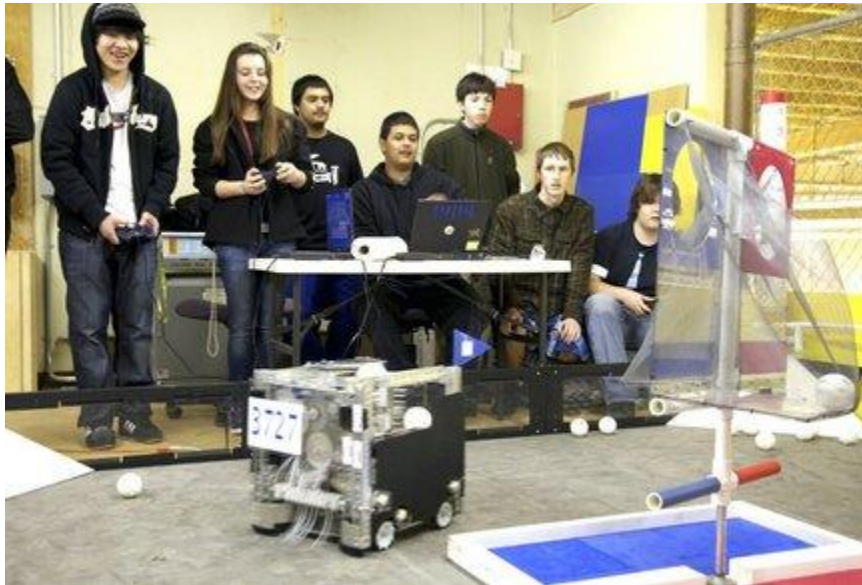


Hillsboro robotic teams build, program and battle robots

By Wendy Owen, The Oregonian

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Savannah Loberger, the only girl who regularly practices with the Hillsboro High School robotics club, fires Wiffle balls into a basket from the robot she helped build. Other students maneuver their robots to block shots and shove other robots out of the way.

HILLSBORO -- Nearly every day after school, a battle breaks out in a second-floor caged room overlooking the shop classroom at [Hillsboro High School](#).

A mix of students crowd both sides of the ring. They give a thumbs up. They're ready.

"Three, two, one. Go!"

The whirring of electronics and the sounds of metal bodies crashing together mix with the shouts of students.

It turns out, these teenagers have found something -- gasp -- better than video games. For two minutes the students control the knee-high robots they built and programmed to pick up [Wiffle](#) balls and compete in a basketball-like game with hockey-style clashes.

The three robots and the roughly 20 students behind them make up the Hillsboro High School Robotics Team, which is in its fourth year.

Hillsboro High's technology teacher and robotics adviser, Don Domes, would love to see the robotics team treated like a sports team.

It has all the elements of a sport -- collaboration, problem-solving, focus, excitement and probably a little sweat. The cramped headquarters where the students practice is stuffy and hot even in the dead of winter. But it doesn't have the annual funding of a sports team.

"How do we inspire the next generation of engineers?" Domes asked.

Teacher plugs in to technology

Read about how Hillsboro High School teacher Don Domes **got into robotics**.

Domes, whose mantra is "this is about the kids," takes little credit for what is considered one of the best robotics programs in the state. He has found grants and worked partnerships over the years to keep it running. It helps that he also teaches electronics, architecture and drafting because it gives the students access to high-tech equipment he has also managed to fund through outside sources.

Domes doesn't want the students to worry about money. He wants them to develop their minds.

"What this is about for me is what the kids are learning," he said, between bouts of refereeing robot games. "There are things that happen here that I couldn't engineer in a classroom."

The students are done with the main competition for the year -- [FIRST Tech Challenge](#), which pits teams from across Oregon against each other in a competition similar to the one in the caged room. It culminates in an international tournament. The students brought home several trophies but didn't perform as well as last year when they placed eighth in the world. Still, they practice with the robots daily in the stuffy loft, which used to be a storage area.



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Hillsboro High Schools robotics club and engineering program have made a name for themselves over the years under the instruction of Don Domes, who has taught at the high school for 30 years.

