

Chairman's Award - Team 1466

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2020 - Team 1466

Team Number

1466

Team Name, Corporate/University Sponsors

KLA Foundation/Arconic Foundation/Y-12 National Security Complex/Planet H2O/Auxier & Associates/Bobcat of Knoxville/RockyTop Coatings Shop/Tennessee Society of Professional Engineers&Webb School of Knoxville

Briefly describe the impact of the *FIRST* program on team participants within the last five years.

FIRST has helped current and past members of Team 1466 learn skills, including usage of power tools, CAD design, and programming, that they likely wouldn't have learned otherwise. Team participants are able to gain hands-on experience in engineering and find their interests. In fact, from a recent survey that we conducted of Webb Robotics alumni, 80% of respondents are in college studying or have completed majors in STEM fields, subjects strongly tied to what they did as active team members.

Describe the impact of the *FIRST* program on your community within the last five years.

The FIRST program, being very invested in volunteering and the sense of responsibility towards the community, has definitely passed that spirit down to 1466 members and branched further to the whole Webb School campus. Our school recognizes our team's value. They've added robotics to the general middle school curriculum, added more computer science and entrepreneurship classes at the high school, and asked us to design a new robotics community and innovation center, currently under construction.

Describe the team's methods for spreading the *FIRST* message in ways that are effective, scalable, sustainable, and creative.

We have helped start many FRC teams in our area, as well as partnering with several community organizations. At our local Boys and Girls Club, we hosted a LEGO Expo that introduced young minds into the world of engineering. We work with several local summer and after school programs, both on and off of our own school campus, to teach kids everything from simple machines to coding to prototyping to team-building to help instill in them the values of FIRST.

Describe examples of how your team members act as role models and inspire other *FIRST* team members to emulate

Webb FIRST Robotics members bring their dedication to community and leadership efforts outside of the robotics curriculum. Over the past 5 years, 25% of graduates have been Eagle Scouts or Gold Award winners. There have been several Presidential Service Award winners. Team members complete a minimum of 60 hours of community service by graduation. We volunteer on our school campus and in the Knoxville community to share what we've learned through robotics and how we hope to improve our community.

Describe the team's initiatives to help start or form other FRC teams

As the 2nd oldest FRC team in Tennessee and the oldest team in East Tennessee, Team 1466 mentors and students have been active in the growth of FIRST in our region. Over the past 16 years, we've worked with most of the area teams in their rookie and early seasons, providing technical support, work space, parts, and mentor involvement to help them each establish sustainable FIRST programs. We've hosted workshops for local teams and given several presentations on robot design and game strategy.

Describe the team's initiatives to help start or form other FIRST teams (including Jr.FLL, FLL, & FTC)

Our team and mentors started one FTC program and two FLL programs: FLL at Webb's Lower School and FLL Club at Boys & Girls Club of Knoxville. Members of our team help by mentoring and volunteering at Lower and Middle school robotics events and meetings. We have at least one FRC team mentor or student at those FLL and FTC meetings every week. Our team mentors regularly volunteer at TN FIRST off-season events and FLL, FTC, and FRC competitions to help build those programs locally.

Describe the team's initiatives on assisting other FIRST teams (including Jr.FLL, FLL, FTC, & FRC) with progressing through the FIRST program

We have mentored our school's FTC (9934) team for the last 5 years and FLL (5358 and 5360) teams for the last 8 years. Members of team 1466 head down to Webb's Pre-K-5 Lower School every week to help our FLL team (5358) and LEGO Robotics Club. They meet year-round, working on programming, Sumobots, fun LEGO building projects, and the FLL season challenge. We introduce them to the concept of prototyping to help them build sumobots. During the FLL season, we help them bring their ideas to life.

Describe how your team works with other FIRST teams to serve as mentors to younger or less experienced FIRST teams (includes Jr.FLL, FLL, FTC, & FRC teams)

In addition to direct mentoring of FRC, FTC, and FLL programs, we do our best as a team to share knowledge and experience with those who are new to FIRST. Over the past five years, we've served as remote mentors for the Robots in the Outback program. We provided technical help remotely to other Tennessee teams via local Slack online mentoring network. Our team actively shares our progress via social media and students regularly present at FIRST events like the Smoky Mountain Meet and Greet.

