

## FIRST Impact Award - Team 2429

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| <b>2023 - Team 2429</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Team Number</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>2429</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Team Nickname</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| La Cañada Engineering Club                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Team Location</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| La Canada Flintridge, CA - USA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>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.</b>                                                                                                                                                                                                                                            |
| <p>The LCEC encourages individuals to pursue community service while simultaneously exploring futures in STEM fields. Our alumni have moved on to some of the best engineering schools in the country and most of them major in STEM. After being inspired by their experience with FIRST, they seek engineering opportunities such as MATE, an underwater robotics challenge, and various race car building competitions. Some of our most notable alumni return as scientists for JPL, and mentors for our program.</p> |
| <b>Describe your community along with how your team addresses its unique opportunities and circumstances.</b>                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p>This year, LCEC is composed of members participating in 5 FLL teams, 2 FTC teams, and 2429's FRC team. Our club's home is La Cañada High School, nestled in the foothills of the San Gabriel Mountains next to the Rose Bowl, CalTech, and NASA JPL. We run our program with the support of donors and sponsors from our community. We give back to our sponsors by providing quality STEM outreach programs throughout the year. Club stakeholders hope to make LCEC the hub of the STEM ecosystem in La Canada.</p>  |
| <b>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?</b>                                                                                                                                                                                                                                                                                                               |
| <p>Coming out of 2020 COVID, team 2429 was in a rebuilding phase. During the pandemic we supported one FTC and one FRC team from a mentor's garage. By the 21-22 season, we went back to our previous model of 4 FLL, 1 FTC, and 1 FRC. Our club continues to build capacity with schools we have access to. This season, 2429 grew membership by working with local elementary schools. 2429 has rebranded the "Blockhead" club to be more visible than ever. Ask about our surveys.</p>                                 |
| <b>Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.</b>                                                                                                                                                                                                                                                                                                                                                                         |
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Members of the club are mentors for our 5 FLL and 2 FTC teams. The last two years we have coached over 100 4th-10th grade students in FLL and FTC. This last year we articulated closely with elementary schools to support development of new robotics programs by revitalizing forgotten EV3 kits and offering training sessions. Blockheads showcase FRC and FTC bots and promote FIRST programs at community events. Let's not forget, LCEC runs and hosts numerous FLL & FTC competitions annually.

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

Historically, the LCEC has provided quality STEM outreach for nearly two decades. 2429 started two new FIRST teams this season. We hosted a FIRST FLL Explorer competition. Teams of students K-3 competed in their robot game and presentation showcase during an event we hosted for a Program Delivery Partner. Now we look forward to building the LCEC FIRST Explorer program in the coming years.

**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?**

2429 has collaborated with other clubs to provide suites of science activities at STEM and robotics events. We partnered with local elementaries to deliver robotics/coding specific camps. Blockheads routinely run coding/building classes for secondary students. Our FLL and FTC events are hosted together, allowing FLL students to be inspired by FTC. We also hosted the STEM speaker series events where local engineers share professional work. Results have created a more resilient engineering club.

**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**

2429 has an ongoing sponsorship to pay FRC first registration as part of a grant supporting teams designated by NASA JPL. Many of our donors and sponsors are family members and businesses. Our new 501c3 non-profit Blockhead Boosters Inc. has made finances much more timely and transparent. LCEC has developed strong articulation with local elementary schools and city municipalities in efforts to raise STEM awareness. The partnership with these organizations has increased club sustainability.

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

As an Equal Opportunity Organization, students facing financial hardship may submit for financial assistance to Blockhead Boosters Inc. Our club requests donations for membership, however students who cannot afford the donation are welcome to participate. Blockhead Boosters Inc will fund their experience, to include room and board for travel expenses. Additionally, 2429 has made successful efforts to recruit and encourage girls to participate in our FIRST programs.

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

2429 has created a sustainable pathway through FIRST called the "Farming System", a program for students to continue their growth in engineering. By housing our FLL, FTC, and FRC teams all under one roof, we have created an intentional transition from one FIRST program to another. We've organized

ourselves to become more effective: increasing parent involvement, encouraging mentorship and changing our financial structure, as well as encouraging more student leadership.

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

Founding the non-profit 501c3 was a big attractor to donors. This type of account streamlined deposits and tax documentation for sponsors. Investing time developing outreach to support elementary schools led to growth of our FLL teams. Consequently, happy families and private businesses donated to our club. Some sponsors have reported increased business opportunities. Metrics indicate that sponsors are satisfied with the outcome of their generous contributions and indicate continued support.

