

# Technology In Our Lives

## FIRST Robotics Competition Builds Strong People, Not Just Robots

(NAPS)—When people think about *FIRST*, they immediately think of high school robotics competitions. But for the 2.5 million students who have participated in *FIRST* programs worldwide since 1989, the payoff is so much more.

*FIRST* is a robotics community that prepares students for their future through inclusive, team-based robotics programs for ages 4-18. Its mission is to inspire young people to be science and technology leaders and innovators, by engaging them in exciting mentor-based programs.

"*FIRST* Robotics is not just a program about building robots, it also focuses on the growth and development of the individual, with technical training, organizational training and community outreach," said Derek Curd, a mentor of the Up a Creek Robotics team (Team 1619), based in Longmont, Colo. "*FIRST* teams operate like small companies, so when students come out of the program, they've had the opportunity to develop management and operational skills as well," he said.

Up a Creek Robotics was established in 2004 and partners with the St. Vrain School District. Curd, a tech industry engineer, has been a team mentor since 2014. The team has won numerous regional competitions dating back to 2015 and has earned several invitations to compete at the international meet in Houston, Texas. It also took first place in the global skills competition last year against more than 1,500 teams.

"Some students from our club have gone on to work at local robotics firms, and about 90% of them pick a career in STEM (Science, Technology, Engineering and Math) fields, such as mechanical engineering or aerospace," Curd said.

### Gracious and Professional

An important element of the *FIRST* culture is being gracious and professional. The organization rewards teams that help each other advance. Unlike combat robot competitions, the focus of *FIRST* robotics challenges is not to destroy your competitor's robot, but to perform the challenges as best you can. The teams want to win, but against opponents who are also at their best.

"Teams are paired with each other in alliances to play games better or faster than their opponents," explained Kate Pilotte, senior manager, kit of parts at *FIRST*. "The ultimate goal for many teams is to be on the alliance that wins the championship."

### Coping with COVID

In March 2020, due to the spread of COVID-19, *FIRST* competitions around the world were canceled. Pilotte said that teams had to pivot their goals. They used what they learned in *FIRST* to make personal protective equipment, ventilators, robots that delivered groceries to seniors, and much more. "In the end," she added, "they found innovative ways to put their talents to the test and



Using state-of-the-art technology from such sponsors as AMD-Xilinx, the *FIRST* robotics program teaches high-school students, like those pictured here from the Up-a-Creek Robotics team in Colorado, critical engineering skills and the value of teamwork and community.

are emerging from the pandemic arguably more resilient."

### The Competition

Every January, the *FIRST* Robotics Competition launches a new challenge in which teams of high school students build industrial-sized robots to play a difficult field game. Sometimes robots have to climb, build, stack, or throw objects, grab things and move them, or fit components together.

"The technology that goes into these robots is crazy," Curd said. "Almost every year we are using state-of-the-art vision systems—tracking targets on the field and shooting at them. There's a lot of complex software algorithmic work going on here that is impressive for these high school students."

Every team builds its robot on a control platform named roboRIO from National Instruments, which is driven by powerful Zynq-7000 adaptive computing chips from AMD-Xilinx that have the processing capacity to handle complex AI algorithms in real time. "The Zynq device can operate at different voltages, interfaces and protocols. It offers a great deal of flexibility that supports different types of input and output paths to and from the NI box," Curd said.

AMD-Xilinx has sponsored the Up a Creek team for many years. "Sponsoring *FIRST* gives us an opportunity to help students get exposed to the idea of pursuing careers in technology and does a lot of other good for the community as well," said Dan Gibbons, vice president of software programmability and compute acceleration at AMD-Xilinx.

### Inspiring Ideas

"There are students from *FIRST* who designed and manufactured a special wheelchair for a kid in their community. In Turkey, one team built a robot to help save a puppy," Pilotte said. "It is truly inspiring to see what these kids can do."

In the Atlanta suburb of College

Park, juniors Alex Van Aacken, Heather Frisch, and Lily Pamphile have been involved in Woodward Academy's *FIRST* robotics program for three years and now are program leads. Van Aacken contributes to the team as a mechanical designer and helps build the robots. Pamphile is head of programming, and Frisch leads electrical engineering.

In March, the team completed its first competition in three years and made it to the quarterfinals.

"The Columbus competition included an interesting game involving lots of balls flying around," Van Aacken said. "We focused our robot on getting good at ball shooting from far away. There were some problems that plagued us along the way, but we're really proud of how far we got. We haven't advanced this far as a team since 2018."

"Our main issue at the competition stemmed from the electrical board," Frisch explained. "We had some new electrical components that had connection problems and we had a firewall issue. It was definitely a struggle, but we got a lot of advice from our *FIRST* mentors and we talked to other teams to help us solve the problems."

Last year, the Woodward Academy robotics team was able to meet in person on a hybrid schedule and participated in competitions online. "We basically built half of an FTC field in our lab and then we ran a match, trying to score as many points as possible," Pamphile explained. "From there, we uploaded our scores and videos to the *FIRST* website, and that's how we were ranked."

### Finding Community

"*FIRST* is not all about robotics. It's not always about kids with the best programming ability. It's also about kids looking for a community," said Tim Hipp, the team's lead faculty mentor. "*FIRST* is the reason many of these students come to school." [More information: <https://xlx.com/38xmjdg>.]