

Chairman's Award - Team 321

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2018 - Team 321

Team Number

321

Team Name, Corporate/University Sponsors

Neubauer Family Foundation/Associated Alumni of Central High School/DoD STEM/Comcast NBCUniversal&Central Hs

Briefly describe the impact of the *FIRST* program on team participants with special emphasis on the 2017/2018 year and the preceding two to five years

Our team opens doors for students, giving them access to opportunities they would not otherwise have had. In the last three years, nine former members have been hired to jobs based on connections made through our team and its sponsors. Of note, Armond Smith and Brian Mata taught programming in a summer program at Penn. And Thomas Davidenko, the mastermind of the Philadelphia Robotics Coalition, earned a City Council internship which led him on to a Congressional internship in D.C.

Describe the impact of the *FIRST* program on your community with special emphasis on the 2017/2018 year and the preceding two to five years

Philadelphia is America's poorest big city. Students at our public schools are far less likely to have access to STEM programming than their suburban counterparts. In 2015, our school district eliminated its STEM coordinator position and cut off grant funding to *FIRST* teams. We have rushed into the breach to restore funding and organization to the city's FTC teams. Through this support, we empower teachers to start STEM programs at schools across the city.

Team's innovative or creative method to spread the *FIRST* message

In 2016 we founded the Philadelphia Robotics Coalition, a project that aims to radically increase access to *FIRST* programs in city high schools. We have gathered funders and stakeholders to build a network of support for Philadelphia's FTC teams. For 7 years, we have run the Philadelphia Robotics Expo, exposing students to STEM for a day. Now, through the Coalition, we build on that success by bringing permanent opportunities to students by starting and supporting FTC teams at their schools.

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

Our team is run by student officers, so we place high value on professionalism and leadership development. Our officers meet periodically with our student Talent Director to set leadership goals and track their progress. These meetings promote productivity and gracious professionalism, helping members establish a valued place on the team. Members take responsibility for training younger students, planning and teaching classes as new students arrive for FTC, and as they prepare to advance to FRC.

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

Our mission is to spread FIRST to as many students as possible. We want every Philadelphia public high school student to have the opportunity to participate in a robotics program. To that end, we have decided to focus our efforts on starting FTC teams, since we can register 21 FTC teams for less than registering one rookie FRC team. As the FTC programs we start grow and thrive, we hope that some will make the jump to FRC, and we'll be excited to support them when they reach that milestone.

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

The Robolancers launched the Philadelphia Robotics Coalition to address the persistent problem of funding and maintaining FIRST teams in Philadelphia high schools. Of the twelve teams currently funded by the Coalition, six are teams we have started in the last two years, and four are previously defunct teams we have restarted. The main goal of the Coalition is to start enough FTC teams so that every Philadelphia public high school student has access to a robotics program.

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

This year, through the Coalition, we are funding 12 teams (\$1000-\$3000/team) and working to coordinate mentors to support them. We ran and hosted 1 FRC event, 3 FTC events, and 1 FLL event. We ran 2 additional FTC events hosted by other schools. And our students volunteered at an additional 5 events in the FRC, FTC, and FLL programs. Apart from these events, 3 FTC teams have come to our space for tools and mentoring this year. Students travel weekly to mentor 3 FLL teams and 1 FLL Jr team.

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)

Through the Coalition and our events, we mentor 19 FTC teams. We host and support FTC workshops, where Robolancers students run classes and help with any issues or questions the teams may have. This mentorship is often focused on programming, as many Coalition teams find this to be their greatest challenge. In addition, we began sending professional mentors to Coalition teams through our partnership with the Navy, and we are actively pursuing similar relationships with college engineering clubs.

Describe your Corporate/University Sponsors

Our team is supported through the generosity of our school's alumni, particularly the 224th class which raised funds for new machine tools last year. We receive additional support from the Department of Defense, Comcast NBC/Universal, and two anonymous donors. The Coalition is funded separately by the Neubauer Family Foundation, the School District of Philadelphia, and the Philadelphia Activities Fund. Our events are made possible through partnerships with Penn and PA FIRST Robotics.

