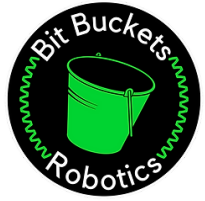


2024 Crescendo Impact

Notebook

Bit Buckets Robotics FRC Team

#4183



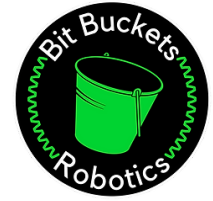
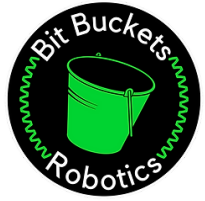
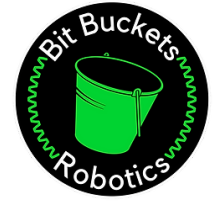


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Mission

The mission of Bit Buckets is to create diverse communities of passionate students who work together to develop technical, leadership, and management skills, while increasing interest for STEM fields among the Tucson youth

Founded in 2011, we have worked to include students from various backgrounds in order to create a diverse community of passionate, driven students. After our rookie year, 2012, we expanded as one of only two teams in Tucson, Arizona at the time. One of the most impactful features of our being a community team is our ability to recruit students from various schools and forms of schooling. To many of our students, Bit Buckets represents not only a group of collaborative peers, but also a cohort of friends who they can relate to despite stark differences in their backgrounds.

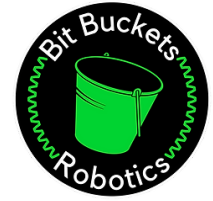


Expansion of FIRST in Tucson

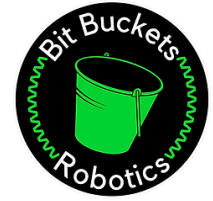
In the early years of our team, we laid the foundation for multiple FIRST Lego League teams, but they ultimately dissolved due to a lack of resources during the Covid-19 pandemic. Since recovering from the pandemic, we have started 2 community FLL teams in Tucson, and plan to expand FIRST in Tucson through the formation of more FLL and FTC teams. Our FLL teams are mentored by FRC students who want to spread their passion for STEM with their younger peers. Some of our FRC students also volunteer at various FTC and FLL events in and near Tucson, encouraging youth interest and involvement in STEM.



Current FRC students mentoring FLL students for
the 2023 competition MASTERPIECE



One of our FRC students helped with field resetting for the local FLL tournament in December (right)



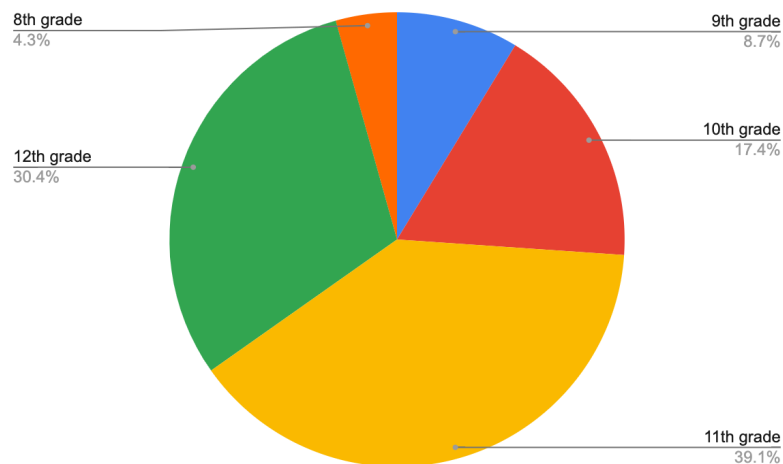
The Team

As a community team, we are made up of 23 students and 9 mentors, with diverse backgrounds. Our students come from all over Tucson and the surrounding areas, from Oro Valley in the North, to Vail in the South. Over the past few years, we have increased our efforts to branch out and recruit in more areas of Tucson that are underrepresented on our team. This year, our team consists of students from 5 schools, including homeschool and digital schooling.

