

FIRST Impact Award - Team 5414

2023 - Team 5414
Team Number
5414
Team Nickname
Pearadox
Team Location
Pearland, TX - USA
Describe the impact of the <i>FIRST</i> 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 <i>FIRST</i> programs as mentors/sponsors.
FIRST equips Pearadox members with valuable skillsets that prepare us for professional careers. As a result, 4 students received full ride/full tuition scholarships, and 8 had co-ops at NASA and other engineering companies. Our alumni attribute much of their success to FIRST; with many coming back as FIRST mentors and returning each season to build our competition field. These alumni understand the valuable skills taught by the program such as communication, education, and service.
Describe your community along with how your team addresses its unique opportunities and circumstances.
Located in the second most diverse city in the US, Pearadox is dedicated to promoting equity in STEM. We created inclusion organizations, GGT and BBB, to support the diversity of our team and community. From conferences at World Championships to our STEM Savvy magazines translated into 4 languages, our organizations impact global audiences. Addressing the need for role models in STEM, our conferences give students the opportunity to build relationships with VIPs who look like them.
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've inspired kids through Pearland's annual Christmas parade, Spring/Winter Fest, and Trick or Treat trail, at which we showcase our robot and bring awareness to FIRST programs to 10,000+ people in our city at each event. Our team has been able to broadcast the FIRST message to Houston residents 3 times through ABC 13 News by celebrating our inclusion groups. These results of our various outreach efforts are measured using our TIGER forms: Team Improvement, Growth, and Education Records.
Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.
At our annual Open House event, Pearadox's workspace buzzes with FIRST teams, as we host a mock inspection to prepare teams for competition. Sharing our full competition field, we have an open-door policy and host teams for practice. In 2022, we welcomed teams from the Netherlands and Brazil. We

machine parts for teams who lack machine shop access. PEARatroopers actively seek teams to assist during competitions. FRC 8150 said "5414 was critical to our success this season on and off the field".

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

We believe students should be exposed to STEM before high school, so we created 8 FTC & 6 FLL teams as a "pipeline" through our school district. We have spent 1,000+ hours mentoring the pipeline, teaching programming, communication, and teamwork. From being referees, to field re-setters and queuers, our students regularly assist the FTC competitions. With FIRST programs readily available in our district, the academic culture of our community has improved for over 13,000 students.

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?

Using the simple idea of dressing up as princesses, we introduced power tools and robotics to young girls. Princesses with Power Tools (PWPT) is an event that shows girls they do not have to sacrifice femininity to pursue STEM. After the success of our last event, a local Girl Scout troop reached out to evolve the event to build bat houses as a conservation project. What fills our hearts is hearing "I found my daughter teaching stuffed animals to use power tools after the event."

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

We PEAR-ed up with FRC 3847 to create the Houston Initiative: reaching out to teams before they see competition to use our full-field and machine shop to give them the opportunity to prosper. FRC 8150 and FTC 12218 came to our room where we mentored them in the construction of an FRC 118 Everybot. As members of the NASA robotics alliance, we support the FRC 118 Everybot project by building our own bot that we evaluate and develop solutions to fix common problems encountered at competition.

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

Pearadox has created three inclusion initiatives: Girls Get Together, Brilliant Black Builders, & Safe Spaces in STEM. Internally, the team hosts weekly post-meeting discussion spaces for students. Externally, we impact our community with team outreach events and collaborations with other organizations, like the creation of a robotics team with the Pearland Chapter of NSBE jr and PWPT. We also consistently host conferences at the district, state, and world championship level.

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

After the success of our 10 GGT conferences, we created the Do It Yourself (DIY): Girls Get Together. This is a manual to ensure that our powerful initiative of introducing high school girls to engineers doesn't stop with our graduating class or our team. From site planning, cost breakdown, advertising, and preparations, the manual has everything to plan your own event. Need help with fundraising? You can also find our DIY Grant Writing manual on our website!

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

past 3 years

There is power in pride—we invite current and potential sponsors to attend our Open House to feel the need for greater action through impact. For 7 years Pearland Lumber has supported our Open Doors initiative as one of 3 Houston teams with a full game field, providing a practice space for 165 FIT teams. Seeing the owner blown away, standing under our field structures, eyes alit with the pride that he made a difference, was infinitely more impactful than seeing a picture on Facebook.

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

There is a divide between technical and impact students and to counter this, we foster relationships through weekly events such as our bonding activities after lunch, where we foster a connection between students all around the team! To address the knowledge gap between veteran and rookie students, student leaders implemented a Big/Little Sibling system where veteran students act as touchstones and mentors to newer students, creating more opportunities for veteran-rookie bonding.

