

## Chairman's Award - Team 2601

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2020 - Team 2601

### Team Number

2601

### Team Name, Corporate/University Sponsors

BAE Systems/Con Edison/Magellan Aerospace/The Mu Family/Queens College, CUNY/THHA/THHS PTA/Titan Machine Corporation/Parkend Group/Grainger/Onsurd&Townsend Harris High School

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

Our supportive learning environment encourages us to develop and advocate for our ideas; we understand that failure is a part of the learning process. Our team comprises many subteams beyond fabrication such as programming, videography, finance, and Public Relations. Being on an FRC team helps each of us explore these options and develop our career paths; 90% of our members pursue STEM majors in college. Our experience on the team fosters our leadership skills and builds self-confidence.

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

We travel from different parts of NYC to our magnet school, but have created a unified community based on our passion for STEM. We demonstrate our robot at many NYC events such as Maker Faire, the World Science Festival, NYSCI's STEM nights and most recently at both the UFT High School Fair and City of Science. Our participation at these events have introduced many students and parents in the NYC community to the hands-on STEM experience that FIRST offers.

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

Daniel Sotelo-Reiner's film "FIRST® Relations" was inspired by the inclusivity of our team. His lead character is a member of the LGBTQ+ community; the cast represents our diverse team. "FIRST® Relations" premiered at the Tribeca Film Festival (4/18), and was screened at the All American HS Film Festival (10/18), the Tribeca Film Institute's Facebook page was visited by more than 1 million visitors, many of whom had been unaware of FIRST's existence.

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

Hawk Talks allow us to share knowledge with teams that come to our school, and distant teams watching via Twitch. We developed a multi-week engineering curriculum we piloted in the Philippines and India. We share our limited build space with teams needing a place to work, and open our practice field to teams in the tristate area. At our competitions we seek out, and assist teams who need assistance, ensuring that the teams we compete with and against us are at their best.

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

During the past five years, we've assisted and mentored rookie teams by encouraging them to work alongside us learning the skills needed to build a robot. We bring our mentees to off-season events, where they compete with the robots we built together. Their experiences in our lab and at competition have inspired our mentees to start FRC teams 5891, 6423, 6593, 8284 and promote STEM in their schools. We continue to assist them by welcoming them to share our build space and practice field.

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

Our visits inspired students at William Floyd Elementary to create FLL team 23094. They won their division's Champions' Award (2018). Our annual visits keep motivating new students to get involved. Their successes inspired 6 other schools in their district to create FLL and Jr.FLL teams. Project SHIFT, our newest outreach, developed to provide STEM opportunities to students in high poverty schools in Queens NY. SHIFT will create and fund 6 FLL teams in the highest poverty schools in Queens.

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

Since 2014, we have been hosting Open Field weekend, where we invite all FRC teams in the tri-state area to our facility. We also annually host our Hawk Talk presentations to share our knowledge on topics robotics. Although small, we've shared our build space and assisted other FRC teams and students that went on to form teams 5599, 6423, and 6593. We've also taken in two members of Team 3017, on the brink of collapse, into our pit crew and helped reinstate their team in 2016.

**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)**

We work with other teams by sharing our scouting data to develop effective strategies and reach out to teams who need help at competition. This year, we also shared our scouting app as an open source code on Chief Delphi and FRC Facebook pages so other teams can expand on our platform. Members volunteer with FRC 694 to mentor many FLL teams at their FLL Clinic. We visit elementary and middle schools annually to demonstrate our robot and introduce students to the engaging world of robotics.

**Describe your Corporate/University Sponsors**

Con Edison reached out to our mentors and provided funding to start an FRC team. Queens College, our PTA, and THHS Alumni joined Con Edison in supporting us. Our corporate sponsors now include BAE Systems (Vision), LMT Onsrud (CNC support), GitHub (software), Magellan (CAD), Titan (machining), Grainger (parts), Prospancy (programming), and Solidworks (CAD software). Their support includes mentoring and parts fabrication, and allows us to grow as engineers.

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

We visit our corporate sponsors' facilities where we hold a FIRST Day, demonstrating our robot, letting them drive it, and highlighting the skills they have taught us and their impact on our final product. Many of our sponsors inform us of their new engineering projects and offer internships to our graduates because of the bond we foster. Every year we send out a calendar highlighting the prior year's achievements. We invite our sponsors to visit our lab space where we show them our robot.

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

The global FIRST community shares our passion for learning and exploring the world. Their annual competitions promote critical thinking and innovation for children as young as 5 through their high school years, as they learn what they need to, to solve problems. FIRST fosters the development of leaders in STEM through mentorship and collaboration. The skills they develop by participating in FIRST programs prepares team members to make a difference in the world.