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

We want to build a World Champion FRC robot. We are now experimenting with swerve and turret mechanisms, which creates the need for new knowledge. To facilitate this, we have garnered expertise from JPL in the form of mechanical and technical mentors. We have also reorganized our finances to afford more creative development when prototyping. We want to make it to the world championships, and win.

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

2429 strives to show kids interested in robotics that they are capable of thriving STEM environments. We aim to help foster confidence for kids to explore STEM. We hope young people learn that anyone can program or use CAD, as long as they put effort into it. Our programs strive to fulfill the goal of creating sustainable STEM pathways for youth and young adults. LCEC's progress is apparent with every FIRST alumni who comes back to share their successes in STEM. Some alumni even become mentors.

**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.**

Once upon a time, there was a young engineer-to-be. They fiddled and tinkered with structure and tools. Sometimes they motorized furniture, other times they built contraptions no one else wanted. Everyone, including the club advisor, called them a "blockhead." So they used CAD to draw a cartoon self portrait of a blockhead. The team loved the drawing so much that they adopted it as a logo. Reminding us to always "Think Outside the Block".

Building Blocks by Blockheads Founded in 2007, Team 2429, the La Cañada Engineering Club, inspires long-term interest in STEM. As a well-established partner of FIRST, we are devoted to growing engagement within FIRST programs throughout our community and the world, one block at a time.

Block 1 - Commitment to FIRST Team 2429's partnership with FIRST extends beyond FRC. We are a leading host for FLL and FTC tournaments. 2429 has hosted 51 FLL tournaments over the last 11 years. In the past two years alone, we have held 15 combined FLL and FTC competitions on our home site at La Cañada High School. We have also helped run FTC interleague and championships in Monrovia these past years. The competitions we produce are exciting and memorable experiences for attending teams. We aim to set an example for growing FIRST tournament partners to follow. We aspire to host FRC competitions one day and even have a vision for how we would make it extraordinary. One day we will make this vision a reality. All Blockhead events are heavily student-run by multitudes of secondary school students and adult volunteers who participate as judges, referees, scorekeepers, vendors, announcers, and audiovisual engineers. Blockheads typically work back-to-back 12-hour days on multiple weekends to ensure that events run smoothly and efficiently. However, the club cannot support the more robust events without community. Therefore, many LCEC family members and blockhead friends are also volunteers. For example, this season, we hosted our largest robotics event by managing three FIRST competitions on the same day, requiring over 100 volunteers. The event consisted of a regional FLL competition, a local area FTC league meet, and an FLL explorer competition, all on the same day. There were 56 FIRST teams: 7 from FLL Explorer, 35 from FLL Challenge, and 14 FTC teams. We have recently begun a tradition of hosting FTC competitions. Team 2429 has hosted and run eight league meets in the past two years. Our commitment to making these events the best they can be is apparent in our recent investment to buy a large truss and lighting system. The 12' x 12' FTC playing field is now bordered by an exciting array of moving lights, clear amplified audio, and a large screen scoreboard. Fans and families love the new experience.

Block 2 - Commitment to Our Community In years past, 2429 has routinely provided computer literacy training to local senior centers, donated goods to food drives, and partnered with Girl Scouts of Greater Los Angeles to offer STEM opportunities to young girls. We continually showcase our robots at events like assemblies, CIF games, parades, car shows, and other functions. In fact, the city of La Canada Flintridge celebrates March 14th as "Appreciate an Engineer Day" annually because of LCEC. Our club has also competed in robotics outside of FIRST. During off-seasons, Blockheads have participated in Marine Advanced Technology Education, Solar Car Challenge, Autonomous Vehicle, and the Solar Cup. But the Blockheads don't just make robots, we help recycle them. Team 2429 has hosted E-Waste drives for more than a decade, providing a reliable venue for the community to dispose of unwanted electronics in an environmentally safe manner. This year's E-Waste drive recycled more than 30 tons of electronics. The 2019-20 season was a great success for 2429 and we earned the Chairman's award at the Los Angeles North Regional FRC competition. Unfortunately, COVID struck and the world championships were canceled. In March, our school district closed facilities and locked our workshop room 604. By May, we regrouped and moved equipment and materials to a mentor's personal garage. During that summer, Blockheads hosted two 5 day CAD and Python camps over Zoom to elementary and middle school students to keep the STEM fire alive. We also supported the 3-D printing of PPE parts for Verdugo Hills Hospital. Our FRC and FTC teams competed remotely for the 2020-21 FIRST season. By the end of quarantine, the La Canada Engineering Club had shuttered and the district was considering new options for our workshop room 604. We were about to lose our home permanently. The status of LCEC after the pandemic made us decide to focus on developing quality partnerships at our local schools and within the community. We ran "science nights," a recurring showcase at local schools where K-6 grade students

