Chairman's Award - Team 4159

Print Close

2021 - Team 4159

Team Number

4159

Team Nickname

CardinalBotics

Team Location

San Francisco, California - USA

Describe the impact of the *FIRST* program on team participants within the last 3 years. This can include but is not limited to percentages of those graduating high school, attending college, in STEM careers, and in *FIRST* programs as mentors/sponsors.

Our team welcomes all with a passion for robotics, no matter their background or prior knowledge. Through kinesthetic learning and enriching experiences, we teach members invaluable engineering and interpersonal skills that can't be learned elsewhere. 3 of our mentors are FIRST alumni, using their experience to improve the next generation of FIRST students. 100% of our alumni pursue higher education, 92% major in a STEM field, and many join companies like SpaceX, Facebook and Apple.

Describe your community along with how your team addresses its unique opportunities and circumstances.

San Francisco is a forefront for innovation in STEM but lacks opportunities for youth to engage in hands-on robotics activities. We've gone to 80+ events in the past 5 years, encouraging them to take STEM classes and opportunities. Our city is full of tech companies, startups, and creative spaces, and we take the opportunity to tour and learn about the STEM workplace. In the past, we've toured and attended workshops at companies like Salesforce, Intuitive Surgical, Creator, Bolt, etc.

Describe the team's methods, with emphasis on the past 3 years, for spreading the FIRST message in ways that are effective, scalable, sustainable, and creative. How does your team measure results?

We strive to make FIRST more accessible by working individually with public libraries to set up community FLL teams, expanding FIRST throughout the city. For 4 years, we've held our annual summer camp for UBER, giving children a taste of FLL in an engaging and unique way. We've also hosted a CAD workshop for our school, making FRC-related skills available to a wider community. We measure success through our reach--90 Uber kids, 15 FIRST events volunteered at, 180 hours of mentoring, etc.

Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.

As the longest-standing team in our city, we lead by example, showing younger teams how to run sustainably. We act as a pillar for the SF FRC community by creating and maintaining the SF Support Network and hosting our Kickoff event, which we've run for the past 7 years. Our members show their commitment to strengthening and spreading FIRST programs by devoting 4700+ volunteering hours over 45 events throughout the past 3 years, including our 5-year-standing FLL Qualifier.

Describe your team's initiatives to Assist, Mentor, and/or Start other *FIRST* teams with emphasis on activities within the past 3 years.

We're working with public libraries to set up FLL teams, and have created 4 teams at schools. We've mentored 13 FLL teams and encourage them to move on to FRC. Using the SF FRC Support Network, we're able to get reliable updates from nearby teams and can assist them when needed. For instance, we hosted workshops for new SF FRC teams over 5 weeks in the 2020 offseason. We work with high schools to help new teams, having started 1, mentored 2, and assisted 3 FRC teams in the past 3 years.

Beyond starting teams, what initiatives have you done to help inspire young people to be science and technology leaders and innovators? What results have you seen from your efforts in the past 3 years?

Every month, our team travels to Maker Faires and similar science events, demoing our robot to budding leaders of STEM. We host tours at SFR and also demo our robot at our FLL Qualifier, answering questions from bright-eyed students about how our robot was built. We have taught curious students through LEGO MINDSTORMS workshops, developing their passion for innovation at a young age. We've seen a dozen of our own members join the team after attending one of our events.

Describe the partnerships you've created with other organizations (teams, sponsors, educational institutions, philanthropic entities, etc.) and what you have accomplished together with emphasis on the past 3 years

This year we hosted our 4th Women In STEM Panel with IGNITE to inspire girls at our school to pursue STEM careers. With EcoFIRST, an environmentally friendly FIRST community, we hosted a social media campaign raising awareness of environmentally dangerous practices. We work with UBER to host a summer camp, as well as 2 other summer programs for underprivileged youth. With FUN, we've hosted a series of 6 video game tournaments to raise morale during quarantine, and are planning our 7th.

Describe your team's efforts in the past 3 years to promote equity, diversity, and inclusion within your team, *FIRST*, and your communities.

We are proud of our team's balanced gender ratio in a male-dominated field. About 85% of our members are of minority ethnicities and 20% are low income. Outside our team, we work to narrow the gender gap by organizing 4 Women in STEM Panels in the past 3 years, connecting female and non-binary students to successful female STEM professionals. We stand as an LGBTQ+ of FIRST partner team, supporting the organization through outreach at our competitions.

Explain how you ensure your team and the initiatives you have created will continue to run effectively for the foreseeable future

We document each initiative with descriptions, contact information, and how-to-continue sections to allow for the preservation and maintenance of each project. Team leaders write project handbooks for events like our IRC and Pasta Dinner to pass down knowledge and make the upcoming year more efficient. In our annual Internal Robotics Competition, we teach all new members valuable engineering, leadership, and teamwork skills that they'll use during the Build Season and in leading the next IRC.

