

“Our Secret Power”

Sandpiper Hexperts – Team 2014F

Sushant & Supriti Bhopale, Vishal Garimella, Shayla & Monika Mukerji



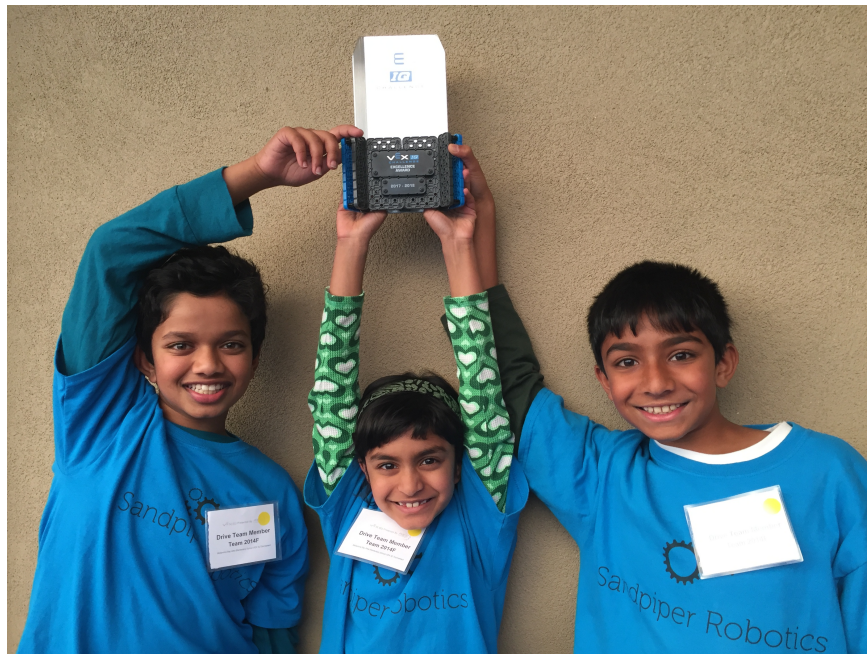
“Oh, no!” exclaimed Supriti, turning to Shayla and Monika. “What do you mean; you can’t make it?” Our first tournament was at Bellarmine, and now we faced the prospect of having only three of us attend. “We’ll really miss you, but we’ve worked hard to this point together, and I think we can make a good showing,” said Sushant. We had worked very hard for months – meeting weekly for hours, modifying our robot design, improving our programming code, revising our STEM project, and regularly documenting our progress in our journal. “Well, like the Warriors, it’s always next man (or woman) up,” chimed in Vishal, who often added pithy, basketball references. Interestingly, other than robotics, basketball is what our team enjoys doing together. After nearly every robotics session, and following our team cheer, we trudge off to the “court” on our mentor’s, tree-lined street and shoot some hoops – a great way to bond and freshen our minds to return back to robotics.

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But, we are digressing. Let’s zoom into the Bellarmine tournament. As each award was given in the spacious auditorium, we sank deeper into our seats. “I just don’t think this is our day,” Supriti grumbled. “We are still very proud of how you performed,” consoled our mentors. “And the Excellence Award for elementary school goes to...” boomed the announcer and waited for what seemed like an eternity to finish his sentence. The air felt heavy with tension. “Team 2014F!” “Yes!” cried out Vishal, jumping up from his seat, knowing that we had punched our ticket to State’s. That moment still feels like a blur, like we were walking on air, even if for just a few minutes. The only thing that would have made it more special would have been to have Shayla and Monika there too.



Winning the Excellence Award at Bellarmine

We are Team 2014F, The Sandpiper Hexperts, consisting of one, fourth grade girl (Supriti), fifth grade, twin girls (Shayla and Monika) and two, sixth grade boys (Vishal and Sushant). Sushant and Supriti competed in VEX World’s last year. This is the first year of

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robotics for Shayla, Monika and Vishal. Because of the diversity by grade, gender and

experience, each person brings a special perspective to our team.

What is our secret power? Diversity of ideas, perspectives and skills is our strength. While we all do the work together, we find that assigning work leaders by interest makes sense. Sushant leads the building process, Supriti leads programming, Vishal leads driving, Shayla leads building our STEM prototype robot, and Monika leads STEM outreach to the community. We all have our areas of expertise, but cross-contributions have ultimately made us successful.

All five of us have diverse viewpoints, whether in suggesting game strategy, choosing a STEM project or modifying the robot. We do not believe that you have to be a girl to embrace the “Girl Powered” perspective. For our team, “Girl Powered” means actively listening and respecting each person’s diverse contribution, regardless of age, gender or experience level. Our team tries to create an inclusive environment, which makes working together more enjoyable.

Consider our first meeting in August, when we discussed game strategy. “We should have a robot that can fling the rings onto the post,” suggested Vishal. “That could be unpredictable,” argued Monika. “Why not hoard all the rings and then sort them by color?” proposed Sushant. “But that could take too much time, and remember that we achieve the highest number of points with a uniform tower,” reminded Shayla. “Why don’t we take the rings off the three, side pegs, since they are already uniform?” suggested Supriti. Everyone agreed.

The way that we strategized our STEM project shows how diversity strengthens our team. Initially, each of us brainstormed ideas separately, and then we shared our thoughts.

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Monika suggested researching robotics in mosquito control, Shayla wanted to focus on recycling, Vishal was intrigued by the ethical issues involved in creating video games, Sushant suggested focusing on robotics in surgery, and Supriti wanted to study innovations in medicine.

