

Chairman's Award - Team 254

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2020 - Team 254

Team Number

254

Team Name, Corporate/University Sponsors

NASA Ames Research Center/Johnson & Johnson/Apple/Google/Lockheed Martin/Innovation First International/West Coast Products/Gilbert Spray Coat/AMEX Plating/Applied Welding/Auris Health/BAE Systems/Intuitive Foundation/Qualcomm&Bellarmine College Preparatory

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

All students on Team 254 develop diverse skills through our technical and nontechnical subteams (grant writing, documentation, leadership, technical, communication) and pursue higher education (B.S. & M.S. degrees) and jobs in the tech industry (LinkedIn & Auris Health). Many members now give back to the program, with seven mentors being Team 254 alumni and two alumni-parent mentors. Members form long-lasting friendships and explore new opportunities: TechCrunch Conference & Annual F4 Cadathon.

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

For many students in Silicon Valley, including members of our team, *FIRST* is often their first experience with robotics and the applications of STEM. We organize numerous outreach events to highlight STEM's effectiveness in solving world challenges, such as Discovery Day (an annual STEM expo in AT&T park), Toys for Tots (a full-day robot demo to introduce East San Jose students to *FIRST*), and Engineering Day (a STEM event hosted at our high school), attracting 120+ students per event.

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

We host Chezy Champs, an annual off-season tournament attended by ~40 FRC teams competing for the title of "Best in the West". 254 members and mentors volunteer 1000s of hours into the event, recruiting volunteers from *FIRST* communities around the world. Team 254 assists *FIRST* teams by sharing resources such as Cheesy Parts and Cheesy Vision at events & online over Chief Delphi and presenting Solidworks Design WRRF FRC Workshops at Santa Clara University & Microsoft's San Francisco office.

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

In the spirit of Gracious Professionalism, our team shares its resources and expertise (Cheesy Vision & Cheesy Parts) with other teams for experience and to learn new methods of approaching problems. In our build blog and annually published tech binder, we share our design process and concepts for our team robot. During competition, our "Robot *FIRST* Aid" policy allows us to work with other teams to ensure that every team is able to operate at full capacity in matches.

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

In addition to sharing our resources and help to other FRC teams, four years ago our team aided the establishment of FRC Team 5924 at another Catholic high school in the Bay Area, St. Ignatius College Preparatory. Sharing our technical knowledge, we aided the team in creating equipment lists, a budget plan, and structured an organizational system based on our own. Now the FRC Team at St. Ignatius College Preparatory hosts the annual San Francisco Regional, attended by several local teams.

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

Team 254 has taken initiative in helping middle schools throughout the Diocese of San Jose to form teams in six Catholic middle schools, which include St. Christopher's, Nativity, and St. Martin of Tours. As a result, FLL Team 8454 and FRC Team 75 have been formed from this effort and initiative, along with 3 other FLL teams that are mentored by individual Team 254 members. Team 254 members also started FLL Team 35052, Lego Stars, at James Franklin Smith Elementary School in South San Jose.

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

The team assists other *FIRST* teams through releasing technical resources to the public. Team 254 releases its robot code and the build blog, breaking down design choices made during the build process, allowing other teams to follow and possibly adapt certain aspects of our engineering process. Just this past season, we also helped FLL Team 35052 Lego Stars in an effort to give younger students the opportunity to gain technical skills early, before participating in FLL and FRC.

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)

Team 254's commitment to excellence and spirit of Gracious Professionalism has inspired other teams to work with us in serving the community. Team 971 now holds design reviews of its own, taking inspiration from 254's design reviews. All year round, Team 254 opens its lab space for other teams to get parts manufactured and get some driving experience on our practice field. We also invite *FIRST* teams from around the world for lab tours.

Describe your Corporate/University Sponsors

Team 254 is sponsored by a variety of companies in the Bay Area. BAE Systems, an aerospace and defense company, and Qualcomm, a major smartphone chip producer, are both long-time sponsors of the program. The team has also been supported by companies such as AMEX Plating and NASA, who offered monetary donations and metal plating services, Google, West Coast Products, Lockheed Martin, Intuitive Surgical, Auris Health, Carbon and Linear Technology, a semiconductor manufacturer.

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

The team maintains its relations with diverse sponsor base through continual updates, annual sponsor gifts, and representing sponsors on our team shirts, robot, pit, and website. Our sponsorships cover in-kind donations and additional monetary funding. We also invite our sponsors and potential sponsors for lab tours, such as Ford in December 2019. Sponsors are given team shirts and invitations for them and their families to attend robotics events to see how the team operates in competition.

