

The background is a solid red color with a repeating pattern of white gear shapes. The gears are of various sizes and orientations, creating a mechanical theme. A white rectangular border is centered on the page, containing the text.

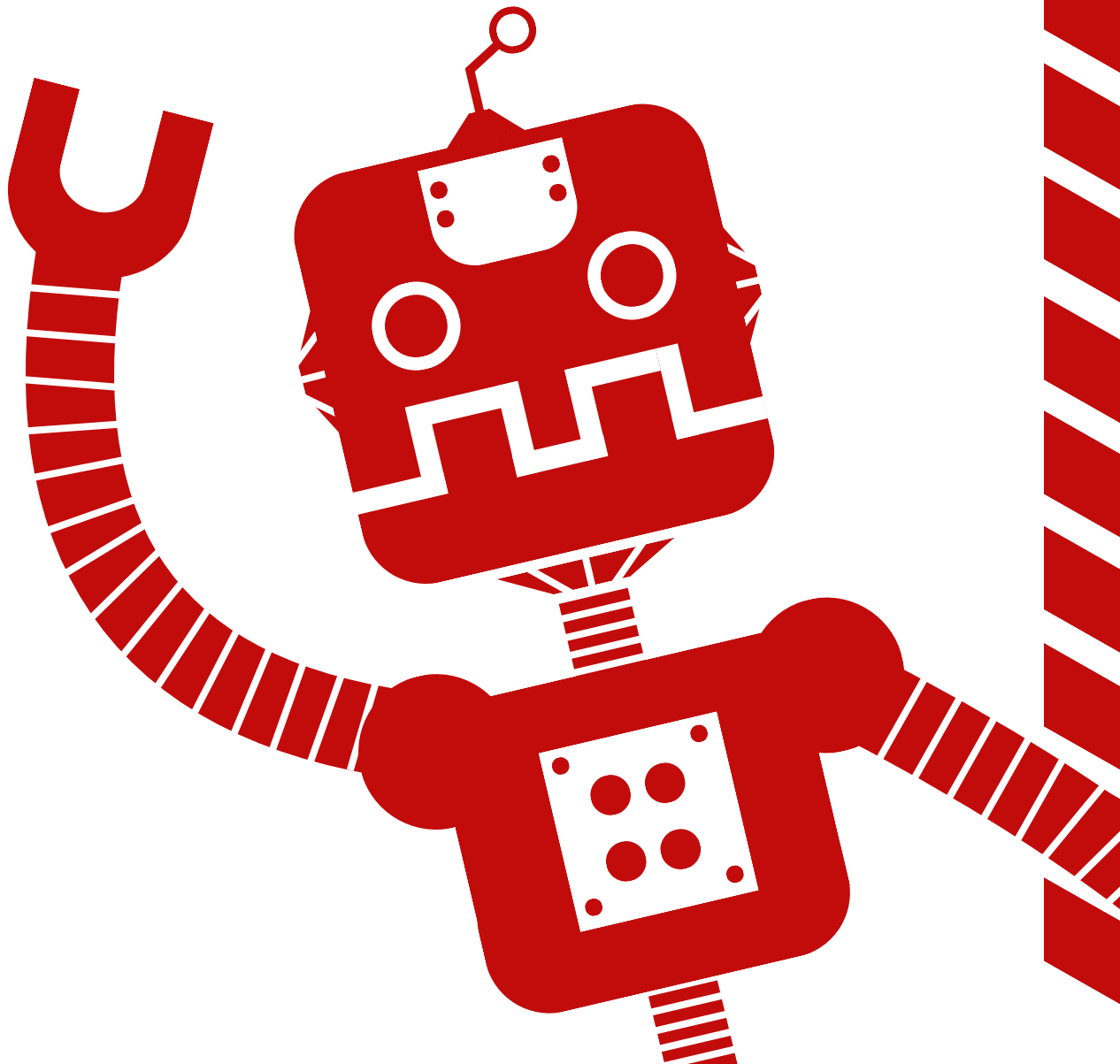
**Gunn Robotics**

**Team 192**



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Thanks to our generous  
sponsors who make everything  
we do possible



