Chairman's Award - Team 604

Print Close

2020 - Team 604

Team Number

604

Team Name, Corporate/University Sponsors

Leland High School FRC Team 604 Quixilver/IBM/BAE Systems/Qualcomm/Lockheed Martin/ARM/Intuitive Surgical Foundation/Almaden Valley Women's Club/Xilinx/Leland Bridge/49er Foundation/100 Black Men of America/Exatron/GitHub/Dropbox/Hurricane Electric/SOLIDWORKS/604 Parents and Alumni&Leland High School

Briefly describe the impact of the *FIRST* program on team participants within the last five years.

100% of 604 students attend college- 90% STEM majors; 40% of current team members participated in JrFLL/FLL/FTC (steady). Alumni avg $30K-$100K in merit scholarships. 25% female leadership. 604 students develop invaluable confidence, leadership, technical, communication, & business skills which help them successfully obtain internships & jobs because FIRST is on their resumes. Life-long friendships form across teams. 604 alumni continue as mentors and take major positions as event volunteers.

Describe the impact of the *FIRST* program on your community within the last five years.

604 successfully petitioned school district-Engineering courses (PLTW) added in 2009 & CS started in 2014. CS now in EVERY SJUSD secondary schools including Alternative HS's. Since 2015, 8400+ SJUSD HS & MS students have enrolled in these courses. Introduced CS to grades 2-5 level as an after-school activity. 604 helps Scouts earn robot badges, Eagle Scouts and Gold Stars. Recruit/organize school's TECH TALKS which emphasize STEM careers. In 2020: 10 jrFLL, 54 FLL, 6 FTC, & 7 FRC within 10miles.

Describe the team's methods for spreading the *FIRST* message in ways that are effective, scalable, sustainable, and creative.

FIRST events/workshops posted on NEXTDOOR, social media, libraries, stores & at local schools. Science Fair judging. 604's Science&Engineering (NGSS standards)-shared with teachers locally & around the world (7 languages). We hold FREE, SUSTAINABLE & REPLICABLE community workshops & classes with curriculum/lesson plans we developed:21 multi-day Lego EV3 workshops at public libraries, schools & UNIVISION:28 CodeONE Programming multi-day classes+coding nights; New outreach w/Micro:Bits activities.

Describe examples of how your team members act as role models and inspire other *FIRST* team members to emulate

Apply scientific method to evaluate outreach activities. We model FIRST Values in all interactions. We are INCLUSIVE & DIVERSE with membership open to all. We have held 11 FLL Qualifiers. 604 members & alumni volunteer at FLL, FTC & FRC tournaments & offseason events. GEARS is our focused rookie mentorship program for new members. Our team has >1350 hr/yr community service (Bay Area.) We build our robots with hand tools in a small storage room. Recruit 120+ FIRST students for Toys4Tots(8yrs).

Describe the team's initiatives to help start or form other FRC teams

We share our "how to start a team" with HS administrators and offer mentoring. In-person tournament invites to HS STEM teachers. 604 parents bring colleagues to FRC tournaments. We continuously update Project Insite database of 1997-2020 FRC teams which is searchable & use it to identify inactive teams. Data shared with FIRST HQ & RD's initially in 2016. Preparation of interactive state maps of FRC teams-to be shared with RD's; FRC sustaining teams matched by zipcode to inactive teams.

Describe the team's initiatives to help start or form other *FIRST* teams (including Jr.FLL, FLL, & FTC)

Extensive outreach community pgms-(Elem/MS demos; County Fairs, Toys4Tots, ATT Park, Family Code Nights, Stanford BioX, Hackathons, MakerFair, Cinco De Mayo, TYCTWD events.) FIRST literature distributed @ 40+ events/yr. FIRST Coloring pages at restaurants. 604 runs EV3 workshops at Univision, libraries & teacher workshops-which result in new FLL & FTC teams. Our 604-mentored FLL teams start jrFLL teams for siblings. Advertise FLL QQ, FRC & FTC events-host community meetings for parents.

