the center. Harris' team explores the concept of ethical collaboration with AI from the perspective of contemporary Native artists and coordinates community-driven conversations.

"What we're encountering is not new," Marshall says. "Native artists have always had to navigate new contexts and technologies while maintaining durable cultural values. AI is just the latest in a long line of challenges and opportunities. We want to facilitate national, Native-led conversation about AI's implications for creativity and for Native artists specifically."

The center will host public conferences over the next three years on themes such as trust in AI, fakery and plagiarism, and the risks and benefits of creative collaborations with AI.

"Part of the goal is to distinguish hype from reality," says Hunter Heyck, who serves as inaugural director of the center and co-principal investigator alongside Marshall and Pete Frosile, associate dean of research and technology for OU's Weitzenhoffer College of Fine Arts.

"We're trying to build a foundation for long-term conversations about AI, not just for artists, but for society as a whole," notes Heyck, a professor in OU's Department of History of Science, Technology and Medicine.

TRAVIS CAPERTON

OU Professor Amy McGovern discusses her pioneering work in trustworthy AI and meteorology with OU President Joseph Harroz, Jr., on his podcast, *Conversations With the President.*

OU's Trustworthy AI Expert

In Oklahoma, the concept of a rock star weather scientist isn't absurd. Residents understand the profound impact these experts can have on community safety, and we don't take them for granted.

OU's Lloyd G. and Joyce Austin Presidential Professor Amy McGovern has been featured in the *New York Times*, *Smithsonian Magazine* and multiple TV and online outlets—often sharing her unparalleled expertise in the intersection of trustworthy AI and meteorology, and the potential for ever more accurate predictions of severe weather events.

Among her many titles—including director and principal investigator for the NSF AI Institute for Research on Trustworthy AI in Weather, Climate and Coastal Oceanography—McGovern is also a STEM advocate. She develops K-12 outreach projects to encourage students from all backgrounds to pursue careers in science, technology, engineering and math, with an emphasis on diversifying representation in the field of computer science.

Her work has earned recognition and support from institutions such as the National Science Foundation, NASA and the National Oceanic and Atmospheric Administration. At OU, she works with students to harness machine learning to improve forecasting and gain environmental insights, furthering the field's capacity to protect life and property with advanced prediction.

"Oklahoma is leading the way in using trustworthy AI in weather science," she says. "It's an important tool."

To watch an NBC interview with Amy McGovern on using AI for weather prediction, scan this QR code.

"PART OF THE GOAL IS TO DISTINGUISH HYPE FROM REALITY."

—HUNTER HEYCK

Transforming Maternal Health Outcomes with AI

WHILE AI IS RESHAPING CONVERSATIONS in the arts and humanities, it also helps scientists reimagine the future of healthcare. In OU's Gallogly College of Engineering, Talayeh Razzaghi is leading a pioneering, interdisciplinary project in maternal health that represents one of many ways OU is advancing human health and safety through AI.

Preeclampsia, a serious complication of pregnancy marked by high blood pressure, contributes to 7 to 8% of U.S. maternal deaths each year. With no medical treatments available other than risky premature delivery, early detection is critical for saving lives.

Razzaghi, an assistant professor in the OU School of Industrial and Systems Engineering, is using AI to develop models that analyze medical records and socioeconomic factors to predict which patients are most at risk for preeclampsia.

"Our goal is to help doctors identify high-risk patients early, before they show symptoms, and without invasive tests," she explains. By analyzing anonymous data sets from healthcare providers at OU Medicine, Razzaghi and her team are developing AI models that will detect patterns of risk factors—such as a mother's social determinants, age or access to healthcare—long before diagnostic methods can.

This research is especially important for underserved populations, including Black and Indigenous women, who are disproportionately affected by preeclampsia and underrepresented in most available data sets. The five-year study, funded by the National Science Foundation, has the potential to improve clinical practices nationwide.

"Even a 5% improvement in identifying at-risk patients could save lives," Razzaghi says.

Enhancing National Security by Protecting Supply Chains

OU'S RESEARCH AND DEVELOPMENT in AI also are playing a critical role in national security. In a collaboration with Tinker Air Force Base that launched in 2022, OU researchers are developing an AI tool to protect military supply chains, a vital aspect of national defense. From spare aircraft parts to uni-

PAIGE OWENS

Enhanced by AI, a component is 3D scanned for reverse engineering at OU's Sooner Advanced Manufacturing Laboratory.

Michael Crespin, left, and J.A. Pryse of OU's Carl Albert Congressional Research and Studies Center are using AI to transcribe and summarize nearly 10,000 presidential political commercials from the center's collections.