Describe your Corporate/University Sponsors

Our sponsors include Webb School of Knoxville, KLA, Y-12 CNS, Tennessee Society of Professional Engineers, TVA, Arconic, and Planet H2O. We also have sponsors in the non-traditional sense: local shops such as Baird and Wilson Sheetmetal and Rocky Top Coatings Shop partner with our team and provide technical services.

Describe the strength of your partnership with your sponsors within the last five years.

Team 1466 has a strong relationship with its sponsors. We have been on many sponsor visits and demonstrations and we have worked with sponsors to help run events for their employees or community events. We've attended several KUB employee appreciation picnics with our robots as well as volunteering yearly at TVA community STEM events such as the Tennessee STEAM festival. Team members have also had internships with ORNL, KLA, Baird & Wilson Sheetmetal, and more.

Describe how your team would explain what FIRST is to someone who has never heard of it

FIRST Robotics is a unique program that offers opportunities for students to apply their heightened sense of curiosity in the world of STEM. While FIRST focuses on robotics, it also cultivates team-building and leadership skills through intense competitions. These competitions not only challenge each student to use their knowledge and experience in a variety of fields, but also prepare them to be tomorrow's problem solvers.

Briefly describe other matters of interest to the FIRST judges, if any

We prioritize welcoming students who aren't naturally drawn to math or science. Attempting to emulate the real world, we invite students who have interests in business, art, film, finance, etc. This year we partnered with Webb's journalism program to advertise our team. We solicit help from Webb's Business Club with finances. Two members of our art team have collectively won 2 Gold Keys and an Honorable Mention in the 2020 Scholastic Art and Writing Awards. One of our mentors is a band teacher.

For FRC teams older than 5 years, briefly describe your team's broader impact from its inception.

In 2004, team 1466 was a rookie team and the only FRC team in Knoxville, TN. Our team helped FIRST grow locally. Our students and mentors could often be found in the labs of new teams over the course of the last 16 years. We presented our robots at other high schools, taught teams about CAD, and shared scouting info at competitions. Team members served on Regional Planning Committees for several years. Of our 120+ alumni, around 40% report volunteering in FIRST or other STEM youth programs.

Team Captain/Student Representative that has double-checked this submission.

Meryl Ye

Essay

Students at the Webb School of Knoxville have the opportunity to attend a phenomenal school with top-notch educational resources. The mission of Webb Robotics -- team 1466 -- is to give students in all grade levels a way to put the myriad of valuable learning experiences available to work. Where much is given, much is expected, so through the robotics program, students can meet that expectation, learn more about engineering concepts, and help others find those same opportunities.

Webb Robotics was founded in 2004, making it the oldest team in east Tennessee. Since then, we have experienced highs such as regional wins, as well as lows where the robot just didn't work as intended. The team's success has varied widely from year to year. The past few seasons have defied that trend, and every year we make stable progress. An important factor in this growth is our more recent efforts to recruit and retain new team members from the student body.

Efforts to promote engineering within the school start with some of the youngest students. We began our interaction with elementary school students through helping teach a weekly after-school Lego robotics club. During the off-season, we send students each week to mentor the children through assembling and programming simple motorized Lego devices. The tasks are not overwhelming, but they are engaging enough to keep these students interested in what they can do with technology in the future.

A few years ago, we also presented our FRC robot to third, fourth, and fifth grade science classes near the end of the school year. This showed them what sorts of projects they could take on by applying their knowledge of science. When showing the younger team our robot, it appeared to be impossibly complex compared to some of their experiments, but we made it relatable by describing how our design and decision-making process is similar to the scientific method they are taught. These presentations were especially effective with fifth grade students, who would soon be moving up to the middle school where new opportunities to participate in robotics programs awaited.

Slightly older students can participate in the school's FLL team. That shared experience enables members of Webb Robotics to help the new students learn how to approach the many challenges on the FLL board. Our high school students have a chance to experience what it is like to be a mentor as we help younger middle school students bring ideas into reality.

After one year of studying in the middle school, students at Webb can join our FTC team. This brings them a step closer to the greater scale and complexity of FRC while remaining approachable. FTC team 9934 is only in its fifth year, but we have helped them learn how to plan for a build season, accounting for limited time. We have also assisted in putting together an engineering notebook for tracking progress over the course of multiple meetings. While they work, we discuss similar design challenges we have faced through participation in FRC. This serves the dual purpose of sharing our insight and piquing their interest in trying FRC. Some of these students have even joined the high school team before entering the 9th grade. "The transition to FRC has been incredible," Nicholas Kurzak, one of our middle school team members said. "Working with FTC first has made it a smooth transition."

