FIRST Impact Award - Team 118

2023 - Team 118

Team Number

118

Team Nickname

Robonauts

Team Location

Houston, TX - 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.

Through participation in FIRST, Robonauts students grow to become confident and caring leaders. 100% of Robonauts graduate high school and 92% pursue STEM-related degrees after graduating. We are proud to have alumni that are extremely active in the FIRST community, as almost 50% of our current mentors are FIRST alumni, with many returning each year to be a part of our Everybot initiative. Robonauts alumni have gone on to work at Google, Facebook, NASA, Microsoft, pursue PhDs, and much more.

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

Living in Houston, the U.S's 'Space City', allows us to capitalize on the excitement surrounding STEM to promote FIRST – from 'NASA Days' at the Lone Star Flight Museum (LSFM) to Houston's Annual Energy Festival. Houston is a hub for robotics, enabling us to share our resources with local teams. Since our move to a more publicly accessible facility in 2021, teams from across the area have visited to make use of our competition field, cut parts, and participate in our scrimmages.

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?

Our team promotes FIRST and STEM to a diverse audience. Annually, students give back an average of 3000 robotics related service hours. Through our trend-setting robot reveal videos, we have reached over 2.3 million viewers across the globe. We have hosted demos for various international organizations, including the Society of Women Engineers, the American Society of Agricultural and Biological Engineers, and met with state representatives; spreading the message of FIRST on a large scale.

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

Sportsmanship and Gracious Professionalism are kept at the forefront of all actions undertaken by our team. We encourage the sharing of knowledge through posting robot code in multiple languages,

documenting our build process in a publicly available blog, and the RAP Design Guide. This past year, a group of 205 superintendents representing 76 school districts across Texas visited our facility to hear about our program, inspiring many to consider putting FIRST programs in their own campuses.

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

Through our Everybot initiative, we are able to support teams across the globe, including teams in their rookie year. We reach out to teams to provide one-on-one support, catering to specific needs. This year, we are supporting team 9284, Eduwizards, flying in from Pakistan to compete at a FIRST event. The Robonauts, in collaboration with RAP, will supply them with an Everybot kit, providing what they cannot bring over on the flight and assisting them in having a successful rookie season.

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?

With 98% of our team participating in educational robotics before being on the Robonauts, we maintain a strong presence in our community. Our team makes frequent appearances at elementary school STEM nights, homecoming parades, and course fairs. Additionally, we provide volunteer support and execute demos at many events throughout the year, including LSFM's 'NASA Day', 'Girls in Aviation', and 'Ellington Day', allowing us to reach and interact with children from the greater Houston area.

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

New to this year, the Everybot initiative resources are included in The Open Alliance database, a resource curated by teams across the globe, along with a comprehensive set of instructional videos made in collaboration with Michigan Engineering Zone. To promote Everybot, the Robonauts have made appearances on the RoboZone podcast and FIRST Canada LIVE! (FCL). Since 2022, we have revealed the Everybot design on the FCL Twitch stream, with each appearance being their most popular show annually.

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

Many current Robonauts were introduced to robotics through our annual Girl Powered Night, presenting STEM and robotics opportunities to young girls in our district. The Robonauts maintain a booth at the Society of Women Engineers Exhibition, the world's largest conference for women in engineering. We believe that in order to promote equity and inclusion within FIRST, diversifying outreach activities is imperative to ensure reaching students from multiple communities.

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

Our outreach initiatives are student-driven. Robonauts take ownership over executing demos, filling mentoring slots, and finding new ways to engage our community. We have founded many public, collaborative, and community-driven resources such as the RAP Robotics Design Guide, where teams can submit content; and in both our Everybot and Virtual Pit discords, teams can ask and answer

questions. This collaborative aspect magnifies their impact, through varied perspectives and unique experiences.

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

The Robonauts are sponsored by CCISD and NASA-JSC as a part of the Robotics Alliance Project (RAP). We engage with CCISD through growing the CCISD robotics pipeline, actively mentoring elementary and middle school teams and hosting almost all CCISD robotics competitions. RAP works to inspire youth in STEM, a mission that aligns directly with FIRST's, which we support through collaborative outreach initiatives, working with fellow RAP teams around the US to uplift each other and our communities.

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

For many students, robotics is a mentally challenging activity. We have started to take steps to highlight the importance of self care, believing that we "can't pour from an empty cup", and encouraging "Family, School, Robot" as a hierarchy of priorities. The team focuses on the ethos that every student is respected and that their opinions matter, having meetings every practice in order to spread inspiration, raise concerns about team policy, and communicate across subsystems.

