

Gatorbotics Team 1700 began in a 10-foot-by-11-foot science department closet in December 2004. A dozen girls spent over three hours each day laying down makeshift carpet to protect the floor, soldering in a corner, and building a robot on two knee-high desks. Eight years later, our team includes 42 students and has an entire lab built specifically for FIRST robotics. With more team members to focus on outreach, we spend every minute of our time working toward our goal: demonstrating the importance of collaboration and hands-on learning in science and engineering.

As Castilleja's first and only FRC team, Gatorbotics is an all-girls robotics team that strives to break stereotypes about women in engineering. We make up 16 percent of the school's student body, and over 90 percent of the team's alumnae pursue careers in STEM. We also understand the importance of students teaching students. Every year, returning members visit freshmen physics classes to talk about FIRST robotics and recruit new members, and since last year, 1700 has also held annual fall workshops that teach prospective members basic mechanical, electrical, and programming skills before jumping into the build season. Not only are the workshops open to the entire school, but they also allow new members to join the team without any prior robotics experience.

This year, to give students a taste of the FIRST competition format, the workshops gave attendees a mini challenge and broke them up into two teams. Each day began with a lesson from the 1700 student leadership team, and students broke into two groups for some hands-on prototyping, building, and programming in the afternoons.

Before the build season began, the 2012 CalGames event also generated a spirit of camaraderie to start the new year. New members received a head-start on learning the necessary skills for robotics, and returning members put their memories to the test. We received the 2012 Video Award for our Youtube video promoting CalGames and STEM education.

During the season, we pair up new and returning members in order to ensure that each new student has someone to answer her questions and help her feel like part of the team. Our strategic decisions are also made democratically through first "green hat" and then "black hat" brainstorming. Consistent with our team value of equality, we want to ensure that both upperclassmen and underclassmen feel fully included and have their voices heard.

Each Gatorbotics team member also learns all of the skills of a well-rounded engineer. Just as FIRST reminds us, students must understand finance, communication, and business in addition to science and math. Every student is given a public relations (PR) task in addition to her technical role, and as members of a one to one laptop school, we also take full advantage of technology and multi-media outreach to keep both our team and our community aware of our progress. We communicate via email,

and team members take turns updating a daily blog. On a global scale, we connect through our Twitter, our Facebook page, and our two Youtube channels. Our PR team works year-round to contact sponsors and reach out to potential mentors.

Gatorbotics has a strong presence at Castilleja School, where we aim to encourage the entire student body to learn STEM. In addition to holding summer Java programming workshops for any interested students, our team pushed for the school to offer engineering-related classes for the last two years, including Computer Science and Engineering Sustainable Solutions, and are currently working to advance the program through higher level courses. We have also helped host speakers for a "C-STEAM" conference (Castilleja - science, technology, engineering, arts, mathematics) to show students the real world applications associated with a STEM education and generate an interest in FIRST robotics by presenting at school meetings and open houses for prospective middle school and high school students.

However, the most significant advancement in Castilleja's STEM education program in the past few years has been the creation of the Bourn Idea Lab. After our mentor Doug Bourn died tragically in a plane crash in 2010, Castilleja partnered with Gatorbotics to build a lab as part of the FabLab@School network. The Bourn Lab has won the Rambus KCI Innovation Award, has been featured on a BBC radio podcast for its innovative nature, and has had a visible impact on the student body. 1700 has nearly doubled in size since the lab's creation, and weekly open labs give everyone an opportunity to work on individual projects. From laser-cut microscopes to 3-D printed game pieces, classes of every grade use the lab to enforce the idea of hands-on learning. The lab has also given our team the resources and tools for many FIRST seasons to come.

Yet, we also strive to spread our values of collaboration and women in STEM to our local community outside Castilleja. In 2012, we represented FRC at a Women in Intel conference and showed off our Rebound Rumble robot at the Bay Area Maker Faire, the "greatest show (and tell) on earth." With over 100,000 people in attendance, the Maker Faire also included a televised interview with student members of our team, and we spoke about the message of FIRST robotics. This year, we also helped two Pinewood students start their own rookie team by explaining the values of FIRST, guiding them toward the necessary tools and resources, making late night runs to debug code, and, most importantly, sharing our love for robotics with them.

We also believe that we must look to the next generation of students to spread the message of FIRST. We hope to inspire younger students by mentoring Castilleja's FLL teams and three of the Tech Museum's Tech Challenge teams. In 2012 and 2013, we hosted an FLL competition at Castilleja and had team members both participate and mentor Iridescent's Technovation Challenge teams.

For the past two years, we have also partnered with our school's Peninsula Bridge and Halford programs, which gives high schools the chance to tutor and collaborate with underprivileged middle school girls from East Palo Alto. Gatorbotics hosts monthly "Science Saturdays" to teach the girls about STEM, and lessons have included letting the girls drive our robot, laser cutting personalized name tags, and making light-up christmas cards to demonstrate basic circuits. Through our mentorship, we aim to provide the girls with female role models in engineering.

