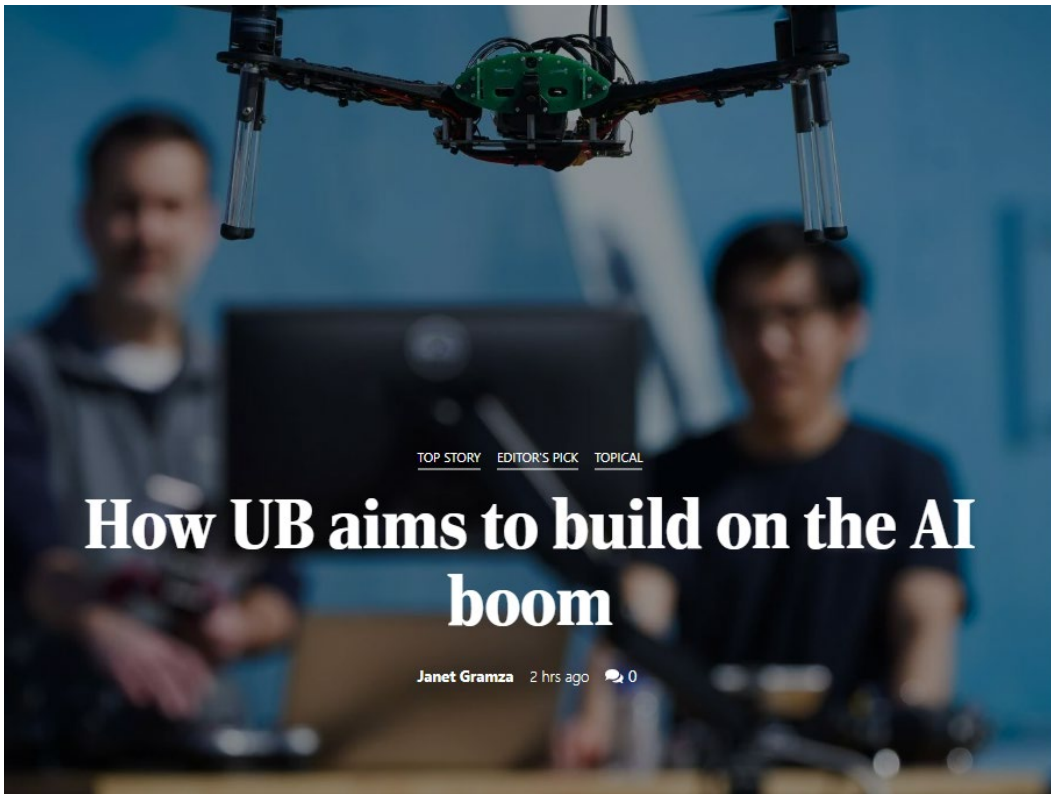


Janet Gramza March 12, 2024



On a summery day in March, the huge mesh drone cage at the University at Buffalo's North Campus is humming as engineering professor Chase Murray and doctoral student Downon Lee practice landing remote- and voice-controlled drones on a small autonomous land rover.

It looks like fun, but it's also part of serious research on how artificial intelligence can equip fleets of drones to launch from the roof of a delivery vehicle and fly packages to customers who live farther from a distribution center than drones can fly.



The University at Buffalo S.O.A.R. facility allows students and faculty to test out new drone technologies.

“The reasoning is to extend the reach of drones that have a short battery life and can’t fly more than 10 miles at a time,” Chase explains. “So, the truck becomes like a mobile distribution center. And in my lab, we have pioneered the algorithms for that.”

UB has been conducting AI research for decades, and it’s paying off as big leaps in AI technology like ChatGPT fuel a global rush to catch up and lead the field.



Professor Chase Murray, left, and graduate student Downon Lee pilot a drone inside the Structure for Outdoor Autonomy Research drone testing facility at the University at Buffalo on Monday, March 4, 2024.
Joshua Bessex/Buffalo News

With multimillion-dollar tech giants jostling for ownership of AI, state and national leaders want to position the public sector and academia as key players to ensure that equity, safety and “the public good” are as important as profits in the industry. And they are tapping UB to play a role in that goal.

Here’s how UB – and its big plans – fit in.

Empire AI

Last month, Gov. Kathy Hochul chose UB as the hub for a new **state consortium**, Empire AI, whose seven institutions will work to “secure New York’s place at the forefront of the artificial intelligence transformation,” she said.

Empire AI comes with an initial \$400 million investment that will fund a new AI supercomputing facility at UB, giving it the same hardware, storage and data-crunching abilities that tech giants like Meta, Google and Microsoft have to spearhead AI research, innovation and job creation.

“Over the years, AI has become very tied to computing power, so the big advantage has been with the tech companies, while the universities – even large ones like UB – can’t match those kinds of resources,” said Venu Govindaraju, UB vice president for research and economic development. “But Empire AI changes the equation for developing AI research.”

