

Chairman's Award - Team 6413

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2022 - Team 6413

Team Number

6413

Team Nickname

Degrees of Freedom

Team Location

Chandler, Arizona - 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.

Degrees of Freedom (DoF) provides an environment for minority students to learn technical & soft skills. Our students gain the confidence to pursue higher education in STEM. Before joining our team, 41% of our students hadn't considered a STEM career. Now, 100% plan to study STEM in college. In addition, preparing to speak to judges at competitions has taught our students to have confidence when speaking to industry professionals about FIRST, like our sponsors & even former astronaut Mark Kelly.

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

Our team takes opportunities to promote both STEM & FIRST in underrepresented communities. By our calculation, 16,526 students among 21 schools in a 10-mile radius of our team do not have access to school run STEM programs. As a community-based team, we increase STEM accessibility by recruiting students who don't have access to FIRST programs. We do this by demoing our robot at local schools like Chandler High & inviting students to our STEM Center to learn more about FIRST & DoF.

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?

An effective method DoF uses to spread the FIRST message is facilitating STEM camps for underrepresented students. For example, Destination College is a summer camp for 6th graders from low-income families. In 2019, we hosted a robot demo day with other FRC teams to showcase FIRST to 101 students. We use our social media platforms to spread the message of FIRST & use Facebook/Instagram Analytics to measure the impact & reach of our social media content.

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

In 2019 & 2020, DoF mentored 11 FLL teams at elementary schools & after-school clubs. We guided them in building their robot & creating a presentation for competition. We exercise confidence in the students we mentor; setting an example as they become STEM leaders. In 2022, we were contacted by FTC 20327 from Mexico & set up a meeting to talk about how to emulate our team. During the meeting, we spoke in Spanish about teamwork, pandemic strategies, & also shared our engineering notebook.

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

In January of 2021, DoF moved into our new build-space, the Si Se Puede Foundation (SSPF) STEM Center. After years of not having a consistent build space, it appeared we had too much space. DoF & SSPF took this opportunity to host the AZ FIRST machine shop. Previously only available 8 days a year at Regionals, the machine shop is now open year round. With this new space, we've assisted our friends at FRC 2403, 4183, 698, & 498 by allowing them to use our meeting space, field, & our CNC.

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?

As a minority majority team, it is in our mission statement to represent the underrepresented in our community. A way that we do this is through robot demos. We gave a presentation & robot demo at Geek Girls, a Girl Scout event hosted by our sponsor GM, & at Intel's STEM day for middle-school girls. We also partnered with FRC 498 to demo our robots at a Title I elementary school. As a result, students in these communities are introduced to a reality where STEM leaders look like them.

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

One of the most impactful relationships we've developed is with our big sister team, Desert WAVE (DW), SSPF's all-women collegiate robotics team. Since 2018, we've held outreach events, fundraisers, team bonding nights, shared equipment/parts for our robots, & some DW team members even mentor DoF. By working together, DoF & DW are creating the next generation of women leaders in STEM who serve our community as accessible & relatable role models.

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

DoF strives to be inclusive & made it a part of our mission statement. Recently we normalized the display of pronouns on our team's message channels. This is important because by normalizing displayed pronouns, we are creating an open environment for people to share their identity. In 2020, the Navajo Code Writers came to Phoenix for an FTC competition, so we hosted a potluck to help them feel included & welcomed in the central AZ FIRST community.

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

In 2021, SSPF acquired a building to use for community STEM education. DoF students set up the building by painting, cleaning, & organizing the space. DoF takes ownership of the space by creating a welcoming atmosphere for other FIRST teams that visit the building. SSPF held an open house, where DoF spoke to the community & potential sponsors about our impact. For years, after not having a permanent build space, this ensures DoF's ability to continue carrying out our mission of spreading FIRST.

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

DoF's prominent image as a program that promotes STEM to underrepresented communities is a way that we innovatively recruit sponsors. We're proud of the fact that a majority of DoF is composed of women & we make this a part of our image by wearing bows at competitions. Our logo of hands joining together to form a bird, resembles the different demographics of students that join to form our team. This image is well reflected by our social media & branding & is recognized by our sponsors.

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

The impact of the pandemic moving FIRST online showed DoF that we needed to improve communication to accommodate a remote setting. To ensure all members are updated on team activities, we keep a digital engineering notebook & a meeting notes channel in Slack that students can refer to if they miss a meeting. We provide virtual meeting options to include our members when they cannot attend in person. We also share status updates at the start & end of meetings to help us reflect upon our progress.