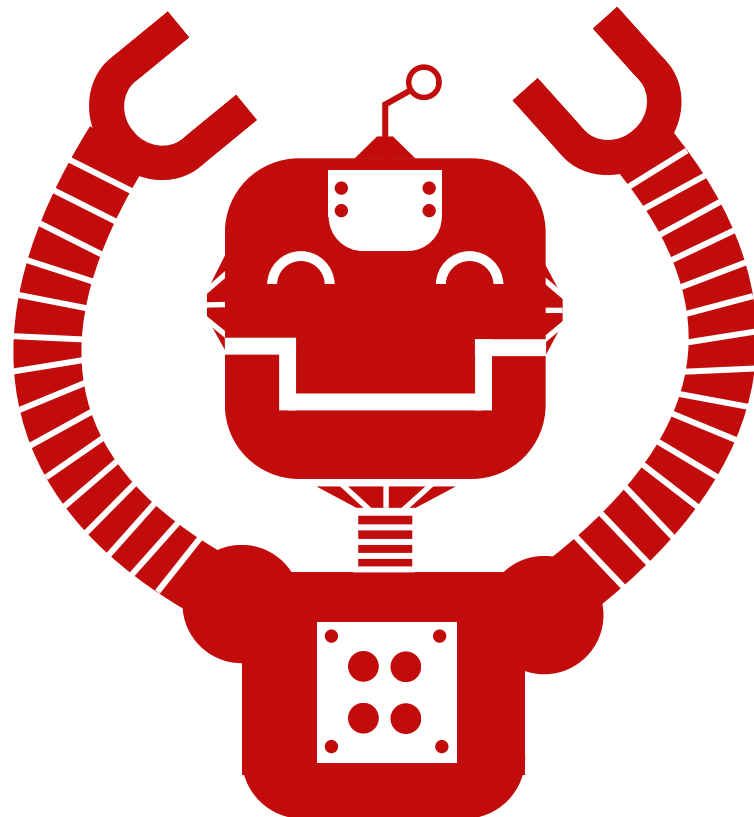
**BOSCH**



**PALO ALTO**  
UNIFIED SCHOOL DISTRICT



**Thank you!**





# Our Team

# Our Mission

Founded in 1997, Gunn Robotics aims to foster learning by immersing high schoolers in a student-managed STEAM workplace. Here at GRT, we prepare the engineers, scientists, leaders, animators, and programmers of the future with the real-world skills and experiences they need to succeed in their careers.

51 Members

1700+ Training Hours

5 Mentors

9500+ Shop Hours

7 subgroups

27 years of FRC

## Leadership

### Captain

Team Manager  
Safety Captain  
Business Manager

## Subgroups

Animation  
Business  
Controls  
CNC  
Drivetrain  
Pneumatics  
Welding

# GRT Alumni

go on to do amazing things!

**100%**

graduate high school and attend college

**10%**

continue to volunteer for FIRST

**92%**

pursue STEAM careers

**90%**

feel that GRT was impactful

## Alum Mentor Spotlight



Michael graduated from GRT in 2016. He studied Computer Science at CU Boulder and now works as a software engineer. This season, he has been volunteering as a mentor to keep the shop open so students have the time they need to work on their robot.

# In the Shop

## Training

During the first few months of school, all of our members, regardless of their background in engineering, go through a collective 1400 hours of training where they learn about shop safety, how to safely operate mills, lathes, and hand tools, and CAD. Afterward, every member of GRT creates two practice parts, one using hand tools and another using either the mill or lathe. Once we ensure that every rookie can safely operate the machines in our shop they go through subgroup-specific training for our various subgroups: animation, business, controls, pneumatics, and drivetrain. Recently, our welding subgroup has been renewed after having received training from one of our mentors, Tim.





# In the Shop

## Shop Project

Each November, our leadership team presents a simple FRC-inspired game for the two class periods of GRT to compete in. This way rookies get the valuable experience in learning the process of designing and building robots. For many rookies, this was their first-time CAD-ing and machining outside of training. This year, our game **Ballistic Blitz** consisted of scoring balls into a box—and a trash can for bonus points. This prepared the team to work together to build a robot during the build season.



