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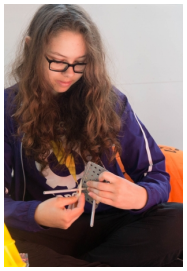
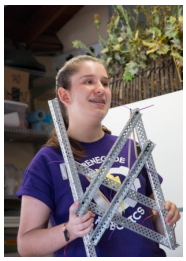
Feature: All-girls robotics team embraces engineering with flair

by Kate Bradshaw / Almanac

Renegade Robotics Team Coach Leslie Peters addresses the team members at the beginning of long summer work day, on June 14, 2017. The team has been known to log in 14 hours in a single weekend building robots. Photo by Ana Sofia Amieva-Wang





They wear purple capes. They decorate their gear with stick-on jewels, and carry a tote bag decorated with their team logo. They also program a robot to operate autonomously and with remote controls.

And, in two years, they've gone from starting their own team to competing in the world championships at an activity known widely to be skewed male.

They're Renegade Robotics, an all-girls robotics team made up of five high school students from Menlo Park and Portola Valley: Serena Peters (grade 9), Avani Anne (grade 10) and Navya Anne (grade 12) at Menlo-Atherton High School; Anna Beaver (grade 11) at Woodside High School; and Elizabeth Peters (grade 11) at Pinewood School.

Coached by Leslie Peters, mother to Elizabeth and Serena, they compete in a league called VEX Robotics, run by the Robotics Education & Competition Foundation. Unlike other leagues, where there is a set amount of time that teams are given to work on their robots, the VEX league allows teams to work on iterations of their robots over the course of a year, as they develop robots that can complete a set of challenges during two-minute, two-on-two competitions.

Of about 11,000 teams in 32 countries, about 700 are all-female, a VEX Robotics spokesperson says. At the California state championships, the Renegade team members were almost the only girls competing among 36 teams, Coach Peters says.

"VEX Robotics has a particularly bad male-to-female ratio," she says.

Renegade is one of only two all-girls teams in Silicon Valley – "the other one is the one we left," she says.

The girls split from the other team because they wanted to spend more time building robots, Ms. Peters says.

Team members interviewed by the Almanac say they typically meet for three-hour sessions twice a week in a teammate's garage. They have been known to log as many as 14 hours in a single weekend, but they find the work rewarding.

"It's the best way to spend your free time," Anna says.

Elizabeth, who does a lot of the programming to make the robot move autonomously, says she loves the feeling when the robot starts working. "It's all this work, but then (it starts) and you're like, 'Whoa! We built this! It's doing things. It's doing really cool things!' ... and you feel so proud that you made this thing that can move on its own."

The competition

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At the annual world championships, the next year's "game," or set of challenges that the robots will have to complete, is announced.

Then the work begins back home. After an intensive study of the rules, there are discussions of strategy and how to best score points. Then comes designing, prototyping, testing and practice driving the robot.

Unlike many of the boys' robots, which are driven usually by one student, the girls say, the Renegade team has multiple drivers operating different parts of the robot.

This year, after competing in local tournaments and the state championships, the girls' robot didn't perform well enough to qualify for the world championships the traditional way, by beating the tournament bracket.

Instead, they got into the competition with a wild-card spot given for winning a video competition. Their video was about how to use an LCD display to calibrate the robot. They say they were motivated to win the competition after receiving an honorable mention the previous year for their tongue-in-cheek video about how handy it is to have a "magic" tote bag to carry extra supplies.

At the 2017 VEX Worlds, a world competition, held April 19 to 22 in Louisville, Kentucky, they saw all-girls teams from other countries, and placed higher than they expected to, with a 5-5 record. Unsurprisingly, the level of robotics competition in Silicon Valley more than holds its own compared to other regions.

"The problem with being from Silicon Valley is that this is where all the good teams are," Anna explained. China and Singapore are also known to be highly competitive, the girls say.

Mentor of the year

The team also submitted an essay to the organization nominating Ms. Peters for the Mentor of the Year award, which she won and was presented with at the world championships.

Though she has a STEM background – she studied mathematics at Princeton and was an actuary before she had kids – Ms. Peters says. "I had to learn all of this stuff really quickly so I get to be just a bit ahead of the girls." She now blogs about strategies and problem-solving for VEX teams.

Ms. Peters and Serena have also helped to mentor an upcoming robotics team at the Corte Madera School in Portola Valley. According to principal Cyndi Maijala and Jason Borgen, the school's director of innovation and learning, parents of Renegade Robotics team members have been involved in helping to launch a competitive robotics program at the school, and the girls have helped to mentor the co-ed middle school team.

Success

"I think their success is self-reinforcing," Ms. Peters says about the team. "They put in a lot and they have a lot to show for it, and that makes them want to keep going." She points to a shelf in the garage lined with trophies: "This is two seasons of five girls in a garage."

Because each team must join with another team to face off against two others during the competitions, and are matched up randomly during the tournaments, Ms. Peters says, the team has had to learn how to negotiate with other teams to discuss strategy and have confidence in their robot's performance.

As middle- and high-school female engineers, they say they sometimes come up with fixes that are different than what boys would do. Using hair ties to help hold pieces in place is an example, Anna said.

They also decorate their robots with stick-on jewels and stickers, and have a tradition of naming each year's robot after a secondary Disney character.

Ms. Peters said the team is looking to add one or two more girls, but noted that there is a significant time commitment. Their next tournament is expected to be held in September.

"It really is fantastic preparation for the real world of engineering," she said. "The girls are getting more confidence as they get older."

Serena, who will start as a freshman at Menlo-Atherton High School in the fall, said the skills she's learned on the robotics team make problem-solving challenges in science class easier and more fun.

Anna described how she felt when the team's robot performed well at a competition.

"You get this insane vibe – you just want to dance," she said.

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Comments

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