

# San Jose's Leland High School robotics team headed to *FIRST* Challenge

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Every year since 2005, Leland High School's robotics team has developed a robot to enter into the *FIRST* Challenge and done well enough to take home at least one prize, usually more. This year should be no different.

About 30 of the 75 members of Team Quixilver have been working hard for weeks to get their robot ready for Rebound Rumble, a *FIRST* Challenge played by competing alliances--each made up of three different teams--on a field resembling a basketball court with four hoops on each side.

Rebound Rumble is this year's national high school competition hosted by the nonprofit *FIRST* (For Inspiration and Recognition of Science and Technology). The *FIRST* season kicked off in January and will culminate with an international competition.

The team's objective in Rebound Rumble is for its robot to shoot as many baskets as possible during a 2-minute, 15-second match.

During a hybrid period, one robot on each alliance team can be controlled using Microsoft Kinect. The match ends with teams attempting to balance robots on bridges located in the middle of the court.

To do this, the team members need to know engineering, design, motor control, programming and even physics. All but one are Leland students: Alex Mitchell, a 14-year old eighth-grader at Bret Harte, Middle School, is a veteran of robotic challenges from Junior *FIRST* Lego League and *FIRST* Lego League.

He's the robot's driver. Alex explains that it takes a lot of skill to control the robot, especially on the bridge. Though he was practicing on a wooden bridge, during the contest, the bridge will be made of aluminum and covered with polycarbonate, which makes driving more difficult.

Three teams of students are building two robots, one as a guide and one for the contest. Several students also are programming the software to enable their robot to pick up the basketballs, place them in a turret and fire them into the basket. They are using an older robot as a test vehicle. A camera will shine a light on reflective tape on the basket, and using physics calculations, the students can program the robot to shoot at the light.

Figuring all this out and actually making it work may seem difficult, but these students are busily following the schematics they've made and working to ensure their robot will deliver. It's not just

a matter of building the robot; it has to work as if it was built by a professional organization, which these kids seem to be.

Quixilver co-president Elizabeth Seger, an 18-year-old senior, has been busy working on the robot and wiring. She says she's been a team member since her freshman year. She joined because her brother was a member and found the work fun and exciting.

As part of Leland's Project Lead the Way, robotics club members can attend three engineering classes offered: intro to engineering design, principles of engineering; and digital electronics. Next year a course in aerospace engineering will be added.

The project requires more than engineering skills. Students combine math, art, physical science and even creative writing into the sub-groups making up the team.

Some students are focusing on public relations, helping to get the news out as well as fundraising to cover costs for materials and for transportation to competitions. Others are occupied with scrapbooking to show the team's work through the contests. The team has recruited more than 20 corporate sponsors.

Most of the parts used in making the robot are standard, team member Nishanth Subramaniam says. There's a power distribution board, battery hooks for motor control to make the device turn on and off and go forward and backward, and wheels that make it move. A vector, which looks like a small fuse box without the fuses, connects the different parts making up the robot to the motor.

Team co-president Kunal Mehta calls Helen Arrington the team driver. Arrington, a math teacher at Leland for the past 13 years, is also the team's engineering design instructional coach.

"All of the students are brilliant. They just haven't figured it out yet," Arrington says.

The team's other mentor, Maggie Best, has been with Quixilver for 12 years, beginning when her son James was a freshman. He's now a sophomore at Harvey Mudd College and coaching a rookie robotics team. Best won the Woodie Flowers Award in 2011 for demonstrated excellence in teaching science, math and creative design. Arrington won the same award the previous year, just before she won the mentor award at the 2010 CalGames off-season competition.

The Leland team itself has won many of the competition's top awards since 2005, including the Silicon Valley regional Chairman's Award.

This year's *FIRST* regional competition takes place March 29-31 at San Jose State University.