

Chairman's Award - Team 5962

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2018 - Team 5962

Team Number

5962

Team Name, Corporate/University Sponsors

University of Massachusetts Lowell/Merrimack Valley Robotics/Analog Devices/Boston Scientific/Ruland Manufacturing/BAE Systems/IBM/Colonial Electronic Manufacturers, Inc./Amazon Robotics/RMS Racing/Fastenal&Neighborhood Group

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

FIRST opens pathways for all participants. The program provides members electrical, mechanical, and software engineering skills. Besides these technical and team skills, it allows them to actively practice and improve their soft skills including communication and leadership. We have had two members acquire internships with one of our primary corporate sponsors as a direct result of being part of our team. The program provides a community in which members can freely identify and collaborate.

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

Since the founding of 5962, we have promoted STEAM in our local community. Our team hosts a semi-annual Women in STEM event along with a bi-annual FLL Jr. Expo for local teams that we coach in the Merrimack Valley. We annually attend local events such as Dracut Old Home Day to inform our community of STEAM opportunities. We support other community organizations, that are not focused on STEM, such as the Steps-to-Home walkathon, which raised money and awareness for the homeless.

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

Annually, the team organizes events to nurture younger generations and teach STEM. We visit various schools in the Merrimack Valley to promote FIRST programs and provide insight into what FRC is all about. The team displays booths at local events such as Lowell Spinners games, and the UMass Lowell NERVE Center. Our team establishes a friendly and welcoming environment by arranging an open house in the makerspace where anyone can learn about FIRST and our team.

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

Team 5962 is divided into subgroups that have members of our mechanical, electrical, and software teams in order to allow better discussion of issues and ideas. Senior members help teach rookie members about unfamiliar concepts to maintain sustainability. We help new members by dedicating days to familiarize them with every part of the robot. 5962 enables members to work together and form close bonds in order to inspire others interested in STEM through teamwork exercises and training.

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

Our rookie year, we assisted Team 5633 in repairing their bot, earning us the Gracious Professionalism Award. We assisted Teams 1474, 4909, and 5556 with acquiring mentors by reaching out to our sponsors to inform their workers. Our team helped Team 3707 and 6335 find a makerspace. Our team also assisted by providing help to Tewksbury in rebuilding the team. We asked our sponsors if any worker nearby would like to mentor the Tewksbury team and offered our help in the meantime and 1474 accepted.

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

Our team assisted our parent organization, Merrimack Valley Robotics, in establishing twenty four FLL Jr. programs throughout various schools in the Merrimack Valley. A growing number of our members are mentoring eight FLL Jr. teams. The team organizes and runs two FLL Jr. Expos annually. After build season, our team has planned to create a "how-to video" for FLL teams to inform them about FRC and the career opportunities available after their season ends.

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

We have mentored team 6335 by sharing our documents, electronic equipment, and kickoff day venue with them. Additionally, we provided guidance in securing a workspace by reaching out our sponsors and suggesting they reach out to local companies and universities. We held a FIRST Night at the Lowell Spinners with Team 4909 to promote STEM education through FIRST ideals. We will be helping Merrimack Valley Robotics with the next step of starting FLL to fill the gap between 4th grade and FRC.

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)

Alongside Merrimack Valley Robotics, we are involved in coaching 24 FLL Jr. teams at elementary schools throughout the area. Spreading STEM and making connections with younger generations is a passion of ours. Over the past 2 years, we have held 2 FLL Jr. Expos in which the teams show off their projects and enjoy activities. At the past event, one little girl said this was her first medal. Although that is small, contributing to her and others' success is immeasurable.

Describe your Corporate/University Sponsors

Team 5962 would not exist without the support of our generous sponsors. The University of Massachusetts Lowell provides us with a makerspace along with access to a wide assortment of tools. Our primary corporate sponsor is Analog Devices; they have provided us continual funding and our team's dedicated mentors since the team's founding. Other corporate sponsors include Colonial Electronic Manufacturers, IBM, Amazon Robotics, BAE Systems, and Ruland Manufacturing, Comcast and Fastenal.

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

Thanks to our partnership with UMass Lowell we have a place to call home. We work with the university to host our Women in STEM events, collaborating with faculty and students to promote STEM. Due to our efforts, UML offers FIRST Scholarships to two students each year. Our fans, the Chancellor and Engineering Dean, drove our robot at an open house. Two-thirds of our seniors chose to continue their education at UML. We attended the technical conference for ADI, an employer of two of our members.

