

Girl Powered: The Road to Gender Equality

Doy Yun, Kashvi Agrawal, Munira Takalkar, Yaahvei Krishna



WOMEN IN STEM

For decades, countless women have courageously attempted to join STEM fields, only to be forcibly turned away. Even today, when female engineers, doctors, and scientists are far more common than ever before, they are constantly outnumbered by their male counterparts and face prejudice solely due to their gender. Being the only team out of four in our school to have any female members, we have faced multiple challenges throughout our journey in VEX IQ. Several times, we have felt the pressure of being the only girls in the program, causing us to doubt our abilities. However, over the course of the season, we have gained self-confidence, as well as acceptance from others.



Ada Lovelace
Mathematician + Writer



Katherine Johnson
Mathematician



Edith Clarke
Electrical Engineer



Grace Hopper
Computer Scientist



The lack of women in STEM is the result of numerous factors, one of which is the underrepresentation of female role models in our lives. In our school's VEX IQ program, the high-school mentors and leading teachers are male. Having few examples of what women can achieve within our immediate environment has subconsciously intimidated our team, keeping us from setting more ambitious goals. However, there are still women in STEM who have inspired our team, not only with their great discoveries, but also with their tenacity in breaking the glass ceiling.

LIN LANYING - HER STORY



One such woman, Lin Lanying, left a lasting impression on us. As a Chinese electrical engineer, materials scientist, physicist, and politician, she stands out as a symbol of the importance of diversity and inclusion in STEM. She is also known as the “mother of aerospace materials” and the “mother of semiconductor materials.” Throughout her lifetime, she fought to be included and accepted in the line of work she was continuously dismissed from.

Her pursuit for equality began early. At the age of six, due to her mother’s conservative views and strong belief that women belong at home, Lin was denied the right to an education. Nevertheless, she persisted in challenging her mother’s ideologies. After locking herself in her room for two days without any food, her family finally relented, allowing her to attend Liqing Primary School. Lin went on to join the All-China Women's Federation, setting the stage for the continued advancement of females in STEM. Despite consistently being told that she wasn’t capable or worthy, Lin Lanying didn’t back down. As a team of four Asian girls, we are determined to learn from Lin and her unwavering attitude — to never fear being assertive and to push for equality.



TAKING INITIATIVE

Inspired by Lin Lanying, we, too, chose to work towards creating a more gender-balanced robotics program at our school. We found that introducing girls to robotics at an early age helps develop their eagerness of further pursuing it, which is why Kashvi is currently a mentor in the First Lego League program in the Elementary School. Guiding a team of four girls in the fifth grade, she is helping them cultivate an understanding of and interest in robotics. Hopefully, they will be encouraged to not only participate in VEX IQ in Middle School, but also in other robotics-based activities in future years.

As for our team, while looking to recruit new teammates, the returning members from the 2020-21 season — Munira, Doy, and Kashvi — specifically focused on reaching out to interested female students to diversify the VEX IQ program. This was how Yaahvei initially joined the team. We additionally created posters at the beginning of the season, encouraging girls to join VEX IQ and spread them around the Middle School to not only bring more girls in, but also increase the general publicity of the program. We were able to successfully spark interest amongst some of them and asked them to try out robotics in the coming years. By sharing our prior learning and experiences, we were able to help more girls, like Yaahvei, build foundational knowledge in robotics to use in the future.

GIRLS IN STEM

JOIN VEX IQ



please scan to fill out a form indicating your interest

VEX IQ Recruiting

Inbox x



Munira Takalkar

Tue, Sept 14, 2021, 11:22 AM



to me ▾

Hello Yaahvei,

My name is Munira, an eighth-grader and current member of the VEX IQ Middle School robotics program, Team 6546W. Our team is looking to recruit new members for the 2021-22 season, and we heard you were interested in STEM. If you would like to join, please let me know! We have meetings every Wednesday from 3:15 to 4:15 and Friday from 3:15 to 6:00. We hope you can join our team.

Regards,
Munira

LIMITLESS ROLES

In our team, we make an effort to experiment with assorted roles throughout each step of the robotics process. While designing and ideating, we each come up with possible plans, adding our unique perspectives to the robot and ultimate goal. We then deliberate as a team, weighing the pros and cons of each design before settling on the most effective one, and solving issues through subsequent iterations. An additional integral step to our process is designing using the CAD software *Autodesk Fusion 360*. Through this, we are able to both visualize the mechanisms to address problems before building the robot itself and plan out the optimal placement of pieces to fit within the given dimensional constraints.



Pros	Cons
the flow while driving the robot will be better	it can't store at full capacity (max would be about five)
we will be able to utilize 5 compartments of the storage	we might not be able to fit both in the limited space we have
we will have a capacity of 6 balls	there are more effective methods we can use



The building aspect of the process is the main area in which we give each team member the opportunity to develop their skills. We assign each person a different component to build, changing every few practices. By experimenting with different roles on the team, each of us broadens our skill set, whether it is in the physical building aspect or collaboration aspect. Reaching out of our comfort zones allows us to improve our competency in each facet of robotics.

MEET OUR TEAM



Doy Yun

With four years of previous experience in competitive robotics, Doy has a strong foundational knowledge of robotics. Returning from her first VEX IQ season last year, she has continued to contribute to the driving portion of the competition, as well as using *Fusion 360* to digitally design robot mechanisms.



