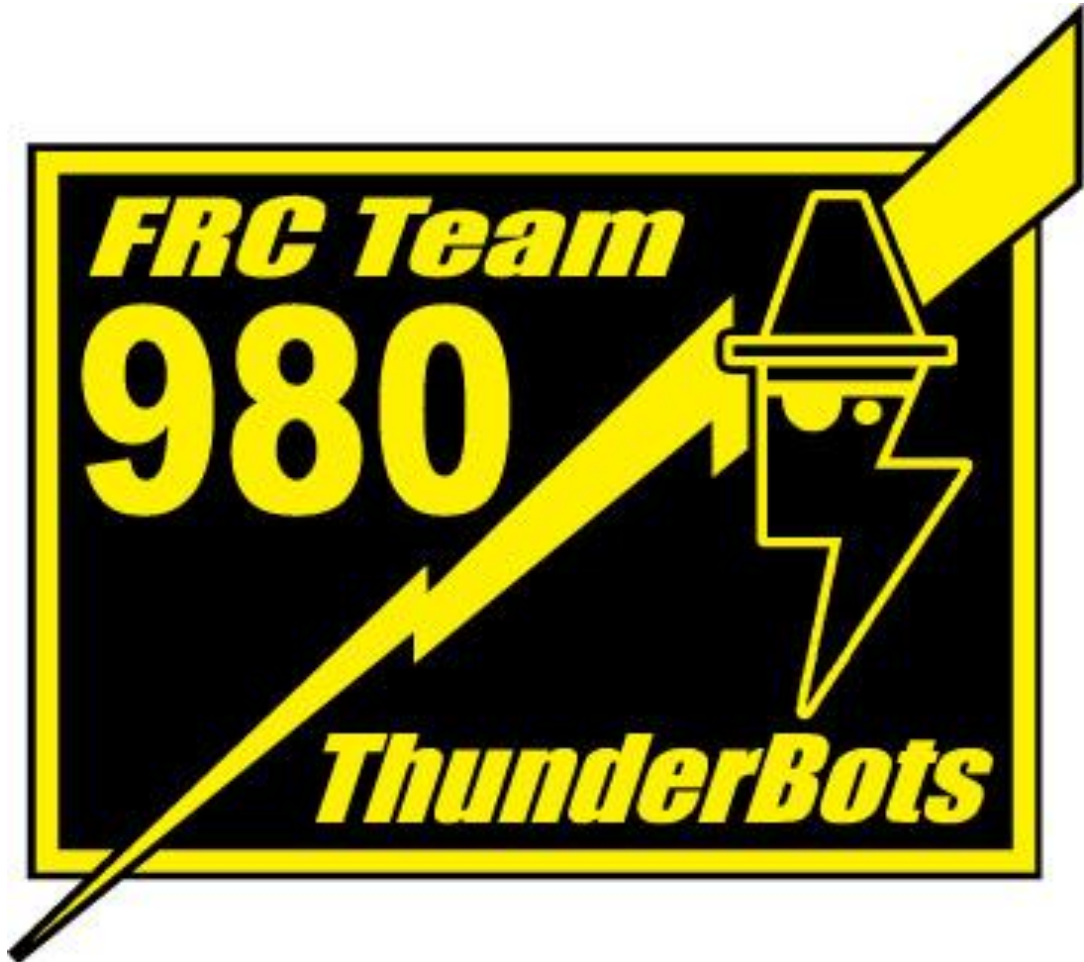


FRC TEAM 980

THUNDERBOTS



**IMPACT AWARD
SUBMISSION 2023**

The story of Team 980 becoming part of BUSD.

After two decades as a community team for north LA County, FRC Team 980 ThunderBots has completed our transition to an FRC team for the Burbank Unified School District, a multi-year journey made possible by our mentors, alumni families, students, and the BUSD NAF Academies.



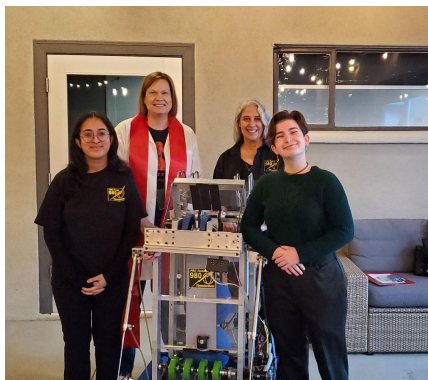
While we will miss the challenge of covering the San Fernando Valley (and beyond), the opportunities we are already seeing by being part of BUSD will help Team 980 grow and provide all students in BUSD greater opportunities to be part of FIRST. The next chapter in the story of Team 980 is THE RECHARGE: being the BUSD FRC team.