Describe your team's innovative strategies to recruit, retain, and engage your sponsors within the past 3 years

We recruit new sponsors by reaching out to the parents of our team members to connect to companies and by applying for grants. To maintain the relationships we have built, we show our appreciation through thank you cards and other gifts and keep in contact by inviting them to our annual Pasta Dinner and sending monthly updates. Welcoming more than financial support, we attend workshops on organization and leadership by sponsors like Intuitive Surgical.

Highlight one area in which your team needs to improve and describe the steps actively being taken to make those improvements.

As new members come in and dozens move on, it is essential to pass down their skills and knowledge. Beyond training workshops, we're working to increase documentation by making it accessible and useful to all members. Team leaders write a handbook at the end of the year to preserve information for those who will fill their position in the future. We've also introduced a Documentarian role, which keeps track of trends in each subteam, updates the team, and improves inter-team communication.

Describe your team's goals to fulfill the mission of *FIRST* and the progress you have made towards those goals.

Throughout the 2020 season, we planned to work with 2 summer camps with the goal of sharing FIRST's opportunities with underprivileged youth. Although the camps postponed partner programs, we will be working with them next year. We've also been in contact with our school district to plan FosterFIRST, an initiative that encourages foster youth to succeed academically through STEM.

Briefly describe other matters of interest to the *FIRST* Judges, including items that may not fit into the above topics. The judges are interested in learning about aspects of your team that may be unique or particularly noteworthy.

We're working on a fundraising campaign to donate money to a local homeless shelter by selling team-designed t-shirts. We're starting a graphic design competition for FIRST teams as well. Within our school, we've hosted a CAD workshop to garner interest for robotics, and are planning a panel of school clubs to show middle schoolers the STEM opportunities

available in high school. Furthermore, at the beginning of quarantine, a team member and mentor created face shields for first responders.

Essay

From SPROUT to SAPLING to TREE to FOREST, our team has grown up and out, spreading our roots throughout our community and now into the ambitious future.

SPROUT: Starting Years

Before our founding, San Francisco lacked FIRST opportunities for students seeking real-world STEM experiences. That changed 9 years ago, when a dozen driven students in the back of a physics classroom planted the seeds of Team 4159 CardinalBotics, now the oldest FRC team in SF. Over the seasons, our team has grown, standing tall among FIRST teams in our community.

As time passed and our founders graduated, there came a need to train new members in a sustainable and effective way. In response, students created the Internal Robotics Competition (IRC) in 2014 to teach new members basic mechanical and soft skills. The IRC simulates an FRC game on a smaller scale, allowing all new members to gain the experience needed to actively work on the robot during build season.

During our second Kickoff, we began hosting a community viewing for fellow FRC teams to brainstorm and learn from one another. Our team sets up a human simulation of the new game for all teams to begin strategizing.

Our first ongoing initiative to introduce FIRST to a wider audience was to demo our robot at schools, STEM Nights, and Maker Faires. We still maintain this tradition, totaling around 80 demos in the last 5 years.

SAPLING: Lasting Impacts

With the tools of success now firmly rooted, we turned our sights to the sustainability of our team and our initiatives with the SF community.

When our team grew to 50+ members, it was difficult to afford everyone the opportunity to go to Championships. Beginning in 2017, we were determined to eliminate out-of-pocket fees, so we redoubled our effort to find grants and connect with sponsors. Since then, we are proud to say that everyone can succeed on our team, regardless of socioeconomic background.

To financially support our team, we've held our annual Pasta Dinner for 5 years, raising a total of $16,000 in revenue. At a lakehouse, in front of plates of pasta, we demo our robot for attendees and offer LEGO MINDSTORMS to give children a taste of FLL. More than a fundraiser, the Pasta Dinner is a networking opportunity to connect with sponsors and our community, with around 100 people in attendance per year.

With the support of sponsors and fundraisers, we focus on giving back to FIRST by spreading and supporting the program□our team started 4 FLL teams, mentored 17, and transitioned 3 from FLL Jr. to FLL. With the start of these new teams, we began our annual FLL Qualifier in 2015, with our team putting in 1500 hours over 3 years in roles ranging from Field Reset to MC. Up until 2020, ours had been the only FLL Qualifier available in SF, but our donated resources and volunteer work supported a new one.

To encourage middle schoolers to continue their FIRST journey in high school, we demo our robot and give tours of our shop throughout the FLL Qualifier. In addition, for the past 3 years, we've invited students from local middle schools to tour the SFR. Many of them entered FRC, with more than a dozen of our own members joining us after attending one of these tours.

Along with FLL teams, we focus on boosting FRC in our community□over the years our team has started Teams 5700, 5924, and 7468. In addition, we have mentored 3 FRC teams, assisted 7, and mentored an FTC team. One of the teams we mentored, Team 6000, was started by a team alumnus. One year, when they were unable to compete due to religious commitments, we quickly flew a drive team and pit crew to LA to act in their stead.