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

FIRST says it best; our goal is to build more than robots. The communities, relationships, and technical skills provided by Pearadox give students the tools needed to become capable leaders. For example, our STEM Savvy magazine uses topics in STEM to give young girls the confidence needed to inspire the next generation of females in STEM. STEM Savvy is downloaded in over 13+ countries, which provides tangible proof that girls globally are hungry to be engaged in 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.

After realizing that most LGBTQ+ conferences and inclusion initiatives are directed towards allies and learning to include LGBTQ+ students rather than LGBTQ+ students themselves, Pearadox started Safe Space in STEM. Safe Space shows a vulnerable population that they are not alone in STEM. We invite students to speak and share their experiences of working through the adversities they face. We have weekly inclusivity meetings and are currently planning our first conference event.

Essay

With over 90 students and 15 mentors, team 5414, Pearadox, is one of growth and persistence. Our activities and goals are analogous to the life of a pear tree. Native to Pearland, Texas, our tree has established a root system of core values and qualities that serve as the base of our missions. Education,

Service, Equity, Inclusion, and Growth are a few values that sustain the tree we have nurtured over the past 9 years.

Our strong roots support branches that embody our goals and missions. These branches support offshoots and produce pears that represent our initiatives and events. Our team's tree has flourished and spread its seeds throughout the world, which sprout and adapt into new varieties to form a sustainable, diverse, and thriving STEM community.

INCLUSIVITY IN STEM Stemming from our roots of equity and service, one of our branches is inclusivity in STEM—to empower and support underrepresented groups. One offshoot of this branch is Gearbox Girls: a diverse group of Pearadox members who inspire young girls to feel creative, confident, and capable in their STEM abilities. Girls often face an uphill battle in their relationship with STEM because of the prevalent gender gap in STEM classrooms and workplaces. As a result, we have optional Gearbox Girls meetings once a week for students and mentors to discuss their experiences, hardships, and successes in a welcoming environment. By creating a community of support for girls on Pearadox, Gearbox Girls has countered a common issue on our team: lack of representation for girls in STEM.

One of the pears produced from the Gearbox Girls offshoot is our STEM Savvy magazine, made to appeal to girls in a world full of superficial magazines that reinforce stereotypes of women. Each STEM Savvy issue features various STEM subjects, such as engineering, genealogy, and programming, and aims to encourage young girls to pursue their scientific passions. Our magazine also includes interviews with female STEM professionals, activities, and comics. Released issues are on our Gearbox Girls website and have been downloaded in 13+ countries. It has a broad international reach due to our team members translating it into Spanish and Mandarin, and we are currently collaborating with team 2212 Spikes to make Hebrew editions available. Our magazines, as showcased twice on ABC 13 News, continues to spread its seeds around the world. Amid Covid restrictions, we adapted our approach to our Girls Get Together (GGT) networking events by creating Digital GGT, a virtual networking panel featuring 20 women in various STEM fields to speak on their unique experiences. One attendee was “very inspired to hear from female engineers and their experience in STEM.” Our in-person events resumed last season, during which we hosted three events at the district, state, and world competitions. Over 200 girls from 70 different teams attended our world event, as well as 21 VIPs. The success of our World Championship conference allowed our GGT Slack workspace to grow and create a community even after the conference, which sprouted a collaboration with girls from teams 1477 Texas Torque and 3735 VorTX to host a summer camp in 2022.

Another offshoot of the inclusivity branch is our Brilliant Black Builders (BBB) initiative. In 2021, BBB confronted the numerous difficulties preventing Black youth participation in STEM by inviting 10 STEM professionals to speak out about their experiences virtually. Our first in-person conference, at the 2022 World Championship, featured 11 speakers from a variety of STEM professions, such as engineering, chemistry, and aviation and had 90 students in attendance. Now BBB is assisting the National Society of Black Engineers Jr. with starting an FLL team. Also, Pearadox's website includes a Black STEM resources page, which multiple companies have asked to be added to. This is critical in introducing FIRST students to role models with whom they can relate, instilling in them a sense of belonging to the organization they love being a part of.