The students built their robots out of small aluminum girders and laser-cut plastic. They programmed the robot's internal gears and chains to move various other thingamajigs that in turn swallow Wiffle balls from the floor like a [Pac-Man](#) and fire them into a net or a plastic basket. Each has a small computer brain controlled via [Bluetooth](#) technology and can run autonomously or under student direction with a joystick controller.

They're not cute like the humanoid robots built in Japan. They look like cubes of metal and plastic on rubber wheels, but once they start battling for the Wiffle balls, it's hard not to root for them.

The robot known as 3213 was built with the movie "Transformers" in mind. The entire cube folds open like some sort of alien creature before it shoots the balls at a basket.

"Ours is the cool one," said Jorge Valdes, a sophomore, controlling the robot.

Three students created robot 3727. Freshman Savannah Loberger, the youngest and one of two girls on the team, built the shooter for 3727. Miles Smith, a junior, created an Archimedes screw

to move the Wiffle balls to the shooter, and Luis Godinez, a senior, created the subsystem -- its nervous system.

Did it involved math? Godinez shrugged. "I did an (algebraic) inequality for the controllers."

Loberger is frequently behind the controller during the battles against the guys, though her favorite part is building the robots. Fortunately, she has brothers, which gives her a better understanding of her colleagues. Like brothers, she said, the guys can be "a pain sometimes."

Most of the students were drawn to robotics because they had an interest in engineering and their friends were already on the team. Many had grown up building and playing with Lego robots.



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Students Nick Jensen, left, Cris Gonzalez and Anh Huynh built robot 3257 after the three became friends in a robotics class.

But Anh Huynh, a senior, may have benefited the most from joining the team. The shy young man who moved to the United States from Vietnam two years ago struggled with English and kept to himself until he took a robotics class.

"You were really quiet," said Nick Jensen, a senior.

Jensen and Cris Gonzelez, a sophomore, befriended Huynh and the three built robot 3257 this year, winning a trophy for design.

With the competition season over, some of the robotics students have returned to their other 'bot projects.

Jensen is finishing his senior project, a bomb disposal robot complete with guide cameras, a claw and red-and-blue flashing lights.

"It can do about 60 percent of what theirs (Washington County sheriff's bomb disposal robot) can do," Jensen said.

He is also part of a group of students working out the bugs on a sweeper robot, which follows a grid mapping of a floor and cleans it autonomously. The project was among 16 selected from across the United States for the [Lemelson-MIT InvenTeam](#) program, which invites students to create inventions to solve real world problems.

The students see a future in which every school janitor has a sweeper robot to clean the cafeteria,

hallways and other large spaces. Ideally, the team would sell its invention and the proceeds would fund the program. They've been working on it for nearly four years.

Several students sit in a wide circle around the 4-foot-by-4-foot chassis of the robot and talk about the multidirectional wheels and two other assist robots that laser-guide the main sweeper. It's not like the [iRobot](#) cleaners, they said.

"The Roomba is random. This is based on precision," Godinez said.

Then, the conversation turns to college. The team is a mix of students reflecting Hillsboro High's demographic of 40 percent Latino students. They all have plans to attend universities ranging from [Massachusetts Institute of Technology](#) to [Oregon State University](#) to [Embry-Riddle Aeronautical University](#).

Domes would deny it, but the program wouldn't be what it is without him at the helm.

"He is relentless and tireless," said Hillsboro High Principal Sloan Presidio. "I've never worked with a teacher who has as much energy as Don."

The 56-year-old teacher, with bushy eyebrows and a wealth of gray hair, has spent more than three decades in the classroom, often getting there by 6 a.m. and working until 7 p.m.

"The amount of work and effort he puts into everything he does is mind-blowing," said Natasha MacDonald, executive director of [TechStart Education Foundation](#).

Domes is a board member of the Portland foundation, which promotes access to technology for all students. MacDonald said Domes has leveraged partnerships throughout the state, including [Intel](#) and the [Engineering and Technology Industry Council](#), and is known for his work.

"The key is those partnerships," she said. "He's gone outside the box and has found people in Oregon who are trying to solve the same problems, creating those opportunities for students to succeed and creating those hands-on experiences so they can be prepared to innovate."

Savannah Loberger summed it up. "There's no way we could do this without Mr. Domes."

-- [Wendy Owen](#)

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