

MONKEY BUSINESS

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



In This Issue

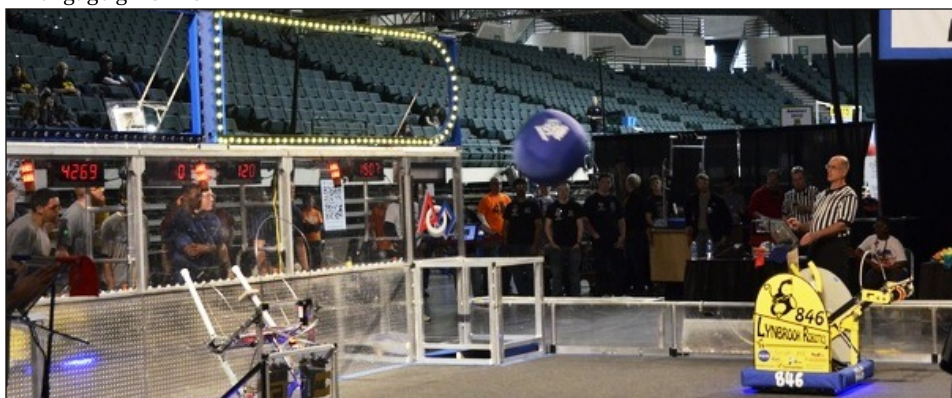
- 1 Funky Monkeys win their first regional competition.
The team challenges its girls to complete a subsystem on their own.
Rahul wins the Dean's List Award.
- 2 Team Highlight: How the Space Cookies engage girls in STEM.
- 3 Check out this year's robot, the Funk Cannon!
Learn what *FIRST* teams need to be competitive.
- 4 See what our graduating seniors have to say about their time as Funky Monkeys.

Editor-in-Chief

Megan Lau

Editors

Stephen Giandomenico,
Michael Chang,
Owen Li, Anurag Makineni,
William Wang, Brent Yi



The Funk Cannon scores extra points in the high goal during autonomous.

Girls' Involvement

Increasing girls' roles in the STEM areas of team

Amrita Iyer (*sophomore*), Owen Li (*sophomore*)

For the first time in team history, the Funky Monkeys have implemented an all-girls subsystem, a team of girls who designed and machined the drivetrain this year. This all-girls subsystem is meant to encourage girls to join the technical side of robot-

see **GIRLS' INVOLVEMENT**, Page 2

Funky Monkeys Win Buckeye Regional

The Funky Monkeys claim their first ever regional victory

William Wang (*sophomore*)

After 12 years of hard work and persistence, the Funky Monkeys reached a long-awaited success: winning a regional competition for the first time, at the Buckeye Regional in Cleveland, Ohio. Our team was first pick during alliance selection, and together we were the last alliance standing among 54 other teams.

"It's been a long-time coming for our team and mentors, and I am very excited we finally won," says Owen Li, Officer at Large.

Co-president Anurag Makineni agrees, "I remember being in the finals in Boston last year and how much we wanted that win. Finally getting it was amazing."

This major milestone is the culmination of years of hard work acquiring new technology, knowledge, and resources. Through the support of our generous sponsors, we have been expanding our operations on a yearly basis. In 2010, the team started holding workshops to train new members and cultivate a continually expanding pool of knowledge. In 2012, we were able to garner the support of our

school, allowing the team to shift its work from members' garages to an on-campus workshop. We have since been filling it with as much machinery and tools as we can.

This year, the expanded resources allowed the team to build a complete duplicate robot, enabling the team to get much needed practice and fine-tuning time. We also emphasized a new modular design approach based on our past experience, breaking down the design of our robot into fully separate subsystems. This made it possible to make changes to individual subsystems without interfering with the others. Together, these allowed the team to continue making significant design changes using lessons learned from the practice robot, after the build season had ended.

According to the team's founding mentor, Mr. Yang Xie, "We were successful [because we] continue to work on building our team." At the same time, "We still have a long way to go." Now that we have one regional win under our belt, he has set his sights on winning the Silicon Valley Regional, the Chairman's award, and becoming a "first tier team".



Dean's List Award finalist Rahul Iyer is congratulated by Dean Kamen, the founder of *FIRST*, and Amrita Iyer, Rahul's twin sister.

Iyer on Dean's List

Hardware Lead Rahul Iyer is recognized for outstanding student leadership

Jessica Zheng (*junior*)

San José State University, April 5th, 2014: At the Silicon Valley Regional competition, sophomore Rahul Iyer received the prestigious Dean's List Award—the pinnacle of an individual's contributions towards the mission of *FIRST*. Similar to the Woodie Flowers Award for mentors, the Dean's List Award recognizes students for their technical knowledge, leadership skills, and ability to inspire and motivate their team. Rahul

see **DEAN'S LIST AWARD**, Page 2

Team Highlight: The Space Cookies

Inspiring girls to pursue STEM

Morgan Chan (*freshman*)

FIRST Team 1868, the “Space Cookies”, excels at empowering women in technical fields. Consisting entirely of high school girls from around the Bay Area, the team not only inspires girls to become involved in STEM, but also gives them the ability to pursue STEM fields as careers.