Age Demographics

One of the most important aspects of an impactful FRC team is age diversity, as students get to spend more time in FIRST, growing their own passion for STEM and encouraging their peers to pursue their STEM interests. Our team has always been open to allowing middle school students to join informally. When our FLL teams dissolved, prior to the pandemic, some of the passionate middle schoolers joined the FRC team, and grew into passionate, driven members of FIRST who aim to spread their love for STEM with their peers.

The following figure shows our current team's age distribution by year of high school:

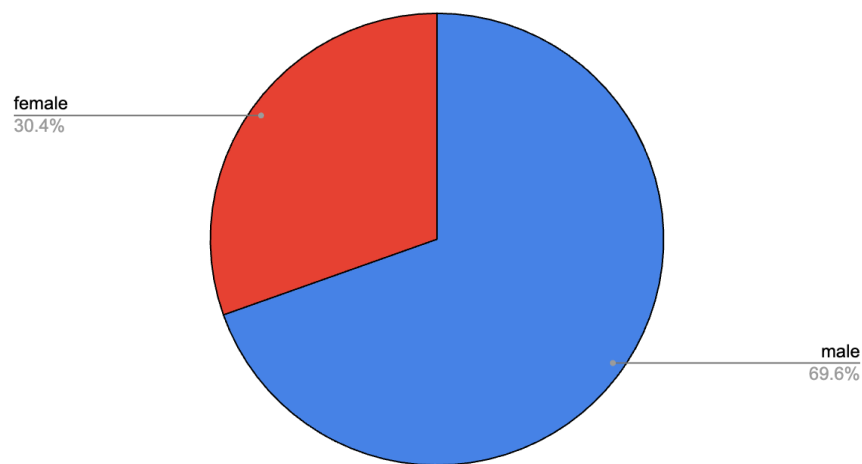




Gender Demographics

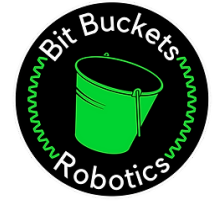
Over the past few years, we have employed measures to eliminate the gender imbalance in our team membership. In 2022, the vast majority of our team members were male, with only 2 female members. However, in 2023 and 2024, we encouraged female students to apply, further diversifying our team.

Our 2024 team's gender distribution:

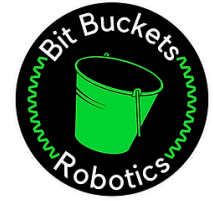


The following shows how our team has developed a more balanced gender demographic since 2022:

| Year | % female students | % male students |
|------|-------------------|-----------------|
| 2022 | 11.11% | 88.89% |
| 2023 | 22.73% | 77.27% |
| 2024 | 30.43% | 70.83% |

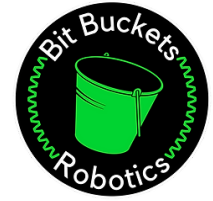


In 2022, there were only two girls on the team, and after recruitment, we were glad to increase that number. However, we hope to continue to improve on this and achieve roughly equal gender representation on our team in the next few years. We believe gender presents one of the largest barriers to students considering entering fields in STEM. STEM fields are often male-dominated and female students face societal pressures to enter non-STEM fields. Bit Buckets aims to enable female students passionate about STEM to pursue their passions, by creating a supportive and inclusive learning environment.



Engagement with FIRST Alums

Tucson is a major location for many defense and technology companies, such as Raytheon, Caterpillar, and Texas Instruments. Through our connections with those companies, we have been able to find and recruit FIRST alumni as mentors. We currently have 5 former FIRST students as mentors, who give us a diverse viewpoint on FIRST. Additionally, in our Discord server, former students who are in college or have graduated from college often chime in to team discussions to provide their insight, gained from years of experience and education. This allows us to stay in touch with our alumni network, which we are working on strengthening, to improve our team's sustainability and student outcomes.

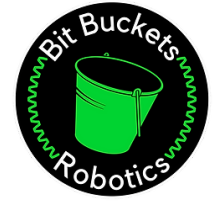


Outreach Events

The Bit Buckets have made efforts to reach out to local schools in order to spread awareness and accessibility to STEM programs in Tucson. We have organized several events at elementary and middle schools with our FLL robots, providing students with the opportunity to code their own programs using robots that our own FLL students have built. We encouraged our FLL students to attend these outreach events, as they will help to give them a better idea of why sharing their passion for STEM with their peers is important. Our hope is that these same, passionate FLL students will later go on to do more outreach events of their own volition, spreading FIRST and STEM in their community. These outreach events have helped our students educate young children on opportunities in STEM across our city, as well as creating a strong connection between local schools and our team. We plan on working with more of these schools to aid in starting up FLL teams in schools in the future.

