

Chairman's Award - Team 1640

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2019 - Team 1640

Team Number

1640

Team Name, Corporate/University Sponsors

IQVIA/The Boeing Company/Lockheed Martin/Comcast/Chatham Financial Corp&Family/Community

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

1640 has armed students with the skills to succeed in college and beyond through opportunities to work with industry professionals on technical and business projects and internships. Additionally, students are able to develop a more holistic perspective by working with team members from across two counties. As a result, Team 1640 has upheld a 100% graduation rate, and for the past several years, has seen about 80% of our students pursue a STEM field.

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

To increase interest in STEM in our community and recruit students, 1640 regularly gives robotics demonstrations at local schools and large professional and educational events, such as our involvement at Turn5's KidsTechDay. We've planned & hosted three annual TechGirlz workshops to advocate for more women in STEM, and we've also started a special needs FIRST LEGO League team. 1640 acts as an advocate for STEM education with elected officials, urging them to increase incentives for it.

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

1640 spreads FIRST's message using methods such as creating and mentoring teams, organizing demonstrations, and hosting workshops. Because our students hail from several schools, we spread our message through 2 counties! We have a website where we post photos and news, as well as CAD drawings and white pages for our innovative designs. This not only helps with recruitment of new members but also with updating our sponsors and the FIRST community on our team's doings.

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

Before learning how to use power tools, program, or screw in a bolt, 1640 members are taught the meaning of gracious professionalism (GP). Prioritizing GP has allowed our members to become strong role models in the FIRST community. At competitions, 1640 readily shares competition scouting data, and is always willing to help other teams. Additionally, we openly publish CAD designs, code, etc., on our website to inspire innovation in the FIRST community.

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

Although we haven't started an FRC team, we are known for helping all teams - particularly rookie teams. At competitions, we lend both parts and people to help teams fix or program their robots; we even make our swerve drive and scouting data public. This year, we also started making visits to other teams' workshops to give presentations on CAD, swerve, and judging presentations.

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

This year, 1640 moved to a new location, the Exton Mall. Although the move was a difficult transition, it ended up being an incredible avenue to expand our organization. Using this more central location to our advantage, we started two new FIRST Tech Challenge teams, 3 new FLL Jr. teams, and welcomed six FLL teams to the DAR family. We share our funds and resources with these teams, which gives us opportunities to draw students into robotics at a young age and create feeder teams for 1640. IX.

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

1640 has worked with other teams throughout the years in an effort to enhance team performance and help our team grow. We have expanded to (mentor/start) six FLL teams and gone from (mentoring) one FLL team to three. In addition, we run both an FLL scrimmage and a qualifier, with students filling in all the roles, in order to ensure the success of the events. The information we share on our website regarding the CVT Swerve - among other things - also immensely helps teams.

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)

As 1640 students learn more about robotics, strategy, business, etc., knowledge is passed down to younger robotics students. Since 2014, 1640 members have consistently mentored and assisted our three sister FTC teams in all aspects. Additionally, 1640 students mentor several local FLL teams including an FLL team specifically for students with special needs. 1640 has also hosted a scrimmage for about 24 FLL teams (for the past 6 years) allowing them to gain experience and expertise. XI. Describe

Describe your Corporate/University Sponsors

Our sponsorship comes from a wide range of organizations, from smaller, local companies to large engineering firms. This diversity in sponsors allows us to maximize the impact and reach of our organization. Students' families also serve as sponsors for 1640, which is a testament to the passion and dedication cultivated in the DAR community. Additionally, our corporate sponsors, such as Boeing and Lockheed Martin, provide mentors as well as internship and shadowing opportunities for students.

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

1640 has made a special effort to forge meaningful relationships with our sponsors, through seeking their mentorship and demonstrating robotics to their professionals. Many of 1640's industry mentors come from our corporate sponsors. They not only help us with our team endeavors, but assist students in gaining internship positions and career insights. We have also demonstrated robotics to our sponsors, such as Boeing, to thank them for their consistent and generous funding.

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

FIRST is an organization in which people have the capability to work with friends in a competitive environment to build robots, meet new people, and acquire a variety of skills including public speaking, machining, programming, and even networking and professional skills. It is a safe and supportive environment to pursue your interests. As FIRST would like to say, it is "more than robots."

