

Chairman's Award - Team 5422

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2019 - Team 5422

Team Number

5422

Team Name, Corporate/University Sponsors

SMC LTC/Creation Station, LLC/Analog Devices/SolidWorks/RedHat/E.T. Duval & Sons/NetScout/Raytheon/Ekaru/Hunter Automation/Add-A-Sign, LLC/Rockwell Automation/Mathworks/Nichols Family/Bose/3DWox Sindoh/McCarty Companies/Northeast Promotion and Apparel/Panera Bread/Torriander/Johnson Controls/PMD&Middlesex County Robotics Club Inc

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

Now in our 5th season, Stormgears enables students to pursue a passion for STEAM, developing strong technical & leadership skills in a professional environment. We emphasize innovation, which has resulted in a custom tank drive & sensor control system. In addition, we help students excel after graduating, as 100% of our alumni are in college, 90% in STEM majors. Furthermore, our students spread FIRST's message: team alumni Miquel Girarde-Villa, returned to Spain determined to start a FRC team.

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

As a non-high school team, we offer opportunities to students from local schools without FRC teams (17 from Acton, 25 Westford, 11 Chelmsford, etc). We showcase FIRST with our robot & "FLL in a box" kits at 4 schools & 8+ community events every year to inspire younger students. Our community outreach covered 45 events, reaching 10,000+ people. We encourage Girls in STEM, reaching 250 girls at State Girls STEM Fair. We are hosting a Scouts Fair for 50 Girl & Cub Scouts to earn robotics badges.

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

Stormgears created a novel, scalable program, STEAMSplash, to make STEAM & FIRST globally accessible. It includes "In a Box" startup kits with hands on exercises for aspiring Jr. FLL & FLL teams, and a web platform to integrate our products into classrooms in remote locations. STEAMSplash has reached underprivileged communities in Rwanda, India & other countries. STEAMSplash was a runner-up at a LearnLaunch business plan competition, and was featured at the 2017 LearnLaunch EdTech Conference.

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

Alekh Beri led our first international outreach in India & inspired others, resulting in outreach to Philippines, Rwanda, Hong Kong & Argentina. His example led Niranjana to conduct workshops in India, Jazmin to help a FLL team in Argentina & others. Aditya Vellal, a Dean's List finalist, was a shining example of technical/team leadership, inspiring other Deans List nominees to follow. Ginny Shea regularly leads rookies to build our field elements, getting them excited to be part of the team.

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

Having been inspired by Andromeda One our rookie year, we have strived to help students and mentors form FRC teams. In our second year, we mentored the formation of team 5962 perSEVERE. Through frequent phone calls and email, we provided guidelines for managing the various facets of a team, advice for fundraising, and answered questions. We have conducted Open Houses each year, reaching out to potential rookie teams, where we shared knowledge about FIRST and offered advice for aspiring teams.

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

We worked with Springboard, an after-school program company, to create a lesson plan. It included a "Jr FLL in a box" kit, and a "season in 8 lessons", to encourage Jr FLL teams. In 2017-18, we helped 3 FLL teams start in Acton, MA, & 4 FLL teams in Harvard, MA. We donated Lego materials & tables, and mentored them. This season, we started & mentored an FLL team in Argentina, which won the Argentina Championship. We are talking to 2 schools in Ghana about starting FLL teams for next season.

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

We created a non-profit organization, Middlesex County Robotics Club, as an umbrella to grow FIRST teams. Students progress through 4 Jr FLL teams, 5 FLL teams & 1 FRC team, Stormgears. Each season, our FRC students assist them & help them succeed. Our mentees eventually become part of our team & help the Stormgears community grow. Also, FLL teams that we helped won the MA State tournament, Argentina Championship, stood 3rd in MA (all this year), and previously won 2nd places in MA (2 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)

We have assisted or mentored 34 Jr FLL & FLL teams locally & globally in India, Philippines & Argentina. Several went to state competitions & 4 of them beyond that. We mentored a FLL team of 7 underprivileged students in India, who won the Project Award. This year we partnered with the Pajama Llamas, an FLL team, to mentor a team in Argentina that is going to Worlds. We hosted a FLL scrimmage (6 teams - 1 of the teams won MA State Championship and another was 3rd).

Describe your Corporate/University Sponsors

As a young team, we depend on corporate sponsors, & are grateful for their support. We started by canvassing local companies door to door, raising awareness. We have 25 sponsors, with 92+ % retention rate. SMC Ltd. in Devens MA is one of our most integral sponsors, with experienced mentors, cutting edge tools, materials & 6400 ft2 of workspace in their factory. Solidworks provides us software licenses. We add new sponsors every year - Rockwell Automation in 2018; Johnson Controls & PMD in 2019.

