Chairman's Award - Team 3847

Print Close

2021 - Team 3847

Team Number

3847

Team Nickname

Spectrum -??

Team Location

Houston, Texas - 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.

100 % of Spectrum alumni have attended college with majors, including Engineering, Biology, and Neuroscience. Several are pursuing graduate degrees in STEM fields like Software Design, Medical School, and Quantum & Electronic Materials. Some alumni work in STEM careers and internships with Microsoft, Amazon, Boeing, Lucid Motors, NASA, etc. Spectrum alumni support the FIRST by volunteering at events and with teams. Our alumni provide guidance, share experiences, and inspire our current members.

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

Spectrum's home, Houston, is a city of immense opportunity and crushing economic circumstances. It's the 4th largest city in America, boasting a population of almost two million, and has a poverty rate that hovers around 20%. From fighting food insecurity through an event called CANstruction, with 24,000 cans donated to the food bank, to encouraging STEM among underserved families through free courses and events, we ensure we use our resources to help those in need.

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?

Over the past three years, Spectrum has spread the FIRST message at various events. Demos at the Children's Museum, Houston Flight Museum, and Museum of Natural Science. We hosted an in-service robotics training for the Archdiocese of Galveston-Houston Science Teachers. We participated in Energy Day, Houston's largest annual festival showcasing STEM and we presented at a STEM Coalition in Houston. We Make it Loud with 10.5K+ tweets, 428K+ video views & 500K+ blog views.

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

During our time at home, our team members helped start a way for our team to connect virtually with and learn from other FRC teams. We have met with several FRC teams like #6838, #246, and #7285 over Zoom to discuss mechanical design, outreach programs, game strategy, team communication, etc. Our members have served as role models to these other teams, preparing presentations and answering questions. We are currently producing videos for a virtual FLL tournament to highlight their performances.

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

We curate a collection of online public resources, including our open build blog, extensive CAD library, and design concepts like "Protopipe." We maintain a Recommended Reading list of over 300 links with topics ranging from technical robot design to team organization on our website. We update our "FIRST $1,000" and "Illuminations" publications, which are specifically designed to help new teams be successful. We have begun releasing FRC curriculum videos on our YouTube channel.

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?

Our "How I Work" series allows us to feature prominent members of the FIRST community. We post in-depth interviews for each entry on our website and blog that describe how they became involved in FIRST and the path they took. In addition, we create trading cards with unique factoids about each member, and we display them at our pit for anyone to collect. The cards spread awareness of STEM mentors in a fun and unique way. The "How I Work" section of our blog alone has produced over 39,000 views.

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

We have initiated relationships with several local organizations to give underserved students basic programming and mechanical skills and inspire them to pursue a STEM career. Since 2012, we have worked with a local Boys and Girls Club to host and run "SPECTaculaR," a free, two-week-long robotics camp during the summer. In 2018, we established a robotics summer camp with Microsoft. We have led an all-girls robotics course at St. Agnes's "Be The Change" camp for low-income families.

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

We collaborated with a local National Charity League chapter to provide a "Women in STEM Volunteer Day" at the Houston Food Bank. We discussed prominent women in STEM and demoed our robot. We started the Girls Drive competition at our annual offseason event, the Texas Robotics Invitational, to empower young women and help them recognize their potential; we have received positive feedback: - "Gave us time to build relationships" - FRC#3335 - "Great opportunity. Please keep doing it." - FRC#2468

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

We established a system that gives our members responsibilities to ensure the endurance and efficiency of many aspects of our team, from media and communications to managing our programming materials. Our members collaborate to lead team programs, and they pass on their knowledge to new members. We document, record, and organize our entire team process to ensure its availability for future reference. With our team of leaders, we have been able to run our team effectively.

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

For our largest sponsors, our schools, St. Agnes & Strake Jesuit, we hold annual interest meetings, demo our robots at pep rallies, and participate in open house events. Our sheetmetal sponsor, Solarcraft, has given our team a tour of their facilities; we demoed our robot for their staff. We have created plaques for sponsors to show our appreciation. This year we reached out to Analog Devices, our newest sponsor and FIRST supporter; they are now providing us with financial and technical support.

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

In past years, our team has struggled with giving our members well-rounded training to prepare them for the build and competition season. This fall, we started a new virtual training guide. We have zoom meetings over programming, design, build, and CAD lessons. To follow up with our students, we have lesson feedback forms and assignments to expand their knowledge. Our trainings are recorded and published on our YouTube page for our members and the entire FRC community.

