Weisong Shi founded the University of Delaware's CAR Lab, which is renowned for its work on autonomous vehicle tech.

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Tech, Quantum & Artificial Intelligence

The tech future is here: technology solutions pervade every sector of the economy, quantum is becoming a global watchword for innovation, and projections for artificial intelligence are soaring. (The UN's Trade and Development agency, for example, expects the global AI market to hit $4.8 trillion by 2033.)

In Delaware, innovators are ready to be a part of that future, starting with state government, which has launched forward-thinking programs such as the "AI Sandbox" that provides a controlled environment for companies to test new AI tools. *(For more, see page 20.)*

The second major engine is the **University of Delaware (UD)**, Delaware's biggest research university. (UD is designated as a doctoral university with the very highest research activity — an honor shared by less than 3% of U.S. colleges.) It would take a far larger publication than this one to fully convey the breadth of UD's tech-focused research and programming, but the following section highlight two compelling examples: the **Connected and Autonomous Research (CAR) Lab**, which is renowned in the field of autonomous vehicles — from the standard (cars) to the unexpected (wheelchairs) — and the university's new program in Quantum Science and Engineering.

In addition to UD, tech education in Delaware is accomplished by a broad spectrum of organizations like **Zip Code Wilmington**, **Code Differently** and **Tech Impact**, which aim to make coding and other tech skills affordable and accessible to every Delawarean. Then there are youth-focused programs like **AIWhoo School** and **Kai Coders**, which teach kids as young as 4 to become comfortable with coding and artificial intelligence.

Organizations like the **Tech Council of Delaware** provide further support to fuel Delaware's tech innovation, by connecting employers, training providers and job seekers to fill persistent talent and skills gaps.

Rounding out the tech scene in Delaware are exciting innovators like **FEERE**, which is revolutionizing e-commerce for the African market; **WhipFlip**, which uses AI to revolutionize the process of selling a car; and **Archie**, which does the same for real estate.

That's not even mentioning Delaware's bourgeoning fintech scene, which we consider in more depth on page 58.

IN THE PAGES THAT FOLLOW, TAKE A CLOSER LOOK AT HOW DELAWARE IS WORKING TO BE AT THE VANGUARD OF OUR TECH FUTURE.

CASE STUDY

UD CAR Lab

Advancing Autonomy, from Smart Cars to Smart Care

BY CLOEY CALLAHAN

At the **University of Delaware (UD)**, connected and autonomous technology is no longer confined to the road.

Inside a lab that spans ground vehicles, aerial systems and assistive robotics, researchers are rethinking how autonomy can move people, goods and data across real-world environments.

Leading that work is the **Connected and Autonomous Research (CAR) Lab**, founded in 2017 and established in 2022 at UD's STAR Campus. It provides a live, mixed-use environment with privately controlled roadways for research and a dense ecosystem of industry partners. Unlike urban centers, where testing requires layers of municipal approval, UD's infrastructure allows rapid prototyping and deployment in realistic conditions.

"One of the really cool things here for innovation is the STAR Campus," says Professor **Weisong Shi**, founder of the CAR Lab. "I'm trying to push to deploy an autonomous shuttle operating on the STAR Campus, serving the first real transportation needs, and to use it as a test bed."

The flexibility of the campus has enabled the lab to expand far beyond traditional autonomous vehicles. While self-driving cars remain a foundational focus, the research now spans indoor robotics, off-road autonomy and drone systems.

The throughline is connectivity. By integrating edge computing, vehicle-to-infrastructure communication and multi-agent coordination, the team is building systems that can operate seamlessly across environments, from hospital corridors to agricultural fields.

One of the most promising applications is in healthcare. In collaboration with **ChristianaCare**, the lab is developing autonomous delivery systems and intelligent wheelchairs designed to reduce strain on clinical staff and improve patient mobility.

"We know that every human being, one day or another, for a certain amount of time, you are sitting in a wheelchair," says Shi.

The autonomous wheelchair in particular represents a shift in how users interact with assistive technology. Instead of relying on manual control or staff assistance, patients can use natural language commands such as "go to the second floor" or "take me to the lobby." The system translates voice input into navigational tasks, combining language processing with computer vision to move safely through complex indoor environments. In a healthcare system facing persistent labor shortages, this kind of automation is critical.

Beyond hospitals, the lab is applying similar principles to agriculture. Precision farming, supported by autonomous ground vehicles and drones, allows for targeted interventions such as spraying only where weeds are detected rather than across entire fields. The result is reduced chemical use, lower costs and improved environmental outcomes. Even simple augmentations, like autonomous carts that follow workers during harvesting, can significantly increase efficiency.

"Autonomous technology for agriculture is getting bigger," says Shi.

This work is deeply interdisciplinary and highly collaborative. Graduate and undergraduate students from computer science, mechanical engineering and electrical engineering contribute alongside industry partners including **Toyota**, **Meta** and **Western Digital**. The lab also engages local governments and community stakeholders to ensure applications are grounded in real needs.

Equally important is the pipeline being built for future talent. Through its **Autonomous Driving Academy**, the lab brings high school students from across the country to campus each summer, introducing them to both the hardware and software behind autonomous systems.

From smart wheelchairs to intelligent intersections, the work underway at UD reflects a broader vision. Autonomy is not just about vehicles, but it is about building connected systems that enhance safety, efficiency and accessibility across every domain where movement matters.

The CAR Lab is developing intelligent wheelchairs to reduce strain on clinical staff and improve patient mobility.

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