# Uplifting Our Community

## Team Bonding Trip

A bonded team is a successful team. Building relationships so rookies feel included is a crucial component of our first semester. Every fall, GRT goes on a camping trip, helping new members feel more comfortable on the team. We set up tents, prepared food, and played games to learn about one another.



## Stanford Concessions



For the past 10 years we have been partnered with Stanford Athletic Concessions. The money earned accounts for around two-thirds of our funding, all of which is earned by our team. Every member contributes by volunteering for at least 3 Stanford sports game concession stands.

The background is a complex, abstract composition of red and white geometric shapes. It features several large, solid red rectangular blocks of varying sizes and orientations. Interspersed among these are horizontal bars with a red and white diagonal striped pattern. Some of these striped bars are connected to the red blocks by thin black lines that terminate in small white square nodes. The overall aesthetic is clean, modern, and high-contrast.

# Outreach

# Outreach

We do more than build robots, FIRST is about spreading a love of STEAM throughout the community. Outreach takes three forms at GRT: Within the team, in our school, in our community.

## This Season:

**100%**  
of GRT members  
participated in  
outreach

**2000+** outreach  
hours

**450+** children  
inspired



# Summer Camp

This past summer marked our fifth annual robotics summer camp for middle school students. 13 GRT members taught engineering principles using VEX kits to 50 students throughout 2 week-long sessions. While our camp is free for anyone to participate, we still brought in \$9,300 through donations. During the summer camp, students compete in the “Seafloor Scramble”, a game made by GRT members, where their robots need to pick up blocks and move them to different areas called deposits. Christine, the 2024 summer camp lead, said “For a lot of kids, this is their first experience with robotics. This is like giving them a little taste of what robotics can be, and if they want to pursue it in the future.”



# FLL

## FLL Explore Team

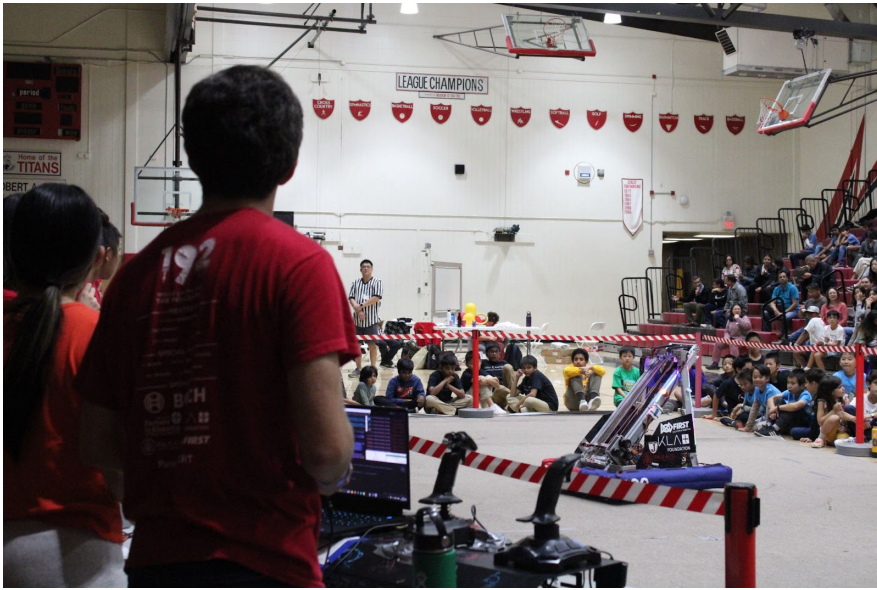
Starting in spring 2022, the FIRST Equity Grant empowered us to start a LEGO Spike program for our community in partnership with the YMCA. This fall, we continued our FLL Explore team at the YMCA Bubb Elementary school site, where 10 GRT members worked with 20 students. We are excited to continue and expand this program in the future.