SUSTAINABILITY AND COLLABORATION As a 2014 rookie FRC team with 7 students from 3 high schools and 3 mentors, Pearadox lacked nutrients to grow its roots. Other FIRST teams struggled as

well; ~47% of the FRC teams in Houston that were started between 2014 and 2021 no longer exist. The Houston attrition rate is actually much lower than other major Texas cities, but it is still not satisfactory. Thus, our second branch is sustainability and collaboration. To prevent future losses and secure a future of FIRST in Texas, Pearadox assumed the duty of fostering a more sustainable environment for FRC teams. We launched the PrePEAR Program to seek out struggling teams and supply aid to enhance their FIRST experience. This program has forged a powerful bond between Pearadox and other FIRST teams. With “pears” like inspection PEARfection, PEARup, and PEARatroopers, we continually aid other teams. Last build season, team 8818 The Foe – Foe came to our facility multiple times, and our students worked with them to assemble, mount, and program a climber mechanism for their robot. They accomplished their first climb on our field, which they used throughout the world championship. Our PrePEAR Programs have a clear lasting impact on FRC teams.

Additionally, our team forged a partnership with FRC team 3847 Spectrum to uplift teams in our community. Last fall, we visited 10 Houston schools and discovered that many FRC teams lacked students, adequate funding, and engineering support. So, we donated necessary resources and funds and made newer teams aware of what resources to buy and how to purchase them. Pearadox and Spectrum coaches delivered weekly email reminders of tasks, grants, and updates necessary for sustaining these teams. Pearadox highlights the importance of students having a positive experience in FIRST, and a lack of resources often prevents FIRST students from reaching their full potential and enjoying robotics. We work towards sustainability in Pearland ISD robotics. After showcasing Pearadox to our district superintendent at the 2017 World Championship, he was motivated to help us start FIRST robotics teams in all 23 schools in our district, creating a pipeline that our team regularly mentors. Members are required to mentor our pipeline for 5+ hours each season. By exposing children to robotics early, we inspire future Pearadox members to continue their STEM pursuits. By “pearing up” with our pipeline teams, we plant seeds to help our districts' robotics program and its students grow.

AWARENESS AND OUTREACH Another way Pearadox spreads its seeds is by planting them locally. In the spring, as the pears ripen and fall from the awareness and outreach branch, Pearadox advocates for STEM. We attend annual events, such as Pearland’s Springfest, in order to build direct community relationships, demonstrate our current projects, and spread STEM awareness. As summer rolls around, our team provides student teachers for PEAR Camp, an annual Pearland ISD STEM camp open to incoming 7th and 8th graders. This camp interactively teaches about coding, Lego robotics, chemistry, and more.

During the offseason, reaching out to our community is essential. We established a strong relationship with Pearland Parks and Rec., who reach out to us for Pearland’s annual community events. For instance, we were asked to showcase our robot and pass out candy at Pearland’s annual Trick or Treat Trail, which allows the community to interact with festively-dressed Pearadox members and our robot. By request, we also made a Smart Geocache for Pearland Parks and Rec. to integrate STEM with the outdoors in an exciting way. Finally, ending with winter, Pearadox builds an elaborate float that incorporates our robot for the annual Pearland Christmas parade and walks alongside it, as we have done since 2014. Being able to show our robots to an audience of 10,000+ supportive viewers annually allows us to promote STEM to our community on a broader-than-ever scope, but our impact is also evident on our own team. Current students were excited to join Pearadox and help build our new float because they had seen us in the Christmas parade in previous years. Last year, we were contacted to be featured on ABC 13 news station, and our initiatives were broadcasted to hundreds of thousands of viewers in the greater-Houston area. And recently, we met up with our Rice alumni and demonstrated at

Rice Univ., in partnership with NASA, for the 60th anniversary of JFK's famous speech. We inspired many students and community members of all ages to learn more about robotics. We CHOOSE to do this not because it is easy, but because we are devoted to creating a future in STEM.

While focusing on growing our tree, we have also been molding our team members into the leaders of tomorrow. Skills gained through FIRST will be useful in future careers, but for many of our students, these skills are already translating into jobs. Our students work at places such as Endress+Hauser, Code Ninjas, and Little STEM Academy, where they are teaching the next generation about STEM. Their experience with FIRST impressed employers and qualified them for success. Our team members have also gained confidence, expertise, and a community. The roots of education, service, and growth are what our students bring with them in all endeavors, present and future.

Pearadox was once a little pear sapling, struggling in the shade of a tall canopy of experienced FRC teams. Pear trees are unfruitful by themselves and succeed best from pollination from nearby pear trees. Similarly, having a supportive community of FRC teams is mutually beneficial to everyone involved. Thus, we nurture other struggling teams by aiding in their pollination, and we have planted the seeds for a new STEM culture- one that is inclusive, sustainable, and collaborative. ;