While strengthening FRC teams individually, we also reinforce the SF FRC community as a whole. We sustain teams around us by creating and maintaining the SF Support Network, a platform for spreading information and new ideas. In 2019, we collaborated with teams in the Network to build a practice field.

With this rise of new FRC teams, there was an idea to form a regional within the city. In 2017, we worked with Team 5924 to start and plan the SF Regional and have contributed a third of all volunteers each year since. Through competitions such as Calgames, SVR, and CCC, as well as other community events, we've devoted 4700+ volunteering hours in the past 3 years. Through our consistent volunteering at FIRST and other STEM events, we give back to our community by supporting FIRST teams and competitions.

TREE: Spreading Upwards

As our team thrives and flourishes upon our steady foundation, we now spread our canopy to provide STEM opportunities to the community around us.

Beyond working with FIRST teams, we work with companies to let students explore the STEM field. For the past 4 years, we partnered with Uber to host an annual week-long summer camp for their employees' children. Through our LEGO MINDSTORMS curriculum for the younger students and VEX curriculum for the older ones, the children dive headfirst into a hands-on learning experience that teaches them problem-solving and programming.

One of our core values is gender equality in the STEM field, so we strive to empower female voices within our team and school. In the past 3 years, 56% of all leadership positions and 67% of board members identify as female. We have an even gender ratio□people of all gender identities are welcomed and supported on the team. Furthermore, the new year marks our 4th WiSTEM panel in partnership with IGNITE (Inspiring Girls Now In Technology Evolution). Women in STEM fields share their experiences with young women and non-binary students eager to follow similar paths. We've amassed an audience of 200+ students, with one attendee reflecting on the feedback form: "It inspired me to look into robotics, engineering, something I had not considered as a career path for myself before."

We inspire our members by touring local Makerspaces and tech companies such as Creator, Salesforce, and Bolt to get a sense of the STEM opportunities waiting for them in the professional world. Through leadership and organization workshops at companies like Intuitive Surgical, our members directly learn from industry leaders while forming new connections.

During 2020, quarantine halted many of our planned outreach initiatives. Rather than viewing this as a setback, we took the chance to make internal improvements and initiatives that brighten our community. We started a monthly newsletter to share updates on current projects with our families, mentors, and sponsors. They incorporate topics from our recent outreach initiatives to progress updates of our robot. These newsletters ensure that no one feels left behind, something of paramount importance when we cannot meet face to face.

Before quarantine, we had noticed that there were always exhausted students standing outside our school waiting for the bus. So our team designed and constructed an eight-foot long bench from scratch, all while following safety guidelines. Through email communication with the school district's architectural team, we successfully erected the project.

With competitions cancelled and the spirits of many teams low, we strove to cheer up the community by partnering with FUN (FIRST Updates Now) to host a series of 6 video game tournaments. 116 teams from both FRC and FTC participated, helping keep the essence of FIRST alive even without in-person events. Encouraged by the engagement, we're enthusiastically planning the next tournament.

FOREST: Our Ambitious Future

Our team has grown larger, stronger, and more determined over the years, giving us the ability to reach new heights. Throughout the past year and into 2021, we have been steadily fleshing out plans and are ready to take the new season head on with ambitious new outreach initiatives.

During 2020, we worked with Seven Tepees and Aim High, two summer camps helping underprivileged youth learn in more engaging ways. We designed a LEGO MINDSTORMS curriculum that teaches programming skills and robot design to students so they can build a small robot to pass a series of challenges. Even though these summer camps chose not to host partner activities due to safety concerns this year, we're excited to continue supporting their mission of STEM education in future summers.

In addition to summer camps, our team has been forming an SF-wide FLL program for budding innovators. We envision local libraries as hubs for easily accessible community FLL teams, giving students the opportunity to experience the excitement of coopertition with other youth. With one major library confirmed, we're contacting other branches in SF to reach a more diverse range of students from different backgrounds.

Reaching outside of California, we are in contact with an alumnus of our school to start a FIRST team in Dallas and are working with school officials in Argentina to start a FRC team once school resumes there. During past school years we have and will continue to introduce FIRST to foreign exchange students, planting the seed of STEM education where FIRST is less common.

To make our team more successful and efficient, we are on track to construct a separate STEM building on the school

campus. Our vision is to enlarge our workshop, and more importantly, build a practice field open to any team that needs the space. The new robotics building will allow us to move past the limitations of our small workshop, and promote collaboration between the SF FRC community.

The unpredictable year of 2020 has tested our team's ability to provide unique STEM education and inspiration for students in our community. However, our resilience enables us to make the best out of our circumstances: hosting virtual workshops, planning for future initiatives, expanding the FIRST network, and bringing our community together in quarantine. Beyond 2021, our branches are not just reaching up but out, spreading FIRST and STEM to all.