## FLL Tournament

This past fall we held our fourth annual FLL regional tournament for 24 teams in our community. Every GRT member volunteered to make the event happen, totaling over 430 hours of community service. At the end of the day, we presented our robot from the Charged Up season—Vermillion—to the kids. This year's FLL lead stated that his favorite part was “watching kids run up, giving them fist bumps, and seeing them ecstatically accept their awards.” At GRT, we’ve seen how participating in robotics at a young age can have a widely positive impact on students’ lives, prompting them to continue with robotics in the future within settings beyond FLL.

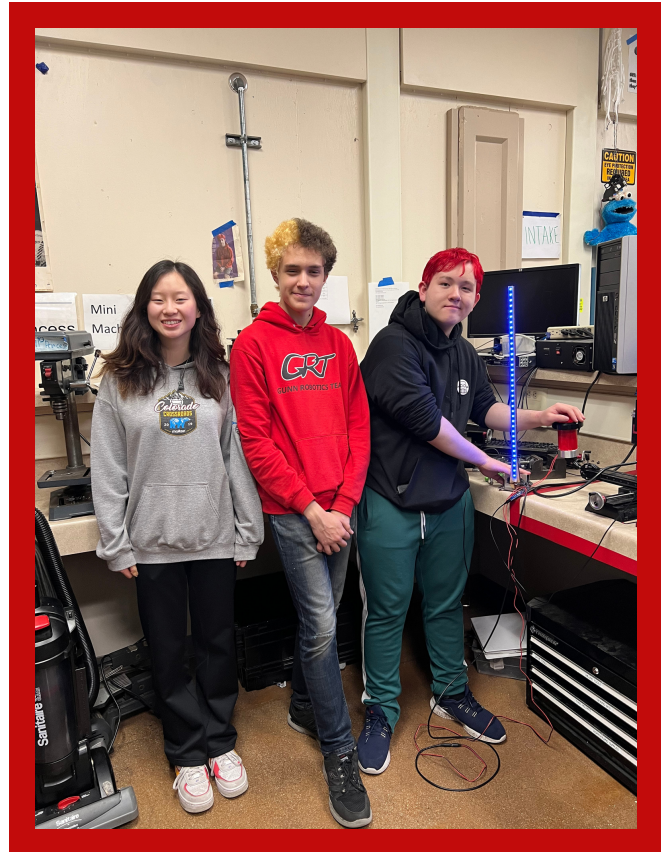
# FLL



# Uplifting our Community

## Hand Raiser

A local 4th grader, Joel, has muscular atrophy. Due to his disability, he had trouble with raising his hand in class. His teacher reached out for help and GRT stepped up to build him a hand-raiser mechanism. After receiving this request, we immediately started to brainstorm. Four GRT members spent 84 hours building a mechanism that allowed Joel to participate more easily in class.



## Soccer Duck

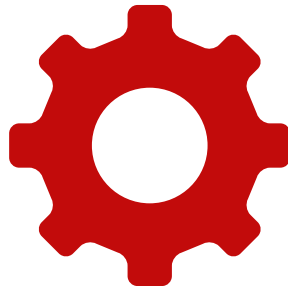
We also built a wheelchair attachment—the SoccerDuck—for Joel to be able to shoot soccer balls. Prototyped from a spring-based launcher, we had a group of five to six members working on this. During the height of the pandemic, these members overcame the difficulties of Zoom classes, design complications, and under-practiced machining skills to create the mechanism for the wheelchair.