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

We have strong relationships with our sponsors, with several supporting us all 5 years - SMC, Analog Devices, NetScout, Raytheon. Beyond funding, we gain valuable design process insight in Netscout workshops each year. We attend Analog Devices' annual General Technical Conference. We attended Rockwell Automation's Engineering Day. We give back where we can: donating to help SMC employees affected by California wildfires, and are offering free membership to SMC's employees' children.

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

Where did we learn to shave 40 pounds off a robot in 12 hours? Where did we learn to educate kids about robotics in a foreign country? FIRST. FIRST is more than robotics. Not only do you gain advanced technical knowledge and engineering skills, you develop teamwork, entrepreneurship and leadership skills. You learn to solve tough challenges in a high-pressure environment. You get opportunities to serve your community by promoting STEAM through outreach. And, you have a lot of fun doing it!

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

Our team's diversity is one of our strengths. We have members from multiple ethnicities, hometowns, schools & backgrounds. This has inspired us to give back, both locally & globally. Our outreach spans the globe in Philippines, India, Rwanda, Ghana, Argentina. A passion for STEM exists there, but they need support. FIRST provides the perfect framework to improve the lives of these students & our mission is to deliver it to them. We have reached over 350 international students through outreach.

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

Jazmin Rodriguez

Essay

We are the Stormgears. It's an apt name, because our team is composed of several gears that seamlessly work together, resulting in a high-achieving, award-winning, role model team. The 7 main gears in our Stormgears machine are Students, Robot, Mentors, Entrepreneurship, Global Outreach, Community, & Sponsors. Although these gears function independently, they are tied together by our team's doctrine: to inspire students locally & globally with STEAM, using FIRST as a framework.

STUDENTS, INSPIRING OTHER STUDENTS

Now in our 5th season, our team was founded from a group of FLL students' motivation to continue their journey with FIRST. Our students' passion drive the first gear of Stormgears. Each technical subteam is overseen by a mentor, but is also led by a veteran student who trains younger members to become next year's leaders. Students acknowledge the immense benefits of being part of a FRC team & have a fierce desire to share these rewards by assisting or mentoring other FIRST teams, with local community & global outreach & developing STEAMsplash -a novel platform to inspire a passion for STEAM in younger kids.

We advocate for those who are underrepresented in STEAM fields. Starting with 1 girl in our 1st year, Stormgears has now grown to 26% female members. We participated in the Statewide Girls STEM Fair & exhibited robotics & outreach activities to 250 girls. We supported FRC Team 5962 perSEVERE in their Girls in STEM event last year. The safety team co-captains in last 2 years were girls; their leadership helped us earn safety awards. This year we have girls in all of the subteams, with 3 of them as team leads.

We are a diverse team: by ethnicity, by gender, by school district, and by economic background. Our diversity influences all of our activities & focus. Our global outreach, with a focus on kids in underprivileged communities, is driven by students reaching back to their parents' countries of origin.

ROBOTS, INSPIRING INNOVATION

Through innovation & strong technical foundation, we are leaders in design & controls. We developed custom circuit boards, designed algorithms for motion control & sensor integration with Raspberry Pi & Arduino. We wrote 3 white papers on our work in building a custom tank drive, which won the Xerox Creativity Award & another on our own robust controls system, StormNet, which won Innovation in Controls award. This year, we came in 4th at Solidworks XDesign Challenge with our design for a moon lander. We are now exploring new capabilities like Lidar sensors and pneumatic lifts.

MENTORS, INSPIRING EXCELLENCE

Mentors are an essential cog in the Stormgears machine, providing us with both technical & non-technical guidance. Our mentor group, consisting of 25+ industry professionals, bring years of engineering experience & offer expert advice in entrepreneurship & marketing. Embodying the core values & ideals of FIRST, our mentors constantly instill the importance of teamwork & perseverance. Our mentors help students hold workshops & seminars during the offseason, such as CAD design, programming, business plan development, even art workshops. One mentor, Mr. Kazman, is known for his signature response to the question "How should we do this?" He replies "Well, that's for you to figure out!" Instead of fixing the problem themselves, our mentors guide us to overcome the problem & reach a higher level of understanding. Our diversity stretches to mentors as well: female mentors who serve as role models that inspire the growing number of female students on our team. Mentors are ethnically diverse as well.

ENTREPRENEURSHIP, INSPIRING LEADERS

Our passion for STEAM motivates us to spend countless hours in developing our STEAMsplash product suite starting with our Jr. FLL & FLL in a Box kits, which allows us to spread the message of FIRST. Started at a local library three years ago, STEAMsplash was a simple set of activities designed to promote a love for engineering through fun challenges such as building spaghetti structures & simple circuits. With its success in many outreach events, we turned it into a scalable product. Its unique design captivated the curriculum director of Springboard, a large after-school enrichment program. We designed a "season in 8 weeks" program. In 2017, we submitted our business plan for this product to a LearnLaunch competition and received third place. We were featured at LearnLaunch EdTech Conference, where we introduced FIRST to hundreds of edtech company executives & school superintendents. Following this event, we focused on designing a web platform to reach many more students all across the globe. We are now in development, conducting pilots, & planning to release it next year!

