

Chairman's Award - Team 1403

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2021 - Team 1403

Team Number

1403

Team Nickname

Cougar Robotics

Team Location

Skillman, New Jersey - USA

Describe the impact of the *FIRST* program on team participants within the last 3 years. This can include but is not limited to percentages of those graduating high school, attending college, in STEM careers, and in *FIRST* programs as mentors/sponsors.

FIRST has had a substantial impact on our members' drive to pursue STEM fields. 85% of our members have moved on to pursue careers in STEM-related fields. We have seen a cycle of members join as young recruits, become alumni, and return to give back to the FIRST community. 50% of our mentors are FIRST alumni, with 9 alumni mentoring other FRC teams. One alumni started his own team, FRC 5125. We started a monthly alumni newsletter and many have reached out to connect with and mentor our team.

Describe your community along with how your team addresses its unique opportunities and circumstances.

Through our annual food drive, over 2,000 food items have been donated to the Trenton Area Soup Kitchen in the past 7 years. In cooperation with the Montgomery Food Drive, we were able to continue our donations during the pandemic by donating toiletries instead of food items. Our team assisted in 3 Boy Scouts Eagle Projects in our school district, spending a total of 88.5 hours. Two field carpets were repurposed for use in the special needs classes in our district's elementary school.

Describe the team's methods, with emphasis on the past 3 years, for spreading the *FIRST* message in ways that are effective, scalable, sustainable, and creative. How does your team measure results?

We measure the results of our impact through the large community from our social media and website, including our alumni and fellow FRC teams. In a Facebook post about our safety protocols, FRC 75 asked us to share our COVID documentation. Our 2 Captains were asked to speak and answer questions about female leadership during the Capital City Classic Workshops. Our team was also asked to present about running a team to FRC 2458. Since 2007 we have been hosting workshops at our Kickoff event.

Please provide specific examples of how your team members act as role models within the *FIRST* community with emphasis on the past 3 years.

Our website has published resources such as Cougar Echo and the Belt and Chain Calculator to help teams with their robots. During competitions, we run service stations to assist teams in need of technical support. At past competitions, we loaned other teams batteries and pre-coordinated lending a tool set to FRC 3132. We have won the FMA Safety Star of the Day award, showing our commitment to safety. At competitions, we have a professional backdrop in our pit displaying our team's initiatives.

Describe your team's initiatives to Assist, Mentor, and/or Start other *FIRST* teams with emphasis on activities within the past 3 years.

Team 1403 has team members mentoring FLL Teams 26361 and 26362, gathering a total of 3677.25 hours since 2016. The FLL teams have won the "Innovation Award" and have qualified for the State competition. Two of our student mentors for these teams have won the "Outstanding Mentor Award" each. We have assisted Rookie FRC 8117 by providing them with team resources. We assisted a local Jr FLL team organize their team structure and meetings.

Beyond starting teams, what initiatives have you done to help inspire young people to be science and technology leaders and innovators? What results have you seen from your efforts in the past 3 years?

Through our programs such as judging at the Science & Invention Convention; mentoring at our middle school recreation program, FLL, and the SOAR summer program; and volunteering at Family STEM Night, we are able to guide students through the basics of STEM education, while seeing their interests increase. Many of these participants are eager to become our next team members.

Describe the partnerships you've created with other organizations (teams, sponsors, educational institutions, philanthropic entities, etc.) and what you have accomplished together with emphasis on the past 3 years

Team 1403 joined The Compass Alliance (TCA) with 7 other worldwide FRC teams in 2017. We have published 62 resources on the TCA website, and have published 5 resources on the official FIRST website, such as an Online Meeting Resource. We have been attending our sponsor Picatinny Arsenal's Women's Engineering Night. We were asked to write about our team's in-person meetings during COVID for DoDSTEM. For 3 years we have been teaching students at Rock Brook School, including virtually this year.

Describe your team's efforts in the past 3 years to promote equity, diversity, and inclusion within your team, *FIRST*, and your communities.

In the past 3 years, we have held "Women in STEM" events at our Kickoffs and District Competitions for the public where professionals tell stories of working in male-dominant fields, touching FRC teams like ours. We held five virtual Women's Technical Nights this year for our younger female members. For 3 years, we have been sharing our different heritage and traditions in our annual Culture Cougar Class. We have had presentations on a total of 15 cultures so far.

Explain how you ensure your team and the initiatives you have created will continue to run effectively for the foreseeable future

Our team creates documentation such as Standard Operating Procedures, Subteam and Robot Standards. In order to standardize our knowledge, we have initiated comprehensive Lesson Plans and Curriculum documents. We create video tutorials on our robot, VR, and safety systems. We post documentation from our Kickoff and TCA Workshops on our website. Our documentation is public for other teams to access. We have maintained our sustainability through our increased mentor base with returning alumni.