participated in various STEM activities. We visited all the local K-6 schools during school hours to show our suite of robots in action. We energized the elementary robotics programs by finding their unused EV3 kits, partnering with their STEM coordinators, and delivering 4 weeks of after-school robotics training to over 50 K-6th graders. We offered 2 weeks of robotics training to dozens of 7-10th grade students in the middle of summer. To gain traction in the community, 2429 set up a booth at La Canada's largest summer event series "Music in the Park". During a series of Saturdays, we drove the FRC bot through thousands of people, sold our newly branded gear, and provided concession sales to festive crowds. We also produced a speaker series where scientists from the ground breaking James Webb and Mars mission projects shared their experiences to live and streaming audiences. The Blockheads are proud of the work we have accomplished in efforts to become the hub of the STEM ecosystem in La Canada.

**Block 3 - Commitment to Sustainability** The LCEC continues to make strides towards building an evermore sustainable program by enhancing communications capacity, providing early robotics engineering to youth, and developing lasting and secure partnerships with our community. Over the past year, students and parents collaborated in dozens of meetings. We planned out and improved the structure and function of our club. As a result, we have developed and started using new communication tools. We use [lacanadaengineeringclub.org](http://lacanadaengineeringclub.org) as a landing page and administrative site to host emails for all of our members. The "Blockhead update" newsletter was started and has been regularly issued by LCEC outreach to our growing email list. Everyone uses the same Google Classroom and cloud Drive for essential instructions and materials. We've polished our social media platforms. We have even developed an IOS app to streamline workflow and safe communications for families and young members. Team 2429 does not receive funding from the school district. Our revolving forty thousand dollar budget is funded through donations, sponsorships, and merchandise sales. This year we formed a non-profit 501c3, "Blockheadboosters Inc". It streamlined the donation process for sponsors and created better purchasing workflow for materials and game registrations. The new non-profit account made our club more accessible to donate to. This year donations are up more than twenty thousand dollars from last year. Our team also made thousands of dollars selling merchandise at a variety of our activities. This year we also sold: LEGOs by the bag, food concessions, booster tickets, Blockhead branded clothing, 3-d printed Christmas ornaments, and even participated in "dine out" fundraisers with four different restaurants. Team 2429 has hustled to be in the black with our budget. The Blockheads at 2429 offer younger members a glimpse into a future with STEM. We have created a "Farming System" where young Beta Blockheads are exposed to engineering concepts, compete in robotics competitions, and build lasting friendships. Our team supports and mentors seven separate FIRST teams with full rosters. By housing our FLL, FTC, and FRC teams under one roof, we intentionally transition young members from one FIRST program to another. Over the years, we have mentored 6 FTC and 53 FLL teams. Growing interest in FIRST within our community has allowed the club to found two new FIRST teams this year. We added FLL team 57907, bringing the total to 5 teams (4 of 5 FLL teams advanced to regionals this year). We also founded FTC team 21525 this season. It has provided a place for 9th and 10th grade students to begin their FIRST competitive robotics journey. Aside from communication, funding, and membership, our club has built and strengthened community relationships. For example, this year, we articulated with local elementary schools, presented to the many different community organizations, marketed FIRST and LCEC at events with thousands in attendance, collaborated with elementary principals to take K-6th students to a FRC competition field trip, built stronger partnerships with our neighbor schools, and rebranded ourselves to become more visible than ever.

**Our Aspiration** Our vision is to be the hub of the STEM ecosystem in La Canada. Through 2429's seventeen years of perseverance and dedication, we have created a sustainable and growing

organization of robotics competition teams. Our participation in FIRST positively impacts STEM engagement and awareness within our communities. Over the years, we have learned that FRC is not only about the robots we build, but that First Robotics Competition is also about forming lasting relationships and leaving legacies behind for those still to come. As members continue to join and graduate from La Cañada Engineering Club, all Blockheads remain a part of one team and one family. We are the blockheads. Together, we continue to develop and perpetuate a stem-focused culture throughout our community, one block at a time. ;

