FIRST Impact Award - Team 6328

2023 - Team 6328

Team Number

6328

Team Nickname

Mechanical Advantage

Team Location

Littleton, MA - 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.

We have 40 FRC students from 10 school districts. While learning technical skills, our students also grow into effective leaders through our annual, student-led leadership/project management and sponsorship/outreach trainings. Our impact is measurable: 90% of our alums are pursuing STEM majors; 100% pursued higher education - 1 even interns with a 7-year sponsor. Since last year, we have grown our FLL program from 5 to 9 teams. Many of our FLL alums join FRC and return to coach and ref FLL.

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

As a founding member of Open Alliance we deliberately foster unique and lasting connections with the FRC community and want everyone to succeed. In 2022 we leveraged those connections to find the Impact Initiative to help teams prepare for judging. We support our fully student-developed AdvantageScope data visualization tool which has been downloaded 1724 times and the companion advanced logging framework AdvantageKit which is used in public GitHub repositories of at least 50 FRC teams.

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?

Demos at town parks engage onlookers. Outreach events raise awareness and recruit students and sponsors. Our FLL-FRC transition program eases that daunting step - ⅔ of our FRC students come from FLL. Our 1 on 1 program in FRC pairs newer students with experienced ones. In the 2023 season, so far, we have logged 2500+ outreach hours, already exceeding last year’s total. The rapid growth of Open Alliance since 2020 shows the desire for culture change to emphasize collaboration among teams.

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

As a prolific presence on Open Alliance, our students take pride in consistently sharing our CAD, code, outreach sources, scouting data, and other resources to the public. We are primary members of OA

leadership and management, and collaborate with FUN to produce content for all teams. This year we hosted our own student-led FLL scrimmage for local teams to practice, where we employed a GP shoutout box to showcase core values early in students. We often host teams in our shop to share resources.

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

Our emphasis on mentoring and assisting other teams helps build a stronger FIRST community. We coach up to 10 FLL teams annually, and have assisted 50+ teams. Our Open Alliance resources have reached 125,000+ views across the globe on Chief Delphi. We have 39 published guides/curricula on our website and add to the list every year. For the 4th year, we are giving rookie care packages to all NE FIRST rookie teams to build connections that will help keep these teams sustainable in the future.

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?

We advocated to Congressional offices for better access to STEM opportunities in underserved areas. For 4 years we've hosted a college admissions seminar to support students applying to college. We demo our robot to Girl Scout and Boy Scout groups, and at community events such as Third Thursday, where young kids love talking to FRC students, interacting with a real robot, and get excited about future opportunities in STEM. These events have led to an increase in both FLL and FRC enrollment.

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

Our ongoing connection with the local selectboard helped us obtain our workspace through a sponsor. We collaborated with UMass Lowell to host an FLL Challenge scrimmage in their facility. We have made connections with other teams through Open Alliance and Impact Initiative. We meet with local officials and our state reps attend our events, providing key opportunities for STEM advocacy. We worked with WPI and ETM Manufacturing to support a community practice field for all NE teams for 2023.

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

Our FLL-FRC Transition program exposes 8th graders to FRC, decreasing intimidation and increasing retention of girls in high school. Our all-girl FLL team has a 100% retention rate to FRC. We are represented on the FIRST Access Advisory Board to advocate for more accommodation of disabilities. We post mental health tips weekly on our social media. In 2020, we hosted a social justice book club to discuss pivotal issues. We run pride fundraisers for LGBTQ+ groups, raising $1,000+ over 3 years.

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

An established pipeline ensures our team's sustainability. Our FLL-FRC and Student-Mentor transition programs help students progress through FIRST and beyond. After each event and season, we conduct all-team retrospective meetings to discuss improvements and goals. We have 1-on-1 conferences with students and mentors. Students self-reflect on their skills and set goals, all to guide newer students to make the most of FRC and help returning students expand on their learning and stay engaged.

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

We hold a yearly student-led sponsorship training to run a coordinated sponsor recruitment. We maintain a large presence in our local community at local events and showing our community what we do. Our Sponsor Newsletters, active media presence, and thank-you letters let sponsors know exactly what their support helped us achieve. Our annual Open House helps bring in new sponsors and maintain existing partner relationships. Year-over-year, we retain ~75% of sponsors and add new ones each year.

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

To continue promoting growth in our team, at the end of each year we run an all-team retrospective meeting. In last season's retrospective we uncovered a disconnect between subteams that stemmed from prior COVID restrictions. This season we publish internal daily updates, hold weekly stand-up meetings, and make specific weekly subteam and all-team goals to ensure everyone is on the same page. Now any student can follow a particular element from its design to its implementation.