Describe your team's innovative strategies to recruit, retain, and engage your sponsors within the past 3 years

We annually present to the Montgomery Board of Education, and made a video this year. We establish bonds with our community and parents through our newsletters, by which we are able to recruit many of our sponsors. We spotlight our sponsors on social media, including a Thank You video. Our other sponsors include, A&K Equipment, Integra LifeSciences, Verizon, Google, Slalom, and Johnson & Johnson Foundation, and Bristol-Myers Squibb which has been our sponsor since our inception.

Highlight one area in which your team needs to improve and describe the steps actively being taken to make those improvements.

One area we need to improve in is the separation between grades. As most of our new members are freshmen, they tend to shy away from taking initiatives, preventing them from learning the inner workings of the team. To improve on this, we initiated a new program called "Big Cougar Little Cougar," where returning members help new ones assimilate into the FRC family. Big Cougars help Little Cougars with technical concepts, team values, and bonding through virtual games.

Describe your team's goals to fulfill the mission of *FIRST* and the progress you have made towards those goals.

Team 1403's goal is to foster STEM education and prepare students for the future. Our team's principles are outlined through our three pillars: dedication, family, and quality. These are present in everything we do, in and out of the robotics room. Our mentors guide students through their journeys, and students help the younger generations find their paths through our outreach. We track our alumni in their college and career choices, seeing what impact Team 1403 has had on them.

Briefly describe other matters of interest to the *FIRST* Judges, including items that may not fit into the above topics. The judges are interested in learning about aspects of your team that may be unique or particularly noteworthy.

Our team structure works like a machine through dividing tasks and focusing on different areas. To complete objectives we have a robot and a logistics side, each of which consist of multiple subteams. All work is student driven, with mentor guidance. All captains are trained on leadership skills, communication, time management, and conflict resolution. Despite

the pandemic, our spirit has not diminished; we meet 6 days a week virtually and in-person, with the approval of our Board of Education.

Essay

Eighteen years ago, 35 high schoolers came together to build a robot. Over time, we have become a cycle of students mastering skills and returning to train new generations. We strengthen our ability to work as a machine; we focus on different tasks and unite for common goals: to grow as a team, produce successful leaders, foster inclusion, and give back to the community while continuing to spread the FIRST message.

Team

Team 1403 is run by 2 Team Captains with Robot and Logistics Managers. We have 9 subteams with 19 captains for a total of 98 members, plus 18 mentors, including 8 FIRST alumni.

This season, we started a Safety Subteam that audits and certifies members on all aspects of our team's safety by creating tests, videos, and presentations including a Fire Safety Video located on our website.

Due to COVID-19, we created guidelines for in person meetings with 5 stages of procedures. We invested in safety technology, including a UV light and fogging machine to sanitize our work environment.

We post about sponsors, mentors, events, and progress on our social media accounts to reach more people, with a total of 1,756 followers. We update our website with resources and tools, such as the Belt and Chain Calculator, for other FIRST teams to use.

Part of our Design Subteam focuses on animation, and recently created field and robot assembly Virtual Reality (VR) simulations to be shown at events. During the pandemic, we made virtual tutorials on how to run and create the VR system.

During regular build season meals, students play Kahoot! quizzes about various FIRST topics, relieving stress and forming friendships. We continue this tradition in our virtual meetings.

149 Varsity letters have been earned since 2014 based on the team's contract requirements, rewarding students with pins for maintaining their status.

Our largest sponsor is The Montgomery Township Board of Education (BOE), with whom we have a symbiotic relationship. The team's machinery is donated to the school's engineering classes. Annually, members present our robot and progress at a BOE meeting, and a video was shown virtually this year.

Many team events were postponed due to COVID restrictions, but we plan to continue them.

Preparing Students for the Real World

Annually, we hold 6 cougar classes where members learn skills that will help them beyond robotics. After mentor-led presentations, members complete challenges promoting team building. At 1 of our virtual cougar classes this year, we invited our school's psychologist to talk about mental health and wellness. Other topics include leadership, introduction to robotics, college preparation, STEM in Food, business etiquette, and team culture.

Branding and documentation are valued in our team to foster a professional identity. At competitions, we distribute brochures about our team to promote values that shape us.

Our Robot Owner's Manual consists of documentation from technical subteams and robot specifications with subsystem documents. Our team implements a "Drawing Control" process that ensures quality through many peer reviews before passing them to another subteam.

We annually update Subteam Standards to help members stay organized while assisting future leadership in conducting meetings. Subteams create Standard Operating Procedures that allow members to successfully run applications and use equipment.

During build season, we post weekly newsletters on our website that document our team's progress and accomplishments.

Members are held to professional standards through a code of conduct, team uniform, and team and safety contracts which they must sign and follow each season.

At competitions, we display a professional backdrop in our pit to provide passersby with information about us. We maintain organization by updating pictures and statistics with recent endeavors.

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Diversity

For the past 3 years, Team 1403 has held cultural cougar classes that explore ethnic backgrounds of our members. In our 2020 virtual class, 6 cultures were presented.