Some events we have participated in include:

- STEM Night
- Math and Science Night



Current FRC students at an outreach event at a local elementary school

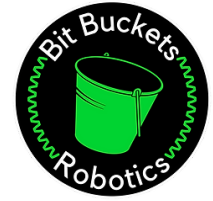


Our Future Goals

For the next few years, our plans include working to expand our outreach across Southern Arizona through building stronger connections with local youth organizations, working with local schools to start up more FLL teams, and working to increase fundraising activities throughout our off season. Currently, we are in contact with multiple elementary and middle schools, trying to build connections with the educators in our community. We hope that in the future we will be able to start FLL and FTC teams in these schools. We especially aim to create and maintain FIRST teams near low-income areas of Southern Arizona, such as downtown Tucson and South Tucson. Although reaching these communities and seeking out passionate and motivated students may be challenging, it is important that we take the time to do so.

We also want to try expanding our alumni network, as it will help create a wider Bit Buckets community of people with similar experiences and interests. We also believe that having current students be in touch with alumni will help give them an idea of what their future after leaving the team will look like. We have some alumni that stay in touch with our members, but there are only a few of them, and they are often too busy with work or college to help us as much as we would like.

As part of our effort to create a collaborative and inclusive environment, we strive to make all members feel welcome at Bit Buckets. Often, FRC can be cliquy, and students can be left out from groups. To us, this is a major issue, as it demotivates students and discourages them from attending meetings. As a community team, we naturally form social subgroups based on similarities, but for those who are unique to the team, the formation of these groups can prevent them from enjoying their time on the team. Over the next few years, we hope to instill in future generations of Bit Buckets students a sense of belonging, community, and inclusivity, so that no student feels left out. Being included is the first step to finding a group of like-minded peers to collaborate with. We hope that this can be achieved through organizing social events with the



team, such as potlucks, movie viewings, and games. This will allow team members to get to know each other on a more personal level, which will help them work together more effectively.

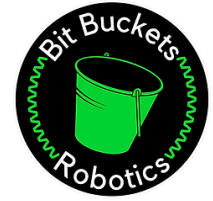
Plans for the future

Statement

As Bit Buckets Robotics continues to expand and grow, we want to ensure that others around Tucson and the Tucson area are given thorough exposure to STEM to the best of our abilities. We want to spread the FIRST statement across Tucson to students, and let young students know that anyone can belong in FIRST. Our plans are ambitious, and while they cannot be thoroughly achieved in just a year or two, we hope this can be used as a guideline of major goals. As we continue to become more experienced, as a team which has existed for over a decade now, we look to give back to our community, and hope to make a genuine impact on Arizona.

Breakdown of Plans

1. Expand FLL teams across Tucson and Southern Arizona
 - a. We believe FLL teams are much more accessible to starting teams with, due to the lower cost and time commitment compared to FTC or FRC. While our goal is to



eventually help start up more FIRST teams across Arizona in general, starting this out with FLL would be most achievable for us.

2. Look into starting up FTC teams or collaborating with existing ones
 - a. Create opportunities for FIRST for older students and create long term relationships between younger and older FIRST students. We hope this can
3. More fundraising and STEM activities
 - a. Starting up summer camp programs or activities for young children to learn about and grow their passion for STEM.engage with STEM in a non-academic way
4. More outreach events and developing connections with local organizations for youth
 - a. Working with groups such as the local Girl Scouts centers, Casa de los Niños, educational centers like Kumon or Mathnasium
5. Spreading diversity of team members
 - a. Increased school diversity for our community team
 - b. Pushing for more gender ratio equality
6. Building a stronger team alumni network
 - a. Encouraging students to return back to the teams they participated in, this time as mentors
 - b. With our alumni from early years (pre 2019) coming out of college now, we can look forward to them rejoining us if they decide to work in Tucson