

## Chairman's Award - Team 1660

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2019 - Team 1660

### Team Number

1660

### Team Name, Corporate/University Sponsors

Robert Schwartz/Bloomberg/ConEdison/Xerox/Charles Hayden Foundation/HBO/Pershing Square Foundation/Numerati Partners/RiskEcon Lab @ Courant Institute (NYU)&Frederick Douglass Academy

### Briefly describe the impact of the *FIRST* program on team participants with special emphasis on the 2018/2019 year and the preceding two to five years

The Harlem Knights are a predominantly Black and Latino team in a Title I public school. Despite the state's 65% graduation rate for Blacks, the Harlem Knights retain a 100% graduation rate. Through FIRST, the team has learned to work with diverse backgrounds and ethnicities. Through the Team Culture committee, we provide academic support and accountability for our members. FIRST has led to 70% of our graduates pursuing STEM majors in college.

### Describe the impact of the *FIRST* program on your community with special emphasis on the 2018/2019 year and the preceding two to five years

The academic leadership of the Harlem Knights has led our school to implement kinesthetic STEM classes into its course offerings, including Robotics, Mechatronics, Art for Engineers, Engineering, Robotronics, Intro to Computer Science and AP Computer Science. The team hosts the most exciting exhibit at our annual District 5 STEM fair, and we have held events in public plazas, at Facebook, Google, and Microsoft for employees, schools, and passers-by to advocate for hands-on learning.

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

Through events such as science fairs, open houses, and pumpkin hacking displays, our team has become a strong representation of STEM education in Harlem. This has led to opportunities for robot demonstrations at movie screenings (including Ghost in the Shell, Transformers: The Last Knight, and Black Panther) and the People's Film Festival. This past year, we have served on panels at Goldman-Sachs and the Council for Opportunity in Education / Upward Bound Math-Science Conference.

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

We are passionate about raising awareness and support for diversity and inclusion in STEM. Team captain Malachi Patrick emceed the FIRST PowerUp kickoff at Columbia University, won the 2018 Dean's List Award in Detroit, and has an internship with Bloomberg cybersecurity. Captains Epiphany Adams and Dillan Moore are student council members pushing for change in the school. Team members are supported academically and emotionally through our Team Culture committee.

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

In 2007, the Harlem Knights started an FRC team for A. Philip Randolph High School, which later restarted as FRC 4108. During the 2018 DESTINATION: FIRST LAUNCH season, we gave advice to a new coach from Robosquad 5891 from Urban Assembly regarding team structure, how we schedule our build weeks, and the amount of mentor support needed to run a team.

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

Through the leadership of ELITE (Emerging Leaders in Technology and Engineering) Education, the team members are excited to be working with alumni to assist with FLL teams. Students and alumni are acting as instructors to middle school students participating on the FLL teams at the Boys and Girls Club and other schools in Harlem. Our goal is to pass on our passion for STEM by providing support in kinesthetic learning through the FLL challenge.

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

During the 2017 season, we acted as tour guides for Gokturkler Team 6402, hosted them to two dinners, provided them with batteries and materials, and built them an operator console. Last season, we assisted Makers Assemble Team 5951 by providing them with AndyMark supplies that were stuck in customs in Israel. This year we supported Megalodons Team 333 with crowdfunding advice, sharing how we have successfully raised money through our annual campaigns since 2013.

**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)**

Metallic Panthers 4640 began their team at Frederick Douglass Academy II in 2013. During their rookie year, we mentored their team, lent them supplies, and have supported them every year at the New York City Regional. We also enjoy helping out other teams in need at competition. Prior to the FIRST LAUNCH season, we were able to offer moral support and advice to the new coach of Robosquad 5891 from the Urban Assembly School for Global Commerce.

**Describe your Corporate/University Sponsors**

Bloomberg, Con Edison, and Pershing Square Foundation have been long-time sponsors to our team. Bloomberg has provided us with funding, mentors, workshops, community service opportunities, and feedback for our Chairman's Award presentations. In 2019, we started partnerships with Xerox and New York University. We gift our sponsors team-written reflection booklets to document the impact they have made on our lives. We send out regular email updates to our sponsors and invite them to visit us.

**Describe the strength of your partnership with your sponsors with special emphasis on the 2018/2019 year and the preceding two to five years**

The past two years when we have qualified for World Championships, we have been able to raise \$25,000 in a matter of weeks. Through the generosity of Con Edison, Bloomberg, Pershing Square Foundation, Google, Goldman-Sachs, and individual sponsors, we have been able to bring 40 students to Worlds two years in a row. Thanks to the enthusiastic support of 100+ crowdfunders, we have raised \$5,000 for robot parts annually, and \$2,200 more for Championship expenses.