This outreach has brought more young team members to Webb Robotics, and on most weekdays, a visitor can look into our lab and see more than half of the students working are sophomores and younger. The younger team members also find themselves more educated early on, both in and out of the lab. Eighth graders are becoming familiar with the concept of torque years before taking a physics course, and those same students are learning practical machining skills, such as milling slots. With freshman team members learning skills previously mastered almost exclusively by juniors and seniors, we are excited to see what the freshmen will learn by the time they are seniors themselves.

We have also extended our mentorship to the local community. The Boys & Girls Club in downtown Knoxville runs a weekly Lego robotics afternoon activity, and outside of the build season, we send a few students to help at each of these meetings along with the Webb FTC team head mentor. The FLL team and FLL club have been growing in popularity each year, so it's not unusual to have three children for each robot and laptop. Even with limited resources, these students are still eager to learn and ask our team members questions.

Webb Robotics has a presence at the school beyond those already interested in STEM programs and levels of FIRST. Our school's schedule includes a daily all-school meeting, which includes time for various announcements. We regularly utilize this time to show videos of our robots, competitions, and other projects. The days our videos are shown are considered by many to be among the most memorable of the meetings.

After the build season and a regional event has finished, we show a video of the robot operating and competing. Most of the people watching these videos are familiar with the opportunities our team provides, but many of the freshmen are still amazed by the display. Their excitement over our successful designs is a chance to see the program through new eyes and appreciate yet again how fortunate we are and what our engagement with the community and school means to the beneficiaries.

Recently, we have made greater efforts to shape our team image while also documenting our endeavours in enjoyable ways. Many team members are talented artists who work eagerly to design new concept art for buttons and t-shirts, which we proudly wear in and outside of school. For the past few years, we have also begun making video logs regularly to keep track of our team progress. While a lot of the footage ends up in the blooper reel, the video logs have been of great help in looking back on strategy planning and prototype designs. As for the jokes and laughs sprinkled throughout our videos, they just show our audience that fun and productivity can indeed coexist, making robotics ever more appealing to potential new members.

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Whenever there is an occasion, we bring out the robots featured on our Instagram and video logs as a demonstration of our accomplishments and to raise awareness and excitement for our program. Every year, Webb holds a fundraising event called Webbfest, featuring carnival games, inflatable slides, and, as of a couple of years ago, robots. Due to the crowds of young children running around the field, we can't perform any tasks resembling an FRC challenge without a large, clear area, but even at the most crowded times of the carnival, driving a chassis full of blinking electronics is enough to catch a curious person's eye. The younger children, whom we are careful to avoid running into, are often the most interesting to talk to while managing our tent. "How do you make the robot move with that?" one of them asked, pointing at a gaming controller plugged into our driver station laptop. He found it fascinating how the laptop and robot could communicate over radio waves like what he used to play music while riding in a car, and it is our team's mission to help children like him through various grade levels and associated STEM programs.

We also display our robots at local community events. We have participated in an off-season tournament at the Tennessee Valley Fair called the Robo-rodeo, driving around our robot and playing the game for a broad, uninitiated audience. In addition to the Robo-rodeo, we drove our robot around Market Square downtown in the Tennessee STEAM Festival. Different levels of STEM and arts education were represented there, and our team acted as ambassadors for what the future may hold for those interested in the activities.

Just as important as its other contributions, our team has a strong record of helping students achieve goals and producing successful individuals. The process of nominating Dean's List Semi-Finalists has delivered indispensable interviewing practice, and we have had two finalists recognized in recent years.. Alumni of the team have won important scholarships and gained prestigious benefits at college, such as a previous team captains winning the Jefferson Scholarship and Danforth Scholarship.. Other members have been inspired to continue studying as undergraduate students what they focused on as part of the robotics team.

Webb Robotics is a pillar of the local community, sustaining the robotics program at a local Boys & Girls club and playing an integral role in just about every interdisciplinary STEM education program at Webb School. Our team has shown that an effective implementation of the FRC program is beneficial to the whole community both before and after high school, not to mention the difficult yet highly rewarding and addictive experience of working on the team. Whether a rookie team at our regional needs help finishing a robot or bumpers, or our school administration offers an opportunity to present about our projects or help with something new, we agree and ask when we can start. We are always available, just a few steps away from their pit or office and in line with their aim of educating and inspiring the next generation of engineers.