

## Chairman's Award - Team 3260

### Team Number

3260

### Team Name, Corporate/University Sponsors

Bechtel Foundation/Robomatter Inc./Comcast NBC Universal/Emerson Charitable Trust/Heinz Endowments/U. S. Steel/Alcoa&Sarah Heinz House Boys and Girls Club

### Briefly describe the impact of the *FIRST* program on team participants with special emphasis on the 2016/2017 year and the preceding two to five years

Since its start in 2010, over 60 students have participated on Team SHARP. Our students have had hands-on experience programming, designing, and engineering in ways that would not have been possible without FIRST and SHARP. All SHARP graduates have gone onto college (including WPI, CalU of PA, Cornell, CMU, and Case Western) or full time work (including UBER and Microsoft). The intensity of the build season has helped members learn to balance jobs, internships, athletics, and school work.

### Describe the impact of the *FIRST* program on your community with special emphasis on the 2016/2017 year and the preceding two to five years

Sarah Heinz House (SHH) was built to meet the needs of underserved youths in Pittsburgh. SHARP takes STEM to kids who wouldn't otherwise have access. We've done over 100 events in the past few years. We hold parties on National STEM Night and run robotics classes for over 100 children each year, as well as the 10-25 children who attend weekly Open Robotics. In 2016 SHARP had 37 outreach events including Children's Hospital, ICAN Speak camp, Pittsburgh Citiparks, Maker Faire, and Handmade Arcade.

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

By using STEAM, we educate children more effectively. SHARP offers hands-on projects combining engineering and art (making mini-catapults, stamping with robot parts, creating binary bead necklaces and constructing small boats from recyclables) while engaging children with robot driving time, answering questions about design, and introducing them to FIRST opportunities. As a Boys & Girls Club of America (BGCA) we are uniquely able to offer the 394 SHH members an Open Robotics time each week.

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

SHARP members are recognized for their outstanding service to the community. Our students are varsity athletes, produced playwrights, Eagle Scouts, and SHH Youth of the Year. Our senior members shepherd younger SHARP members through their first season. Students mentor FLL teams and referee FLL and VEX competitions. Representing almost 50% of our team, SHARP's young women are team leaders on build, electronics, and drive team, modeling for all junior members that women excel in STEM fields.

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

SHARP, in conjunction with Team 3623, created a FRC BGCA Facebook page because we believe it is important to unify teams who are based in Boys & Girls Clubs. On this page we post build season updates and team member testimonials, describing the excitement of FRC and encouraging and inspiring other BGCAs to form their own FRC teams. In the future, we want to create more resources for BGCA rookie teams.

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

We loan NXT kits for novice FLL teams and this year one of our senior team members created an FLL team in her local community. She and other members of the team now mentor FLL team 26477, The Hippies. Almost half of our current SHARP members began on an FLL team, either on the SHARP FLL team or on one based in their middle schools. Because of this, our students understand how important participating in FLL can be.

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

For 10 years we've hosted May Madness, designing and running a competition to engage students in FLL and develop skills before their season begins. SHARP helps to runs summer camps at SHH that help young students hone early

programming, engineering, and logic skills. We've hosted FRC Workshops twice for students and mentors with classes ranging from robot design to fundraising and have held 4 FLL competitions. For 6 years, SHARP has held an end-of-season scrimmage.

**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)**

For the past two years, SHARP hosted the Pittsburgh Workshops at SHH. This year, students and mentors from 6 teams from Western Pennsylvania and West Virginia shared their area of knowledge with other teams. Over 150 people attended this event. In 2016 we also hosted a FLL Kickoff Day, where SHARP members helped over 30 FLL teams brainstorm ideas for their season.

**Describe your Corporate/University Sponsors**

Emerson Charitable Trust/UBER/Comcast NBC Universal/Heinz Endowments/Alcoa/ Robomatter Inc./Bechtel Foundation/Dollar Bank/American Society of Mechanical Engineers/Sarah Heinz House Boys and Girls Club

**Describe the strength of your partnership with your sponsors with special emphasis on the 2016/2017 year and the preceding two to five years**

We send out updates to our sponsors about SHARP, our robot and our program. We attended Emerson's yearly company meeting and spoke to teenagers at Comcast's STEM day. At SHH, Comcast hosts a "Comcast Cares Day," and we worked with Bechtel Marine Propulsion Corporation (BMPC) to run a STEM night. With RoboMatter we hosted Robotics Days at CMU, competitions at SHH, and the international Summer of Learning. We have mentors from Comcast, BMPC, and RoboMatter who are part of our robotics program.

