Winter 2022 Volume 32

Monkey Business

News of The Funky Monkeys, Lynbrook High School Robotics, FIRST® Team 846

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Students visit FUHSD Superintendant Mr. Graham Clark to discuss Field Initiative.

Monkey Moonshot

Aishwarya Poolla (jr.)

In 2018, a $275 million school bond for the modernization of classrooms was passed called Measure CC. The bond mentioned that any leftover money would go to a district robotics facility, but this never happened. It did, however, bolster the interests and efforts of the students in our team and district to make this field a reality.

In 2019, after attending the World Championships, our team identified that the lack of a field was holding us back severely from competing at our highest level. Practicing and testing require setting up and tearing down various setups that require many moving parts. This process wastes precious time that we could spend working on or practicing with the robot. 2019 Co-President Anna Shaposhnik, along with her Co-President Kunal Sheth and other team members, reached out to other schools to build a robotics practice field for all five schools in our district. Members from each team met weekly and constructed a nine-page proposal that they presented to the district board.

Our team, led by 2020 Co-President Joonha Hwang and 2022 Co-Presidents Yuvraj Dhadwal and Arjun Kumar, continued to attend board meetings to campaign for the passing of Measure G, which would be a continuation of Measure CC. Measure G was also for the modernization of classrooms with money allocated for the robotics center. Students handed out flyers to registered voters to raise awareness for the bond among the community; our team alone handed out more than 1000 flyers. On June 7, as students held their breath watching the results, Measure G passed with 55.71% of votes in favor, barely meeting the 55% required to pass.

Graham Clark, FUHSD Superintendent, as of July 2022, has shown much interest in the robotics program and has visited many robotics sites in our area. Formerly Deputy Superintendent Clark had reached out to the students about the initiative and communicated with us regularly, showing an interest in bolstering the district robotics program. When the team attended Chezy Champs in

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The Power of Passion

How robotics built my confidence and skills for success in the tech industry

Ankith Madadi (sr.)

Walking into a room full of experienced engineers, I felt similar to when I entered the robotics shop for the first year. Over the years, I've built up confidence, technical and non-technical skills, and everlasting bonds in robotics. This confidence has carried over in work environments and helped me get the best out of these experiences. Through my invested passion for software over the past five years, I have been fortunate to receive software development internships, fellowships, and contracting jobs.

I've often mentioned robotics in interviews because whenever I explain what we do as the Funky Monkeys, people are surprised by the extent of technical and non-technical skills that go into the program.

From a technical standpoint, our team's emphasis on clean code and good programming practices has elevated my code's quality, allowing teammates and colleagues to quickly parse through my code and prevent as many bugs as possible. Experienced software engineers were impressed by the code I wrote at work and the professional maturity and discipline to stick to code cleanliness (a highly valued skill in the industry); they were so impressed that they even provided a full-time offer to forgo college.

Although I work primarily on software, robotics has pushed me to explore design, electrical, and business. Especially working in companies that focus on biotech, transportation, video games, dating apps, and much more, I have gained so much more from my experiences by taking the initiative to learn about other areas in the company and sitting in on extra meetings.

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Off-season

Abhishek Nambiar (jr.),
Naman Athavle (soph.)

Abhishek: Following a very strong showing during the 2022 FRC season, I was excited to take part in Chezy Champs Robotics Com, the first of two offseason competitions that Team 846 went to this year. While our team was going into Chezy Champs facing tough competition and a challenging match schedule, I was still anxious to see how we would perform, knowing full well what we're capable of.

On Friday, the first day of Chezy Champs, I had a sense of optimism about the rest of the competition after seeing our team perform relatively well during our two practice matches of the day; in these matches, we pulled off a successful climb and had many accurate shots. On Saturday, it was thrilling to see us continue Friday's momentum throughout our eight matches of the day. I watched in awe and excitement as we consistently climbed to the traversal rung – the highest one on the hanger – and continued to hold our own so well. I was especially ecstatic after our team achieved the highest score in the competition at the time: 208 points, along with our alliance partners, Citrus Circuits (Team 1678) and Hightide (Team 1444). Ultimately, by Saturday's end we were in 12th place – a pretty good showing considering the hyper-competitive nature of Chezy Champs.