Team 1868’s founding purpose was to encourage girls’ interest in science and technology. They also do well in competitions. They are repeatedly finalists at the Silicon Valley Regional, and have won the Regional Chairman’s Award (considered the most prestigious award) three times.

Even so, getting girls to actively participate in STEM and making decisions for the team takes precedence over just winning competitions and awards. Many of their activities involve reaching out to the community to increase female interest and participation in STEM fields. Through demonstrations at community events including the Maker Faire and Bay Area Science Festival, they spread knowledge of *FIRST* and the importance of technology. In addition, the Space Cookies support and mentor five *FIRST* Lego League (FLL) teams and teach FLL workshops, cultivating opportunities for younger generations to get involved in STEM. They also created the Girls Engineering Tomorrow Workshops to introduce girls in fourth and fifth grade to engineering fields.

Marketing and Outreach Captain Maddy Augustine says that working with only girls provides a different environment that encourages girls to be more assertive and take on leadership roles in technical and administrative fields. The girls think similarly and know how to interact, and they themselves make all final decisions regarding the robot.

Team 1868’s efforts have been very successful. Ninety-four percent of graduates go on to study STEM fields in college. Active membership of the Space Cookies has increased to the extent that they have had to set a limit on the amount of girls in the workshop at a time, requiring them to sign up to participate in a work-session. As the Space Cookies team grows and thrives, it continues to be an inspiration for girls of all ages everywhere to speak openly and participate actively in whatever they choose to pursue as a career.

Girls’ Involvement

continued from page 1

ics since, according to *FIRST* founder Dean Kamen, the female population only makes up around 30% of teams’ total membership. After being given the opportunity to work on their own subsystem, the group of girls quickly rose to the challenge and succeeded in making one of our team’s best drivetrains ever while learning valuable lessons along the way.

When first asked about the idea of having the all-girls subsystem, the girls on our team felt a little uneasy. “We were skeptical of the idea of having an all girls subsystem at first, and we felt like we were being put up on a pedestal,” says Eva Lomazov (12). Despite having these sentiments, the girls accepted the challenge of making the 2014 robot’s drivetrain. While tackling the challenge of producing a drivetrain, the girls working on the drivetrain learned the in and outs of CAD software, from drawing sketches to mating parts together and making machinist drawings. Afterwards, they machined the parts that they personally designed, ultimately creating the reliable and robust drivetrain of Funk Cannon. In the end, the girls in the subsystem were glad that they took the initiative to lead their own subsystem, feeling a newfound sense of ac-

complishment and ownership of the robot.

A positive outcome from this new subsystem is that the girls on our team became much more motivated to be actively involved in making the robot and to start taking charge of other projects. Sophomore Nikita Seth, a member of the girls subsystem explains that “by designing and machining the drivetrain I, along with other girls, have not only learned valuable skills in the technical side of the team, but have also gained confidence as a leader.” The girls from the subsystem



Morgan Chan changes the drill bit on the mini mill.

were able to dissect the problem, propose a solution, transfer ideas into a computer, print onto paper and, finally, stamp their work into metal creations. With an all girls subsystem this year, all the girls who participated have really peaked their interest in STEM and are excited to continue on creating and developing new ideas.

Dean’s List Award

continued from page 1

was one of two students chosen from all 59 teams to receive the award.

Head coach Mr. G. nominated Rahul for the award because of his outstanding contributions to the team and the community. In particular, Mr. G. remarked that “Rahul fits this idea of gracious professionalism. He goes out of his way to help other people and to teach them about robotics.”

During the school year, Rahul led CAD workshops for his fellow peers. Through these workshops, he taught members how to use CAD software to model and design a robot, greatly expanding the team’s pool of capable designers. When he hosted a similar workshop at the WRRF workshops in December 2013, Rahul extended this further into the *FIRST* community by sharing his knowledge of robot hardware with people from other teams.

However, Rahul’s most unique achievement on the team was his role as liaison to the “All Girls Subsystem” program introduced this year, which aimed at motivating girls to take on engineering roles. Rahul oversaw the development of this subsystem—the robot drivetrain—instructing the girls how to use the software and machinery, as well as how to do design work. Eventually, the girls were able to take over, and produce the entire drivetrain from start to finish. Rahul’s contributions to the All Girls Subsystem not only helped bring female participation on the team to an all-time high, but also ensure that girls will continue to play vital roles in the years to come.