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

Over 60% of DoF students are a gender minority in STEM & 75% are BIPOC. Following FIRST's mission, DoF creates opportunities for people of all backgrounds to participate in STEM. As a result of our program, 100% of our alumni have graduated high school, 81% are first-generation & 54% study STEM. Our veteran student leaders & mentors reflect the diversity of DoF. Guided by leaders who look like them, new DoF members are empowered to become leaders themselves.

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.

Prior to 2020, DoF was an all-girls team. After enduring pandemic struggles, our brother team Binary Bots didn't have enough students or resources to operate independently. To ensure that everyone in our community had access to a

FIRST team, we opened our doors to all genders.. Despite the new team dynamic, we continue to uphold our team's culture of supporting marginalized communities in STEM & creating an entire generation of people who respect women.

Essay

Degrees of Freedom (DoF) is a student-led FIRST Robotics Competition team with the mission to use STEM to empower everyone in the community no matter their gender identity, race, creed, national origin, age, sexual orientation, or ability. DoF was founded in 2016 by the Si Se Puede Foundation (SSPF), an organization that provides opportunities to underrepresented communities. SSPF provides DoF with the funding & support to help us create our own successes. DoF & SSPF are birds of a feather: our missions align as we aim to improve our community via STEM. To fulfill our mission, we serve those who are underrepresented in STEM: those from low socioeconomic backgrounds, those who are differently-abled, & the elderly. While our efforts are primarily in Chandler, AZ, our impact has migrated across the globe. DoF began with a handful of students motivated by hard work & is now a larger flock that strives to soar even higher. This season, our 18-student team from 6 schools is 75% BIPOC & over 60% are gender minorities in STEM & all student officers are female or non-binary BIPOC. Our program removes barriers that often restrict underrepresented students from participating in FIRST. We remove language barriers by having multilingual students & mentors express to non-English speaking parents about the importance of FIRST. We remove financial barriers by making participation in our team free. DoF students do not pay team dues or for t-shirts & travel. DoF is funded by long-standing sponsorships & our students write grants & organize team fundraisers.

Prior to 2021, DoF was an all-female team, but as a result of pandemic struggles, FRC 5465 Binary Bots (BB) & DoF united. In addition, we recruited 11 new students & 7 new mentors before the 2022 season. The new team environment was a change for all students & took time to adjust to. With new students in our nest, we came up with ways to bond together: we've held potlucks, arts & craft parties, & movie nights. Along with bonding, we held "Workshop Wednesdays" to get students familiar with new technical skills. One workshop was about team imagery, which got the students excited about revamping DoF's image & gave them a sense of ownership over the team's identity.

After the pandemic began, our FRC future was uncertain, but we wanted to continue to develop our technical skills, so in 2020 we started our own FTC team, Da Geese of Freedom (DGF). DGF, instilled with the same passion for their community as DoF, was very active in their outreach: hosting a mock kickoff & assisting other FTC teams, including FRC 4118's feeder teams, FTC 18317 & FTC 18205, from Florida. Unable to meet in person during much of the season, DGF developed the "Sisterhood of the Travelling Bot," a contactless system of having the robot travel between each students' home so they could work on it safely. Each student kept detailed accounts in an engineering notebook to overcome communication obstacles that arose from not meeting in person. The notebook was so successful, we continued the practice of making an Engineering Notebook for our FRC team.

We've spent 1245 student hours in 2018-2020 mentoring over 11 FLL teams, teaching Core Values, technical skills, & setting an example of Coopertition. Many of them went on to compete at FLL state competitions, with DoF students mentoring & cheering them on. In addition to mentoring FLL teams, DoF assists our FRC peers at SSPF's STEM Center, where we've been able to forge stronger relationships in the AZ FIRST Community. FRC 498 & 698 reached out to us this season & we let them use our equipment to machine their robot parts. FRC 2403 & 4183 also visited to use our practice field & strategize after Kickoff.

Despite being a small team, DoF prioritizes paying it forward to FIRST, even during build season. In 2019 alone, DoF assisted at 2 FLL Regional Competitions, the FLL AZ State Championship, & the Sanghi Foundation Arizona State FIRST Robotics Championship. In 2020, DoF also volunteered at the Central Phoenix FTC Tournament.

ICAN is an afterschool program in Chandler that helps underrepresented youth achieve personal & academic success. DoF students set up a demo & donation of Snap Circuits, toy electrical circuits, at ICAN. These Snap Circuits will spark students' interest in STEM learning & propel their innovation skills.