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

Embracing the mission of FIRST, Spectrum enriches people in our communities by spreading the importance of STEM. Our team supports our students and provides them with a meaningful experience. With their knowledge, our members actively seek to help others, whether running our summer camps, creating public FRC resources, or teaching other team members while continuing to develop our team. Our alumni use their Spectrum experiences to inspire the next generation of innovators.

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.

Starting this year, we partnered with STEM-E, an organization to give underserved middle and high school students the skills needed to pursue a STEM career. We will be conducting four 2-hour long virtual sessions this spring as part of an "Intro to OnShape" robotics program. We will give them an overview of why CADing is useful, how to use OnShape, and create some fun and exciting designs. We hope that our OnShape series will inspire these kids to design their own creative inventions.

Essay

"Learn Today, Build Tomorrow"

Spectrum was founded by the collaboration of two rival BEST robotics teams with the goal of doing something greater than either could do alone. The idea that when we learn from others and share our knowledge, everyone can improve is a lesson that has permeated everything we do. We believe that the resources and documentation we share so that other FRC teams can learn today will build a stronger FIRST program tomorrow. We believe that when children learn to be excited about STEM today, they will build better lives tomorrow. We believe that the knowledge FIRST students learn today will propel them to build a better world tomorrow.

As part of our mission to spread STEM, we keep our resources completely open and available to the public. On our Recommended Reading webpage, we curate a collection of hundreds of links over a variety of FRC topics, including team organization, media, brand standards, mechanical design, strategy, and gracious professionalism. Our FRC CAD Collection contains over 500 CAD models of other teams' robots with over 100 links of supporting documentation, including engineering notebooks and build blogs. A member of FRC#5406 noted our CAD Collection is "an easy way to inspire and educate the broader robotics community." Our "Protopipe" 3D models and documentation enable teams to 3D print parts that make their prototyping process more effective. Our "Guide to the FRC MCC" shows how to effectively use limited money, tools, and time to make a "Minimum Competitive Concept" FRC robot. Members of the community have reached out about the positive effects of our MCC guide: FRC#5414 said, "it does not seem like there's a team that puts out more quality content than Spectrum when it comes to helping raise the floor of FRC." Phil So said, "thanks to you and your team for writing such a clear and concise design guide and sharing it with the community." The "FIRST $1,000" and "FIRST $10,000" are tool lists to help rookie teams know what tools to purchase; they have garnered over 3k views on Chief Delphi. Our "Illuminations Guide" provides rookie teams with clarity and information about the build season, competition strategies, design basics, useful resources, and the importance of communication. We wrote and published a series of guides intended to help teams during build season, including our "Advanced Pneumatics Guide," "FRC Powder Coating Guide," "Spectrum Design Concept Slides," "Spectrum Electrical Guide," "Spectrum Design Guide," & "FRC Maintenance Guide." We maintain a photo gallery with over 93k photos. The Robot Mechanism Library is a popular section of the gallery; it has amassed over 83k views and contains images of hundreds of different FRC robot mechanisms.

In 2019, Spectrum joined "The Open Alliance," an initiative dedicated to improving all FRC teams through collaboration and openly sharing designs. We believe that teams can still be competitive while helping others. Since our rookie season of 2012, we share our competition designs and code publicly, and we document our season progress on our Build Blog. We publish our design slides, which contain notes and CAD images of our subsystems written by our members. Our Build Blog has become a popular resource for the FRC Community with over 500k views. Our valuable resources and documentation build a foundation of knowledge for FRC teams to learn from.

Every year, thousands of people work tirelessly for the FIRST community, so we started an initiative, "How I Work," to show our appreciation for their dedication and inspire FIRST students with their impassioned lives. Our students reach out to FRC mentors and volunteers; we conduct interviews based on their interests in STEM, their journey to FIRST, and their most memorable moments with the community. Over eight years, we have interviewed over 40 incredible FIRST members. We create "How I Work" trading cards and distribute them at events. "How I Work" is an exceptional outreach tool and has been an excellent experience for our team to connect with these mentors and volunteers personally. We post the interviews and trading cards on our blog and website for the entire FIRST community. With over 39k views, "How I Work" is one of our most unique initiatives. It has been able to enlighten and influence the FRC community about some of its notable members.