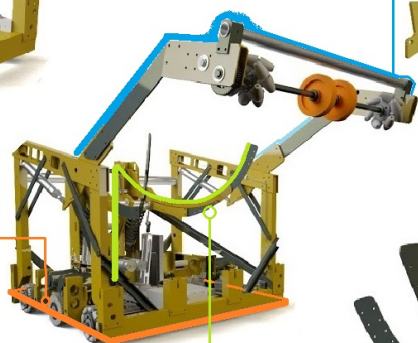
Fellow members recall Rahul being so overjoyed when he won that he was out of his seat and ready to accept the award before the judges had even announced it. “He’s very deserving,” says Mr. G. “His efforts are influential. The things that he is doing are impacting a lot of people.”

INTRODUCING THE FUNK CANNON



DRIVETRAIN

The drivetrain runs at a maximum speed of 16 feet per second. The motors are inverted over the wheels to save space for electronics. In order to use a flat wheelbase, while maintaining an agile robot, there are 2 traction wheels in the center and 4 omni-wheels in the corners.



COLLECTOR

Mecanum wheels help funnel the ball to the center of the robot. The perfectly counterbalanced arms allow for the use of smaller cylinders, reducing air consumption, and weight.

SHOOTER

The shooter loads and releases the game ball with a multi-dimensional crank driven by a worm gearbox against a pair of 400 lb compression springs. It also features a two-position latch for long and short shots, allowing the robot to launch or lob the ball into the goals from anywhere in the end zone.



Team Resources

Learn about how a *FIRST* team can achieve success

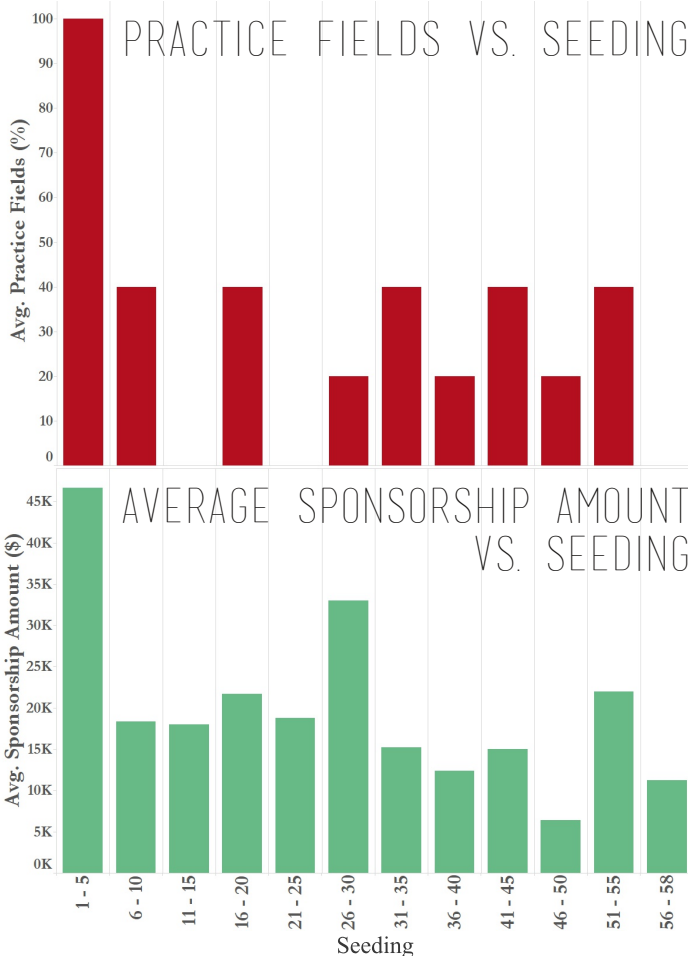
Megan Lau (*junior*), Anurag Makineni (*senior*)

Why are some *FIRST* Robotics teams so successful every year? To answer this, our team did research at the Silicon Valley Regional Competition (SVR) and concluded that practice fields, sponsors, and dedication are some of the most crucial factors to a successful *FIRST* team.

Looking at the red diagram on the right, at SVR we found that 100% of the top 5 seeded teams had full practice fields. In comparison, only about 22% of the remaining teams at SVR had a practice field. By having practice fields, these high ranking teams were able to practice their driving skills and analyze the performance of their robot prior to competitions. "At regionals, our average points contribution to a match hovered around 70 points, but it definitely could be improved upon," says our team's Co-President Miles Chan. "We increased our average to 100 points at Championships, in part, through showing up to practice at NASA with other teams on a real field a few times." Through these practices, the drive team gained confidence and skill critical for strategy-driven *FIRST* games like this year's Aerial Assist.