Describe the team's initiatives on assisting other *FIRST* teams (including Jr.FLL, FLL, FTC, & FRC) with progressing through the *FIRST* program

We established a community pipeline of students into FLL/FTC programs by being available to the K-8 parents/principals/teachers as volunteers at their school events. FLL/FTC teams are invited to join our demos. Share mentors with FTC 84840 &14298. We mentor local FLL teams & send email invites to incoming 9th graders from FLL teams. FLL clinics are held at the public library. We give talks on CAD, team management, programming & award submissions at WRRF's workshops@Santa Clara University.

Describe how your team works with other *FIRST* teams to serve as mentors to younger or less experienced *FIRST* teams (includes Jr.FLL, FLL, FTC, & FRC teams)

FLL teams receive 1 on 1 mentoring & tend to remain with the same student mentor. 604 mentors maintain close contact with other teams' FTC & FRC mentors. 604 mentors become the alternate contacts for FTC teams; we review award submissions. We share parts, safety manuals, supplies, workshops, PR materials,demos. We communicate by email, text, Skype, Discord & make personal visits as needed to help troubleshoot electronics, mechanics. Invite FTC members to volunteer at FLL Qualifiers.

Describe your Corporate/University Sponsors

Our long term corporate sponsors include IBM, BAE, Qualcomm, Intuitive Surgical, Lockheed Martin. New corporate sponsor (ARM) from FIRST CA RD. 604 actively recruits new corporate sponsors with marketing packets. We ask local businesses. We urge parents to check their workplaces for grant applications & matching funds & scour the internet for STEM grants (Best Buy). WD funds every 2 yrs. We receive machining support at Exatron. Newly employed 604 alumni are potential links to sponsorships.

Describe the strength of your partnership with your sponsors within the last five years.

We focus on building sustainable connections & accommodate any sponsor's requests. 12yr with IBM includes: running robotics sessions @ 2 tech camps for underserved middle school ages & TYCTWD STEM activities at multiple IBM sites; We borrow IBM's Lego kits for our Build A Bot classes. We volunteer at sponsors' community events like Art&Wine. UNIVISION STEM partnership for the Latino community: we run multi-day EV3 workshops at their facility during school breaks using lesson plans we developed.

Describe how your team would explain what *FIRST* is to someone who has never heard of it

You build character & bonds through building robots, but you grow as an individual & become the next generation of passionate STEM leaders. FIRST is a large, extended family-students, alumni, parents, mentors who form lifelong connections around the world. FIRST prepares students to think globally about society's challenges while living & breathing core values: gracious professionalism, respect for diversity, teamwork, self-learning, leadership, perseverance, creativity & volunteerism.

Briefly describe other matters of interest to the *FIRST* judges, if any

Cafeteria work 5 days/week. BetaTesting 2020 control system software. 2 members recognized with NCWIT (National Center for Women & Information Technology) awards (2018). Multiple Commendations from SJ Mayor & Congressional Recognition for STEM Outreach. 604 & SJUSD partnered with Cogswell Polytechnical College for Video Game Development focus group. 2017 Girls Tech Week. 4 WFFA's. 2018 Finalist-STEM FIRST Grant. Contribution to Kendrik Castillo Fund. 3 alums recently earned STEM PhD's. 1 MD.

For FRC teams older than 5 years, briefly describe your team's broader impact from its inception.

Started 5 FRC+2 FTC teams; mentored 49 FLL teams. 604 alums continue to run TBA & FRC live play. We support NoCal thru RD & SVR planning committee requests. 12yrs-KOP distribution. Demos with major FIRST sponsors & potential sponsors (APPLE, Google, TESLA). Alumni & parents serve FIRST as volunteers & stay long after their child graduates; 4 regional WFA. 9800+ SJUSD students took Engr and/or CS classes since 2009. ProjectInsite likely led to "search for teams near me" feature on FIRST website.

Team Captain/Student Representative that has double-checked this submission.

Rajan Nandan

Essay

FRC 604 is fortunate to have founder and mentor Helen Arrington, whose constant drive continually pushes our team to greater heights every year. Fueled by her INSPIRATION, we are committed to advancing FIRST through the community and beyond with a strong alumni network of FIRST volunteers and our extensive demos, programs, and workshops that captivate the minds of children. We seek out a global audience in our quest to generate access to STEM education, build long-lasting partnerships, and form a community of lifelong science & technology enthusiasts.