Our first step was making sure that the BUSD students knew we were there. Manning tables at both Burbank High School and John Burroughs High School for Club Rush, we recruited many new students. Using Slack and the schools' internal communications - Google Classroom and the morning news programs - we maintained a high profile and stayed in communication with additional interested students.



Turning our team Holiday Potluck into an Open House/Pizza Party brought in more students - including a group from Huerta Middle School's robotics program - the future leaders of Team 980. Being on the Burbank HS campus also brought students from STEM clubs and NAF Engineering Academy, doubling our numbers – a product of our strong community engagement and recruitment efforts.

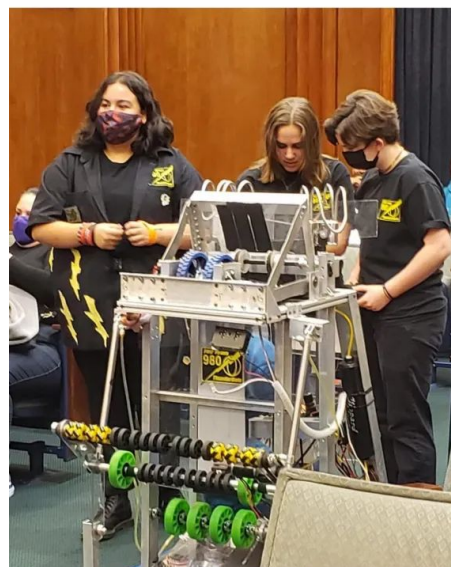


Our next step is securing our future, through community engagement and what we call our “Pipeline.” This is a two part effort: with community outreach at the Burbank Public Library (BPL) and other venues, and through the Board of Education funding FLL teams in all BUSD elementary and middle schools.



In November 2022, Team 980 and our Burbank FLL team, the ThunderDragons, were invited to a meeting of the Burbank Board of Education. We brought enthusiasm, passion, a detailed breakdown of the benefits of a FIRST program and the actual costs of starting FLL teams - and, of course, a robot demonstration.

Students from both teams addressed the Board, and the students and mentors fielded questions and engaged in a lively discussion for nearly an hour! We then thanked the Board and departed so other business could be done. Our proposal is now in committee, and we eagerly await the next steps.



In our community, we are bringing back our calendar of events at the Burbank Public Library - our spring Robotics Open House and summer LEGO RoboCamp. Open House this year is Saturday, May 13, and we'll be featuring not just a robot demo by our 2023 competition robot, but we'll have FLL competition tables for families to see our FLL teams, plus our FLL partners the SoCal Grizzlies. We're inviting educators and the Board of Ed., too! We're focusing on FLL for this event because this is the entry to FIRST for most of our library families.



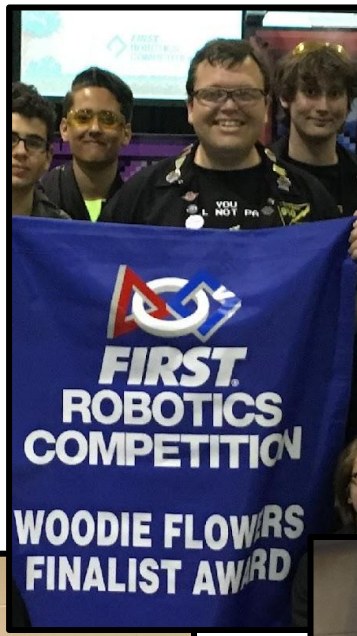
Our in-person LEGO RoboCamp - a week-long instruction of LEGO Mindstorms as preparation for FLL - faced a major rework due to COVID, going virtual for several years. Team 980 students created, refined and taught the curriculum themselves, and expanded it to introduce middle school students to Onshape CAD, robotic design and mechanical engineering. We brought in guest speakers from JPL, Northrop Grumman, mechanical design and IT. We had 60 registrations - more than double the number we could accommodate in our in-person camp.

And we learned that 5th and 6th graders can become proficient in CAD and robot design! As we get ready to go back to in-person camp, we're keeping those in our curriculum, and also adding 3D printing, using the BPL "Spark Lab." This will allow us to offer more tools to more campers, and create even more awareness of and demand for FIRST in the Burbank community.



With our outward facing plans in place, we had to turn inward and make sure that our team was up to the task. Team 980 prides itself on being a student-driven team. Our reorganization and empowerment of student leadership in 2015 led to an Engineering Inspiration (2016), Entrepreneurship (2017) and Chairman's (2018), as well as 2 Dean's Lists, 3 Woodie Flowers and a Regional Finalist (2018). 2019 was a transition year after graduating our entire student leadership in 2018, and we were doing well - until COVID-19. Our 2020 leadership couldn't pass on their knowledge in person, and 2021 was virtual, so our 2022 team was mostly rookies - inexperienced, but eager to learn! Well, in 2023 those rookies are ready. Led by our indomitable captain Luci M, the students have re-established our successful system of Team Captain and Student Leads – all of whom are veteran students. Student Leads run each of our sub-groups: Design, Fabrication/Assembly, Controls and Business. The Captain acts as our Systems Engineer, facilitating communication between sub-groups, helping students stay on top of deadlines, and keeping us on our track to success. The Student Leads coordinate with the other subgroups, prioritize and delegate tasks, and train the rookies and less experienced members. We have several rookie middle schoolers and freshmen on the team, and since they're being trained now, they'll be ready to take up leadership roles when the time comes!