Describe the strength of your partnership with your sponsors with special emphasis on the 2017/2018 year and the preceding two to five years

The Philadelphia Robotics Coalition was started with a generous grant from the Neubauer Family Foundation. Becky Cornejo, the Foundation's executive director, raves that we do more with \$25,000 a year than their other grantees do with much more money. We are rebuilding support for FIRST teams from the School District of Philadelphia, partnering with them to fund coach stipends and to open buildings for events. We are partnering with the Navy to send engineering mentors to Coalition teams.

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

FIRST is a series of programs that reach K-12 students around the world. Its core values teach students about friendly competition and teamwork, and exposes them to the world of STEM. FIRST prepares students to become leaders of their generation with whatever field they choose to go into. FIRST not only teaches students to thrive as a team but also as individuals. It creates lasting experiences that will help students for whatever the future may hold.

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

Philadelphia's persistent poverty and often unstable school district make it unusually difficult to start and sustain FIRST teams in our city's schools. Now in our twentieth season, we have learned to survive this uncertainty and to thrive. We are using the knowledge gained along our journey to fuel a FIRST renaissance in Philadelphia, building a support network for teams and bringing FIRST programming and STEM opportunities to an ever-growing number of Philadelphia students.

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

Connor McCole

Essay

The RoboLancers started in 1999 as a team of fewer than ten people, struggling to find our footing. Now, after having achieved stability, we are focusing on leading STEM education in our community, building a strong framework that supports teams across our city. Since 2011 we have been hosting FTC events and a robotics expo, but we knew hosting events was only the first step. We wanted to impact our community on a deeper level. This led us to start a new initiative that directly confronts the shortage of robotics programs in Philadelphia's public high schools.

A quarter of Philadelphia's residents and over one third of our children live below the poverty line, making us the poorest major city in our nation. Many students do not get the opportunity to experience the world of robotics. Our economic disadvantage makes it more difficult to establish FIRST robotics programs in public high schools. From 2014 to 2015, fourteen Philadelphia FTC teams disbanded due to lack of funding.

Seeing our city in crisis, we sprung into action. We founded the Philadelphia Robotics Coalition in 2016 to reboot and expand FIRST programming throughout our city. The Philadelphia Robotics Coalition connects businesses, universities, and foundations with Philadelphia public high school robotics teams, building an ecosystem of mentorship and support for the next generation of STEM and business leaders in our city.

In its first year, the Philadelphia Robotics Coalition restarted four of the FTC teams that had disbanded and started two rookie teams. Now in our second year we have started four additional rookie teams and support two additional veteran teams, bringing our total to a dozen teams. The number of registered FTC teams in Philadelphia increased from 18 in 2015-2016 to 33 this season. Two thirds of that growth—10 teams—are the direct result of the Coalition's work to start and restart Philadelphia teams.

We provide each team with a \$2,000 program grant in their first year, and a \$1000 program grant in subsequent years, to be spent on registration, parts, tools, and other team expenses. We provide most teams with an additional \$1,000 each year as a coach stipend.

Funding for the Coalition comes from a three-year transformative challenge grant of \$25,000 annually, generously provided by the Neubauer Family Foundation. This grant is matched by an additional \$25,000 in funding from the School District of Philadelphia for coach stipends and facilities use. Our vision for the future is to raise even more money and put it back into the community by starting, funding, and mentoring additional teams.

The Coalition was founded—and is operated—by the RoboLancers. In order to effectively reach beyond our school, we have assembled a board of directors, comprised of a diverse group of stakeholders from Philadelphia's political, philanthropic, and education arenas. This group will help our students work strategically to better access resources and expand the Coalition's reach.

We want to provide teams with a solid foundation they can continue to build upon. Many local FTC teams have faded in and out of existence because of a lack of consistent support, and one of our central goals is to create a sustainable environment for robotics. We want to ignite interest in the next generation in hopes that they will pursue STEM and robotics in the future, and keep robotics alive in Philadelphia.

One of the biggest challenges of the Coalition is making sure that all of our teams are prepared to compete. This came down to two central issues: starting up FTC teams from scratch and recruiting mentors for the teams.