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

FIRST is the thousands of dedicated students, alumni, mentors, and volunteers who understand the importance of inspiring interest in STEM from elementary through high school. It's a community engaged in teaching students to have well rounded critical thinking, time management, teamwork, and leadership skills. FIRST encourages the idea of "Gracious Professionalism," celebrates science and technology, and demonstrates the limitless possibilities that engineering and innovation present.

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

As part of a Boys and Girls Club, we are in a unique position to provide access to hundreds of students every time our doors are open. Every Saturday morning we have elementary school kids working simultaneously with us as we plan, CAD, and wire the robot. We don't have to be at outreach to inspire younger kids. Many children who may not have the opportunities otherwise are able to witness the excitement (and realities) of engineering regularly.

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

Katrina Selavko

**Essay**

LAUGH, LEARN, and LEAD

From the inception of Sarah Heinz Advanced Robotics Program (SHARP) including FRC Team 3260, the core values and unique culture of Sarah Heinz House (SHH) have shaped and developed who we are as a program. Using FIRST's inspirational methodology to "engage kids in kindergarten through high school in exciting, mentor-based research and robotics programs," we've worked to enhance SHH's goal to "empower all youth, especially those who need us most, to laugh, learn, and lead." SHH is southwestern Pennsylvania's largest single-unit Boys and Girls Club (BGCA), and as a part of SHH, SHARP strives to offer children and adolescents the opportunity to experience the applications of science, technology, engineering, and mathematics. Moreover, the team seeks to equip students with the foundations necessary to become engineers, programmers, and scientists. SHARP synthesizes SHH's mission with that of FIRST, "to inspire young people to be science and technology leaders" and to "foster well-rounded life capabilities including self-confidence, communication, and leadership." SHARP aims to increase the community's awareness of STEM through its commitment to laughter, learning, and leadership.

LAUGH

SHARP is 31 kids from 15 different schools in southwestern Pennsylvania. We come from public, charter, parochial, cyber, private, and home-schools. We have 13 mentors (some of whom are SHARP alumni) from a wide range of local universities and companies. Each of us brings something different to SHARP and our many traditions foster a family

feeling between our members and mentors. Each year during the Greater Pittsburgh regional, everyone stays in a house together, and parents make meals so that the team can gather each night to reflect upon the day's competition and unwind. We have a holiday party where SHARP members, mentors, alumni, and families gather for an evening of food and fun (ask us about the cabin socks!). We also stop for ice cream after every competition. Additionally, we have constant open communication in and out of season through a team Google Chat. We have a Google Drive folder (accessible to all SHARP members) with all team documents, robot ideas, fundraising letters, and budget documents.

Our students gain more than just knowledge about robots. SHARP team members also work on important life skills. Members practice working through disagreements, giving emotional support, and managing time wisely. We use these skills and others that are developed and nurtured in SHARP to be "Gracious Professionals." We strive to help each other to be the best possible versions of ourselves.

Our sponsors are also an important part of who we are. We work to strengthen relationships with our sponsors through email and personal interaction. For the past 4 years, Comcast has donated funds and volunteer hours to SHH on "Comcast Cares Day." On this day, we demonstrate our robots to local politicians (such as Representative Mike Doyle and Allegheny County Chairman Rich Fitzgerald) and volunteering Comcast employees including the Senior Executive Vice President of Comcast Corporation, David L. Cohen. Mr. Cohen was so impressed with the team that he continues to personally stay in touch. In 2015, we hosted representatives from the Sprout Fund in our lab where they listened to our stories and drove our competition robot. We went to an Emerson meeting where attendees drove our frisbee-throwing robot. They loved it! In fact, we gained one of our new mentors from this event. We've run programs in conjunction with our sponsors Bechtel Bettis and Thermo Fisher Scientific. When a sponsor requests a meeting with us, at our lab or at their facilities, we bring members and robots to show them what they support.

#### LEARN

SHARP continually works to educate ourselves and others. To prepare for the season this year, we instituted mandatory fall classes held once a week. Each class met for eight weeks before build season to teach fundamental skills in programming, CAD, and fabrication. Another way we foster learning inside our team is through our recent alumni, who return to help the youngest members of the team at the beginning of the build season. They do this because they know how important it is to help new members develop skills for the rest of their years on the team. Finally, SHARP, with Team 3504, received a SPROUT Fund grant that allowed us to create an introductory CAD class for middle and high school students. This 8-week curriculum was taught at SHH and CMU to 53 students. Understanding CAD gives students the ability to better visualize and conceptualize engineering design, assembly, and manufacturing. This curriculum will be used in subsequent years as well.

