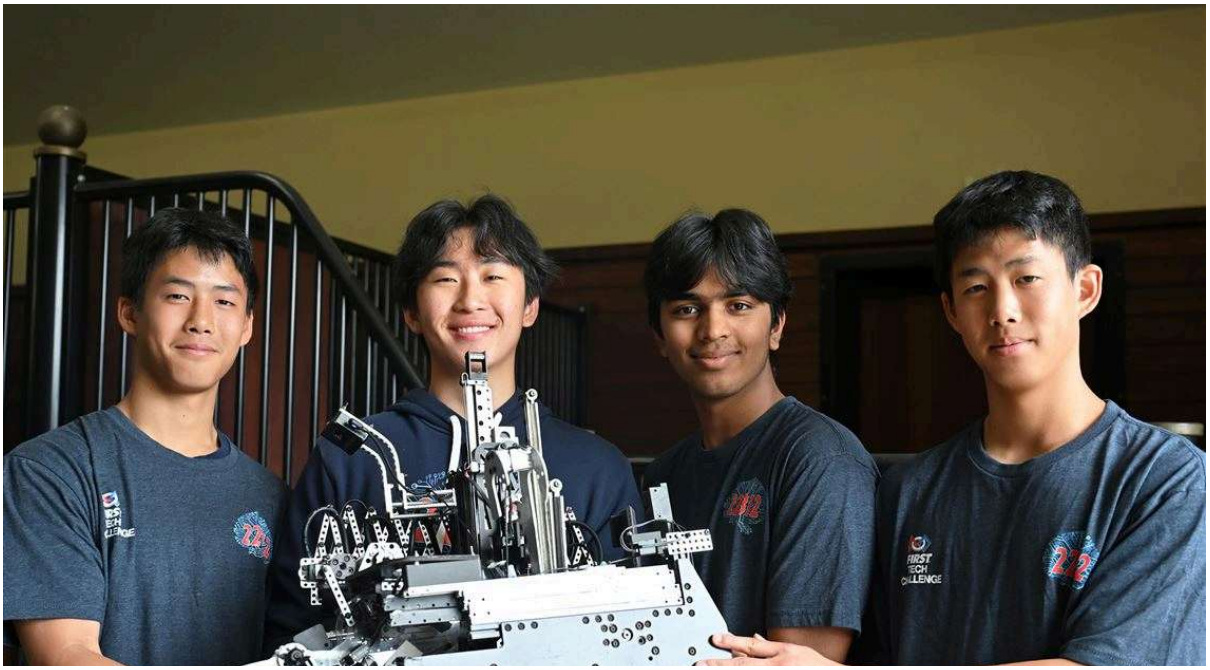

With their robot 'Brobert,' these North Allegheny students are prepping for an international competition

The team of four will put their robot to the test against teams from all over the world at the Maryland Technology Invitational

CHLOE JAD
Pittsburgh Post-Gazette
cjad@post-gazette.com

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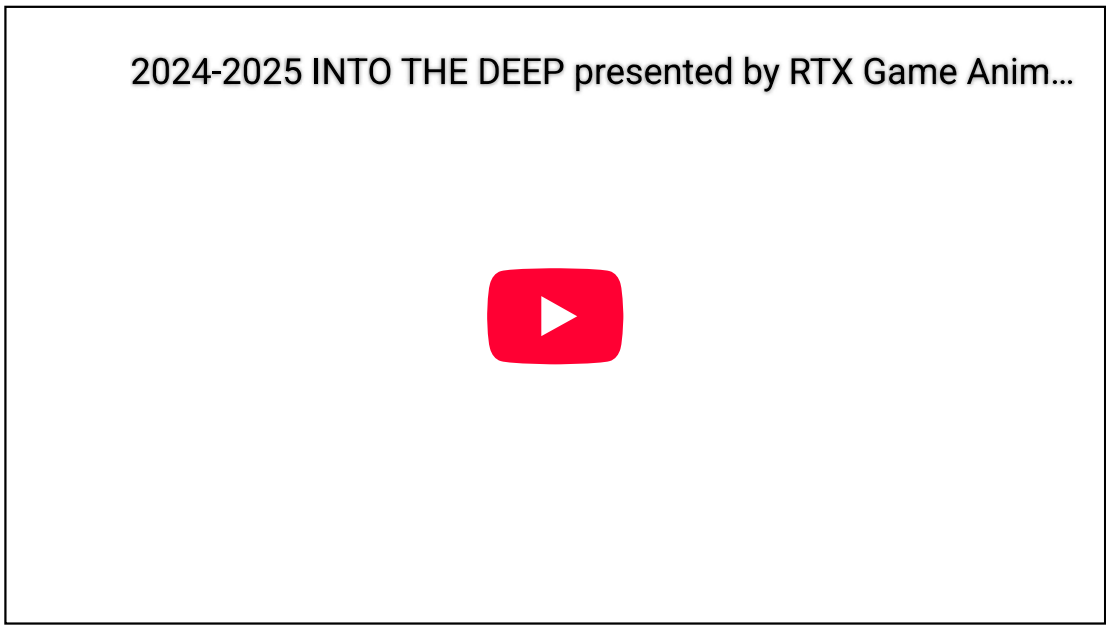
Past a metal gate and up a winding, grassy road lined with white picket fences, robots roam free.