DoF understands the importance of engaging with all ages of the community so we're bridging the gap between the elderly population & modern technology. Solterra, a senior living center, is an organization we have been volunteering with since 2016. We have spent our time with the residents in various ways, like teaching them how to use technology to communicate with their loved ones & keeping them company. Due to COVID-19, we cannot visit in person, but we wanted to remind them that we are still thinking about them, so we made & delivered Valentine's Day care packages to them.

DoF strives to create an environment for FIRST & STEM to flourish in our community. With an average of 14 students per year, DoF has dedicated 5000+ hours of service to the community promoting STEM since May 2017. Of those hours, 2442 specifically promoted & supported FIRST. DoF also volunteers at community events, such as ASU's SunHacks Hack-A-Thon & Intel's Boat Parade in 2019. We also demoed our robot at the 2019 STEM Fun Run marathon.

At the beginning of the pandemic, FRC 1108 asked us if we could help produce PPE for Oasis Pavilion Nursing & Rehabilitation Center. We realized that with a few changes, 3D printed shields could be laser cut, allowing us to make 38 face shields in the same time it would take to print 1 & it was cheaper. By partnering with our big sister collegiate robotics team, Desert WAVE (DW), DoF delivered over 200 face shields & over 100 ear savers to Oasis, IASIS, & the Navajo Nation Department of Health. With this PPE, DoF sent hand-written thank you notes to essential workers.

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DoF was inspired to work on assistive technology (AT) projects after learning about the great work done by FRC 4118. AT is technology that aids people with disabilities to accomplish tasks. Since 2019, DoF has been engineering AT to teach team members how they can use the skills they learn in FIRST to directly help their community. DoF met with the students at ACCEL, a school for children with disabilities, & learned they needed pool toys to play with, so DoF began to adapt PVC submarines. Through electrical modifications, these toys can be operated by children who do not have fine motor control of their hands (e.g. those with spinal muscular atrophy). We invited the ACCEL therapists & students to be our guests at the 2019 AZ West Regional, where we gifted the submarines to them. That summer we were invited by ACCEL to present our work to physical & occupational therapists at a local AT conference: AzTAP. DoF students spoke about the process behind adapting the submarines. After our presentation, occupational & physical therapists in attendance commended us on the AT work we are doing in our community.

During the holidays, DoF works with DW to adapt toys to deliver to local children with disabilities. With over 20 total adapted toys, children have been able to better learn concepts like cause & effect, how to operate devices (e.g. learning how to drive a wheelchair), socialize with others, & most importantly, it allows them the opportunity to be a kid & play. In 2020, DoF became the first official #FIRSTwithAT ambassador team, an initiative started by 4118. DoF wrote a Toy Adaptation Guide for 4118's AT kits that were sent to 8 FRC teams across the world to help them start their own AT projects. In April & November of 2021, DoF continued to work with AT by participating in 2 DW Toy Hacks to adapt toys for children at ACCEL.

January 2022, FTC 20327, a rookie team from Mexico, reached out to us with questions after seeing our FTC success on social media. DoF shared our engineering notebook & gave them advice in their native language, Spanish, on how to reach out to sponsors & stay organized as a team.

In 2020, SSPF was invited to a virtual conference hosted in Spain & gave a presentation titled, "Why the World Needs More Women Engineers." A DoF student was selected to speak about her experience in FIRST & as a woman in STEM. She talked about the AT work DoF does & how her time on DoF has helped her gain soft & technical skills that she can use in the future. In her words, "I would recommend being on a robotics team to anyone."

DoF has been working hard to "make it loud" by promoting FIRST through increasing our digital presence. In August 2018, DoF's Facebook page had 119 followers. DoF has grown the page by over 750% to 904 followers. This makes the DoF page the largest active FRC Facebook page in AZ. Social media has given DoF the ability to spread the FIRST message globally, & as of 2/14/22 our content was viewed by 175000+ people in 106 countries. DoF posts multiple times a week, with the themes: Sponsorship Sundays, Mentor Mondays, Team Tuesdays, Women in STEM Wednesdays, Throwback Thursdays, & Safety Saturdays.

DoF is made of STEM leaders who recognize the opportunity that FIRST has provided them & make sure to pay it forward by using their skills to teach, serve, & inspire our communities. DoF uses skills we learn in FIRST to adapt toys for children with disabilities enhancing their quality of life. DoF's diversity allows us to expand the FIRST mission to non-English speaking communities, including Title 1 schools, & show kids that look like us that they can do STEM too.

Degrees of Freedom chose its name because we don't believe that anyone's dreams or aspirations to engage in the STEM community should be grounded. By showing others how to spread their wings, we help them fly to new heights.