One of our fellow The Compass Alliance (TCA) teams, FRC 4481, spoke to us about their Dutch traditions and climate. Our members were interested to learn about the diversity of our team and partner teams, spreading our core values and strengthening FIRST's culture.

Since 2018, we encourage women to pursue STEM careers through our "Women in STEM" events at Kickoff and District Competition Events. A total of 30 women presented their journeys in professional STEM fields through our 6 events. We held our first virtual event last year, along with an informative meeting for incoming team members. To advertise, we design flyers, posters, and brochures.

Since its inception in 2013, female team members have attended our sponsor Picatinny Arsenal's "Women in Engineering" event where they learn about a variety of STEM careers available.

As a new initiative, our team held virtual "Women's Technical Nights", where experienced female team members educated newer ones on programming, electrical, CAD, and basic mechanical tools. The women strengthened their bond by participating in Jeopardy and other hands-on activities.

Team 1403's leadership is 42% female, with a 6% female team membership increase from last year.

Community Impact

Annually, our team donates food and toiletries to the Trenton Area Soup Kitchen. In the past 7 years, we collected over 2,000 items. During COVID, we donated toiletries to the Montgomery Food Pantry.

We have mentored FLL Teams 26361 and 26362 since their inception 5 years ago. This year, 19 members virtually mentored these teams so far for 745 hours.

For 5 years, 65 of our members volunteered to teach students in grades 3-8 at the S.O.A.R Summer Program to build and program NXT LEGO robots for a total of 2500 hours.

For 4 years, our team members have taught children with special needs the fundamentals of EV3 robots and Scratch Programming at the Rock Brook School in Skillman NJ. This year, our members put together a virtual curriculum teaching VEX VR. We are partnering with Montgomery Special Education Parent Teacher Association to teach this curriculum for students in our district.

We have worked with our school's special education program for 2 years, helping them create a Raspberry Pi face-tracking program.

We taught the basics of EV3 robots in our district by mentoring students in grades 5-6 at their After School Robotics Recreation program under the tech teacher at our Lower Middle School.

We have been helping with our school's Family STEM night since 2017. At our booth, attendees could interact with our VR system and VEX robots. We are currently working on creating a STEM week for middle schoolers.

At our district's past 6 Science and Invention Convention events, members volunteered to judge younger students' projects. We implemented our Family STEM Night booth at this event.

Future of Team 1403

To maintain sustainability, our subteams made detailed preseason lesson plans and instructional videos to help future leadership. For consistency, the main topics taught yearly are outlined in our standardized curriculum program.

This year we introduced the "Big Cougar Little Cougar" initiative where team veterans guide their subteam's new members. These relationships run as peer mentorships that lead to friendships and memories.

We track our alumni yearly to maintain contact by adding them on social media such as LinkedIn and Instagram, and sending surveys. We received 217 responses on what they are pursuing and how the team impacted them dating back to 2004. During COVID, we added 2 alumni mentors.

The FIRST Message

In 2007, we hosted our first Kickoff and continued this tradition by gathering about 36 teams and 900 members yearly to start the build season. We distribute Kit of Parts, show a video capturing our enthusiasm for the season, and host workshops such as Autodesk Inventor, pneumatics, bumpers, fundraising, and safety. In our 2020 Kickoff, we raised \$800 for our sister team FRC 3132 to support the victims of Australian Bushfires.

We hosted our first off-season event 15 years ago: Monty Madness. Ten years later, this tradition became an FMA

District Event with 35 teams competing. This event is supported by over 100 volunteers including team members, our community, and alumni. Team parents run food concession sales which is our major fundraiser.

In 2017, Team 1403 became one of the founding core teams of The Compass Alliance (TCA) through which we regularly add to the sustainability of other FIRST teams.

Our team has published 10 written resources and 52 videos on the TCA website. This year, we created an Online Meeting Resource which was published on the official FIRST website.

We have established strong bonds with teams across the world through TCA, including FRC 3132 and 4481. We are heavily involved in TCA group calls where we share projects and exchange feedback throughout the year.

We welcomed 18 teams to share resources at our first "TCA Workshop" in September 2019. We hosted 12 workshops consisting of topics such as CAD, mentor discussions, team, programming, and robot resources. Our team advisor presented his STEM classroom, encouraging other teams to model his program.

This year, our 2 female captains were asked by TCA to present and answer questions about their experiences in STEM at the Capital City Classic Workshops, hosted by FRC 1678, 2073, and 3859.

In spring 2020, our team was asked to virtually present our robot and team dynamics on FMA+, a FIRST Mid-Atlantic weekly webcast.

Team 1403 revolves around the pillars of dedication, family, and quality. By dedicating 6,279 hours to the team so far, we are confident that our members will sustain their growth to transcend STEM culture in the real world and shape the next generation of STEM leaders into a diverse array of voices.