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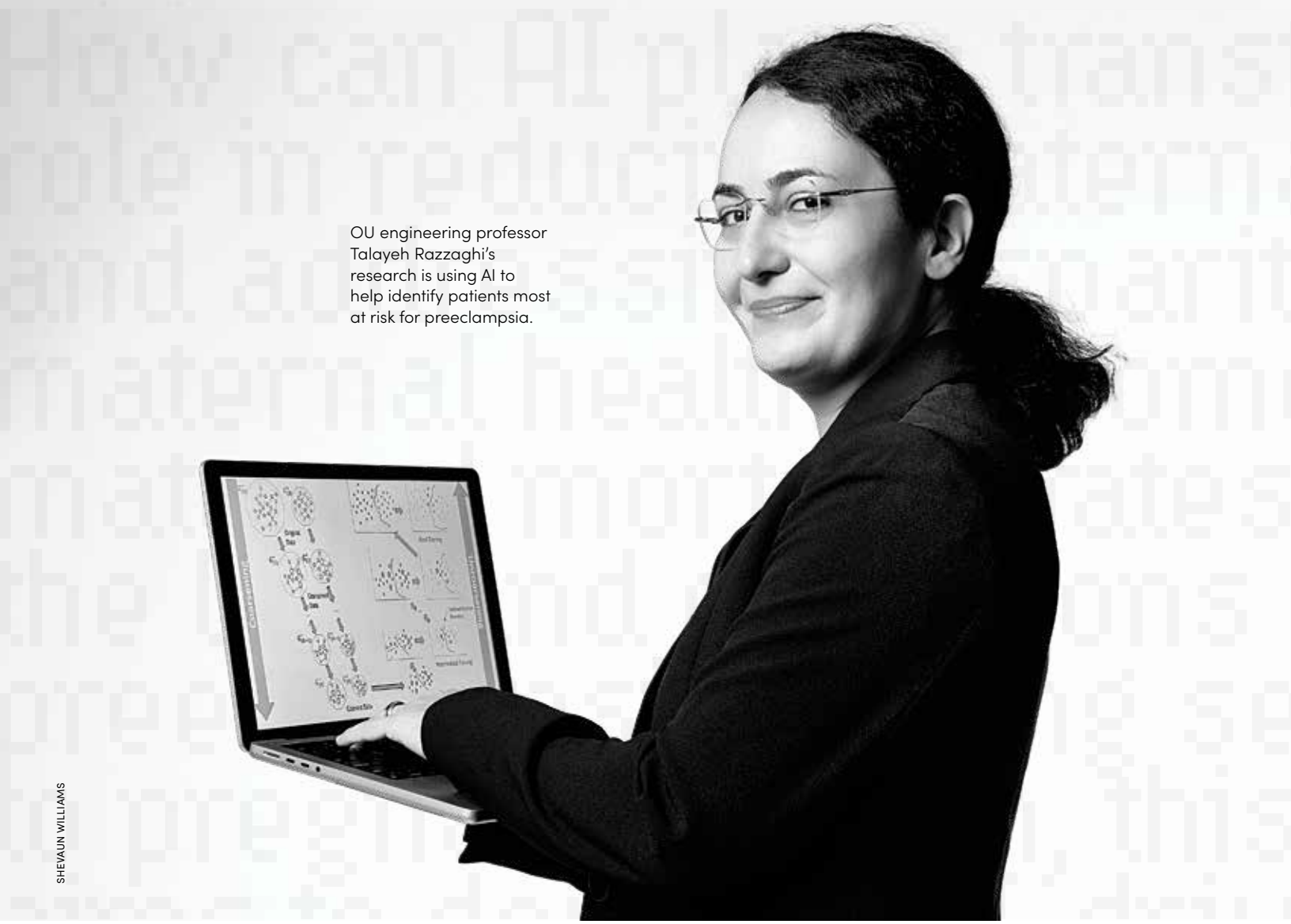

OU engineering professor Talayeh Razzaghi's research is using AI to help identify patients most at risk for preeclampsia.

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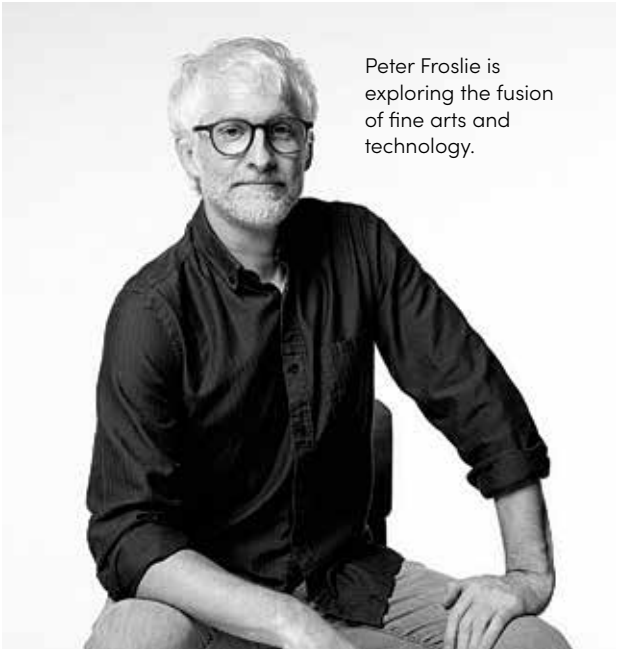


Peter Froslie is exploring the fusion of fine arts and technology.