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

We encourage effective leadership and coopertition through collaborative learning and teamwork. Open Alliance brings this to the wider FIRST community. It can be daunting to share our knowledge during the season since it can blunt our competitive edge, but we prioritize strengthening the FIRST community. As one of 6 OA founding teams in 2020, we are thrilled to watch OA grow all over the world to more than 90 teams, and we love seeing how our work has positively impacted others.

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.

We see ourselves not as just a team, but as a family. Bonded by an inclusive environment and a common love for FRC, our students and mentors simply enjoy spending time together, whether or not it's within an FRC context. We eat dinner together in the shop during build season, and embark on fun team outings during the offseason, allowing us to bond beyond just "work." We extend our family and helping hands to other teams as much as we can by establishing connections and sharing resources.

Essay

In 2016, 11 passionate students who shared a love for robotics unified to form the 6328 Mechanical Advantage family. We've since grown to 40 students across 9 towns and 10 schools, with 25% identifying

as female/nonbinary and 40% as POC. Our 20 mentors come from diverse backgrounds and include FIRST alumni, college students, and parents, several of whom continue as dedicated mentors even though their children graduated. Our 7-year journey has molded us into a family, with the core tenet of making a positive impact on all our communities. We believe in taking measurable and actionable steps to achieve our goals, which is why we are proud to say that 6328 is a team that A.C.T.S.

We ADVOCATE

Recognizing the need for increased equity within STEM, we have always made it a point to advocate for change. In 2021, we attended training conferences held by the Student Association for STEM Advocacy. This inspired us to work with students from other teams in our congressional district to secure continued funding for Title IV Part A: Every Student Succeeds Act which supports quality education for all students in public schools, including underrepresented students. We also advocated with state legislators for Massachusetts bill H.700/SD.2559 to establish a robotics grant program for public schools in the Commonwealth. We are also represented on the FIRST Access Advocacy Board to advocate for policy changes and additional resources within FIRST to make FLL more accessible to people with physical and developmental disabilities.

To increase female representation in STEM, we have run an all-girl FLL team for the past 2 years, in which 100% of students eligible have moved on to FRC. We launched our Girl Up club in 2019, and continuing to the present, attending community events while raising awareness for women in STEM, fundraising $1,500 to build classrooms to educate over 50 refugee girls in Uganda and Ethiopia. As our GirlUp program grows, we are setting bigger and better fundraising goals each year. Since 2018 we've hosted badge events for local Girl Scout troops. In 2022 this grew into a partnership with the Girl Scouts of Eastern MA to host 3 Programming Robots Badge events for 81 Girl Scouts and an additional station at the GSEMA STEM Expo. Since 2019, to raise awareness for mental health, we've hosted quiet rooms at all 14 FIRST events we attended to provide a safe and peaceful environment for people to detach themselves from the stress of an event. Since the onset of COVID, we have posted a series of "Mental Health Mondays" on social media during build season with tips on mindfulness and relaxation. Inspired by resurging social justice movements in 2020, we ran a public social justice book club where we read and discussed related issues while isolated during the initial phase of the pandemic.

We CREATE

Creating the leaders of tomorrow starts with action today, which is why our team structure is optimized to build an environment that fosters the growth of leadership skills in all of our members. This growth starts on our FLL teams, where students get excited about STEM and learn the foundational values of leadership and communication. Our FLL-to-FRC transition program allows our students to easily make the daunting leap to FRC and seamlessly integrate into our team. Our FRC students lead the design, software, manufacturing, electrical, scouting/strategy, outreach, media, and awards subteams, while our technical and business project managers ensure the team remains on track and executes its desired goals. Our FRC students also serve as FLL mentors, inspiring younger STEM leaders.

We create a sustainable team by emphasizing the transfer of knowledge throughout the year. During the season we have a 1-on-1 program where we match each new student with a more experienced student in their subteam to help them find their place. During the offseason, our student leads organize and run training programs for every subteam to prepare for the upcoming season. Experienced students act as

TAs to facilitate a transfer of knowledge while also improving their own leadership and communication skills. This eliminates a divide between new students and more experienced ones, allowing every student to form a connection with each other. We also require all our leads to participate in an annual student-led leadership training, where they learn about becoming an effective leader. After every event and season, we run a full-team retrospective meeting to ensure continual team improvement. To sustain sponsor engagement, we run an annual sponsorship training in an effort to reach out to sponsors on a coordinated front, where we send regular sponsor newsletters, and host sponsor open house days.