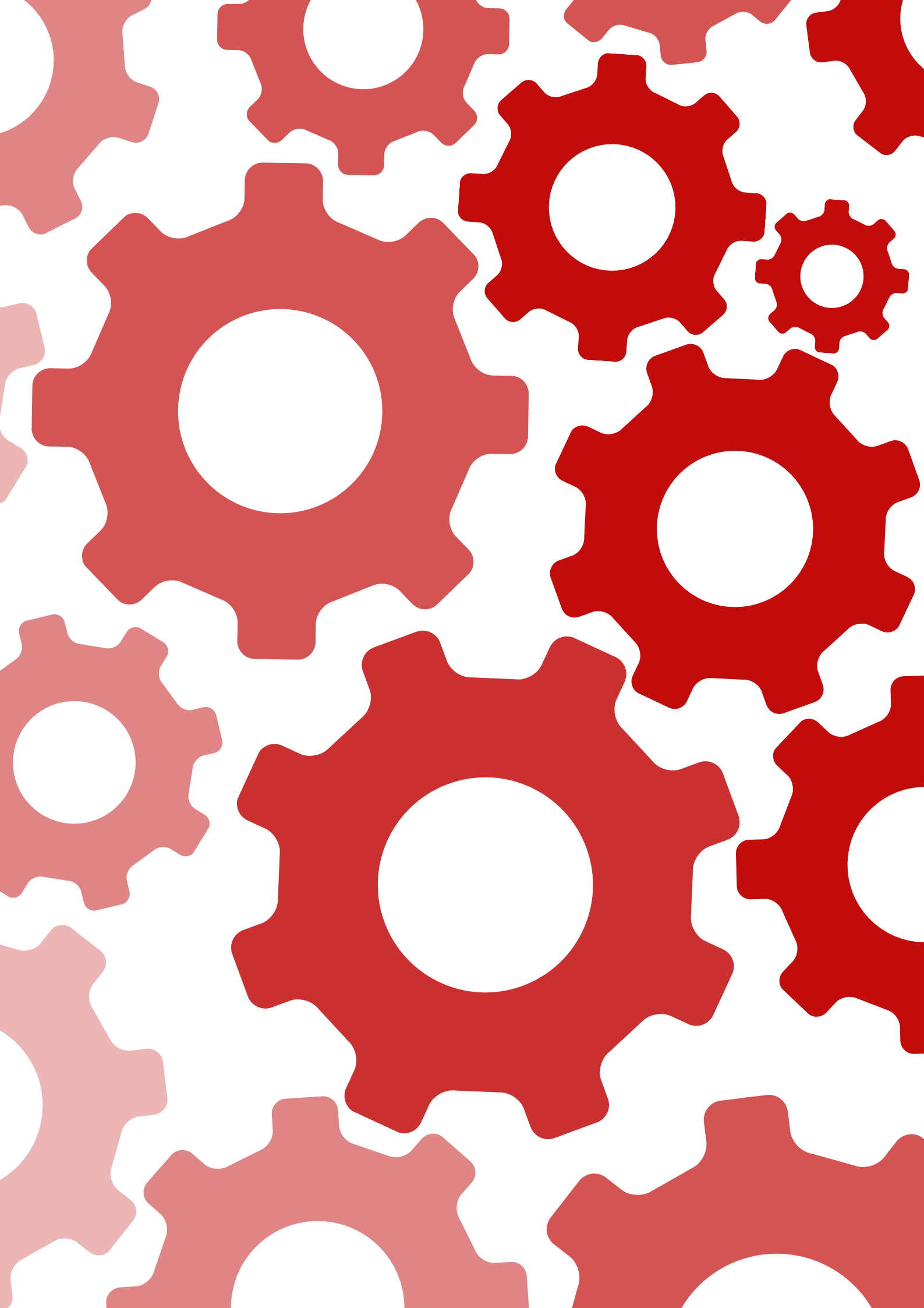




# Haunted House

For over a decade, GRT partnered with Juana Briones Elementary to give elementary schoolers a mechanized haunted house. This year we spent 660 hours creating and presenting the haunted house mechanisms, inspired by ideas from the fifth-grade students.







# **Impact Award**

# **Submission**



# Impact Essay

The Impact Award, formerly known as The Chairmans Award, enables direct entry to The World Championships if won. The point of the award is to show judges that a team spreads FIRST core values and STEM education. Generally, the Impact Award consists of three components: an essay, a video, and a presentation. This year the award was created by our business subgroup and overseen by the business manager.

The words of FIRST's founder, Dean Kamen ring true at Gunn Robotics: Life is so short. Why spend days doing something arbitrary, that doesn't aim to be greater? Here at GRT, we ask the question: why should students wait until high school or college before feeling excited about approaching challenges with an engineering mindset? An important part of our mission is to leverage our own privilege of participating in FIRST by providing engineering opportunities for children of all ages in our community. We've created outreach initiatives for students starting in kindergarten all the way up to high school. Within our own team, we embrace the spirit of education by ensuring everyone has a chance to master the facets of STEAM they are the most passionate about.