The Brobdingnagian Tritocephalic BrainSTEM Robotics Team tests and perfects their robot — nicknamed “Brobert” — in a lofty horse barn on their coach’s property in Baden, Beaver County. A laser cutter, 3D printer and water jet are available in-house, with robot parts strewn about. No horses, though.

The Brobdingnagian team members — Ray Zeng, Prakhar Kiran, and Justin and Kevin Chen — are rising seniors at North Allegheny Senior High School. The team said they spend 15 to 25 hours a week here, honing Brobert, a small-but-mighty work of wires and metal that darts across the floor and fits into an 18-inch cube.

“It’s like a part-time job,” said Prakhar, a designer on the team.

Brobert will be put to the test at the Maryland Tech Invitational at the end of the month. Hosted at Johns Hopkins University’s Applied Physics Laboratory, 40 teams representing 16 states and eight countries will battle for international robot clout in this year’s “Into the Deep” game.



“Into the Deep” requires four teams, paired in alliances as blue and red, to use their robot creations to collect colored plastic blocks for points. On a 12-foot square “field,” robots, driven by their human teams, must pick up as many of their team blocks as possible in two minutes and place them in designated scoring areas.

The first 30 seconds of the game are the “autonomous” period, showcasing a robot’s ability to score points on its own, following a pre-programmed algorithm without a human controlling it. A bonus opportunity for points comes at the end, when robots can show off by hanging onto the metal bars in the middle of the field, lifting themselves off the ground.

The competition is a test not only of a robot’s technical abilities — a testament to the team’s robotics skills — but also a challenge of human collaboration and, most importantly, speed. The Brobdingnagians rank

globally for Brobert's agility and efficiency for scoring points in the autonomous portion.

"That's a really special part about this year's game," Ray said. "It's not just about being able to do everything. It's about being able to do it as fast as humanly possible."

The Brobdingnagian clan, which started building their robot last September, is sponsored by the nonprofit BrainSTEM, founded by Brobdingnagian's coach, Gordon Walton.

In Mr. Walton's barn, the team built an exact replica of the 12-by-12 field.

BrainSTEM sponsors teams to participate in FIRST (For Inspiration and Recognition of Science and Technology), an organization that aims to advance STEM education globally, including by hosting three tiers of competition based on age group and experience level. BrainSTEM is the regional partner for "FIRST LEGO League," putting it in charge of hosting those first-tier tournaments in Western Pennsylvania.

The Brobdingnagians compete in the second tier designated for middle to high schoolers, called the "FIRST Tech Challenge," or FTC. They're also part of a larger team at the highest level called "FIRST Robotics Competition," or FRC.

Now, they've been included in the elite, invite-only international competition just outside of Baltimore from June 27 to 29. That makes Brobdingnagian's robot among the top 40 in the world, even if half of the four-person team is new to the competition — and robotics in general.

"That's what we're really proud of, because no one was expecting much out of us," Ray said. "But we were able to compete at the international level."

Ray said FTC became a kind of obsession for him. Since the Tech Challenge division allows a free-for-all for the robot's design materials, there's a great "diversity" of robots, "and so you can always see how other teams are doing it different and doing it better," he said, mentioning how he would obsess over robotics YouTube videos and fall asleep strategizing.

"I found joy in robotics for the first time in a long time — mainly because we were winning" he said, laughing.

He wants to keep winning.

“It basically gave me something to always be thinking about, always be coming up with solutions.”

Building ‘Brobert’

Justin and Kevin are Brobdingnagian’s programmers. They’re also twins.

It’s their first year on the team — and it’s also their first time participating in robotics in any capacity.

“This is actually a really unique experience for us, because this was the first time we got to use our software skills and mesh it with the hardware side of things,” Justin said.