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SHARP works to support other FIRST teams. For the past two years, we've planned and hosted the Pittsburgh FRC Workshops at which every team in Southwestern PA and a number from West Virginia were invited to attend or give presentations on a variety of topics. Over 150 students, mentors, and parents attended this full-day event. This day was not only to increase the dissemination of knowledge between teams, but also to develop community between teams in Pittsburgh and surrounding areas. At the end of the day, students enjoyed down-time together: playing pool, ping pong, and dodgeball. In 2016, SHARP also helped build field elements for the practice field hosted by Team 3504. SHARP is dedicated to helping younger students as well. SHARP has been hosting May Madness, an off season LEGO Competition, for about 30 teams each year. This competition is used to build FLL teams skills and encourage more people to create teams.

In recent years, we have also spread our reach across the globe. We partnered with Robomatter to help facilitate the Robotics Summer of Learning in 2015. Students and teachers from 51 countries were a part of this program that taught virtual programming. We answered every question sent into the Q&A and also produced videos to help students through challenges they might have while completing the curriculum.

#### LEAD

One unique aspect of SHARP is that we are rooted in a Boys and Girls Club. We hold demonstrations and activities to show the roughly 400 regular members, many of whom qualify for free or reduced lunch, that robotics is something they can do. SHARP regularly provides STEM classes for all the different age groups at SHH. We engage members by having them drive our robots and participate in engineering activities, like making sugar rockets. SHARP helps run four low cost classes (from Pre-K to 6th grade) and we encourage students to continue participation on one of our four teams: FLL, FRC, VEX and VEX IQ. If a student isn't able to participate in one of these programs, we also have Open Robotics. On Saturday mornings, any member can come inside our lab and build with LEGOs, program EV3s, or watch us work on our robot. We have an "Open Door" policy, which means that on any given night during build season SHH members can come in and ask questions about what we're doing. We also host events inside SHH for members. This year for National STEM Day, we had a party where kids could make a balloon powered car and helped to decorate our

gingerbread robot that was displayed in the PPG Gingerbread house display.

A number of national corporations have recognized our efforts spreading STEM. They requested that we collaborate with them to hold STEM events for SHH members. Two years ago, Bechtel Bettis approached us about jointly hosting a STEM night at SHH that was open to the community. In fall 2016, SHARP was recognized as a top BGCA STEM program. We collaborated with Thermo Fisher Scientific to deliver workshops for Heinz House members from grades 1-12 to kick off their partnership with BGCA.

SHARP engaged in 37 outreach events during our 2016 offseason, reaching approximately 14,760 people. We went to places like Maker Faire, where STEM was already prominent, and to places such as libraries and parks. For the past two summers we've joined the Citiparks Roving Art Cart each week in public parks, where we integrate art into our STEM activities by making robotic spin art and using a VEX marker CNC. At Handmade Arcade, we did robot-part stamping with families, while at the same time demonstrating our robot and answering questions about our team and FIRST. In October 2016, SHARP had our own Pumpkin Chunkin event, working with the Allegheny County Parks. We built an enormous trebuchet, and families came to watch as we launched pumpkins across a field and then built their own catapults. This event sparked a relationship with Allegheny Parks; we have 3 major events planned in 2017. We strive to inspire our community to dream of becoming scientists and engineers.

After reaching out to several BGCAs, we realized BGCA FRC teams are rare. This year we partnered with Team 3623, the Terror Bots, to create an alliance between the FRC teams based out of national BGCAs. We created a Facebook page for alliance members, hoping to encourage other BGCAs to create FRC Teams. We also created a subreddit where teams ask questions on a variety of topics from funding to robot design and receive answers from other alliance members. We hope to continue to make other BGCA robotics programs more sustainable by providing information that helps teams gain sponsors and support necessary to be a successful team. We hope to be able to gather enough funding and support to create additional teams in the coming years.

In the past eight years, SHARP has grown into a team that inspires others, both inside and outside of SHH, to pursue STEM. We have incorporated STEM into SHH, and our next goal is to spread the message of STEM throughout the Boys and Girls Clubs of America. As SHH has inspired us, we hope to inspire others to Laugh, Learn and Lead within Sarah Heinz House, throughout Pittsburgh, across the United States, and around the world.