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

FIRST is a non-profit organization that gives students K-12 of all colors and socioeconomic backgrounds a chance to "go-pro" in STEM fields. Through creative challenges and hands-on learning, students do not only build and program robots, but also learn teamwork and leadership skills. FIRST provides scholarships for college and inspires its members to demonstrate gracious professionalism and give back to our communities.

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

The Harlem Knights had the honor of representing diversity in STEM during the 2015 and 2017 FIRST Inspire Galas. Our own Malachi Patrick and founder Dean Kamen presented President Barack Obama with the #MakeitLoud Award, and our mentor Chelsey Roebuck received the Rising Star Award for his efforts in providing STEM education to underrepresented populations. At the 2017 event, we helped to raise \$1.8 million to fund the STEM Equity Community Innovation Grant.

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

Epiphany Adams

## Essay

"Without struggle, there is no progress." This statement by Frederick Douglass is what embodies the inception and growth of the Harlem Knights FIRST Robotics Team 1660 over the last fifteen years. What started in 2005 as an effort to prepare graduates to pursue STEM majors has resulted in over 160 FIRST alumni, with 70% studying STEM fields in college; and seven kinesthetic STEM elective classes implemented into Frederick Douglass Academy I's curriculum. The team is more than a solution to a problem: it has become a hub of creativity, innovation, and bonding. It has turned lives around and offered bright pathways in STEM fields. This is what fuels our passion to raise awareness and support for FIRST so that more young people can have the same life-changing experiences.

The Harlem Knights embody the struggle of a Title I school--a place where it seems opportunities are limited. As students stroll the halls they are left wondering how to improve on their own circumstances. They want to make their dreams a reality, and the Harlem Knights provide a way. In 2004, many Frederick Douglass Academy I (FDA) students were failing STEM classes, and this was a major concern. Though a college preparatory school, hardly any graduates were considering STEM majors in college. Principal Gregory Hodge believed a robotics team could remedy this problem, and in 2005, the Harlem Knights FIRST Robotics Team 1660 was established. Students who joined the Harlem Knights saw STEM subjects come to life as they connected what they learned in the classroom with the challenge of designing and building a robot to compete in the FIRST Robotics Competition.

The Harlem Knights have made a resounding impact on the FDA community. The academic success of the team has proved the power of hands-on learning, and has led our principals (Dr. Hodge, Joseph Gates, and Ayisha Fullerton) to integrate STEM elective courses such as Robotics, Mechatronics, Art for Engineers, college-level Engineering, Robotronics, Intro to Computer Science, and AP Computer Science courses into the school's curriculum. During Build Season, five of these courses interface with FRC resulting in over 200 students working on our robot each year and attracting new students to join the team.

Team 1660 not only provides a healthy and safe environment for students from different backgrounds to learn and grow as leaders, it also inspires students to be innovators and problem-solvers who can give back to their community. Being a Harlem Knight has equipped students of color with the tools and skills needed to pursue careers in STEM fields. In spite of the low high school graduation rates (based on 2015 NYS graduation rates for Blacks and Hispanics, 65.1% and 64.8%, respectively), Harlem Knights 1660 students have a 100% graduation rate, with 70% of graduates pursuing STEM majors in colleges such as Columbia University, MIT, Brown, Carnegie-Mellon, and Rensselaer Polytechnic Institute.

Since the team's inception, the Harlem Knights have been actively working to revitalize the culture of our school through FIRST. Each year, we present demos of our robots at open houses and science fairs to recruit new team members. In November and December, we hold information meetings and workshops to give prospective team members a taste of the skills they will develop by joining the Harlem Knights. For the past two years, we have held a "Girls in STEM" workshop to bridge the gender gap by demonstrating the opportunities and challenges unique to women in STEM careers. In addition, we host Computer Science Education Week, where we draw attention by 'hacking' the school, such as converting school steps into piano steps that play music, creating interactive videos games and signs, and hosting programming workshops for middle and high school students.

The team is organized into different committees during our six-week build season. In the Engineering Department, we have Mechanical Committees (mechanical drive train, mechanical manipulator, pneumatics) and Controls Committees (programming, electrical, strategy). In the Business Department, we have Marketing, Finance, and Team Culture Committees. Our team has a Slack workspace where we post announcements, updates, purchase requests, and robotics memes. Towards the end of each meeting, we have a recap, where each committee updates the others on what has been accomplished and what is being worked on.