SHEVAUN WILLIAMS

forms, food and medicine, ensuring the military has what it needs is crucial for mission success.

OU's AI-driven tool analyzes publicly available data sources—news reports, financial disclosures and even weather patterns—to predict potential disruptions in the supply chain.

"If a key supplier is located in a hurricane-prone area, AI can recommend alternative suppliers before a disaster strikes," says David Ebert, associate vice president for research and partnerships and the supply chain project's lead researcher. This predictive approach helps the military plan long-term and mitigate risks, ensuring operations continue uninterrupted. He says the AI tool is now being used by the 448th Supply Management Wing and will have impacts across the U.S. Air Force.

"Such tools have the potential to benefit not just the military, but also other sectors like FEMA or large corporations that depend on reliable supply chains," adds Ebert, who is also the director of DISC.

In turn, such endeavors bolster the economy of Oklahoma by training a workforce equipped with cutting-edge skills and providing OU students with valuable, hands-on experience using AI to solve real-world problems.

The Human Side of AI: Ethical Leadership at OU

EBERT SAYS OU IS USING AI TO AD-dress complex societal challenges across disciplines while ensuring ethical and transparent applications. All reflect the university's leadership in the responsible development of AI as a force for good—built on collaboration, ethical standards and a deep understanding of societal impacts.

OU President Joseph Harroz, Jr., notes that such cross-disciplinary initiatives are a central piece of the university's larger AI strategy. As he wrote in *The Oklahoman* this spring, "By embracing these advanced tools, Oklahoma also becomes a destination for students and experts interested in studying computer science disciplines and developing innovative future tools and processes."

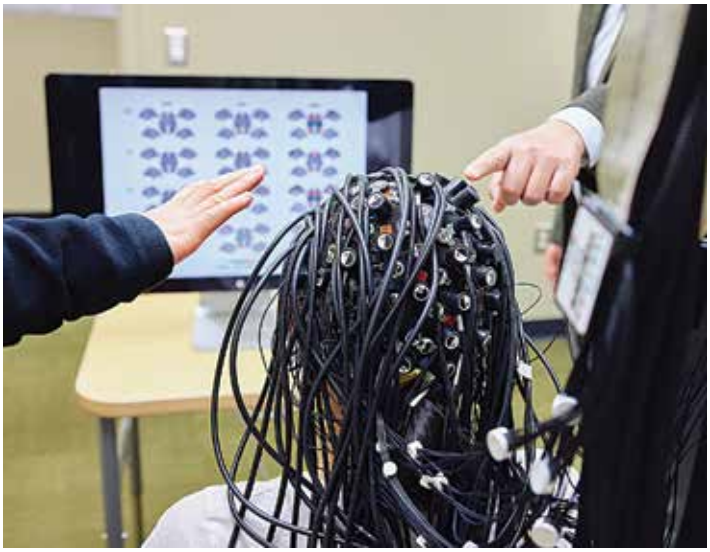
OU innovators are ready to lead the way.

"We are a generation of college professors who have been adapting to new technologies our whole adult lives," says Marshall, a self-described junior member of Generation X. "We became adults at the dawn of the digital age and were early adopters of e-mail, Facebook, Google and Wikipedia.

"During the pandemic, we had to figure out how to teach online, absolutely upending our professional practice. We are an innovative faculty, viewing our disciplines as adaptable and finding the core things that make them valuable. Technologies are always shifting, but we see the hope and possibility.

"OU has a lot of proactive energy," Marshall says, "and we are guiding AI to a better end, to keep human values in the driver's seat."

Sara Morrell Cowan is assistant editor of Sooner Magazine.



SOPHIA ARMOUDIAN

TRAVIS CAPERTON

Top: OU Stephenson School of Biomedical Engineering researchers Han Yuan , left, and Lei Ding, right, employ AI tools to develop state-of-the-art neuroimaging and brain stimulation technology.

Bottom: Yuan taps AI to supercharge research on the human brain.

"EVEN A 5% IMPROVEMENT COULD SAVE LIVES."

—TALAYEH RAZZAGHI