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Robots go to work in Hazelwood

Inside CMU's new innovation center, machines jump, swim and fly

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The words “robots at work” now line the concrete floor of a three-story warehouse in Hazelwood, where machines on Friday built Lego sets, whizzed past metal beams and climbed over wooden chests as onlookers watched.

A crowd of hundreds gained an inside look at the robots soon to fill Carnegie Mellon University's new Robotics Innovation Center during the research hub's grand opening last week.

The multimillion-dollar facility, years in the making, will house many of CMU's robotics labs and several tech companies — including the California-based artificial intelligence company Field AI, the center's first corporate tenant.

“Hazelwood has always been a neighborhood of builders,” said Sonya Tilghman, executive director of the neighborhood

nonprofit Hazelwood Initiative, referencing the former steel mill that once sat at the site of the new center.

“With the Robotics Innovation Center, we are adding a new chapter to that story — one that connects our history of making to richer technologies and new opportunities,” she added.

The center is the latest development at Hazelwood Green, the growing tech community at the site of the defunct Jones & Laughlin steel mill.

The 178-acre former industrial plot is undergoing a transformation, now home to the new center, a University of Pittsburgh life sciences facility, and Mill 19 — an advanced manufacturing research hub.

A \$10 million youth sports complex is also in the works, along with a five-story affordable apartment building — the first of several housing projects planned for the new neighborhood.

The Post-Gazette toured the new center during its grand opening last week and spoke to researchers about the robots they'll develop inside the building.

From assembling Legos to building cars

Standing behind a wooden desk on Friday, a white-and-black humanoid bot on wheels lifted and pressed together Lego pieces.

The prototype is the work of CMU's Intelligent Control Lab, where researchers are building self-sufficient robots that “perform helpful tasks in the real world,” CMU doctoral student Ruixuan Liu said.

For robots, there's more to Legos than meets the eye: Assembling the children's building blocks requires an understanding of physics, Mr. Liu said. The machines have to decide when to press

pieces together and how much force to use.

Mastering that decision-making prepares robots to complete real-world tasks on their own, such as assembling cars, personal computers or gearboxes, according to Mr. Liu.

Inside of the Robotics Innovation Lab, Mr. Liu and his team will have much more space to test their creations, he said. The expansive warehouse allows researchers to simulate real environments, like an assembly line on a factory floor.

“We don't want the robot to only stay in the virtual reality,” he said, as the machine behind him pressed together two yellow Legos.

Robots for ‘dirty and dangerous’ places

Just a few feet from the Lego setup, a four-legged silver robot on wheels hoisted itself up and over two wooden chests.



Giuseppe LoPiccolo/Post-Gazette photos

Above: Gov. Josh Shapiro speaks prior to the ribbon cutting that officially opened the center.

Left: Local and state officials, members of Carnegie Mellon University leadership and community members hold slices of cut ribbon after ceremonially opening the university's Robotics Innovation Center in Hazelwood on Friday.

The machine is one of several created by CMU's Robomechanics Lab, where researchers create robots equipped for all of the "dirty and dangerous" places that humans can't go, doctoral student Wensen Liu said.

The Robomechanics Lab builds new robots and outfits existing machines with systems that control how they operate, researchers said. Examples include aquatic bots used for search-and-rescue missions or land machines that survey abandoned oil fields.

The group has collaborated with the energy giant Chevron Corp., deploying robots to measure the company's environmental impact at old oil drilling sites. They have also created robots that monitor the growth of oysters in the Chesapeake Bay entirely on their own.

CMU postdoctoral researcher Aja Carter sums up the lab's work simply: "How can we use robots to go into this place we definitely don't want any [people] to go?" she said.

The group's current research space is about the size of the small corner of the Robotics Innovation Center they occupied to exhibit their work on Friday, Ms. Carter said. Inside the new center, they'll have much more room to experiment.

"We can't be a field robotics lab without a field," Wensen Liu said. "The [Robotics Innovation Center] gives us a really good field."

Drones that swim and fly

In two different corners of the new center's first floor, drones operated far above ground — and far below it.

The center's new autonomous drone room provides a testing area designed for flying robots. The confined space is outfitted with cameras that track the machines' every move.

Inside, students from CMU's Computational Engineering and Robotics Lab monitored self-flying drones on Friday as the machines navigated around stacks of foam blocks. The compact whirring robots are trained to avoid obsta-

cles while gathering data on their surroundings.

In the real world, these drones could inspect tunnels as they are constructed, scanning and measuring the walls of environments that are unsafe for humans.

"It's better than sending workers to excavation [sites] where rocks are very unstable, and it can fall on them anytime," said CMU professor and lab leader Kenji Shimada. "We replace those manual measurements with drones. Drones can do all of that with two sensors."

Across the center's first floor, behind another doorway, a different drone moved around several feet below ground — at the base of a large in-ground pool.

The water tank inside of the new center is designed for testing aquatic technology, including the company Aquatonomy's "underwater drones," said Aquatonomy robotics engineer and CMU alumni Theo Chemel.

The company — spun out of research conducted at CMU, the University of Michigan and the Massachusetts Institute of Technology — creates robots that operate themselves underwater.

Equipped with a suite of sensors, these machines can map out some of the darkest corners of choppy waterways.

In Pittsburgh, the group has already partnered with the city's River Rescue group, which prevents and responds to water emergencies — such as search-and-rescue missions for people or vehicles in the rivers.

Aquatonomy's robots can produce detailed maps of areas where River Rescue's divers often travel, including rocks, trees or other obstacles that human divers need to avoid, according to Mr. Chemel.

"We can give that to them beforehand so that they can plan safer dives [and] recovery efforts," Mr. Chemel said.

Aquatonomy also works with the Army Corps of Engineers, which manages dams and navigation tools along the Allegheny and Ohio rivers. Robots search



Giuseppe LoPiccolo/Post-Gazette photos

People walk through Carnegie Mellon University's newly opened Robotics Innovation Center in Hazelwood on Friday.



Guests tour the interior of Carnegie Mellon University's newly opened Robotics Innovation Center in Hazelwood on Friday.

for and identify piles of debris in the rivers — helping the group make decisions about maintenance, Mr. Chemel said.

Mr. Chemel, who graduated from CMU in 2025, spent most of his undergraduate years lifting heavy robots into a much smaller above-ground water tank, he said. Experimenting with robots in Pittsburgh's waterways also posed difficulties: Robots can get stuck on branches and logs or be dragged off course by strong currents.

At the Robotics Innovation Center, researchers can easily drop machines into the in-ground pool and manipulate the environment, dimming or flashing the lights, for instance, or building objects for mock inspections.

"It's nice to have this jumping ground for us, where we can make sure that things

are dialed in just right before we go out and do the real thing," Mr. Chemel said.

Infrastructure in and around water degrades quickly and quietly. Steel rusts, and concrete erodes, but water often obscures those developments from plain sight. And sending divers out to inspect sites can be expensive and risky.

That's why Mr. Chemel believes that advancing Aquatonomy's work inside the Robotics Innovation Center is critical.

"As a country, we're working on improving our infrastructure," he said. "A lot of that infrastructure is in the water."

"[It's important to] make sure that we have the tools that are able to keep things safe, especially in Pittsburgh — the city of bridges."