To ensure that Coalition teams have a strong footing in the beginning of their season we run and host multiple workshops. The benefits of these workshops were immediately apparent. During our first workshop, Build It!, one of the smaller FTC teams had a student who did not speak English (and a coach who didn't speak Spanish). That student worked closely with a Spanish-speaking RoboLancer who taught them how the game worked and how the team could prepare for competition. The team arrived with just a bucket of parts, but by the time they left the workshop they had built something together and had a plan for completing their robot.

These workshops also help us figure out what support the Coalition teams need. They needed programming help, and a lot of it, which makes sense because picking up a programming language with no previous experience is a daunting task. We addressed this problem by creating a Programming Mentor Coordinator role on the RoboLancers to get Coalition teams the programming help they need. As a result, we saw a jump in programming readiness and ability to compete this season. We even saw teams with fairly successful autonomous programs, which was very rare in the prior season.

Our outreach to Philadelphia schools does not stop with the Philadelphia Robotics Coalition. The RoboLancers run and host many events each year, including: the Philadelphia PennFLL Qualifier, Philadelphia FTC Qualifier, an off-season FTC competition, and FTC and FRC workshops and scrimmages. We also host the Philly Robotics Expo (PRX), an annual event that reaches hundreds of students of all ages and introduces them to the world of STEM — providing a plethora of classes, workshops, and exhibits. PRX is currently held in collaboration with the University of Pennsylvania. In previous years, we have hosted this event with Drexel University, and we frequently have exhibitors from these universities as well as other local colleges, including Temple University. PRX has brought STEM education into the limelight for Philadelphia students for seven years and counting.

All of our team's work would be impossible without the support of our tremendous sponsors. Our events are hosted in partnership with the University of Pennsylvania's GRASP Lab and PennFLL, the School District of Philadelphia, and Pennsylvania FIRST Robotics. In addition to the Neubauer Family Foundation's transformative support of the Philadelphia Robotics Coalition, we rely on a number of additional sponsors, including: the Associated Alumni of Central High School, the Department of Defense, Comcast NBCUniversal, and two anonymous donors.

Beyond financial support, the Department of Defense has connected us to our most dedicated professional mentors: engineers from the U.S. Navy. Navy mentors are especially helpful during our design reviews, in which students present about their robot design and discuss their progress. Sean Gallagher, one of our mentors, helped us put together this process and has even said he wished the Navy was organized more like the RoboLancers.

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Our team is Central's largest student group, with around 85 active members. The team is split into two FTC teams and one FRC team. The FTC teams are made up entirely of freshmen, introducing our new students to FIRST values and preparing them to move on to FRC. All three of our teams are organized into four different subgroups: Mechanical, Electrical, Programming, and Business. But before the incoming members choose a subgroup, they must go through Bootcamp. This student-run program includes classes on safety, the design process, the FTC game, programming, and business, and gets new members up to speed with the basics of the team. We post our Bootcamp training materials on our website for other teams to use. At the end of their first year, students complete Spring Training—an additional series of student- and mentor-taught classes—preparing students to graduate to FRC.

Robotics builds a strong work ethic and teaches real world skills like writing, public speaking, and time management. These same skills have opened up doors for graduating RoboLancers and helped them take advantage of exciting opportunities in STEM. For example, some RoboLancers alumni have gone on to work at Penn's GRASP Lab. But FIRST is about more than just robots, and our team prepares students to pursue majors in a wide variety of fields. For example, past alumni have gone on to major in mechanical engineering and computer science, as well as international business, construction management, and various art majors. RoboLancers alumni often return to the team to mentor newer members and provide a sense of what the team was like when they were on it.

The RoboLancers have grown considerably since our inception. After establishing a strong foundation for ourselves, we are expanding and strengthening our city's robotics programs as pipelines to educational and career opportunities. The Philadelphia Robotics Coalition amplifies the RoboLancers' existing initiatives by building a vibrant ecosystem of robotics teams in Philadelphia. We are proud of how far we have come as a team and as a city. We are committed to continue this work to help FIRST POWER UP in Philadelphia.