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

Team 254 was responsible for innovating and popularizing the "West Coast Drive" drivetrain that numerous FRC teams use today in their robots. A mentor on Team 1538, the 2013 Chairman's Award Winner, said, "There's no doubt that The Holy Cows wouldn't be the team they are today without the extraordinary efforts of The Cheesy Poofs." Team 254 has also helped start two *FIRST* teams in Hawaii--Teams 359 and 368.

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

FIRST is an organization dedicated to spreading the wonders of STEM to every corner of the world. *FIRST* is a great way for passionate students to explore robotics with a fun and creative approach. *FIRST* is unique since it imbues values such as collaboration, leadership, and critical thinking into a technical learning environment. Most of all, students in the program are able to find a supportive community that will enable them to solve the world's challenges.

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

Team 254 has integrated a subteam system that allows students to develop their own interests. These interest groups (Design, Prototyping, Manufacturing, Ordering, etc.) are divided into specific subteams with a student leader, who divides tasks and projects for individual members to complete. By assigning students into technical and nontechnical subteams we also increase the effectiveness of our team because students grow in one direction instead of being a "jack of all trades".

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

Shruthik Musukula

Essay

Mission

Founded on the unwavering dedication of its members, The Cheesy Poofs' excellence in robotics is driven by leadership. Leadership gives our team something to aspire towards and directs our efforts to a central goal. Inspired by this force, Team 254 prepares its members to become leaders in technology through our dedication to innovation, teamwork, and inspiration.

Our Identity

Over the past few years, team membership has increased to 160+ students, making us one of the largest teams in FIRST. At our school, Bellarmine College Preparatory, membership in our team is comparable to varsity football, basketball, and water polo teams combined. To expand interest in STEM, we make robotics a school activity accessible to all. Our 160+ students bring diverse interests and skills: 75% participate in other extracurriculars.

The core theme that drives our team to excellence is the question: "How can we accomplish our tasks in a way that nobody has done before?". In everything we do, from technical achievement to media operations, we always keep in mind what makes us different, and how much effort it takes to achieve excellence. Our subteams take years of 254 innovation and experience and apply it in a unique way every year. To us, you can't achieve excellence without doing things differently.

The leadership team, chosen through an open application, is the core of our management structure. The 13-member leadership team provides the centralization and division necessary to operate a large organization. Other students lead build and competition subteams. Thirty current team members have served in leadership positions over the past 2 years. Allowing students the opportunity to learn time management, responsibility, and communication skills satisfies our goal of building not only scientists and engineers but also leaders in these fields.

Fostering Growth

Innovation is the process of transforming an idea into reality. It enables students and leaders to envision a path, making an idea, reality. The Team 254 experience enables students to take part in the process of innovation, thus equipping students with the necessary skills to become innovative leaders.

Team 254 is committed to raising the standard for what a group of high school students can accomplish. Since Team 254's inception, students have learned from the opportunities our team provides to develop the technical and business skills for innovation. Our iterative process allows us to create hardware and software that is as competitive as we can make it. Teaching leaders about excellence enables them to set high standards for themselves and those they are leading. Our commitment to excellence and innovation is evident in the fact that our team frequently invests hundreds of hours between regionals to redesign and improve entire subsystems. On Team 254, we aren't simply satisfied with a decent robot, we strive to enhance and strengthen any part of our robot that doesn't meet the goals we set for ourselves.

All business and technical operations are managed through the sub-team system: student-led groups focused around a specific (technical or nontechnical) aspect of our team. The sub-team system allows students to focus on their interests, in areas like business development and manufacturing, while giving them the flexibility to explore other facets of our team. Throughout the year, the student leaders of these subteams host workshops to equip their sub-team members to be successful in those areas. The subteams model the structure of a small business and allow students to learn valuable skills that align with their technical and nontechnical interests. Although these more specific skills are important, our members also learn to collaborate on long-term projects, commit to deadlines, and communicate with audiences outside the team. Through our team structure, we empower our students to learn and gain hands-on experience in business areas that align with their passion for science and technology. We create Cheesy Poofs who are adept leaders and team players, as well as budding engineers.