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

We have a motto on our team that enthusiastic members like to repeat, "FIRST is first." Why? Because FIRST is more than just robots. FIRST is fun, flexible, sometimes even a fiasco. But FIRST is family. FIRST is a place where you can learn to problem solve, to network and create plans, and get exposure to many different aspects of STEM. However, the most important thing is the people you meet, the community you work to change, the things you learn, and the sense that you are making a difference.

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

Our team teaches that engineering is not just about math and building. Instead, it is a network of everything you have learned in school and life, including humanities, arts, math, and science, combined into one subject. As member of FRC Team 5962, you learn the importance of math and science along with being able to write well, work in a professional manner, and collaborate to lead people. Our team prepares our member for not only college but also the work environment.

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

Angenie Pang

Essay

Welcome to Our STEM Garden

In the city of Lowell, Massachusetts there is a community garden, made possible and sustained by the efforts of everyone living there. Inside, there are plots containing a variety of unique plants, ranging from sunflowers to ethnic produce.

It's been three years since we started our own garden, FRC Team 5962 perSEVERE, where we are planting seeds of inspiration in the Merrimack Valley. Our rookie year was very fruitful. In our first season, we earned Rookie All Star, Highest Rookie Seed, Gracious Professionalism, and Rookie Inspiration awards. In 2017, we were awarded the Team Spirit Award. For the 2018 season, we are even more motivated to set out and gather more hands to not only plant and nurture the seeds of our team, but also to spread the joy that comes with being a part of our garden.

Our garden has had to perSEVERE through many challenges. What started out as a handful of seeds has grown into a biome. We have had members from eleven different towns. Starting with 8 members, our team has now tripled in size. Since the team's inception our number of females has increased steadily, now with two female co-captains. Like the various plots of a garden, our team has developed and maintains six major plots of growth.

Plot 1: Women in STEM

For a garden to be successful over time, it needs to be diversified. Each new plant adds something special to the garden and keeps the soil fertile. As a rookie team, our team, while diverse in many respects, invested time in recruiting more females for our more recent and future seasons. With just two girls on the team in the first season, the gender difference was noticeable. We wondered what could be causing this gap. Perhaps many girls did not really understand how fun engineering can be, and we sought to take advantage of this opportunity to spread our love of STEM to girls who had not had a chance to experience it in a hands-on way.

With our mission to attract more women to our garden, we started planning our first Women in STEM Event at UMass Lowell in May 2016. Our goal is to spread STEM to girls through fun, hands-on projects run by female engineers and engineering students. We wanted to have girls inspiring each other to pursue their passions.

Our first event had a dozen girls, a few female engineers and the UML SWE chapter, and has grown quickly. At our second event, we attracted over 30 girls from up to 60 miles away! We also had a dozen women engineers from various local companies, as well as the Boston and UML SWE chapters. With each event, we try to add a new component. For our third event in June 2017, we added a leadership activity to the original electrical, mechanical, and software activities to promote development of soft skills in parallel with technical skills. Most recently, inspired by the idea that "engineering without art is just calculating," we added art activities to the event.

These events have also strengthened our bond with the University, and have served as opportunities to bring new mentors to our team. Through these events, we have gained new team mentors from the groups of women who have volunteered.

Through our extra efforts to include girls in STEM, we have tripled our female population on the team. Many of our new female members joined the team because they had so much fun at our events. The University values our Women in STEM event so much that they have asked us to host another event in February 2018 for the UML Engineering Week. This time, we are continuing with our positive trend to include even more engineers, university groups, and girls. Even more exciting, another FRC Team who attended our event is now hosting their own similar event. The College of Engineering has asked us to hold more frequent Girls in STEM events and FRC Team 5422 has also offered to join us to run the event.

The University also asked Team 5962 to present in the concourse of Tsongas Arena for the Engineering Hockey night. Hockey games are popular events at UMass Lowell and this offers exposure to as many as 6000 students and hockey enthusiasts.

Plot 2: FLL Jr.

Before a flower can bloom, it must be tended from a young age. For a young student to blossom into an aspiring engineer, their curiosity and passion must be fueled and encouraged. On our team, we recognize and embrace this fact and have taken great care in promoting enthusiasm and curiosity for STEM through our FLL Jr. program.