As an urban team from New York City, we appreciate the cultural similarities and differences found among our team members and on other teams. In 2017, we had the opportunity to provide hospitality to Team 6402, GOKTURKLER. We sent sightseeing and restaurant suggestions prior to their arrival, hosted them to dinner at our school twice, and lent them batteries and supplies that they were not able to pack in their crate. During the NYC regional, we helped with meal orders and offered mechanical and electrical support. Last year, we had the pleasure of assisting Makers Assemble Team 5951 by providing them with materials that were stuck in Israeli customs. In their own words, "we saved their build season."

This year, we supported rookie coach of Team 5891 Robosquad with advice on team structure, build season scheduling, meeting organization, and garnering mentor support. Having received so much, it is an honor to support other teams as much as we can.

The Harlem Knights are a family, and we constantly look for ways to expand and reach more people. Last year, team members served as mentors for FDA middle school's FIRST Lego League team, the Lego Raiders. This season, in collaboration with ELiTE (Emerging Leaders in Technology and Engineering) Education, we are mentoring FLL teams at the Boys and Girl's Club and neighboring schools in Harlem. We believe their experience will empower them to pursue their dreams.

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In effort to share our vision and passion for diversity in STEM education, we hold events that demonstrate the successful implementation of kinesthetic STEM classes in a public school. We participate annually in the District 5 Super Saturday STEM Expo at the Harlem Armory. Since 2009, the Harlem Knights have designed, facilitated, and judged a new VEX game annually for FDA robotics classes. It is the most exciting exhibition in the armory. For four years, we held a "pumpkatronics" expo in conjunction with ELiTE. We held this event at the plaza on 125th Street, at Facebook NY where it was live streamed to over 1,000 Facebook employees, and most recently at WeWork Harlem, students presented their pumpkin hacks which were judged by employees of Silicon Harlem. Mechatronics students and robotics team members had the opportunity to present their inventions to other urban schools at Google NY and Microsoft, and receive feedback from employees about preparing their inventions for market. Robotics members and engineering students finish their year with outreach to local non-profit organizations. One of these projects involved editing labs for ELiTE's summer STEM camps in Ghana, and our former team captain, Jessica Adjei, was able to serve as a counselor at the camps. While we realize FIRST is impactful for any participant, we look for opportunities to represent how life-changing FIRST can be for students of color. We actively seek media exposure and have been featured on NY1, Fox 5 New York, Univision, Popular Mechanics, Wall Street Journal, and US News. In 2017, we kicked off movie screenings of "Ghost in the Shell" and "Transformers: The Last Knight" with robot demonstrations and invitations to upcoming FIRST events. In the summer of 2018, we had the privilege of representing STEM at the Wakanda Tech Village at Marcus Garvey Park prior to a Black Panther screening, as well as at the Tech People Expo at the People's Film Festival, held at the Harlem Hospital Art Gallery. We gave children and adults opportunities to drive our robot "TinkoKong," passed out FIRST brochures, and followed up with interested people about how to start their own FIRST teams. Team members participated in panels at Goldman-Sachs and at the Council for Opportunity in Education / Upward Bound Math-Science Conference leading up to the FIRST LAUNCH season.

It has been our greatest honor for team members to be masters of ceremonies at the first and third "FIRST, Inspire" galas. In 2017, our mentor Chelsey Roebuck received the Evelyn Kamen Rising Star Award for his work in providing opportunities in STEM to underrepresented communities. Our team captain (and 2018 World's Dean's List Winner!) Malachi Patrick presented with Dean Kamen the #MakeltLoud Award to President Barack Obama for the way he has supported FIRST and spread awareness for its mission. This auspicious occasion raised \$1.8 million to help fund FIRST STEM Equity Community Innovation Grants.

The achievements of our team would not be possible without the generous support of our sponsors: Robert Schwartz, Bloomberg, Con Edison, Charles Hayden Foundation, Xerox, Pershing Square Foundation, and NYU Risk Econ Labs; our alumni, and our mentors. Through innovative crowdfunding, those who donate are given ownership over specific parts of the robot to show that they were part of our efforts. Last season, we were empowered by a community of 100+ individuals around the world supporting us.

Over the last fifteen years, FIRST has allowed us to build a strong Harlem Knights family. In the words of former captain Michael Stone, "in FIRST I found everything I needed to make my dream a reality. I had a teacher whom I revere as a father, a mentor who has saved me more times than I can count, a support group that always has my back." Together as a diverse group of minds and personalities, we stand strong to conquer the stereotypes of socioeconomic and racial prejudice: we are the future generation of inventors and innovators. This is our spirit. We are the Harlem Knights.