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BYU's one-eyed 'Y-Clops' robot ready to stare down rivals at national engineering competition

[High-res photography](#)[Read more in the Deseret Morning News](#)[Read more in the Salt Lake Tribune](#)[Watch video at abc4.com](#)

It looks like a cross between a lawn mower and a snowmobile, but the Brigham Young University Y-Clops is all high-tech.

Designed and built by a [team](#) of 12 electrical and computer engineering students, the [mobile robot](#) uses a color camera for an eye, an old wheelchair for a body and a custom-built circuit board running artificial intelligence algorithms for a brain as it navigates a course filled with barrels, buckets and cones "all by itself." [Click here to see video.](#)

Faculty adviser [Dah-Jye Lee](#) says the students have done a wonderful job of preparing for the 14th Annual [Intelligent Ground Vehicle Competition](#), which will be held in Michigan on June 10 - 12. The contest is sponsored in part by the Department of Defense and is similar to its \$2 million [DARPA Grand Challenge](#) but on a much smaller scale.

"Last year, our first at the competition, we came in fifth of 37 teams in the autonomous competition," said Lee, an associate professor of electrical and computer engineering whose research focuses on [robotic vision](#). "This year, who knows? The students are very talented. They have worked hard and have done a good job of fine-tuning the robot, so I'm excited to see how their efforts pay off."

To successfully navigate its cluttered course, the robot transfers video captured with its single camera "eye" to a computer. Software instructions written by the BYU students tell the robot where to drive and how to avoid obstacles in its path. Once started, the robot moves and makes adjustments to its movements independently.

The project, tied to curriculum in the BYU Department of Electrical and Computer Engineering, gives students experiences in design, production, testing and budgeting. (The thrifty group has only spent \$4,800 building the Y-clops instead of the \$14,800 it would have cost using new instead of salvaged parts.) The students are also exposed to work in cross-disciplinary teams, a situation many of them will face as they enter the workforce.

"The classroom teaches essential concepts, and a project like this fills in the gaps with practical experience," said Lee, who is joined on the project by second faculty adviser [James Archibald](#).

Beau Tippetts, a senior from Star Valley, Wyo., says that BYU has a reputation for providing students with great opportunities for hands-on engineering projects.

"Knowing theories is one thing, but everything takes on new light when you try to implement theories in real life," said Tippetts. "A project like this is what engineering is all about "getting down and making something work. If you know how to debug, to solve problems as they arise, you are invaluable to future employers."

In addition to navigating through an obstacle course, the BYU robot will also be tested on its ability to locate [Global Positioning System](#) waypoints. All the robots in the IGV competition are judged on innovation, speed and accuracy of navigation.

This year, the BYU team added Caterpillar-style tracks, adapted from an old snowmobile, for greater stability, tighter turns and all-terrain ability.

Spencer Fowers, a senior from Hooper, Utah, said he thinks the Y-Clops has what it takes to do well at the national competition.

"We're already running a lot faster than last year's first-place team," said Fowers. "But thanks to the intelligent machine learning algorithm we developed, we're also pretty accurate. Of course, I'm optimistic, but we're hoping to blow the other teams out of the water."



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Other BYU team members include Evan Andersen, Chris Archibald, Aaron Dennis, Christopher Greco, Nicholas Jepsen, Peter Lamb, Kirt Lillywhite, Kent McGillivray, Justin Perry and Chris Young.

*In 2003, the **Deseret Morning News** ran a [story](#) about BYU student engineers developing tiny airplanes that are piloted by computers using GPS technology. Faculty adviser James Archibald also mentored students in 2001 as they designed and built autonomous robots that play soccer. Read more about that competition [here](#).*



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