

When booting up a new game, you start at zero. By gaining experience and overcoming challenges throughout your journey, you level up and become better-equipped for the stages ahead. In Lightning Robotics Team 862's case, our journey began in 1999 with only 7 students and 3 mentors, and we have continued to grow ever since. Our team's students, mentors, and alumni strive not only to create positive change within the team itself, but also to inspire students to become involved in STEM in the Plymouth-Canton area and beyond. We have continuously improved our team by supporting *FIRST* events, reaching out to our community, and building professional relationships with our sponsors. As we have advanced through our 18 year adventure, we have reached many essential checkpoints and completed a variety of side quests.

Team Operations

Progressing from 1999 to 2018, our team now has 141 students and 43 mentors. In order to manage so many people while still preserving productivity, we implement a unique 7 subgroup structure overseen by an elected student board. The student board, consisting of a president, vice president, treasurer, and secretary, directs the team's operations, and each subgroup (Awards, Design, Electrical, Fabrication, Marketing, Programming, and Scouting/Strategy) has their own student leader and lead mentor. Veterans teach rookies the skills that they have acquired from their time on the team, crafting a strong system of student-led operations. Placing students, especially rookies, at the forefront of important decisions helps them learn important leadership and collaboration skills that they can share with incoming students, and apply to professional work environments in the future.

Sponsor Involvement

Ever since Lightning was created, we have had the opportunity to work with a variety of sponsors. Our foundational partners are Bosch, Jabil, Belanger Inc., and Plymouth-Canton Community Schools. Bosch has provided us with valuable mentor support and use of their facilities since they became our sponsor in 2007. Through our partnership, Bosch also offers our students real-world opportunities. In 2014, Bosch started an internship program for Lightning Robotics and FRC3414, through which 7 seniors have been awarded internships. These internships act as a bridge for former team members to contribute their STEM expertise from high school directly into the workforce.

We form close relationships with our other sponsors by learning about their industries through site tours and volunteering at their outreach events. This past year, we participated in Ford's STEAM Day, toured Jabil's plant, and supported Nissan's VEX Robotics Qualifier. We recognize our sponsors through different sponsorship tiers, which defines benefits depending on their level of contribution to the team. Each year, our sponsors are invited to attend our robot unveil and end-of-the-year banquet to celebrate the accomplishments they made possible that season.

We recruit new sponsors in our community through letters and presentations; as a result, we gained 4 new sponsors this year, including Belanger Inc. and Security 101. The support from our growing range of sponsors makes fundraising and budget allocation (necessary parts of running our large team) easier, allowing us to focus on other aspects of *FIRST*, such as reaching out to our local community.

Community Involvement

One of our trademark events, Robots in the Park, helps get our community more interested in STEM. The event hosts a variety of STEM-based activities for children of all ages, including creating non-newtonian fluids, design challenges, and driving our previous robots. The feedback from the first event, held in 2015, served as a tutorial for the next 2 events. Through adding more activities and gearing them toward younger audiences, the popularity of the event grew each year. In total, all 3 events had an attendance of over 4,900 community members.

In 2014, we established an annual event called Girl Scout Robotics Exploration Day. Since then, 300 Girl Scouts have attended the 4 events, learning about STEM, teamwork, and problem solving. By the end of the event, the girls earn the unique Robotics Exploration badge created by our students. This year, we demonstrated our robot at Think Like an Engineer Day to an audience of over 200 Girl Scouts. Since 2016, we have participated in 5 Digital Di vas conferences, held semiannually at Eastern Michigan University for both middle and high school levels. These are some of many events in which we use robotics to support girls' interest in STEM, including Bosch's Girls in Engineering and Women of AT&T's Girls in Future Technology Day. Our team also participates in the American Cancer Society's Relay for Life. Over our 14 year involvement, we have raised over \$50,000 for cancer research through robot demonstrations and donations from team members and families. We serve and engage our community at events like United Way Make A Difference Day, Rotary Chicken Dinner, and Plymouth's Fourth of July Parade. We have also demonstrated our robot at an assisted living home, as well as live on a local Channel 7 news station.