UB has already joined a new federal AI safety group, the U.S. AI Safety Institute Consortium, and an international group, the AI Alliance, to unite industry, government and research organizations to promote open, safe and responsible AI.

U.S. Senate Majority Leader Charles E. Schumer is also lobbying the Biden administration to include UB and Empire AI in a pilot project for a new National AI Research Resource group to oversee AI innovation and policy.



Hochul announces new AI consortium; UB hopes to be its hub

Gov. Kathy Hochul announced the creation of a new AI consortium Monday that aims to secure New York’s place at the forefront of the artificial intelligence industry – and the University at Buffalo stands a chance to be the site of the new partnership dubbed Empire AI.

Why UB?

UB gained an international reputation in AI and data science in the 1990s, before the term “AI” was in common use. Govindaraju’s team of computer scientists “taught” computers to decipher handwriting more quickly and accurately than human beings can.

UB’s autonomous handwriting recognition system was hailed as one of the first successes in machine learning when it was adopted by the U.S. Postal Service in 1997, saving the post office \$90 million the first year and billions since.

At the time, Govindaraju said people were “reluctant to label such technology as AI” partly from fear of autonomous computers and partly due to AI failures like the accidents that have plagued driverless cars.

“We called our technology ‘pattern recognition or image processing,’ because people were shying away from the term ‘AI,’ ” Govindaraju said. “But around 2010, people began looking back and saying, ‘This was and is AI.’ ”



Venu Govindaraju, University at Buffalo vice president of the Office of Research and Economic Development.
Joshua Bessex/Buffalo News

It's got the computer power

UB also launched a supercomputing center in 1999 with a \$1.3 million gift from IBM and upgraded it with Dell “cluster” computers in 2020 to exponentially increase its power and speed.

UB’s supercomputing facility ranks among the best at any university and has AI capabilities, but the new super-system for Empire AI will be “a couple of magnitudes larger – maybe 20 or 40 times more powerful – than what we have now,” Govindaraju said.

“Right now, only the profit-making giants have the latest and greatest computing infrastructure, because no other state has made this kind of investment,” he said.

Research funding is rising

Hochul has been investing heavily in UB since taking office as governor. She named it a SUNY flagship in early 2022 and pledged \$68 million for a new engineering building on UB’s North Campus. Last year she announced another \$100 million for new and updated research buildings, labs and equipment at UB.

The governor has also set up UB to reach \$1 billion in research funding by 2030, and UB is advancing toward that with some impressive federal grants. It boasts the highest amount of National Science Foundation Cyberinfrastructure funding – \$18 million in active grants – of any New York university. (Cornell comes in second with \$10.6 million.)

In 2022, NSF chose UB and its supercomputing center to lead a \$10 million project to develop advanced supercomputing infrastructure with six other institutions including several larger universities, which UB hailed as a vote of confidence in its ability to become “one of the nation’s hubs for technological innovation,” Govindaraju said at the time.

Then last year, NSF awarded UB a major AI plum: \$20 million for a national AI Institute, the AI Institute for Exceptional Education, that’s devising AI applications to **assist children** with speech and language challenges. UB’s collaborators include researchers at eight other universities including Stanford, the University of Illinois, Penn State, Cornell and Georgia Tech.

Building on a tech hub

UB will need to catch up with heavy hitters like Stanford University and MIT to lead in the AI race – not just in computer power and grant funding. Stanford’s affiliation with Silicon Valley has given it a huge advantage, while MIT has made Boston a leading startup city.

But UB has high hopes that Western and Central New York’s designation as a federal tech hub will create a similar symbiosis here. The tech hub groups Buffalo, Rochester and Syracuse as one of 31 regions eligible for \$54 million in federal funding to advance industries of the future. Only five to 10 of the regions will get any funding.

The three upstate cities plan to be a “semiconductor superhighway” with chip maker Micron to build the nation’s largest semiconductor plant near Syracuse. Schumer fought for the designation and cited UB as a critical center for research and training in semiconductor technologies.

If the tech hub plan succeeds, UB, Syracuse University and Rochester Institute of Technology will benefit from a regional boom around the semiconductor chips that fuel AI.



Schumer seeks to include UB, New York in federal AI research pilot

Schumer has invited the heads of the Biden Administration’s National AI Research Resource pilot to visit New York and “strongly consider” Empire AI for their two-year project to create a national shared infrastructure for AI innovation.

A focus on startups

UB has more than 200 faculty members involved in AI research, and that number is growing. Last year UB embarked on a historic hiring push to add 200 more faculty researchers to increase its depth and diversity as a public research university. It has hired more than 150 so far, and many brought ongoing research grants with them from other schools.

With Empire AI and the tech hub, UB will attract more researchers, more funding and more students, especially international students from AI-focused countries like India and China, Govindaraju said.