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

As a team, we strive to instill strong leadership and communication skills within our students while also uplifting teams within our community. Initiatives like R^3 are a marked example of our progress in these goals– R^3 is entirely student driven, allowing for students to become more confident in their skills, as they in turn enable students on other teams to have a positive competitive experience, which we believe is key to inspiring students to pursue STEM.

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.

A core aspect of our outreach is to create initiatives across a variety of mediums. We constantly reassess our outreach to find new ways to increase accessibility and utility to teams. Whether that's the online resources we have constantly available, the discussions we host and contribute to, or the physical resources we provide, the Robonauts are constantly working to provide a solid foundation of knowledge, raising the floor for all teams, in whatever position they find themselves.

Essay

BLUEPRINT TO CULTURE CHANGE: ELEVATING ACCESS TO ROBOTICS EDUCATION BY RAISING THE FLOOR: "With Gracious Professionalism, fierce competition and mutual gain are not separate notions. Gracious professionals learn and compete like crazy, but treat one another with respect and kindness in the process… Knowledge, competition, and empathy are comfortably blended…One can add to society and enjoy the satisfaction of knowing one has acted with integrity and sensitivity." – Woodie Flowers Gracious Professionalism is best exemplified through initiatives that raise ALL teams up. If the ceiling is the highest level that someone can aspire to reach, the floor is the necessary foundation below which no one can fall. "Raising the floor" for all is a blueprint to providing a more equitable experience and inspiring students to pursue their passions. The Robonauts believe that every team, regardless of circumstance, should have the opportunity to excel and reach their full potential in FIRST. In our mission to elevate access to robotics education, the Robonauts have dedicated 27 years to curating unique resources to raise the floor for all and provide a solid foundation of knowledge, competition, and empathy within our team, the FIRST community, and on a global scale.

RAISING THE FLOOR WITHIN THE LOCAL COMMUNITY: In the blueprint to culture change, we start by setting the foundation to begin raising the floor through curating a strong local community and team. The Robonauts host events, demos, and competitions to expand impact in our area. Through engaging students from diverse backgrounds, we are able to feed into the Robonauts family, sustaining the program, and building future STEM leaders. We supplement our local outreach activities with a multitude of educational robotics opportunities, including the support of 84 elementary teams across 25 campuses and 45 intermediate teams across 9 campuses. 98% of Robonaut students this year participated in educational robotics within CCISD before high school, providing evidence of a successful pipeline into FIRST. We put a special focus on nurturing our team members to become confident mentors so they may provide guidance to the younger generation of future leaders. Many students recall being mentored by Robonauts, and join the team to share this excitement with the next generation. Our emphasis on mentoring in CCISD has resulted in nearly 70% of current students being mentored by a Robonaut prior to joining the team. Once students have progressed through the robust CCISD robotics pipeline, they emerge eager to join the Robonauts to take their passion to the next level. The impact of FIRST is seen throughout all members of our team, as Robonauts students have been awarded "Dean’s List Finalist" five times and "Dean’s List Winner" three times. When Robonauts become seniors, they’re given the opportunity to join a group of recent FIRST graduates in the Summer Robotics Academy (SRA), an initiative started by the Robonauts in partnership with the Robotics Alliance Project. SRA students gain valuable experience by supporting complex NASA projects such as designing and fabricating rovers, humanoids, and wearable technology. While working alongside professionals, each student gains industry experience, providing a solid foundation for their future careers. Through SRA and similar opportunities, the Robonauts are proud to have some of the most active alumni in the FIRST community, with 50% of our current mentors being FIRST alumni. Several Robonauts alumni have been awarded Woodie Flowers Finalist, exemplifying the positive influence of the Robonauts on those who progress through our program.