Once students graduate from FRC, our FRC-to-Mentor transition program guides alumni in becoming mentors. This pipeline from FLL through FRC and beyond ensures that students have a clear path to follow as they progress through their FIRST journey, which builds a stronger, more sustainable team, and helps students develop the skills and confidence they need to succeed in any field.

We TRANSFORM

We founded the Open Alliance (OA) in 2020 with 5 other teams to transform the prevalent culture of secrecy within FRC to one of collaboration. OA is a platform where teams publicly share their resources and knowledge for others to see and learn from, including strategic ideas, prototypes, CAD, robot code, awards resources, and anything else that could be useful to the FRC community. Since those initial 6 teams, OA grew to 40 teams in 2022, and to 97 teams in 2023! Because of OA's demonstrated transformative impact on FRC, it was recently named a community resource for teams by FIRST.

6328 has always been a leader in the Open Alliance. We were one of only 2 teams to remain active for the 2021 At Home season, and in 2022 our build thread was the most viewed OA thread on Chief Delphi, with 44,400 views. We take on an administrative role by managing participating teams and moderating OA chat spaces. This year we partnered with FIRST Updates Now to start a weekly Open Alliance Highlights post and video series to showcase the work of OA teams. Thanks to what we share, we have had some rewarding experiences with other teams. For example, in our first 2020 competition, 4 teams included parts of our robot design such as the climber and the event winners relied on our scouting data. At the World Championship in 2022 we connected with team 836, who graciously thanked us for our climber CAD, as it helped them reach Champs. Later that year, a team member on a college visit in Pittsburgh connected with FRC 3504 who was in the middle of recreating our 2022 robot as a learning experience.

Our student-developed AdvantageKit and AdvantageScope are publicly available software programs that provide state-of-the-art data logging and visualization that transform the way FRC teams test and program their robots. Coupled with sophisticated simulation and playback, they enable optimization, issue analysis, and drive-team feedback at a level of fidelity unimaginable just a few years ago. Teams around the world praise the work and developers at WPILib, a programming library all FRC teams use, are discussing options for distributing the tools to all teams.

We SERVE

Serving all of our communities is a top priority for 6328. We aim to spread our love for STEM through our extensive outreach program. Since pre-rookie season in 2006, we've gone to Backyard Bolton and Third Thursday, local events in town parks where kids and their families interact with the robot and learn about FIRST. These events have drawn many interested students for both our FLL and FRC teams. In 2019,

we organized attendance of 15 FIRST teams at WaterFire, a community event in Rhode Island drawing over 100,000 attendees, and we are planning for a return in 2023. We run 9 FLL Challenge and 5 FLL Explore teams, with a combined 68 students. Earlier this season, 20 teams attended our FLL scrimmage, which mimicked the schedule and atmosphere of a real event. During the process, we established a new connection with UMass Lowell, who graciously provided us the event space for the scrimmage. We also connected with a nearby FLL team who didn't have a proper practice field, so we hosted them in our shop for multiple practice sessions.

We have also hosted several FRC teams in our workspace over the past 3 years, sharing resources and establishing connections. We fondly remember helping 8604 progress from a box of parts to a functioning robot a week before their first event. Since 2020, we've sent 24 Rookie Care Packages to all rookie FRC teams in New England with useful items to kick start their season, and scheduled conferences with them to provide our support. Additionally, for the past 4 years, we've hosted a college admissions seminar with a College Counselor to encourage early college planning, with 50-75 attendees annually. This year we connected WPI and FRC 190 with a local sheet metal fabrication sponsor and facilitated the creation of a new full practice field at WPI, the first of its kind in our area, which is open to serve all FRC teams.

Following the success of the Open Alliance, we launched the Impact Initiative (previously Chairman's Alliance) in 2022 to give FRC and FTC teams a space to practice their Dean's List and Impact Award presentations. Our overall outreach efforts have culminated to over 8,600 hours since 2020, with 2,500 just in the 2023 season so far.

We are FAMILY. We are 6328.

We have come a long way since our fateful beginning in 2016. But the core of 6328 remains the same - we see ourselves as not just a robotics team, but as a family. Our nightly shop dinners during build season and team social events in the offseason give our students the space to bond beyond just robotics. Our work to Advocate, Create, Transform, and Serve ensures that the 6328 family and communities continue to thrive. ;