Through a step-by-step design process, students have the opportunity to gain important technical skills by working on robots during the build season and the offseason. The diligent efforts of our team to create a great design for any element of our robot further demonstrates the level of excellence we pursue so that our members can learn to set high standards for themselves and for those they lead. These efforts are rooted in the idea of continual improvement on our team. For example, our creation of a new Cheesy Vision System assists in our team's competition performance. The innovative mindset of the programming leaders on our team enabled them to design a method of detecting objects and structures on the field. We developed a targeting system, using a Nexus 5 as a camera and onboard processor, which we presented to other FIRST teams at the FIRST Championship in 2016. The vision system has been extremely successful within the FIRST Community; our programmers have responded to dozens of requests from other FIRST Teams asking for tips on using our vision system. Creating such programs and the level of excellence we pursue demonstrate the innovative mindset, spread by our team leaders, that we encourage on Team 254.

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Local Outreach

We make efforts to impact communities on a wider scale through outreach and robot demonstrations at community events. We spark interest in STEM in the general public by contributing 500+ outreach hours through many channels, reaching audiences containing people of all ages at events including: Toys for Tots, the Bay Area Science Festival, and Hot San Jose Nights. At every one of these events, we provide up-close, exciting experiences for a huge range of audiences. Every year, we introduce 5,000+ attendees to the value of STEM at the Toys for Tots event, and 30,000+ attendees at the Bay Area Science Festival. In total, we attend 11 outreach events annually to bring FIRST and STEM to underrepresented groups in our community.

FIRST Community

We make efforts to engage with the FIRST community through our sharing of information and resources such as our website, competition strategy, build blogs, WRRF workshops (at Santa Clara University & Microsoft - San Francisco), technical handbooks, and online presence. At FIRST competitions, we organize a Robot First-Aid Team that helps teams who are in need of certain tools or extra hands in solving an issue. In addition to sharing Cheesy Parts and Cheesy Scout, we developed "Cheesy Vision" and posted it on Chief Delphi, an online forum for FIRST teams and followers. A mentor from Team 781 responded: "This is absolutely phenomenal... I have not been this happy about programming for a while [...] I am incredibly grateful." This is an example of our major goal - to use our experience to help others and spread the FIRST message.

Each year, we host approximately 40 FRC teams from around the world at our Chezy Champs offseason tournament. The purpose of the event is to encourage other FIRST Teams to embrace each other in the spirit of friendly competition, STEM, and of course to have fun! As a student-organized event, Chezy Champs allows us to work alongside several FIRST volunteers while also providing a complete tournament experience with judged awards and competition at the highest level.

FIRST Mentors

Sharing knowledge is part of our mission to inspire on Team 254. Not only do we share skills with new members, but we also do share our knowledge for others in our community who are interested in getting involved with STEM opportunities. We reach out to local FIRST Lego League teams, as several of our members dedicate their time to passing their expertise to elementary and middle school communities. During our annual Engineering Day event, we invite local middle school students and teachers to our lab to learn about engineering, as well as to build and compete with a robot.

Inspiring Others

Annually, over 30 FIRST teams utilize our open lab time and scrimmage event to practice and test their robots, learn about the team's processes and be inspired in a different capacity from what they are used to. For many, this is the only chance to practice on an official field and make improvements to their robots prior to their first event. Many teams have commented that this experience is invaluable and a key component to their success during the season.

Since we built Shockwave, a T-shirt shooting robot meant to train new members, we have promoted the team and FIRST at large, public events to reach more people. Shockwave and the current year's competition robot are always present at its events, demonstrating that 254 is committed to bringing FIRST to as large a community as possible. We bring Shockwave to all our outreach events, fashion shows, and Stanford basketball games.

We also provide demonstrations to some of our generous sponsors at company events like BAE and NASA Diversity Days. At our high school, we help in pep-rallies with Shockwave's T-shirt cannon and open up our lab to visitors and prospective members at our school's annual open house. This year, our high school introduced an Intro to CAD class in an otherwise humanities-dominated curriculum, a direct result of our team's use of CAD in our design process.

A Family and A Home

FIRST Team 254 has grown more robust in its operation and its ability to inspire others. Its goal has been to educate and inspire its community, and for the past five years alone, it has achieved that goal and has gone beyond. From Engineering day to Robot First Aid, Team 254 always strives to improve itself both technically and programmatically and anticipates 2020 to be its best year yet. Its students continue to inspire others even beyond graduation, by their mentorship of other students, the outreach to the public, and their constant commitment to excellence.