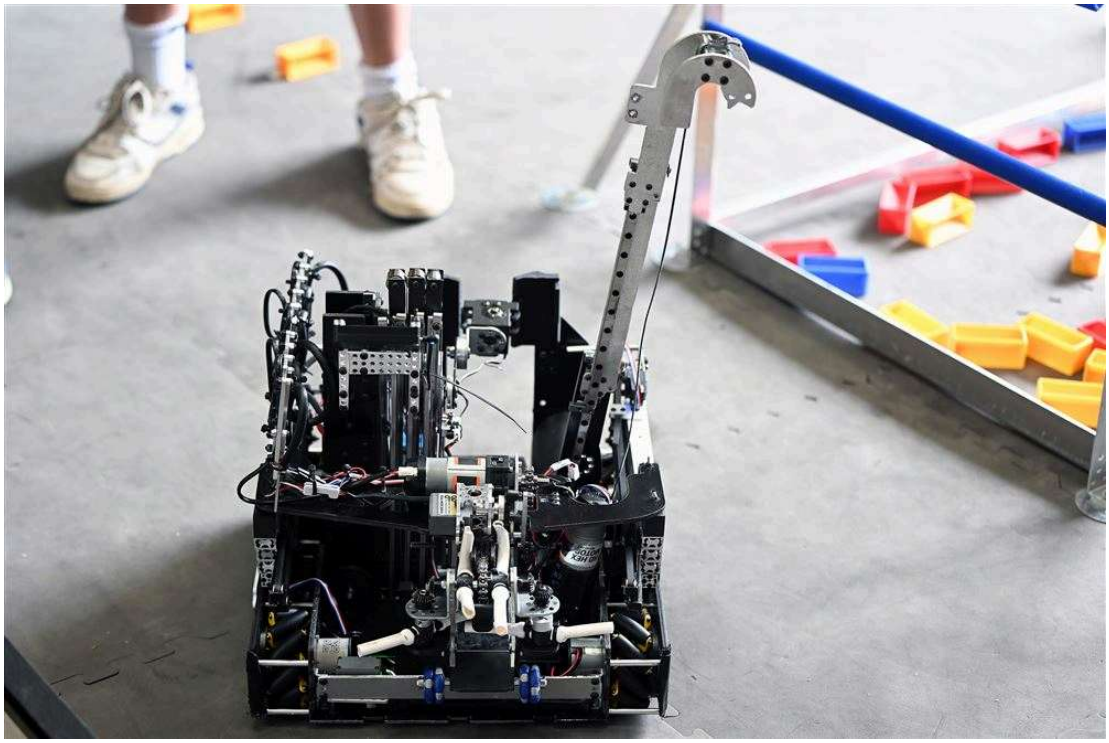
Justin used to program his own small games, but he said he never got to interact with the hardware of his inventions. Now that he is, it opens “a whole new world of problems” — which was frustrating at first, he said, but has become increasingly rewarding as his skills expand.

After 10 months of iterating and reiterating systems of code, hardware and software, the team has stretched its creative muscles to new territory — which is necessary for survival at the highest levels of competition.

“At the state championships, or worlds,” Kevin said, “pretty much everybody could do everything.”

What sets Brobdingnagian apart, and what Kevin said he was most proud of, was the lengthy process of figuring out how to use camera technology to help the robot identify the colored plastic blocks in the game’s autonomous portion. Connecting the dots between physical design and software programming made the process ‘very interdisciplinary,” Kevin said.

“We spent a significant time thinking, ‘How do you even convert camera coordinates into coordinates on the field? How do you make the robot go there?’” he said.



Team Brobdingnagian Tritocephalic BrainSTEM robotics team, with students from North Allegheny High School, show off their robot named Brobert on Monday, June 16, 2025. (Lucy Schaly/Post-Gazette)

Brobert is made out of a collage of 3D-printed carbon fiber, nylon, plenty of aluminum and a lot of EGL, or epoxy glass laminates. A color sensor the twins programmed helps ensure Brobert is picking up the correct color of blocks. If the color is wrong, the collector automatically ejects the block.

Instead of building a new robot from scratch after every tournament like most teams, which also means re-coding its programs, Team Brobdingnagian saved time by sticking with their initial design and focusing on refining and improving it, keeping them on “a trail of optimization,” Ray said.

Brobert kept getting faster as a result. That also gave the twins nearly a year of uninterrupted coding.

“It’s really weird for the twins to have jumped in as juniors with no experience and do really well,” Mr. Walton said. “And it really is a sign of the level of genius polymath that they exhibit.”

Ray said they sometimes refer to the twins collectively as “Jevin.” And unexpected perks come from having a twin programmer team, other than efficient nicknames.

“They’re always here at the same time,” Ray said. “They never have any miscommunication.”

Sometimes, he said, the two say the same thing at the same time.

Plus, Justin said, he and Kevin get to talk about issues they’re having with Brobert on the way home.

Although “Brobert” as a robot name seems to speak for itself, the Brobdingnagian Tritocephalic BrainSTEM Robotics Team twists the tongue. It’s a BrainSTEM tradition to pick a synonym of “gigantic” and a part of the brain (“cephalic” refers to the head) to create a mouthful of a team name.

When Mr. Walton coached his own kids’ FIRST team, they chose to be the “Giant Diencephalic BrainSTEM Robotics Team.”

Essentially: Big-brained.

For now, however, Brobert still has some kinks to be smoothed out before the big weekend.

“It’s crunch time,” the Brobdingnagians said.

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Chloe Jad is a business reporter focusing on retail, tech and artificial intelligence. She’s a 2025 graduate of Boston University’s College of Communication.

cjad@post-gazette.com
@JadChloe
chloejad.bsky.social

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