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

There are no skills required to become a Steel Hawk; all are welcome and everyone is encouraged to find their passion. We supported teammates to host robotics workshops for high school students in their hometown by donating resources and creating the curriculum for Project Philippines and Project India. These workshops piqued their interest in STEM. Project India was recognized by the government, and opened the door to providing some of these opportunities to even the poorest students.

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

Initially, our mission was to create a collaborative learning environment to foster a passion for STEM within our school. In 12 years, our impact has resulted in the percentage of graduating students pursuing STEM majors increasing from 10% to 75%. We have extended our mission beyond our school, through "FIRST® Relations", Projects India, Philippines and SHIFT. We provide opportunities within FIRST to various communities, inspiring the next generation of innovators.

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

Amrita Roy



## Essay

### Our Story

Seven students, two mentors, one idea: to build a robot and compete. We began in 2008 with few tools and no building space. Making the most of meager resources, we built a robot using the KOP and fashioned a wooden gear. That gear is a symbol of our innovation and perseverance, reminding us that we can make the most of what we have to overcome our challenges. We are now a student-led team of 76; each year, our rookies arrive with little to no knowledge but with a drive to learn and succeed. Our mentors and veteran students foster a supportive environment where it's safe to fail and try again. Veterans teach rookies fundamental skills and help them become engineers and problem-solvers. Becoming a Steel Hawk means joining a family and being committed to caring and accepting each other regardless of who you are or where you come from. We guide each other to find our own unique place on the team, work collaboratively, and discover our individual passions.

Our team's ethos is encapsulated by the acronym ATP, a direct outgrowth of both FIRST's mission and our school's Ephebic Oath, informing and driving everything we do. The Ephebic Oath challenges us to not "desert our comrades in the ranks" and to "leave [our] city greater than [we] found it." With these valuable lessons in mind, we committed to ASSIST students, parents, and teachers to understand the benefits of an interactive STEM education, TEACH them the skills they need, and PROVIDE STEM experiences through our outreach. Over time, ATP has evolved from mentoring our rookies to founding and helping teams in other schools, communities, and even nations. Our mission is to empower our diverse team to develop abilities, create opportunities in STEM, and inspire the next generation of innovators.

### Local Impact

Before our team's inception, our humanities-focused school had no engineering courses. True to our ATP philosophy, our team successfully advocated for courses like CAD, Electrical and Mechanical Design, Principles of Engineering, and AP Computer Science. 12 years later, the percentage of Harris students pursuing STEM careers from 10% in 2008 to more than 75% now.

Hawk Talks, our annual open forum, is where we share our knowledge of scouting, bumper-making, beta-testing, and videography to FRC teams, in person, and via Twitch. We collect evaluations of the talks to make the presentations more impactful. We also share both our vision code and the code for our scouting app on Chief Delphi and FRC Facebook pages, allowing other teams to analyze match data and improve strategies for their team.

Continuing our commitment to ATP, the Steel Hawks spread our wings beyond our team and school, welcoming potential FIRST students and mentors into our lab. While we focus on teaching students essential skills, our coaches mentor their coaches. When our mentees accompany us to off-season events, we lend them our robot to experience the thrill of competition. Our mentees from Cardozo HS formed FRC 5599 in 2015 and won the Rookie Inspiration Award at their first regional (NYC). Later that year, we did not desert our comrades from Francis Lewis HS, adopting their last 2 members of FRC 3017 into our Steel Hawks family because their team was suspended. Their experiences with us inspired them to restart FRC 3017 in 2016.

Our methodology has consistently been successful in forming new teams. We mentored FRC 6423 (2016), FRC 6593 (2017-present), FRC 5891 (2016), and FRC 1600 (2018), with the last two teams using our build space when theirs was not available. Our programmers are currently mentoring a Spanish-speaking rookie team, FRC 8284 (Bushwick, NY), using the language skills we gained in our humanities high school.

We were gratified when FRC 5891 won the Rookie All Star Award and became NYC Regional Winners (2017). Helping teams to become their best inspired us to host a free Open Field weekend so all tri-state area teams can test their robot in a competition setting. Open Field has grown from 2 teams, in 2014, to 18 and counting, this year.

We don't limit our help to FRC teams. We enjoy demonstrating our robot throughout our community to introduce FIRST to young children to motivate them to become involved in STEM. At Solomon Schechter Manhattan, our visits resulted in a K-8 STEAM program that includes a MakerSpace and a coding curriculum that starts in kindergarten. We are especially proud to have started FLL Team 23094, the FloydBots (2016) at William Floyd Elementary. They have won awards every year since their founding; their success prompted the William Floyd SD to fully fund 6 additional FLL and FLL Jr. teams. Our influence led to the district agreeing to host this year's FTC, FLL, FLL Jr. qualifiers (1/11-1/12/20).