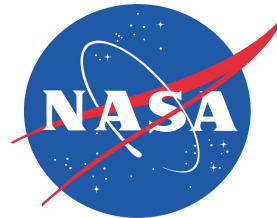




The mentors work closely with the Captain and Student Leads, providing guidance and technical knowledge and a dose of “real world” experience. Four of our mentors - David Brinza, David Toyne, Alex Davis & Robin Dorfman - are WFFAs, with over 70 combined years in FIRST. NASA/JPL Engineer David Brinza has been our Lead Mentor for over 20 years and is a long-time FRC Lead Robot Inspector, Vice-President of LA Robotics, and member of the LA Regional Planning Committee. He was especially instrumental in developing the partnership between BUSD NAF Academies and Team 980. Computer Science teacher Alex Davis mentors the controls area while keeping us abreast of all things Disney. Mechanical Engineer David Toyne was able to mentor our design team for most of the build season before heading off to Africa on a green technology project. Robin Dorfman, a Creative Director in post production, mentors our business team, and is also an experienced FLL and FRC Judge. IMAX Lead Film Scanning and Recording Technician and newest mentor David “Fred” Masselink was just a dad helping out, and is now our Fabrication mentor and a key member of our team. All of our mentors inspire us through their passion, commitment and communication. We thank them for their support and acknowledge the Culture of Volunteerism they have fostered in Team 980.



Teams need support to function. Team 980 has outstanding sponsors. NASA/JPL, WDI, Boeing, Raytheon and Solutions for Automation have all graciously provided funds and/or mentors. We are a NASA “house team” because our lead mentor is a JPL employee, qualifying us for a NASA grant. Our families are also stepping up, with sponsorships and matching grants from Brennan Construction and the Walt Disney Company. The Burbank NAF Academies provide our build space and other support within the BUSD.



We also think that it's important for us, the students, to take an active role in supporting the team, so every year Team 980 runs one or two PiggyBackr fundraisers and encourages us to learn how to talk to our families and friends about all the hard work we're doing. Our most recent PiggyBackr raised over \$3500, which will go towards parts, tools and materials for our robot.



Team 980 has gone through a major transformation in the last few years, but who we are has remained fundamentally the same. From a “small but mighty” community team to NAF sponsored BUSD team, Team 980 has always been guided by our motto of “Strive for Excellence.” Our students demonstrate this through the way they work together, whether it’s engineering a robot, doing community outreach, or inspiring the next generation to love STEM.



We’re just starting to realize the opportunities available to us to have a real impact in our new community of Burbank. Starting FLL or FTC teams in all elementary and middle schools, and an FLL tournament held in Burbank. Working with the NAF Engineering Academy to have robotics as part of the curriculum. Establishing more sponsorship and educational opportunities with other entities in the community. Burbank, we are HERE, and we ARE Team 980.



GRADUATES' SCHOOLS



Our graduates pursue STEM educations and go on to have successful careers in Aerospace and other Engineering fields.

2023 FRC Team 980 Impact Executive Summary

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.

Team 980 graduates attend some of the finest schools, the majority pursuing STEM fields. 2020-2023 graduates are accepted at or attending USC Viterbi, UC Berkeley and UC Berkeley M.E.T., Georgia Tech, Purdue, Northeastern, U of San Francisco, Illinois Tech, Duke, Cal Poly Pomona, Embry-Riddle, RPI and Woodbury. Previous alumni attended Caltech, MIT, Cornell, Harvey Mudd, UCSD and Drexel.



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

Partnering with the NAF Engineering Academy, Team 980 is the FRC team for Burbank Unified School District. In addition to students from Burbank HS and John Burroughs HS, we have middle school students from the Dolores Huerta MS robotics program. Being a BUSD team, we have more access to the Burbank Board of Ed, NAF Academies and other Burbank resources - such as the Burbank Public Library and Chamber of Commerce - to fully implement our "FIRST Pipeline" for BUSD students from FLL to FTC and FRC.