# The Spark: Elementary School

GRT employs our experience in STEAM to create robotics projects that inspire local elementary schoolers. Every Halloween, our team constructs a haunted house full of spooky mechanisms to display at Juana Briones Elementary School to inspire the students. We begin the design process by inviting the fifth graders over to our robotics shop where we tell them about FIRST and invite them to draw out their ideas for the potential haunted house robots. Next, our team split into smaller groups to create eight mechanisms based on the students' drawings.

Last October, our team committed over 650 hours to designing, machining, and assembling robots for the haunted house. During Halloween week, we displayed our finished product at Juana Briones, where GRT members also conversed and answered students' questions, sharing ways to become involved in local STEAM programs. Our team has been running the Haunted House 20 project for over a decade and will continue this partnership in the future. Building the Halloween mechanisms is particularly special for Juana Briones alumni on GRT, who fondly recalls being inspired by the house as elementary students.

GRT reaches the students at Benjamin Bubb Elementary School through our collaboration with the YMCA. In the spring of 2022, we purchased LEGO SPIKE Essential kits with funds from the FIRST Equity Grant. Using these kits, we ran a six-week-long LEGO pilot program for twenty students ranging from kindergarten through fifth grade in the Bubb YMCA after-school program. Students enjoyed learning the fundamentals of building for strength, FIRST values, and the iterative design process. Our members spent over seventy hours mentoring and planning lessons for the program.

Last fall, GRT founded and mentored a registered FLL Explore

team for the Bubb students, in which four small teams of students learned closely from GRT mentors. Each group worked through the design process to create an “energy journey” based on last year’s Super Powered challenge. They built LEGO creations involved in sustainable energy generation and creative uses for electricity. GRT members created mini-lessons tailored directly to what the groups were interested in, their energy project, and their experience level. The students learned about gear ratios, torque, sustainable power, and how different types of energy are converted into electricity. We volunteered over eighty hours teaching biweekly sessions at Bubb plus fifteen hours organizing and planning lessons. This collaboration between GRT and the YMCA provided the kids at Bubb experienced role models closer to their own age to inspire them to pursue STEAM.

## **Spreading Out: Middle School**

GRT continues to provide STEAM opportunities as students enter middle school with targeted outreach events. This year, our team attended the JLS Middle School Back to School Night where we showcased our robot to dozens of students and parents. We also introduced the attendees to FIRST and the variety of programs offered. Each spring, we march our robot in the Palo Alto May Fete Parade alongside local school bands and clubs to show the community our team’s work from the season. Our efforts encourage and provide the tools for youth to get involved in the many hands-on pre-engineering programs our community has to offer. For the first time since the pandemic, GRT was able to host our annual FLL regional tournament at Gunn High School last fall. Twenty-four teams participated in the full-day event

where they were able to show off their robots and projects. All together, GRT members volunteered over 430 hours to set up, staff, and clean up the event, all of which were coordinated by our student organizer. Team members filled all roles open to teens from M.C., to floor manager, to robot inspector. After all of the matches, we held a robot demo to inspire students to participate in FRC when they graduate from FLL. This event is especially important to our team because it is a chance to pay forward the generosity of the volunteers at our own FRC events. We also host an annual VEX summer camp for fifty students over two week-long sessions. GRT members teach principles of design and programming during the first few days, followed by a mock VEX challenge for teams of students to build robots.

Last summer, GRT members volunteered 175 hours preparing for the camp and over 600 hours teaching. Campers were split into groups of four, each guided by a pair of mentors who provided hands-off support. When groups surprised us by working through our prepared curriculum faster than anticipated, our GRT members experienced with robotics challenges were able to improvise new 22 problems to engage the campers. For example, we challenged campers to lift their robot using a pull-up bar. We are proud to provide this camp for free to our community, making donations to GRT optional. Summer camp participants are inspired to join FIRST programs and often apply to our team once they reach high school.