### Global Impact

As our skills grew, we were able to reach beyond our city and state, unimaginable even our wildest dreams, to places across the world. Our teammate, Phyllis Alinsao, wanted to launch Project Philippines--a STEM workshop teaching fundamental engineering skills to children in her hometown, Iloilo, Philippines. Our team's support made her dream a reality. We developed curricula for the workshop and donated over \$4,500 in supplies and resources, including a chassis and Iloilo's first 3D printer. In the summer of 2017, Phyllis traveled to the Alimodian National Comprehensive HS and led a 4-week workshop, using our ATP process, teaching in her native language of Tagalog. She taught teachers to CAD and 3D print, and 3 years later they are still using this. Under her guidance, students learned to code in Java, construct electrical boards, build gearboxes, and assemble drivetrains. These students never imagined they would wire an electrical board or code commands, but by the end of the program, they built a functioning robot.

Phyllis returned ecstatic about her experiences but saddened that her students didn't have access to textbooks or a library. Determined to help, we worked with our school's administration to collect old textbooks and hosted a schoolwide book drive; we donated more than 2,500 books to schools in the 3 regions of the Philippines. They were thrilled to receive their new resources.

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Inspired by Phyllis, teammate, Neeharika Kotimreddy, hoped to travel to her hometown of Muthukur in Nellore, India and host Project India. In 2019, we made this possible—we were determined to give them a life-changing experience. Based on the experiences gained from Project Philippines, our curricula was expanded for India's workshop, and we ordered and packed materials and tools. Neeharika traveled 18 miles on dirt roads to and from the government school, Zilla Praja Parishth HS, daily for three weeks to work with students who comprised the poorest 10% of the population. She taught the fundamentals of mechanical and electrical engineering in Telugu, giving them the knowledge necessary to build a robot. During the program, our team troubleshooted any problems that she could not resolve on her own. Her students also learned to code in Java and C++, enabling them to control their robot, their first hands-on experience with technology in the classroom. Project India was recognized by the Government of Andhra Pradesh and catalyzed a discussion among local political leaders about including this type of career-applicable learning in their government schools. Through Projects Philippines and India, we improved our method of introducing robotics to students who don't have opportunities in STEM. Our diversity enables us to translate and teach our curriculum in multiple languages and we can customize these materials to suit the needs of different communities.

**Making FIRST Loud**

We proudly represent FIRST by demonstrating our robot at NYC science events like World Science Festival, Maker Faire, and NYSCI's STEM Night. We look forward to seeing children's faces light up when they help us control our robot. Sharing our stories motivates parents to get their children involved in robotics.

Since 2015, we have gladly supported FIRST robotics by hosting and running NYC's FTC Championship at our school. Every year, we enthusiastically volunteer at the championship as scorekeepers, field crew members, and queuers. In 2016, we learned to livestream, making the event easily accessible to a wider audience. As we have improved the quality of our livestream, our audience has grown from 14 to 5,000.

Inspired by his experiences as a Steel Hawk, our teammate Daniel Sotelo-Reiner wrote, directed, and produced "FIRST® Relations" (2018) for his fellowship project at the Tribeca Film Institute (TFI). Daniel highlighted the inclusive environment of our team, which is diverse in race, religion, socio-economic background, and sexual orientation. "FIRST® Relations" premiered at the 2018 Tribeca Film Festival, an event attended by more than 148,000 people. Daniel was invited to screen his film at the All American High School Film Festival for an audience of 300. His film is posted on TFI's Facebook page, which has 334,000 followers and more than a million views.

**Our Future**

We are more than a group of engineering enthusiasts—we are a team that develops abilities, creates opportunities, inspires communities, and changes lives. Our continuing journey with FIRST is amazing. Lives within our team have been transformed, and we want as many people as possible to have this experience. We are always looking for new places and ways to share our passion for STEM, provide hands-on engineering experiences, and foster a love of learning.

Our next goal is to obtain the necessary funding to complete Project SHIFT (Steel Hawks Inspiring FIRST Teams): establishing 6 FLL teams in schools where at least 70% of families are at or below the poverty level. This will allow us to mentor students, SHIFTing their focus so they can see opportunities in STEM and resources only available to FIRST participants. We hope we can help them carve and cherish their own wooden gear.

We are the Steel Hawks.