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 are reinforcing the FIRST Pipeline in Burbank by mentoring our FLL team and bringing back our live LEGO RoboCamp for MS students. Linking with Burbank NAF Academy has attracted new students to Team 980. We have close ties to the Women in STEM and Coding clubs at BHS, and other STEM clubs in both HSSs. We brought in 8th graders from Huerta MS robotics program, laying the foundation for our future. We are working with the Burbank Board of Ed to fund FLL teams in all BUSD Elem and Middle Schools.



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

4 DL Finalists, 4 WFFAs. We do community outreach, FIRST recruitment and FLL. We teach LEGO RoboCamp with students from FLL and FRC teams. We help teams during build season and at competitions. Lead mentor is LRI at Regionals/Champs, and other mentors volunteer at FLL and FRC events. LEGO RoboCamp and Virtual STEM Camp documents free at team980.com. In 2022 Lead Mentor was awarded the Bruce Murray Award for Excellence in Education and Public Engagement by NASA/JPL.



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

Presented a proposal to the Burbank Board of Education to establish and fund FLL teams at all Burbank ES and MSs. The proposal has been forwarded to committee. Mentored 4 FLL teams in BUSD & 2 at Delphi Academy (one new for 2022). The FLL ThunderDragons visited our build site as part of their Project and to see how an FRC team works. FLL SoCal Grizzlies collaborates on outreach events for ES students. Assisting veteran and rookie FRC teams with design, controls, fab, awards.



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?

During COVID, LEGO RoboCamp became a Virtual STEM camp, with double the attendance and greater reach. Now we're back to a live camp, and keeping robot/mechanical design, CAD, and now 3D printing. Build 2.0 is our summer instructional program to teach robotics basics, open to any BUSD HS student. We are continuing our tradition of working with Scout troops by teaching the Brownie Robotics badges. We provided our 2021 minibot design information to Kettering's Robotics Center for their outreach.



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

Team 980 offers non-paid internships to Burbank NAF Engineering Academy students as well as hands-on engineering experience. We are returning to live programs at Burbank Public Library with a Robotics Open House and LEGO RoboCamp. We are developing relationships with the Burbank Chamber of Commerce, bringing in sponsorships and educational opportunities, and providing venues for Outreach. Long time sponsor WDI prominently features Team 980 in their recent FIRST blog post/video.



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

Team 980 has a strict non-discrimination policy. We believe in equal opportunity to learn and grow regardless of socio-economic, ethnic, and religious background; that this team can be a place of belonging, where minority and LGBTQ+ voices can be heard. Female and nonbinary students make up 40% of our team. Our outreach mentor is one of the few women WFFA winners. We believe that it is our actions, not our traits, that define who we are.



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

Since 2015 we have used SWOT Analysis to assess risks and lay out opportunities, and the Balanced Scorecard for our 1-, 3- and 5-year goals. We put a special emphasis on recruiting younger students so they can grow into experienced engineers who lead our team. We rely on our strong student leadership to guide each sub group and train the rookie members, assuring that Team 980 will have sustainable growth and a reliable transmission of skills and knowledge within BUSD.



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

Long term corporate sponsors, NASA/JPL, Boeing, Raytheon, Walt Disney Imagineering and Solutions for Automation (and affiliates) provide mentors, financial support and internship opportunities. Recent team growth has provided new sponsors through team members and their families. Team 980's relationship with NAF Academies has opened up opportunities with Burbank businesses through the Chamber of Commerce, with several new sponsors on the horizon.



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

Our organizational structure and hands-on activities eroded during COVID, leaving our 2022 veteran students without the experience to lead effectively. We have restored our successful pre-COVID student leadership model, tasking student leaders to coordinate between the different sub-groups, delegate tasks and train their rookie members. We are now working better while guaranteeing the future of the team. By learning from veteran students, rookies will be ready when it's their turn to lead.



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

[The mission of FIRST® is to inspire young people to be science and technology leaders and innovators, by engaging them in exciting mentor-based programs that build science, engineering, and technology skills, that inspire innovation, and that foster well-rounded life capabilities including self-confidence, communication, and leadership.]

Team 980 is a student-driven program. We are supported by mentors who are experts in their fields who empower students by sharing technical knowledge, encouraging them as leaders and communicators, and exposing them to ideas and opportunities unique to FIRST. We are passing this on by mentoring FLL teams and creating our FIRST Pipeline in Burbank, from FLL to FRC. Having established a partnership with BUSD NAF Academies, we're bringing FIRST to many more students across Burbank.



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.

COVID was a major threat to our survival, but we came out of it RECHARGED!. We lost our build site at WDI, but ended up partnered with the NAF Academies at Burbank HS - a long term goal - and sharing their space. We are now ON the BHS campus, fulfilling our dream of a FIRST Pipeline in Burbank from FLL to FRC. Burbank students are enthusiastic about our presence! Our roster has doubled since 2020, with girls and nonbinary students making up about 40% of the team, many in leadership positions.