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

1640's main focus on the team is to teach and support as many students as possible through our emphasis on representation and inclusion. This means that we host workshops and create teams for students regardless of special needs and across all socioeconomic levels and genders. We make an effort to ensure that they are as well integrated into our programs as possible by including them in all opportunities and leadership positions.

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

Akhila Yalvigi

Essay

1640 Sab-BOT-age was formed in 2005 to provide students with an exciting, completely hands-on avenue to explore robotics and STEM. Our team's mission is to teach and inspire students of all age groups, while equipping students with a foundational skill set from which they can grow and develop. **FAIL FORWARD, FAIL FAST: THE 1640 PHILOSOPHY** Framed and hung on the walls of our workshop, the words "fail forward, fail fast" serve as a special reminder to 1640 students that their time in FIRST is a journey, not a destination. We

understand that robotics can be daunting and making mistakes can be a huge blow to a student's confidence. Consequently, we strive to promote an open, stress-free environment in which students can turn their failures into learning experiences. **THE SAB-BOT-AGE FAMILY** Celebrating our 14th anniversary, we have grown into a large community team, currently including over 30 members from 12 different schools. As a result, our team has become a smorgasbord of new perspectives, cultures, and ideas bound by our unconditional passion for STEM. Outside of robotics, students pursue extracurricular activities including music, dance, and sports, frequently bringing these passions into the workshop. Our members are always discussing their favorite music/entertainment (there's something new playing in the workshop every day) and offering help and advice in areas completely unrelated to robotics. Because students are encouraged to share their own passions with their teammates, this diversity in interests - both within and away from robotics - ultimately strengthens our bond as a family. **THE ROAD TO SUCCESS**

Our team's journey so far has not been an easy one. In the 14 years we have been around, we have moved approximately 12 times. Whether it was building in the captain's garage or working out of a barn with no electricity in the middle of build season, we never failed to continue our robotics programs and deliver on our promise. This past season, 1640 received the especially devastating news that we would have to leave our longtime home, The Chester County Intermediate Unit (CCIU). For 5 years, the CCIU provided us with a place to keep our tools, hold our meetings, and most importantly, grow our team. As all over the map as we were, we did not let this deter our spirit. We finished out 2018 strong in all aspects, winning several field awards, engineering awards, and even our very first Chairman's award, all while reaching out to community organizations, elected officials, and leaders to try and find a space for the 2019 season. After months of calls and meetings, late in the 2018 offseason, we finally secured a space in the Exton Square Mall. In the month following the move, we painted, cleaned, and decorated, all in hopes of making our new space feel like a new home. **EXPANSION**

Instead of using the difficult move as an excuse to remain stagnant, 1640 actually turned it into a vehicle for unprecedented expansion. Taking advantage of the mall's central location in the community, 1640 added 6 FLL teams, 2 new FTC teams, and 3 new FLL Jr. teams to Downingtown Area Robotics. Our organization now reaches 150 students a year, almost triple what it used to. Additionally, we created an eye-catching, colorful storefront display to attract the attention of passersby and inspire them to get involved with FIRST. Every meeting, we get at least 5 or 6 innocent shoppers inquiring about our program and asking how they can enroll their children or become mentors. In our most recent meeting, we even had a couple walk in and offer a spontaneous donation to help out our program! As a result, we have grown our FRC program by at least a dozen students. **SAB-BOT-AGING BARRIERS IN STEM** Since our inception, one of 1640's biggest goals has been to promote inclusion and representation in STEM fields. For the third year in a row, 1640 worked with the national nonprofit TechGirlz to develop and execute robotics workshops for younger girls in our area. Each year, our workshop has been attended by 20-25 girls, and each year, around 20% of the participants come back to join our organization. Four years ago, our female participation in the program was approximately 12%. Since then, that number has more than tripled, due to the TechGirlz workshops and other recruitment efforts. 1640 also focuses on special needs representation in FIRST by providing one on one mentorship to special needs students in our FLL program. Students in the mentorship program receive specialized instruction relating to robot design, programming, and research skills. Our student mentors ensure that students can participate in all team activities, including building the robot, participating in the robot game at tournaments, and contributing to the judging presentation.