On Sunday, the third and final day of the competition, our team had a tough time during our last 2 qualification matches, and we ultimately finished the qualifications in

The Funky Monkeys cheer from the stands at Chezy Champs.

20th place; although, we were grateful to be selected by the seventh-seed alliance of the Hawaiian Kids (Team 359), Quixilver (Team 604), and Stuypulse (Team 694). While I was disappointed that we likely wouldn't get a chance to play again, I still cheered on our alliance from the stands, wishing the best for our alliance. Unfortunately, this did not come to fruition, as a tough loss in Round 2 put us out of the competition.

While our team may not have gotten as

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Behind the Doors of Room 608

Khadija Raza (soph.)

When the final bell of the day rings, Room 608 transforms. As the last of the Computer Science students leave the room, grateful to return home, robotics students enter, excited to finally begin their day. What is Mr. Kwong's Intro to CS Java and AP CS A classroom throughout the day turns into *the* hub for The Funky Monkeys after hours.

The Funky Monkey brand is present inside and out, from the flag and banners on display on the wall to traces of the trademark black and yellow spraypaint on the concrete outside. This is the room where it all happens, from team administrative meetings to the crucial integration meetings between subsystems during build seaon. *This* is where we finally welcome our rookie members to the wonderful world of robotics through a period of six or more weeks in our annual Fall Workshops.

This article reveals what happens behind the closed doors of Room 608 during these workshops. It shows two perspectives, a new member learning software through the workshops, and a student getting to mentor her peers about something she is passionate about. Enjoy!

Software Workshops in Room 608.

From a Lead

Celine Li (jr.)

Putting up the slideshow exhibiting "Welcome to Design Workshops" in bold letters, my gaze traveled to the desks that soon will seat the curious students. It seemed to be a blink of an eye away when I was the curious, overwhelmed student sitting there. As a flock they piled in, excited to see what they will learn and do.

Looking at the potential future designers of the team, I asked them what other workshops they attended: many attended software, electrical, machining, media, even all of them. I got carried away with the eagerness and excitement of the attendees and soon quickly grabbed everyone's attention back to our first lesson of the workshop.

For the students that are not able to make the workshops, we share weekly slides containing the lectures and materials in email recaps and film step by step tutorials for classwork explaining uses, definitions, and important points for each tool in Inventor Professional. In addition to the yearly CAD lessons, this year we also covered machinist drawings and CAM lessons. We hope to encourage more CNC operators since there are a low percentage of students on the team with CAM and CNC knowledge.

Prior to the workshop, Anushree, my fellow co-lead, and I carefully created a teach-

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From a Rookie

Yuvraj Gill (fr.)

It was the start of 9th grade and my high school career, marking the beginning of one of the biggest and most influential times of my life. I wasn't exactly sure on what I wanted to do in high school, and with so many opportunities presented my way, I quickly became overwhelmed and feared that my indecisiveness would cause me to miss important opportunities. Several people advised me to do things that I genuinely enjoyed and was good at, and since I am passionate about science and technology, I decided to look at various clubs pertaining to STEM during Club Info Day. I came across the Lynbrook Robotics team, and, after reading about some of Lynbrook's inclusive culture, eye-opening accolades, and opportunity for hands-on learning and engineering, I decided to sign up for the team and give The Funky Monkeys a shot.

A few days later, I received an email encouraging me to attend workshops to see how the robot-creation process works, and I immediately signed up for the Software Workshops. I had always enjoyed coding and computer science, but all of my experiences with it were more on the computer and not as interactive as I had wanted it to be. I wished for a more hands-on experi-

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Welcome OMIO!

Yuvraj Dhadwal (sr.)

A Computer Numerical Controlled (CNC) Machine is a machine that requires a program to cut material stock to create parts.