Our team has helped to plant the seeds for over twenty-four FLL Jr. teams in the Merrimack Valley. In the spring of 2016, we started this with Merrimack Valley Robotics. One of our members helped to nurture two of the teams by coaching them for their first season. When the teams were finished with their seasons, and it was time to harvest their new skills, our team organized an FLL Jr. expo for the kids to celebrate what they had learned. We invited families, members of the press, and school officials to this event. Just like the young engineers, support for our program flourished as we got ready for our second season.

This year, more of our members worked to get involved and tend to the saplings of young engineers by coaching FLL Jr. The original twenty-four teams we formed grew as schools invested more of their own resources into the programs. The Lincoln Elementary School grew from two teams funded by us, to four teams funded by MACOM, a neighboring company enthusiastic about the work we had done. St. Michael School's program grew from just two teams to over 100 kids in the program.

With such immense growth, our second Expo grew dramatically. Our expo sparked massive amounts of pride as some young students earned their first-ever medals with huge smiles plastered across their faces and big ideas in their minds. If the sheer number of smiles could measure our impact, our success would have been immeasurable.

Plot 3: Community Engagement

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We spend a great deal of time trying to strengthen the roots in our communities. In the summer of 2016 and 2017, our robot threw the first pitch at the Lowell Spinners baseball game attended by over 1000 people. We held a booth there, showcasing our robot and FIRST. Another annual event that we take part in is the Dracut Old Home Day where anyone aged 3-73 drive our robot and earn a "robot driver's license," in an effort to introduce people to our team, FIRST, and STEM activities. By invitation, we have presented at the Dracut Brookside Elementary School Science Fair, Lowell Middle School Science Fair, and Dracut Council on Aging, thus planting more seeds and increasing our involvement throughout the community.

Plot 4: Fundraising

Without water, a plant cannot grow. Similarly, without monetary support, a robot can't be built. In only our third season, finances are important and the team works together to cultivate this plot. We set a goal to would raise \$20,000 for the 2017-2018 season. All summer we met every week to discuss and complete grants and to formulate strategies for fundraising: We fundraised at Market Basket; held a movie night at Chunky's theater, sold Celtics tickets, and had a night at Chipotle. On several occasions we visited local businesses to ask if they'd like to sponsor us. Our experiences fundraising have taught team members, old and new, that you must work hard for what you want- every tree starts with a seed.

Plot 5: Teamwork

A garden can not sustain itself, it demands teamwork. As a new team trying to navigate our first two build seasons, we faced many challenges. We have learned from our mistakes and blossomed into an entire ecosystem of different skill sets and backgrounds all working together.

As a culturally diverse team from multiple towns, we realize that a key to our success is good communication. We have taken steps to implement better communication outside of the meetings. Our biggest improvement was the integration of Google Classroom. Now, all our files and our communication sit in one organized, interactive platform. Every student can post ideas, comments, or work in one place. Another big step in communication this year is our component documentation binders. Because we want to organized documentation of our build, our team has adopted a meeting journal system in which we record goals, progress, and to-dos for each meeting. Through the use of classroom, everyone has easy access to any work that is done on meetings they have missed.

Plot 6: Sponsorship

Our plots are cared for through the support of sponsors, but it is not just their monetary support that has provided huge opportunities for our team. The support of the University is through their generous offering of the makerspace and mentors. Many FIRST alumni at the University are able to stay involved through our team. Furthermore, UML now gives out two large FIRST scholarships to alumni from any team due to our collaboration. We have been given a huge outreach platform through the university between invitations to present at school events such as the UML Hockey game and their annual expo at the NERVE Robotics center in the spring. We have also been invited to have a booth at UML's i2i Conference where younger kids and local technology companies attend to see the undergraduate capstone presentations.

Similarly, Analog Devices provides huge resources to the team in the form of mentors and opportunities. Last March, we were invited to Analog's annual General Technical Conference - a conference of thousands of ADI employees - to give a presentation of FIRST and our team. The interaction between students and engineers provided unique real-world experience. Also, two of our students were able to intern over the course of the summer and help develop ADI's connection with FIRST.

Like the agricultural garden, our garden full of the perennial seeds of inspiration has become an important, and ever-growing, part of our community. If we perSEVERE, it will continue to grow.