Gatorbotics also works hard to share the message of FIRST not only with our local neighbors but also with our global ones. In 2012, we founded a worldwide Youtube project called Five Awesome Robots. Along with five (originally four) other teams, we post weekly videos during the robotics build season to document our team's progress. We want to break down the barriers of secretive competition among teams and have successfully obtained over 13,000 views. Having reached over twenty-five countries, the videos share our prototyping, building, and programming processes to better communicate and spread FIRST's message of "coopertition."

This year our global outreach has also extended to Castilleja's sister school in Shanghai, China, the Shanghai No. 3 Girls' School. We are hosting a delegation of five girls and two teachers from Shanghai for nine days during the weekend of the Silicon Valley Regional. During their stay, we will offer workshops about robotics and STEM and hope to show them the true meaning of FIRST. Our goal is to inspire them to establish their own team in Shanghai - the first all girls' FRC team in China - so that they, in turn can also spread their love of STEM.

Overall, the effect of hands-on learning through FIRST robotics can be seen in both current Gatorbotics students and our alumnae. Programming Lead and 2013 Intel Semifinalist Victoria Dean explains that "Gatorbotics is really what got me interested in the STEM fields... FIRST robotics has given me excellent skills, not only in programming, but also in collaboration and leadership on an engineering team."

One hundred percent of our team members study at four-year universities, and many have attended top STEM colleges such as MIT, Stanford, Caltech, and Harvey Mudd. In addition, alumnae and current students continue to work together: three of our current mentors are Gatorbotics alumnae. Original team captain and current mentor Jessa Lee ('05) says of FIRST, "Robotics was great because I had taken physics, and now I could actually use everything I had learned... It's fun, and I care about women in science and technology."

Gatorbotics believes that having more women in STEM is important for the future of technology, and

we strive to encourage more young women to pursue careers in engineering. We've come a long way since the science department closet, but with our 10-year anniversary approaching in 2014, we hope to expand our outreach even more than we have in the past couple years. We want to continue to spread FIRST's values of teamwork, creativity, and leadership in both our local and global communities by learning from our mentors, from our teachers, and most importantly from each other.

Briefly describe the impact of the FIRST program on team participants with special emphasis on the 2012/2013 year and the preceding two years:

Gatorbotics provides a friendly, high-energy environment for young women to explore the STEM fields. One hundred percent of our students attend four-year colleges, and over 90 percent major in STEM fields. Alumnae often come back to mentor us and provide strong female role models for our team members. Through FIRST robotics, our team members learn many important skills such as critical thinking, electrical and mechanical engineering, computer science, communication, business, and so much more.

Examples of role model characteristics for other teams to emulate:

Gatorbotics aims to spread the message of FIRST to generations of future engineers. Partnering with the Peninsula Bridge and Halford programs, we host Science Saturdays for underprivileged children in East Palo Alto. We have hosted several off-season workshops to encourage STEM education at Castilleja and worked with our mentors to hold summer programming lessons in Java. Additionally, we spread the message of FIRST at school meetings and open houses for both middle school and high school.

Describe the impact of the FIRST program on your team and community with special emphasis on the 2012/2013 year and the preceding two years:

The FIRST program has inspired over 90 percent of our team members to pursue careers in the STEM fields, and many alumnae even return to mentor our team. We have pushed for the expansion of our school's STEM education program, and as a result of our efforts, Castilleja has offered courses such as Computer Science, Engineering Sustainable Solutions, and even Robotics. Gatorbotics also partnered with our school to create the Bourn Idea Lab: a space for hands-on learning and tinkering.

Team's innovative methods to spread the FIRST message:

In 2012, our team initiated an online project called Five Awesome Robots. Partnering with five other teams from across the country and even one in Australia, we post weekly videos to document our progress throughout the build season and to spread the FIRST value of "coopertition." Our videos have reached over 25 countries and have over 13,000 views. We also represented FRC at the Women in Intel Conference this year and used the opportunity to inspire potential FIRST mentors.

Describe the strength of your partnership with special emphasis on the 2012/2013 year and the preceding two years:

Gatorbotics values FIRST's message of collaboration and teamwork. In addition to our Five Awesome Robots YouTube project, we are working to create the first all-girls FRC team in Shanghai, China. We also helped students at Pinewood start a new FRC team, mentored FLL and Tech Challenge teams, and have students who participated in Iridescent's Technovation Challenge for girls. We also partner with companies like Google, Palantir, LinkedIn, and many more through our sponsorships and mentors.

Team's communication methods and results:

Gatorbotics uses email and Google Docs to keep team members, families, and mentors up-to-date. We communicate with our local community by volunteering at Castilleja open houses, clubs fairs, FLL tournaments, school meetings, and conferences. We also maintain a daily blog on our website, update our Facebook page, and "tweet" regularly - all of which receive consistently high traffic. Through our Five Awesome Robots project we communicate with thousands of people from around the world.

Other matters of interest to the FIRST judges, if any

The spirit of FIRST is present in all aspects of our team, from pressing our school to offer computer science to contacting our local congresswoman, Anna Eshoo, to set up a meet-&-greet. We also give tours of our lab to potential sponsors, our mentors, and our community members such as Pinewood's rookie FRC team, whom we helped throughout the 2013 season. Our team is a sisterhood based on a common love of the STEM fields and a goal to spread the message of collaboration and women in engineering.