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For six years, we have hosted an annual FRC off-season event, the Texas Robotics Invitational. Our event started small with only teams from our immediate community and has grown to welcome teams from distant regions willing to make the trip. We provide teams a challenging competition, a fun team-bonding night, and an inspirational weekend. We mimic the reality of official competitions while relieving the pressure and tension of official games. FRC#3103 describes TRI as "an excellent way for our team to start training students for the next season." TRI begins with our Girls Drive Tournament to empower young women to experience drive team positions and build a more inclusive STEM generation. The Girls Drive Tournament provides a hands-on opportunity to strengthen their logic, reasoning, and troubleshooting skills, as well as their communication and collaboration skills. FRC#2587 explained how the "Girls tournament increased female interest in joining the drive team for the full season." TRI attendees look forward to the team dinner and dodgeball social where everyone relaxes and has fun. To give people opportunities to learn more about STEM, we host different panels and discussions on various topics throughout the tournament. We promote year-long involvement in FRC by supporting other offseason events, both in and out of state. We have provided live-streaming, video archival, and photography services to 23 offseason events, making them more accessible to the public. "Spectrum has been an avid supporter of Red Stick Rumble, Louisiana's offseason FRC event. Whether it's helping video stream the event, with setup and teardown, or providing volunteers; their assistance has always been invaluable." - Daniel Eiland, RSR Coordinator.

Spectrum members serve as role models, organizing and leading courses for underserved children in our community. We teach them the skills necessary to develop their own STEM innovations. We lead "SPECTaculaR," a free, two-week-long robotics course in the summer with a local Boys and Girls Club. We have been teaching the course for eight years, and we revise our curriculum each year, allowing for returning participants to learn new concepts. With our annual course, Spectrum members make a difference in their lives, establishing friendships with them and helping them realize the importance of STEM. The Spring Branch Club Director said our "work ethic and passion for STEM inspired all the kids we mentored." With St. Agnes, we run the programming sessions during their all-girls "Be The Change" camp for low-income families. Through these coding lessons, we have witnessed the students grow their critical thinking skills and self-confidence. We aim to create a STEM-inspired generation in our local community that will help build a better tomorrow.

During the pandemic, we met with teams FRC#6838, #246, and #7285 via Zoom to discuss topics including team organization, new outreach opportunities, mechanical design, and social media presence. With being completely virtual, we had the chance to meet two international teams from Turkey. We established new relationships with these teams, inspiring us to reach out to more teams. With this initiative, we are learning about the varied workings of other teams, building their knowledge, and creating a lasting impact with members of the FIRST community.

Spectrum has worked in recent months to provide a clear and distinct form of FRC training for our members and the greater FIRST community. Our traditional offseason training for new and existing members relies heavily on being in our lab, learning how to use our tools, and doing projects. We have adapted this to create a completely virtual training series for various FRC topics: Controls (programming and electronics), Design (CAD, mechanical design, and prototyping), Strategy, Build, & Media. For each subject, there are several subtopics, each one covered in a different meeting with a presentation. We publish our meetings to YouTube and Chief Delphi so that the entire FIRST community can access our new curriculum. At the beginning of 2021, We safely met in person at our lab, with masks and social distancing, introducing new members to our space and helping them use tools to build basic designs like bumper corners and rubber band cars. We have published our meetings introducing these designs, walking through the CAD, and videos/photos of the final products.

This year, Spectrum formed a developmental FRC Team, Photon 8515; it's the perfect environment for new students to learn how to dream up ideas and put them into action. During the offseason, Photon functions primarily as a learning platform, teaching members essential skills such as CAD, using various tools and machines around the lab, and utilizing principles of design. Experienced members from Spectrum help with this process, passing on their knowledge and experience from their time in FIRST through instructional videos and training sessions. The team will build a simpler robot using community resources such as the Everybot and Open Alliance. Our main goal with Photon is to give more students hands-on experience at building and competing with a robot.

For over a decade Spectrum's mission has been to improve the FRC experience, accelerate the progress of new teams, spread the FIRST message, and inspire our members to be future STEM leaders. Though we have accomplished a great deal, there is still much to do. The skills we learn in FIRST today, prepare us for a rapidly changing environment and empower us to build solutions to tomorrow's problems.