# Building Up: GRT Members

GRT operates as a class at Gunn High School with significant after-school commitments and activities managed by a four-member elected leadership team. As a course, we emphasize teaching and accepting members with diverse experience levels. We train each member to operate in our machine shop, where they gain proficiency using hand tools, mills, lathes, and 3D modeling. After a full month of student-led shop training, some members continue designing and machining while others have the option to develop more focused skills. Those who are excited about specific facets of STEAM may choose to explore deeper into one of our team subgroups, including drivetrain design, controls, CNC milling, pneumatics design, welding, animation, and business. Since 1997, GRT has prepared the engineers, programmers, scientists, animators, educators, and leaders of the future using our student-managed philosophy. Our mentors and more experienced members guide new recruits with a hands-off approach, asking questions and providing suggestions while allowing students to think for themselves. Although challenging, this approach allows students to truly learn. GRT embodies the idea that good engineering must be experienced. The result is that GRT alumni go on to do incredible things. Over 90% of alumni say that GRT was impactful for them, citing soft skills like leadership, group dynamics, and communication, along with a range of technical skills. 100% of our alumni attend college with over 90% pursuing STEAM careers. GRT alumni find great success obtaining PhDs; working for companies including Google, Facebook, and Microsoft; and founding startups and companies including 23 ViaBot. After graduating, alumni continue to stay in touch with GRT, and many return each year for kickoff or to mentor during the build season. Over 10% continue to volunteer for other FIRST programs after high school.



# Making Connections: Helping the Community

GRT is committed to improving the lives of individuals in our community. Our educational programs and outreach events have garnered a reputation for GRT for using engineering to make an impact. In recent years, we have undertaken two major projects to directly assist local students with activities they enjoy. In 2021, a special-ed teacher contacted our team about one of her students, Joel, whose spinal muscular atrophy prevents him from playing sports with his brother and friends. We jumped on this opportunity to make a difference for Joel.

A group of ten GRT members brainstormed a few ways to tackle this problem using an attachment to Joel's wheelchair. We used the same design process that we used for building robots to compete in FIRST competitions. After many iterations, we landed on the SoccerDuck: a flywheel shooter featuring four maneuverable wheels, a two-ball storage chute, and a laser pointer (per Joel's special request). We designed and machined the SoccerDuck at our shop to attach and travel with Joel's wheelchair across grassy terrain. After we delivered the SoccerDuck to Joel last fall, his family posted videos of him happily playing with the device to his Instagram account, thanking our team for our hard work.

Two band teachers from our school district reached out to GRT with another request. One of their students, Farin, has cerebral palsy which makes it difficult for him to push the valves on his trumpet. We were excited at yet another opportunity to use our engineering in action. Our team created a compact, hybrid trumpet stand and electric valve depressor to alleviate the physical stress of playing the trumpet. Farin brings this device to his new middle school band class where it has

enabled him to play with his 24 classmates for longer periods of time. This coming spring we will be undertaking a new project for another local student with spinal muscular atrophy to help him participate in class using a hand-raising device. These ventures show our members how powerful engineering isn't solely confined to robotics competitions but to create real impacts for individuals within our community.



# Executive Summaries

**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.**

The creative process of building a robot for the FIRST Robotics Competition serves as a gateway for GRT members into future STEM careers. According to a recent survey, 90% of GRT alumni feel better prepared for the workplace, with both technical and soft skills such as communication and group dynamics. 100% of GRT alumni attend college, with 90% pursuing STEAM, and 10% continuing to volunteer for FIRST.

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

Our community strongly supports STEM initiatives for students; however, these are less inclusive toward those with disabilities. Since the spring of 2021, GRT members have spent over 1550 hours designing mechanisms intended to ease the lives of two students with physical disabilities. The completed devices enabled a student with cerebral palsy to play the trumpet in his school band, and another with spinal muscular atrophy to play soccer.

# Executive Summaries

**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?**

Each year, members dedicate hundreds of hours designing and leading the GRT robotics summer camp with the goal of spreading the FIRST message in our community. Free of charge, our camp covers the essentials of robotics, and our members serve as role models for future FIRST participants. GRT hosts robot showcases to inspire the next generation of leaders in STEM. Recently we participated in a STEM fair at a nearby middle school and a technology celebration festival at Stanford University.