RAISING THE FLOOR WITHIN THE FIRST COMMUNITY: Once our foundation is laid, and the floor within our local community and team begins to rise, we elevate it to the next level by raising the floor within the FIRST community. With Gracious Professionalism at the forefront, the Robonauts are dedicated to providing assistance at each floor of a team’s journey in FIRST. With our resources, teams are able to choose which initiative fits them best to maximize their positive experience within FIRST and sustain a desire to pursue STEM. We have expanded our outreach and impact digitally in the FRC

community with initiatives like our Virtual Pit, a wide-scale Discord forum held monthly since its establishment in 2020. Virtual Pit was created during the pandemic to provide teams with an online alternative to the supportive environment of in-person competitions. This serves as an inclusive digital community for over 900 FIRST participants, growing 30% since just last year, facilitating an exchange of knowledge between teams that would otherwise never be able to meet. Beyond digital assistance, we raise the floor for teams in-person at competitions. Since the inception of our team, the Robonauts have set out to assist with all technical needs to ensure that teams can safely enter the playing field with competitive robots. In 2013, this student-led initiative adopted the name "Robonauts Robot Rescue (R3)." As a part of R3, Robonauts stand ready to assist at competitions, providing aid and resources to any team interested. In the 2022 season, R3 efforts included providing teams with hooks for the endgame, aiding with autonomous code, troubleshooting errors, and sharing anything from tools to extra sheet metal. Competing with a working robot and identifying and overcoming obstacles makes competitions enjoyable for everyone; not just the teams themselves, but their alliance partners, and even their competitors. R3 ensures smooth and successful FRC events and a positive student experience, raising the competitive floor for ALL teams at our competitions.

RAISING THE FLOOR WITHIN THE GLOBAL COMMUNITY: For the Robonauts, raising the floor extends beyond our immediate reach. Through initiatives like Everybot, we reach beyond to uplift robotics globally and uphold the FIRST core values of diversity, equity, and inclusion. With Everybot, any FRC team, anywhere in the world has the opportunity to create a competitive robot regardless of financial or practical limitations. This initiative is consistently elevating the playing field for ALL teams. The Robonauts Everybot is an affordable, competitive, and elegant robot that can be built with only basic tools and items found in either the kit of parts, purchased from a local hardware store, or online from various FRC suppliers. The goal of the initiative is to provide a more accessible avenue for students to have a positive FRC experience regardless of their unique circumstances or other limitations. We continue to make iterations to our program to maximize positive impact. The Everybot initiative was created when we noticed a distinct lack of resources for rookie and lower resource teams and decided to design a model robot in one week to serve as a guide and inspiration for designs. Teams are encouraged to and often modify and customize the Everybot to serve their specific game strategies and goals, from first time teams using it as an outline, to experienced teams using it to train their new students in the basics of engineering. With the success of the initiative, other teams and suppliers have emulated the process to contribute to raising the floor within FIRST. Beginning in the 2022 season, major FRC suppliers are providing resources to support the initiative, including Everybot kits to further reduce the cost to teams and simplify the material collection process. In 2023, the Robonauts are distributing intake plates to teams in need. Teams are able to request a free set of intake plates to further decrease their build cost, with every order being fulfilled to date. As a team, we post various resources on the Everybot website- which accumulated nearly 16,000 views in the first month of this year's robot release. This year, we provided almost 150 pages of comprehensive build documentation, robot code, and computer-aided design (CAD), increasing design accessibility. Robonauts also answer questions around the clock on Chief Delphi and our Everybot Discord, which has over 1100 members. We believe that when students are able to have a positive competitive experience, they are more inspired to pursue engineering, despite any obstacles they may face. A mentor on Chief Delphi praised the initiative, writing that "[Everybot] is one of the largest improvements of program accessibility to rookie/young teams I've seen…this build is something every rookie team should look at." We are consistently working hard and making improvements to the program to remove existing barriers to engineering through raising the floor of competition accessibility. The impact of this initiative has been prominent across FRC competitions, especially over the past few years. From 2019 to 2022, the number of Everybot-inspired robots grew

from 88 to 226, and are currently found across 7 countries including the United States, Canada, Israel, Mexico, Turkey, Taiwan, and Australia. In the 2022 season, 6% of ALL FRC teams built Everybots or Everybot-inspired robots.

RAISING THE FLOOR FOR ALL: In the blueprint to culture change, FIRST means more than just robots. It means having an outlet to encourage members of our team and local community. It means inspiring those individuals to uplift those they can reach within the FIRST community. It means creating accessible resources that have the capability to raise the floor, no matter what level you find yourself at. Our goal of elevating access to robotics education by raising the floor is possible through putting gracious professionalism at the forefront of our endeavors, knowing that if one team is elevated, ALL teams are elevated. Through sustained and new initiatives alike, we plan to continue to use FIRST as an outlet to reach this target. As Woodie Flowers himself once said, "When you see your target, your aim is perfect".
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