Our Tormach CNCs can cut plate material on a 9.5" x 18" bed size. This is great for machining small parts. However, sometimes we need to machine parts that cannot fit on this bed size. For example, when machining our hood for our shooter in 2020, we used the Tormach or the bearing and lightening holes and cut the rest of the part out using the bandsaw. A similar method was used again in 2022 for the Intake roller assembly side plates.

A CNC router, such as the OMIO, would allow us to do everything in one pass. For comparison, the OMIO CNC Router we purchased has a 30.3" x 22.2" bed size. This allows us to machine multiple parts without needing to replace the sheet metal after every part and save time. The machine's spindle speed is much faster than any other machine we have in our shop, which means we can machine at an even faster pace.

We chose the OMIO CNC over other CNC options because of space constraints. Our machine shop is filling up, and there isn't sufficient room for a large CNC router. We also chose the OMIO because it has strong recommendations from many other FRC teams. Space and power usage were the biggest factors we needed to consider when choosing a CNC machine.

Led by students, we bought and assembled the CNC router in our machine shop. We had our sophomore and junior members research a lot into all the components that go into the CNC, such as the spoil board, the endmills, and the vacuums. This way, we could involve the underclassmen in this project. We hope to have all our students comfortable with this machine come kickoff, and we expect this machine to help our team remain a lot more competitive. Thanks to the generous support of sponsors like NASA, KLA-Tencor, ARM, Western Digital, Intuitive Surgical, and Boeing, we were able to have this wonderful addition to our shop.

Students assemble the CNC in the shop.

***Monkey Moonshot**, Continued...*

September of 2022, Clark came to Bellarmine College Preparatory. He toured our team's pit and Team 254's field and machine shop to better understand what our facility would need. In February of 2023, Clark came with other district administrations to visit our team's shop and classrooms for the first time.

Co-President Yuvraj Dhadwal and mentor Chirag Amin, along with mentors and students from other teams and various district administrators, including Graham Clark, also went to tour the NASA Ames Research Center's robotics field and ask several questions to the our hosts, Team 1868. Not long after this tour, on October 28, students, mentors, and administrators met with representatives from Quattrocchi Kwok Architects or QKA and presented their specifications for a facility.

Currently, in February 2023, we are discussing the logistics of construction, such as the square footage and the budget. The architects are discussing a visit to another team's field to better understand what this project would entail. We are also debating whether to put the facility at Cupertino High School or Lynbrook High School. All five teams are excited by all the recent development and their hard work finally coming to fruition. There is still much work to be done even before construction begins, but senior students who had started work on this initiative in their freshmen year are very gratified to see these results.

***From a Lead**, Continued...*

ing schedule and rehearsed our lessons to each other, preparing ourselves for the new challenge of public speaking and teaching. From grammar mistakes to completely missing steps in our tutorial, we fixed each mistake carefully. Through this, we both learned our flaws and worked hard to carry out a better lesson. We made sure to put in our best efforts to prepare the rookies for build season and to teach as many things as time would allow. I was motivated to provide new members the same enriching experience I had when I was a new member.

This goes the same for all the other students teaching each workshop. Through mentoring a workshop, I have grown a lot in terms of public speaking and also my own skills at design. It helped me be a more confident person and taught me important lessons about planning ahead and being responsible. We hope that everyone leaves with valuable lessons and is ready and excited for the new season.

Students learn about design and using Autodesk Inventor at workshops.

***From a Rookie**, Continued...*

ence. Weeks had passed, and I had finally been able to attend my first meeting, which went differently than I had anticipated. Originally, I expected that the Software Workshop would simply be a class teaching coding and explaining how different parts of the robot worked. However, I was pleasantly surprised after the first meeting, in which I was informed that we would be able to get hands-on experience with last year's robot, Furious George, and that we could even get the robot to work with our own code. I enjoyed the first meeting and made it a point to attend the Software Workshops over the following 6 weeks. Along the way, I gained plenty of experience with the robot and got to meet new friends along the way.

As a freshman, the robotics workshops were perfect for me to develop and deepen my knowledge with operating and programming the robot, and it helped build my confidence for when I will resume work on the robot when the official season starts. I would

"Along the way, I gained plenty of experience with the robot and got to meet new friends along the way."

recommend the robotics workshops to any incoming freshmen next year who are interested in Lynbrook Robotics. It is a perfect way to build knowledge and confidence and develop the tools necessary to be an influential member and have a successful season.