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

GRT hosts an annual Norcal FLL Regional Qualifier in the fall, with each of our fifty members volunteering through a designated role. This includes our MCs (always previous FLL members), a student FLL coordinator, robot inspectors, greeters and robot drivers that showcase our FRC robots abilities to the crowd. By engaging with these young scholars, we set an example of what FLL members can achieve later in their FIRST journeys.

# Executive Summaries

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

In 2020, GRT started a student-led FLL Explore team in collaboration with the YMCA. Since then, GRT members have developed and presented bi-weekly lessons each spring, teaching robotics concepts to young scholars.

This fall GRT started an FLL team specifically for IEP students in our school district. Our mission is to promote access to STEM education for each student in our community, and this is a method to ensure that under-represented students have the opportunity to participate.

**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?**

Each year, GRT collaborates with Juana Briones Elementary School to create a “haunted” house for their fall festival. The elementary schoolers draw their design ideas, and watch them come to life in pneumatic mechanisms built by GRT members just weeks later. In our 2022 survey, 64% of these students expressed interest in joining a FIRST robotics team in the future. In fact, some current GRT members state that the haunted house project inspired them to join the team years later.

# Executive Summaries

**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.**

GRT is partnered with with Fletcher Middle School and the YMCA, overseeing multiple student-led FLL teams. We have also worked with PAUSD teachers to create three mechanisms over the past two years to aid students with disabilities and enable them to their fullest potential in their education. During the year, GRT also organizes several robot showcases around our community to encourage student involvement in FIRST and robotics.

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

In alignment with our goal of equal opportunity, GRT is committed to creating an inclusive environment for minority groups in STEM. Our head mentor annually hosts a “girls night”, a dedicated time to address sexism in STEM. Outside of our community, we strive to support FRC teams around the world. We toured our shop to an FRC team from England, and shared our training curriculum to an FRC team in Lithuania.

# Executive Summaries

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

To preserve knowledge within the team, GRT mandates that all members participate in a two-month student-led training program. The curriculum covers basic principles of design, machining and CAD, facilitating the transfer of knowledge from veteran to rookie members. Financially, GRT members have been working at Stanford Athletic Concessions for the past nine years to obtain funds, and will continue the partnership in the future.

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

For many years, GRT has benefitted from corporate sponsors such as Bosch and KLA Foundation. Our team's business group writes grant applications each year—recently earning grants from PG&E and FIRST NorCal. Outside of sponsorships, GRT runs a free of cost summer camp every year. Although not required to, generous parents donate to the camp, accounting for one-thirds of our funds.

# Executive Summaries

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

As a team with members of diverse backgrounds, it can be difficult for students without prior engineering knowledge to get involved—in the past year we have taken several steps to help these students. Our veteran members noticed that those without prior CAD experience often shy away from contributing to the design process. Thus, they created CAD+, a guide that prepares members new to engineering for designing a robot. This program gave the 9 participants the skills to be involved in build season.

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

Our mission with FIRST is simple: to offer every student in our community access to foster their passion in STEM through student led initiatives. Within our school, we created a T-shirt launcher for school assemblies to showcase GRT and FIRST to our students. Externally, we started two FLL teams, organized several robot showcases for our local community each year, hosted an annual summer camp and undertook multiple projects creating mechanisms to improve the lives of specific students.



# Executive Summaries

**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.**

Our team takes immense pride in the dedication of our members. We aim to teach members both technical and soft skills, and thus our mentors let our members to handle the decision-making for the team. This includes both our internal projects, as well as outreach initiatives. We believe that each members' background is valuable to the team, whether they specialize in business, animation, design, programming, or other fields. It is the unwavering commitment of these members that make GRT possible.

The logo consists of the letters 'GRT' in a bold, red, cursive script. The 'G' is a large, rounded letter with a thick stroke. The 'R' is a tall, narrow letter with a thick stroke. The 'T' is a simple, blocky letter with a thick stroke. The letters are connected at the top and bottom, giving the logo a cohesive, hand-drawn appearance.