FIRST Involvement

Team 862 makes an extensive effort to connect with the younger levels of *FIRST*. Involvement within *FIRST* Tech Challenge has been a key side quest that has helped our team to level up. This year, 13 teams are directly partnered with Lightning Robotics through our FTC mentoring program. This number has grown significantly in recent years. A new student leadership position, the FTC Coordinator, was created in 2015 to manage the teams. This student leader organizes and oversees all processes of the program. Each FTC team has full use of our shop and storage space, as well as access to dedicated FTC adult mentors and Lightning student mentors. The FTC Startup Guide, created in the 2018 season, details how to start and sustain FTC teams, including acquiring mentors and funding. FTC Shadow Day invites 8th graders from local FTC teams to attend one of our Saturday build season meetings and observe the team's

inner workings. This opportunity provides a smooth transition between middle and high school, and keeps students involved with *FIRST*. The teams we mentor can also attend our Canton FTC Qualifier, which we have hosted at our school since 2012. The 2017 qualifier welcomed 34 teams and had over 114 Lightning-affiliated volunteers handling the event's operation.

Recently, we have expanded beyond FTC to reach out to elementary students in *FIRST*. This year, we started an FLL team, providing startup funding, adult mentors, and meeting space. Since 2015, we have hosted 7 FLL Jr. Expos. Each event introduces new activities such as driving a previous Lightning robot, stacking cup towers, and Rainforest Rescue, reinforcing essential skills like public speaking, organization, and teamwork. At the end of each season, our seniors travel to 17 elementary and middle schools during Tour D'Robots, promoting the different levels of *FIRST* to younger members of our school district; last year, we reached over 2300 students.

In addition to our collaboration with FTC, FLL, and FLL Jr., we also connect with other FRC teams both near us and around the world. Since their rookie year in 2017, we have mentored local team FRC6583 Human Error by inviting them to team meetings and hosting them in our shop during build season. This year, we are providing mentor support to Dearborn FRC6057 Thunderbots. Additionally, we have held several Skype sessions with Australian FRC Teams 5333 Can't C# and 5663 Ground Control, in which we discussed topics including our team's operations and award submissions in order to broaden the experiences of students on all 3 teams. When not directly assisting teams, our members volunteer at numerous *FIRST* events. During the 2017 season alone, 156 Lightning students, mentors, parents, and alumni assisted at 23 events.

Recent Accomplishments

In recent years, Lightning Robotics has gained new experience, allowing us to continue preparing members for success during and beyond their time on the team. In summer 2016, alumni started a program called Leadership College, hosted at Bosch. Each session featured a mentor or alumni speaker that taught the upcoming student leaders public speaking, team operations, and how to take initiative in starting projects and setting goals. Proving to be a success, this is now an annual event. With our student leadership team's new skills, we upgraded team cooperation as a whole. Last year, we created an Alumni Association to continue alumni engagement after graduation.

With our increased recognition after winning the 2017 St. Louis World Championship and the *FIRST* Class 2017 Festival of Champions, we are able to make a greater impact in promoting *FIRST* in our region. With our fellow Michigan alliance partner, FRC2767 Stryke Force, we were invited to visit with Governor Snyder at the State Capitol. In October 2017, we partnered with Governor Snyder again at the Conference of Great Lakes and St. Lawrence Governors and Premiers, an event with government officials from 10 states and provinces in the Great Lakes region. At the conference, 2 students from our team shared how *FIRST* impacted their future career choices

alongside students from Canadian team FRC2056 OP Robotics. After robot explanations from students on both teams, Governor Snyder and Premier Wynne demonstrated the robots for the 150 government officials in attendance.

These recent accomplishments do not mark the final level of our quest of spreading the message of *FIRST* in our community. We plan to continuously improve by running, hosting, and volunteering at *FIRST* and community events, developing long-term partnerships with all of our sponsors, and expanding our reach into other *FIRST* programs.