***2022 Off-season**, Continued...*

far at Chezy Champs as some of us–myself included–had hoped, we still had an amazing time watching world class teams compete, and it was a rewarding experience to get to play with them. I, for one, had a great time getting to know people from other teams that I hadn't gotten a chance to interact much with in the past. Either way though, as a team we hope to perform even better during next year's competition.

Naman: With another upcoming competition, The Funky Monkeys were very excited to once again compete at CalGames this year. CalGames is an off-season competition hosted by Western Region Robotics Forum (WRRF). This competition included 30+ local teams from the Bay Area and was hosted by team 5430 Pirate Robolution in Pittsburg High School, California. Not only that, you can also be a volunteer for CalGames to help run the competition seamlessly from helping set up the game field to creating graphics and media.

I was thrilled for our team to compete at CalGames. Since our team competed at Chezy Champs, a very competitive competition, I was optimistic about our team placing high in qualification matches and forming a good alliance in CalGames.

We were pleasantly surprised on day one of the competition, when we saw an excellent marching band performance. I never knew that I would be watching a band performance happening in front of me in an FRC competition.

With a strong performance showing in qualification matches, we were feeling optimistic about elimination rounds. We won all but 2 matches and were ranked 4th place with 6036 Peninsula Robotics from Palo Alto, California rounding the top. We were grateful to be first pick of the number one alliance seed with our wonderful alliance captain 6036, and 2813B Gear Heads from Saratoga, California.

At the semi-finals we were up against 8 Paly Robotics from Palo Alto, California, Gear Heads' other robot, and 766B M-A Bears from Atherton, California. We cheered on our alliance from the stands until two tough losses that put us out of the competition. Although some of us hoped our team would win CalGames, we were still proud with the progress that we've made throughout the competition.

We received one award, the Entrepreneurship Award. The Entrepreneurship Award celebrates a team's entrepreneurial spirit whose comprehensive business plan helps achieve the team's ongoing objectives. My experience with presenting the Entrepreneurship Award was good. At first I was nervous prior to walking up to the judges but as I spoke to the judges I became more confident speaking about our business plan. This was a great learning experience for me and our business planning team since it was led by mostly underclassmen and was our first time presenting to a panel of judges. Not only did we win the Entrepreneurship Award, it was our third time in a row winning it in CalGames!

Although our team hoped to win CalGames, we still had an amazing time playing with many local teams around the Bay Area. We hope to perform even better next year.

***The Power of Passion**, Continued...*

Robotics emulates a work environment by requiring collaboration between different sub-groups, enforcing quick deadlines, emphasis on responsibility, and forming a tight-knit environment. I stood out in a fast-paced work environment by being able to communicate progress, take responsibility, and take initiative. At one of the fellowships, I was even able to lead a group of college students and post-graduate students, playing off my experience leading sub-groups in robotics. Through the countless hours at robotics, I've made close friends, another parallel to a work environment where I've made friends and gained lasting mentorship from colleagues.

Similarly, I was able to carry over experiences from work. During my summer at Fig, a developer tooling company, I migrated key parts of the company codebase to Rust (a new programming language) while carefully scoping out software architecture. This inspired me when switching from Kotlin to C++, where we similarly scoped out the architecture before diving into writing the code. The careful attention to our basic architecture built a strong basis for our codebase and allowed us to quickly get the essential functions of the robot working and our autonomous routine working from the first match! The strong core structure allowed us to build more complicated features later in the season, including a custom vision system recognized by the Innovation in Control Award at Champs.

Ankith Madadi (sr.) works on robot code.

I'm so grateful for the past three years of being a part of The Funky Monkeys and the knowledge my seniors and mentors imparted to me, allowing me to become a better innovator, creator, thinker, colleague, teammate, and mentor. I hope to give back in the future by mentoring other students through FIRST!

Graphic by Cindy Liang

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