RAISING A NEW GENERATION OF SAB-BOT-TEURS

Long-term, we would love to see students follow a FIRST progression, all the way from FLL Jr. to FRC. With the recent influx of younger teams joining our organization, 1640 members have stepped up to assume the role of mentors in all of the disciplines covered by FIRST. During the FLL season, FRC students attended meetings weekly to guide teams through building their robots, creating their presentations, and just having a good time! It was incredible to

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see kids grow from never seeing code before to writing their own programs within the span of a few short months. When we weren't helping out with FLL, we were working with FTC. Downingtown Area Robotics introduced two new FTC teams to the organization this year, and both of them have achieved incredible heights despite being comprised of nearly 100% FIRST rookies. In December, our new teams were a part of the first seed, winning alliance at one of the Pennsylvania FTC Qualifiers; one of whom qualified to the Pennsylvania FTC State Championship. Our veteran team, FTC 7314, recently won the Rockwell Collins Innovation Award at another PA FTC Qualifier.

We also want to encourage a progression of student mentors through the program. After introducing three FLL Jr. teams to the DAR family, our FTC students served as mentors and guided the young students to success, just as FRC students do with FTC and FLL. We hope that this early introduction to mentorship inspires our students to become leaders and come back to FIRST after graduating. COOPERTITION

Because FIRST tournaments have helped us so much to learn and grow, we want to do our best to create that opportunity for other teams in different levels of FIRST. Last December, we ran our sixth annual FLL scrimmage (The D-Town Dustoff), and regional qualifying tournament. Both of the events were full and well-attended; the qualifier housed a record-breaking 26 teams. At these events, we display cooperation with our community by choosing a local organization to raise funds and resources for. At last year's tournaments, we encouraged teams to bring in pet items to help supply our regional SPCA chapter.

Additionally, for the last three years, we have co-hosted the Westtown MAR District Tournament with team 1391 Metal Moose. Hosting an event allows us to directly contribute to the MAR community SWERVIN' OUR WAY AROUND TOWN

In 2010, 1640 conceptualized our first version of swerve drive, an omnidirectional drive system known for its unparalleled maneuverability and agility. Since then, we have used swerve regularly to give us an advantage on the field; but more importantly, to forge connections with teams on a regional and international scale. With the inception of swerve came the creation of Swerve Central: a comprehensive collection of the design principles and techniques that guided us on our swerve journey. Every iteration of swerve, from our initial design to our most recent CVT version is publicly available through swerve central and has logged tens of thousands of views to date. Additionally, all of our swerve CAD is available through GrabCAD, and again, has been viewed by thousands. More personally, at competitions, we field several questions and offer advice to teams pursuing swerve. We also travel to other teams' spaces to conduct swerve centered workshops to help teams begin their own swerve adventures. SAB-BOT-AGING THE COMMUNITY

When you ask alumni about their favorite part of 1640, you'll find that the common denominator of their responses is community. At 1640, community is central to all that we do - and this includes reaching out to our local community too. In addition to leading workshops, we also strive to broaden our impact on the local community by hosting demos. This past fall, we ran a booth at the inaugural Turn5 KidsTech Day. This event was attended by around 1,000 kids of all ages. Our booth featured FLL, FTC, and FRC; and offered interactive activities like operating the FRC/FTC robots and creating a short block program. Like always, our brochures and buttons flew off the tables, with parents and kids alike interesting in joining our programs. We also followed this up with our usual school demonstrations, which comprise a large source of our recruitment. SAB-BOT-AGING THE INDUSTRY

Maintaining a close relationship with the industry has always been one of 1640's top priorities. Several of our sponsors are engineering firms, including large corporations like Boeing, Arkema, and Lockheed and smaller, local companies. Around 4-5 sponsors provide us with dedicated mentorship, resulting in access to internships for 1640 students. Additionally, 1640 has presented at industrial events, including the Society of Women Engineers National Conference, the International Society of Pharmaceutical Engineers' Conference, and Boeing's Engineering Week. Closer to our team, many of our mentors come from different disciplines, including chemical engineering, software development, and law. This close interaction with industry professionals enables students to get real advice and experience in their prospective fields of study.

WHAT'S NEXT? Everything.