Sponsors also greatly contribute to a team's success. Of the 58 teams we surveyed at SVR, two of the three teams on the winning alliance had corporate sponsorships totalling over \$50,000, which was \$10,000 more than any other team competing at SVR. Luke Knight from Team 971, SVR's 1st seeded team, explains that "sponsors have allowed [their team] to make a robot with a high level of precision". The trend in the green graph shows a correlation in which the higher ranking teams had, on average, more money than the lower seeded teams.

The last, perhaps most valuable trait a team can have, is what Andrew Torrance from Team 254 would call a "commitment to excellence. Every bit of graphic design, every bit of outreach, every bit of demo you do you give it 110%. The difference between a good team and a great team is that a great team can achieve excellence in all that they do."





SENIOR GOODBYES



I remember on my rookie year on the team, we spent hours writing g-code by hand, praying that we didn't make a mistake. The drivetrain was the only part of the robot designed by students, and the only driver practice we got was the Thursday of our first regional. Now, machining complex parts using CAM is a common occurrence, the entire robot design is student led, and we build a prac-

tice robot every year. These key differences underscore how much our team has grown over the last few years.

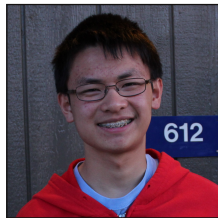
The team has never been stronger than it is right now, and as a result, this season has been filled with record breaking accomplishments: our first regional win, the highest Offensive Power Rating (OPR) in the Newton division, our first Creativity and Quality awards, and of course the first Dean's list finalist from our team! Our success can be directly attributed to how we've learned to work together as a team - we've been able to complement

each other's strengths and cover each other's weaknesses, allowing us to do more than any of us could ever hope to do alone. And it is this teamwork that will bring our team even more success in the years to come.

As my time on the team comes to an end, I can't help but think about all the things I've learned, all the successes (and failures) I've experienced, and the people who've become some of my closest friends. I'm truly proud to call myself a part of the Funky Monkey family.

—Anurag Makineni, Co-President

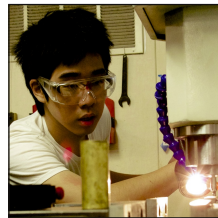
I've been incredibly fortunate to be a Funky Monkey during four of the greatest years in our team's history. Our first regional win, two runs in the Championship eliminations, a Quality Award and the highest offensive power ranking on the Newton field; what an amazing ride! It has been an absolute pleasure working with all of you to bring our team to our highest competitive level ever. I'm just proud that I had my little role to play in making it all finally happen for everyone who's worked so hard for our team over the years.



As we seniors leave, I hope that all of you who are still here set the next great goals and continue to improve our amazing team. I know you will build upon the experiences of this year and cannot wait to see what you all accomplish in FRC 2015

You all are the greatest group of people I've ever known, and there's not much else to say about that. Thanks for letting me be a part of it for four years. At heart, I'll always be a Funky Monkey! Go kick butt next year.

—Miles Chan, Co-President



To those who are joining robotics next year:

Before I joined the team I thought there were only two types of robots, each with its unique missions: one that delivers a ping pong ball to empty tissue boxes, while the other conquers humanity. There is a third robot, however, that one can find them in room 612. This robot not only delivers tubes,

frisbee, or balls to high goals, but it delivers us to high goals. Because robots, we become leaders, entrepreneurs, writers, engineers, programmers, photographers, and artists. Without it, we wouldn't have had the valuable experience to be part of the team, take new challenges, and advance ourselves. This robot exists because we created it, and next year you will continue to build upon its never ending missions. Good luck!

—Eric Yeh, Vice President of Engineering

From a young age we were asked what we wanted to be - an astronaut, a superhero, a policeman - for me I didn't answer. It wasn't because I didn't want to, it was because I couldn't: I am dyslexic and with that comes reading, writing, and speaking disabilities. It was because of this that I was kicked out of classes, bullied. But there was always dirt, legos, and metal to help me take my mind off what others said - I built, morphed, drew, and created. Team 846 isn't just a group of students who build a robot, to me, it is a family where I could continue to build, learn, and inspire others to do the same.



On this team I answered that question from 18 years ago: I want to be a mech-

anical engineer. In my freshman year I didn't think of joining robotics, I thought it was a place where smart people went, and I obviously was not one of them. Looking back, I am glad I took my first step into that garage lined with machines and I'm glad that I continued to go until my senior year. Working with students and mentors passionate about technology, media, photography, art, public communication, and writing is what *FIRST* means to me, what every Funky Monkey experiences upon walking into room 612 and what I hope for those who enter that room in future years.

The people I met here, the lessons I learned, the robots I helped make: will always have an important place in my heart. I hope you all will leave this team with the same feelings too.

—Michael Lin, Vice President