COMMUNITY:
Our FRC program inspires teachers and families when they see 604 robots at school rallies, WASC visits, recruitment events, Back to School nights, and SJUSD board meetings. We are regular speakers & judges for science fairs at elementary schools & always bring a robot! We also augment Special Ed. class lessons with our robots.
We wrote common core math lesson plans aimed at 4th-8th graders, researched & assembled "Math Resources" for Math 6-8, Algebra & Geometry & made lesson plans using Legos for 4th grade & geometry curriculum. All these are available & distributed to 1700 teachers via the SJUSD Wiki pages and Illuminate website.
The team petitioned our school board for PLTW engineering classes and our mentor taught the first Intro to Engineering Design class in 2010. Our school now has 4 PLTW courses since the addition of BioMed in 2019. 56% of our current team has taken at least one PLTW class & 770 Leland students have taken the PLTW classes in the last 5 years. The BioMed courses are 64% female and engineering classes are 22% female. Engineering courses, now at 6 HS's & 6 MS's in the district, have been taken by 5000+ students since 2010.
We observed that our HS was lacking in Computer Science classes, so we again petitioned the school board in 2014. Some of our parents even jumped in as CS teachers the 1st year! 60% of this year's team has taken Intro to Computer Science and 44% of the 2019 AP CS students are female. As a direct result of our INITIATIVE, there are 22 CS & AP CS classes in ALL SJUSD HS's and 9 classes in 6 MS's, reaching 1050 students in the 19-20 school year.
We don't think the K-5 grades should be left out! We ran a 14 wk after-school activity at Graystone Elementary called "6&4" for Lego WeDo and SCRATCH programming, each held once a week for 12-16 students (2018).

COLLABORATION FOR STEM:
604 and Leland's WiSTEM, FBLA & Science Clubs first collaborated in 2017 for TECH TALKS where professional engineers from FIRST contacts/sponsors come and talk about their careers. Originally the purpose was to encourage women to look at STEM careers, but the demand was so high that we opened the annual talks to all Leland students & siblings. An audience of 125+ students listens to scientists, physicians, engineers, and business owners.
We again partnered with the WiSTEM club and formed CodeOne Programming. Our first year, we held 13 FREE 6-week programming workshops for middle school ages on Saturday at Leland-including SCATCH, Java, Visual Programming, and Python. So far, there have been 28 CodeOne events. We now hold the programming classes at public libraries and sometimes at the SJUSD office. In addition, we bring Hackathons and Family Code Nights to San Jose schools, averaging 100 parents, students, and teachers at each session.

PIPELINE INTO FIRST via Lego EV3 Workshops:
We wrote EV3 BUILD-A-BOT lessons for IBM in exchange for their sponsorship. This partnership expanded to 604 running IBM's TYCTWD classes. We also run the robotics sessions at IBM's Boys'& Girls' Technology Camps every summer (40 MS students from underserved schools). We hold our own FREE BUILD-A-BOT classes at Leland using the kits & computers we borrow from IBM for 50 students & their parents.
During school breaks, we hold FREE multi-day EV3 workshops for 3rd-8th graders using EV3 kits we bought and lesson plans we created. Since 2017, we have held 18 multi-day workshops (15-20 kids/session)@3 libraries.
A Latina CS high school teacher came to one of these workshops, and with her help, we formed a partnership with UNIVISION (Spanish TV network) to hold EV3 workshops at their UTEC Education Center in San Jose. UNIVISION supplied new EV3 kits and computers for our 2-3 day workshops and advertises this STEM activity in their TV commercials. We've held 10 multi-day workshops during school breaks and these classes expose Latino students to STEM. 75% of the students who take our workshops speak Spanish as their first language and 604 students can practice their Spanish skills! Several FLL teams formed and this CS teacher started an FTC team at her school as a result of the workshops!

NEW INITIATIVE-Micro:Bits
We use the scientific method to evaluate our outreach activities and Micro:bits is a winner. We bought 20 kits for a team member to use for her Girl Scout Gold Star project (intro to computer programming). A wide range of innovative and engaging projects can be found online, allowing us to tailor our program to best suit each group of students. We have reached out to several elementary school principals and hope to get Micro:bits into their schools as an afterschool activity this fall.