Another asset to help that happen is UB's emphasis on entrepreneurship. In recent years, UB has worked to build a strong entrepreneurial ecosystem to feed and bolster regional startup resources like 43North and LaunchNY that are revitalizing the region's economy.

“The new faculty and students coming to universities these days are entrepreneurial in their mindset,” Govindaraju said. “They are not satisfied with writing theses and publishing papers. They want to found startups, contribute to society and generate wealth. As that happens, and as more companies use AI to become more efficient, UB and Empire AI will play a critical role in these innovations.”



Professor Chase Murray, left, and graduate student Downon Lee test a drone in the Structure for Outdoor Autonomy Research drone testing facility at the University at Buffalo North Campus on March 4.

Joshua Bessex/Buffalo News

Keeping AI safe

Empire AI is also meant to help formulate industry guidelines and safety standards to keep AI transparent, responsible and equitable. Govindaraju said the AI Alliance and the national AI Safety Institute will unite tech companies, government entities and research institutions in developing standards for responsible and open AI.

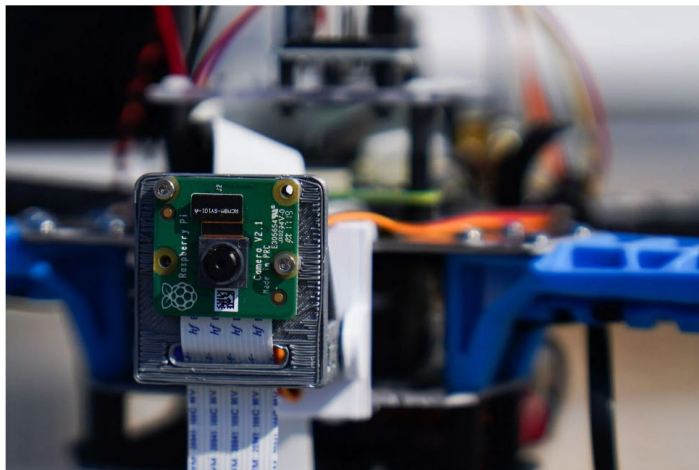
“I look at it like building codes that, if society follows them, buildings are safer,” Govindaraju said. “AI needs a similar code that everyone should follow to make sure they don’t cut corners and sacrifice safety for profits.”

In announcing Empire AI, Hochul introduced new state **“acceptable use”** policies for AI that include developing controls on how personal data can be gathered and used.

Govindaraju said UB and its fellow Empire AI founding institutions – Columbia, Cornell, New York University, Rensselaer Polytechnic Institute, SUNY, CUNY and the Simons Foundation – will collaborate to share data so that even the small companies can come to them for AI solutions to their problems.

“We will pool our resources so that no one is left out of pursuing big ideas,” he said.

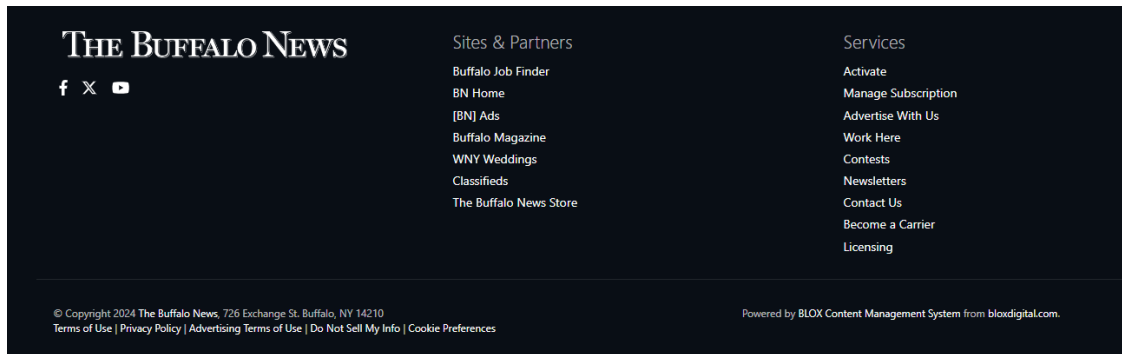
At UB’s drone cage – dubbed “SOAR” for Structure for Outdoor Autonomy Research – Chase Murray said he expects Empire AI to grow his research and facilities. SOAR, completed in 2020, is among the three largest outdoor drone testing centers in the nation, “but there’s room to expand” to be the biggest and best equipped, he said.



A detailed look at a camera on a drone inside the Structure for Outdoor Autonomy Research drone testing facility at the University at Buffalo.
Joshua Bessey/Buffalo News

He said he foresees more research funding focused on equipping autonomous drones to react to potential attacks, like using “sight” to navigate if their GPS signals are jammed.

“One of the first things I worked on here was using drones for military applications, and it was kind of the traditional surveillance stuff,” Murray said. “That was 15 years ago, and now the technology has emerged very rapidly in that area. Things that we thought were nowhere near the horizon are now upon us.”



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