GLOBAL OUTREACH, INSPIRING UNDERPRIVILEGED KIDS

Essay - page 2

Leveraging FIRST programs, we started initiatives all across the world in India, Rwanda, Hong Kong, Argentina, Ghana & the Philippines. By conducting robotics workshops, assisting & mentoring rookie teams, providing supplies to newly formed teams & raising funds, we support & promote STEAM in underprivileged areas. We began this effort in India, visiting 4 poverty-stricken schools & teaching them robotics basics using NXT kits. One student said after the workshop that she had always heard of robotics, but getting to touch and see it in real life truly changed her life and that she wanted to become an engineer. We also mentored an FLL team of 7 students from poor families in Pune, who went on to win the Project Award. The following year, we used proceeds from our outreach events to fund 3 all-girls teams from underprivileged areas in India to compete at the World Robotics Olympiad & this past summer we conducted Solidworks workshops in Rwanda & sent supplies.

In the past year we have been in contact with 2 schools in Ghana about starting FLL teams to participate in the 2019-2020 season. We inspired these schools to build an engineering program centered around FIRST & plan to mentor these teams both online through Skype calls & in person with our own FLL start-up kit & with the help of an engineer who is spending the summer in Ghana.

We helped start Flecha Cosmica, an Argentina-based FLL team of 10 members between 12-14 years old. Through numerous conference calls and emails, we mentored them & helped them together alongside another team we mentored in our community - Pajama Llamas FLL team. This rookie team was also an attendee at the first official FLL competition in Argentina, winning the Champion's Award & heading to Houston World Championship.

COMMUNITY, INSPIRING "STEAM"

Based in Middlesex County, our relationship with the community has been an important focus. Each year, we showcase FIRST & our robots in 3 high schools (WA, ABRHS, CHS) that do not have FRC teams & at 1 local elementary school in Chelmsford. We participate in local events like Apple Blossom Parades, community races, and school STEAM fairs. In only 5 seasons, we have reached 10,000+ people across 45 outreach events. At events such as the State Girls STEM Fair, we encourage organizations outside of FIRST to inspire STEAM. This year, we expanded to other events such as the Solidworks user group at DEKA, where we talked to executives from many companies about how they can sponsor, mentor & encourage FIRST teams. We also hosted an FLL scrimmage with 6 teams & are hosting a Scouts Fair for 50 Cub & Girl Scouts to earn robotics badges. We are co-hosting with sponsor NetScout a Hackathon for 100 kids using FIRST themes.

By assisting & mentoring 34 Jr. FLL & FLL teams in our local community over last 4+ years, we not only shared our passion for robotics, but also gained valuable experience teaching them. In the FRC community, we are proud to have continued the chain of support. Having been mentored by Andromeda One our rookie year, we went on to mentor Team 5962, perSEVERE, in our 2nd year. Through frequent phone calls & emails & in-person mentoring, we guided them during their first season. We are proud that they won the Rookie Inspiration Award and then the Chairman's Award. Last year, we partnered with them for their Girls in STEM Event. We have also conducted Open Houses each year, reaching out to potential rookie teams, where we shared knowledge about FIRST & offered advice. This year, we spoke to the Boys & Girls Club in Lowell, MA about a long term relationship, helping their FLL teams. We started by helping 2 of their teams.

SPONSORS, INSPIRING ENGAGEMENT

Stormgears sponsors are more than just corporate donors; they mesh with team members & mentors to spur action in both competition & community. We are proud to be sponsored by 25 tech companies & small businesses. As a young team, Stormgears would not have progressed as far without their support & we are very thankful. Our most critical sponsor is SMC Ltd, hosting us at their facility in Devens, MA & supporting us with mentors, tools, equipment, & 6400 sqft of space. Last year, we raised \$500 to support displaced employees at SMC's location in Santa Rosa, CA affected by fires. UTC has funded our attendance to the World Championships for 4 years. Last season, we invited Netscout employees to our Kinetic Sculpture Workshop, creating blueprints for our pit. Solidworks provides us with software licences. Each year, we present our progress at RedHat & discuss how to improve our performance. We attended the Analog Devices GTC Conference & shared our experience with employees & express our gratitude for their support. We participated in Rockwell Automation's Engineering Day this year, where we led STEAM activities for their employees' children.

All of these gears are essential keys to our success. Working together, each gear strengthens the others & results in a strong, sustainable, successful & well-oiled machine. We aim to keep the gears moving for many more years, promoting a love for STEAM and inspiring children across the globe to learn, grow & become STEAM professionals.