STEM INCLUSION:

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In 2019, we facilitated the donation of older PLTW engineering kits to a STEM MS teacher in another district. She is using the kits as an afterschool activity and expects to have 2 FTC teams next year.
Like many FRC teams, we do large demos like Maker Faire & Bay Area Science Festival. Focused on STEM Equality, we concentrate our efforts on the underserved diverse populations specifically Latino students. County Fair-goers love to drive our robots. Because of our 4yr partnership with UNIVISION, our students and robots have also been part of the UNIVISION's Cinco De Mayo booth where we showcase our robots & give out FIRST literature in Spanish. UNIVISION's Director of Community Empowerment loves driving our robot. After learning that we hoped to be in Houston for the FIRST World Championship, she connected us with Univision Houston and Atlanta to expand the workshops. We submitted proposals to those locations. Result TBD!
Our ethnically diverse team translated 604's Engineering Activity Books into 7 languages. These books contain simple hands-on science experiments aligned with the Next Generation Science Standards. These books are used in local schools, at the SJ family shelter, foreign language classes & science presentations to introduce diverse communities to STEM. Books have been distributed to Chinese educators, to a school in rural Cambodia sponsored by a former SJ teacher, and to students visiting schools in their home countries.
So why do we do outreach? Much of our effort has gone into activities that encourage participation from groups that are underrepresented in STEM fields. A 604 alumna in college said: "Being in a FIRST program has benefited me because it made me more aware of the importance of STEM majors and encouraged me to pursue a science field. I want to help the next generation! I go to middle schools and talk to 8th grade girls about college-different types of college, how to pay for it, what a degree is-basically everything. It's what I learned to do in FIRST-to make a difference."

604's FIRST IMPACT:
Our programs can effectively scale & expand. Each year we review what worked. Then, we critique & iterate to be more effective at the next demo, workshop or coding event. 604 students make themselves available! We represented FIRST, talked to employees and demoed our robots at Google, Apple, Tesla, Semiconductor Industry Association's awards dinner & the Embedded Vision Summit in Santa Clara with Dean Kamen.
We were one of the first FRC teams to do international outreach in India (2008) because of our students' ethnic diversity. We ran the San Jose KOP distribution (2008-2019). We recruit our team parents and sponsors' employees as judges & volunteers for our FLL Qualifiers. Our mentors, judges, and refs also volunteer at other FIRST events. We use our FLL qualifiers to help recruit FLL students and their parents into our FTC and FRC teams with tours of our workroom, demos of our robots, and interactions with team members.
604 was ahead of the curve in 2016-17 by emphasizing our 7 I's (INSPIRATION, IMPACT, INNOVATION, INITIATIVE, INVOLVEMENT, IMPROVEMENT & INCLUSION) in our Chairmans' submissions that are now the latest core values for FLL: Innovation, Impact, Inclusion.
TheBlueAlliance.com is run by 604 alumni. We used info from the site and made Project Insite, a list of FRC teams that is searchable by number/name/school/city/state/country. We added US zipcodes to make maps of active and inactive teams. Our database was initially shared with FIRST HQ and RD's in '16. In 2019 there were 3300+ veteran US teams who competed BUT 2300+ dormant US teams. We know from trying to restart 3 near us that it requires both an interested principal AND teacher. Restarting teams is a long term effort that requires the help of other FRC teams. We personally reached out to FRC teams at the '18 &'19 Houston Championships.

VOLUNTEERING:
We help at K-9 school Open houses and Heritage Days. We have volunteered at Toys4Tots Holiday party for 12 yrs, and we have been responsible for recruiting 120+ FIRST students (3 shifts) as toy runners/elves for 8 yrs. Team mentors are Santas, run games, and help distribute food to 2000+ families. FIRST teams bring robots and we readily hand out robot drivers' licenses, FIRST information and talk with the kids. We have volunteered at Gifts for Teens since 2013. Each year we help assemble 1300 bags for homeless teens and teens in SJ foster care.

CONCLUSION:
For 20 years, 604 has been spreading FIRST and its mission as far as possible. It is firmly instilled in our team ethos that we must inspire the next generation. Our passion and energy is infinite as our 604 family grows. This is the Quixilver way.