Kashvi Agrawal

Kashvi has been participating in different robotics competitions since 5th grade, and took part in the previous VEX IQ season as well. Her main contribution to the team is in designing the robot to complete the tasks and building the mechanisms.



Munira Takalkar

After joining VEX IQ in the previous season, Munira returned with a stronger understanding of robotics. As someone who codes, she programmed the robot for the autonomous portion of the competition, in addition to her contribution in creating CADs of the robot iterations and building.

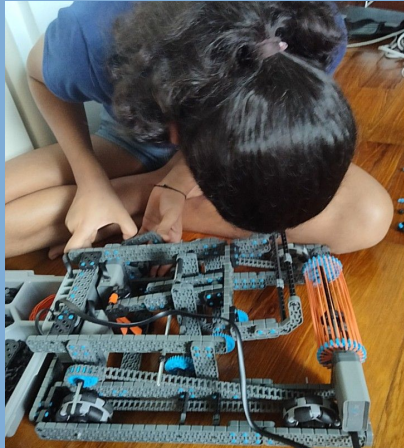


Yaahvei Krishna

Yaahvei is the newest member of our team as she joined VEX IQ this season. However, this does not limit her contributions. She helps design the different parts of the robot using her background with engineering projects and is also one of our team's drivers. Yaahvei also works on the building process of the robot.

DIVERSITY OF PERSPECTIVES

Each member in our team has had different experiences and brings unique qualities and perspectives to the table, which we have taken advantage of while creating our robot. Doy and Kashvi previously participated in the First Lego League competition, which gave them a foundation for robotics and the building mechanisms used to complete tasks.



With four years of prior experience in robotics and as someone who CADs the robot, Doy has developed an understanding for the importance of the intricacies in the design. She focuses more on the exact placement of the mechanisms, bringing an important perspective to the creation of the robot. Kashvi, being more building invested, prefers coming up with design ideas while constructing the robot, taking inspiration from day-to-day objects in order to fulfill the task at hand. In addition to that, her problem-solving approach throughout the building process often helps our team move forward when we're stuck.



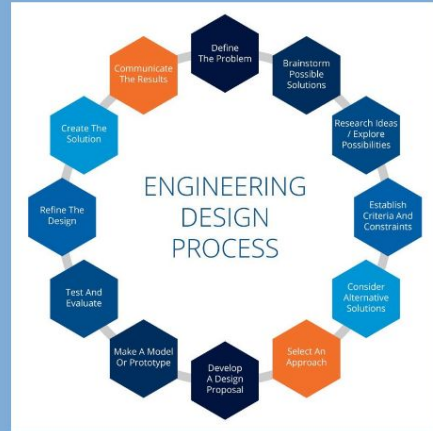
DIVERSITY OF PERSPECTIVES

Having experience in JavaScript and Python, Munira helps our team integrate logic from other languages and apply it to the VEX IQ programming language. As someone more programming oriented, Munira views tasks linearly and finds it easiest to get from the starting position to getting the balls in the goal by following a series of direct steps. This impacts her view of the robot design, including the function and placement of the mechanisms, and driving strategy.

Yaahvei, although new to robotics, has been designing and creating things since she was young. This, along with the semester-long Technology class she participated in at school, helped her translate her learning of the engineering design process into the creation of our robot. Due to this, she developed a non-linear way of thinking, and doesn't mind taking a few extra steps or creating more iterations in order to reach the end goal.

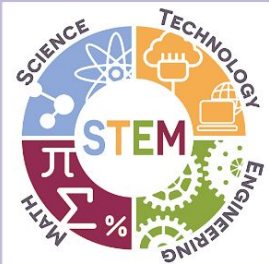


By taking each of these strengths and perspectives into account, our team has been able to create a robot design that encompasses each area of robotics, designing each mechanism to work well autonomously and through driver control. Although each of us come with different experiences and perspectives regarding robotics, we are able to work effectively together by developing ideas through disagreement and concord to create an efficient robot design and better our ability to succeed.



“GIRL POWERED” - WHAT IT MEANS TO US

By working successfully and efficiently within our team, we were able to prove our competence as well as gain confidence in ourselves. We hope to carry this mindset of confidence even when surrounded by males, in the VEX IQ competitions and while pursuing STEM in the future. This development of confidence is one of the many meanings of “girl powered” to our team. Along with that, this phrase carries the weight of all the women before us, fighting against the hard-set stereotypes that hinder girls’ pursuits of STEM fields. Although, over the years, “girl powered” has transformed into yet another threadbare slogan used in place of substantive measures to truly turn the tide of the male-dominated field of STEM, in essence the phrase denotes so much more.



To our team, the underlying message behind “girl powered” represents women’s priceless role in STEM; it represents projects spearheaded by women and advancements in the disciplines of science, technology, engineering, and mathematics developed by them. As a team that embodies the very phrase, we feel compelled to continue the fight to follow our passions for STEM, even as the minority demographic in the field. We strive to set an example for other girls and help abate their fear of the male-dominated STEM environment. We hope to inspire other girls to discover the joy of learning science, technology, engineering, and mathematics, just as we have.

CREDITS:



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Authors: Doy, Kashvi, Munira, Yaahvei
Team: 6546W