Rather than making an uninformed decision, our mentor instructed each of us to set up a field trip or interview regarding our area of interest. As a result, we made field trips to the Recology Recycling Plant, Kaiser’s Garfield Innovation Center and Crystal Springs Upland School (CSUS). We also interviewed experts: Dr. Huan Phan at Intuitive Surgical, Dr. Craig Eldershaw at Verily, Shruti Krishnagiri at Garfield Center, and Dr. Chris Schoberl at CSUS.



Recology Recycling Plant

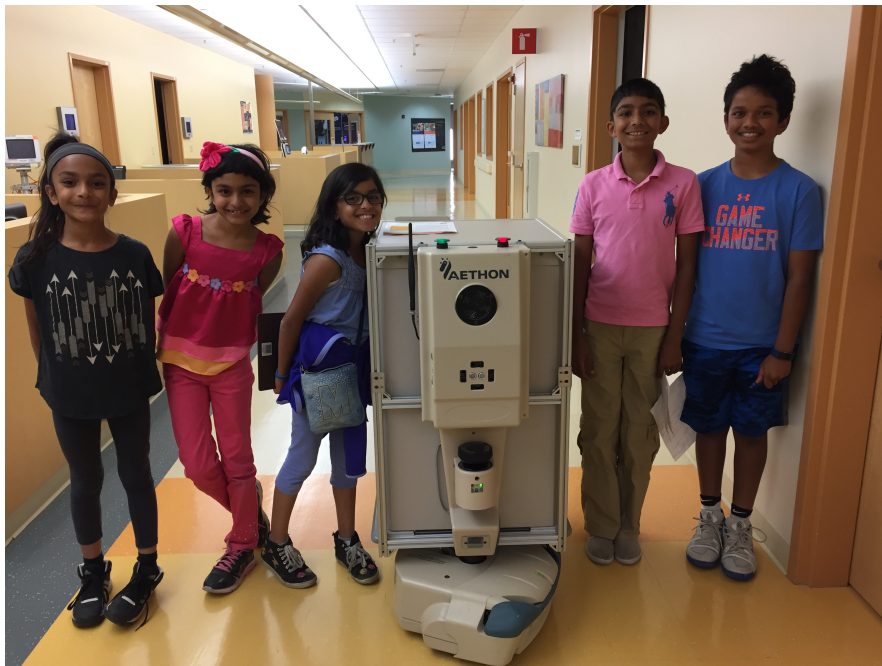
After surveying our options, we focused on the ethical issues surrounding robots in medicine, sparked by our Garfield Center visit. There, we observed three robots: Relay

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(delivery robot), Tug (delivery robot), and a Facetime robot that allowed doctors to be virtually present in the hospital, checking remotely on patients from home.

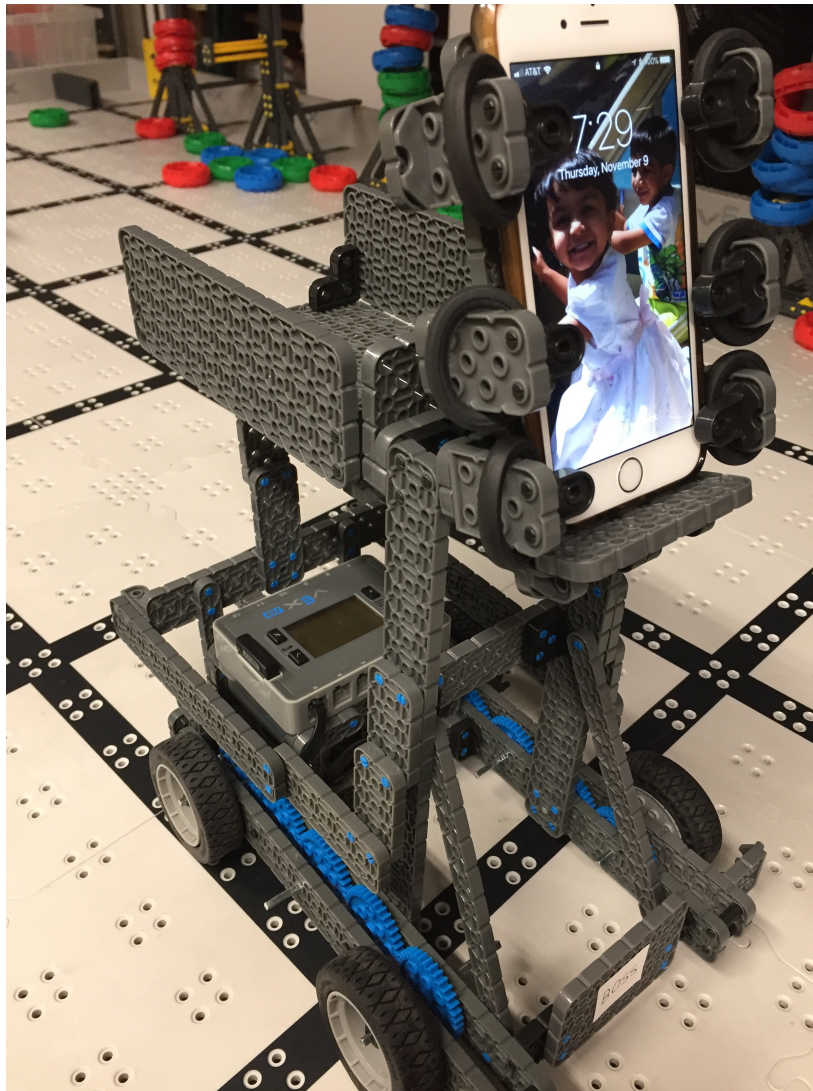


Robots at Garfield Center

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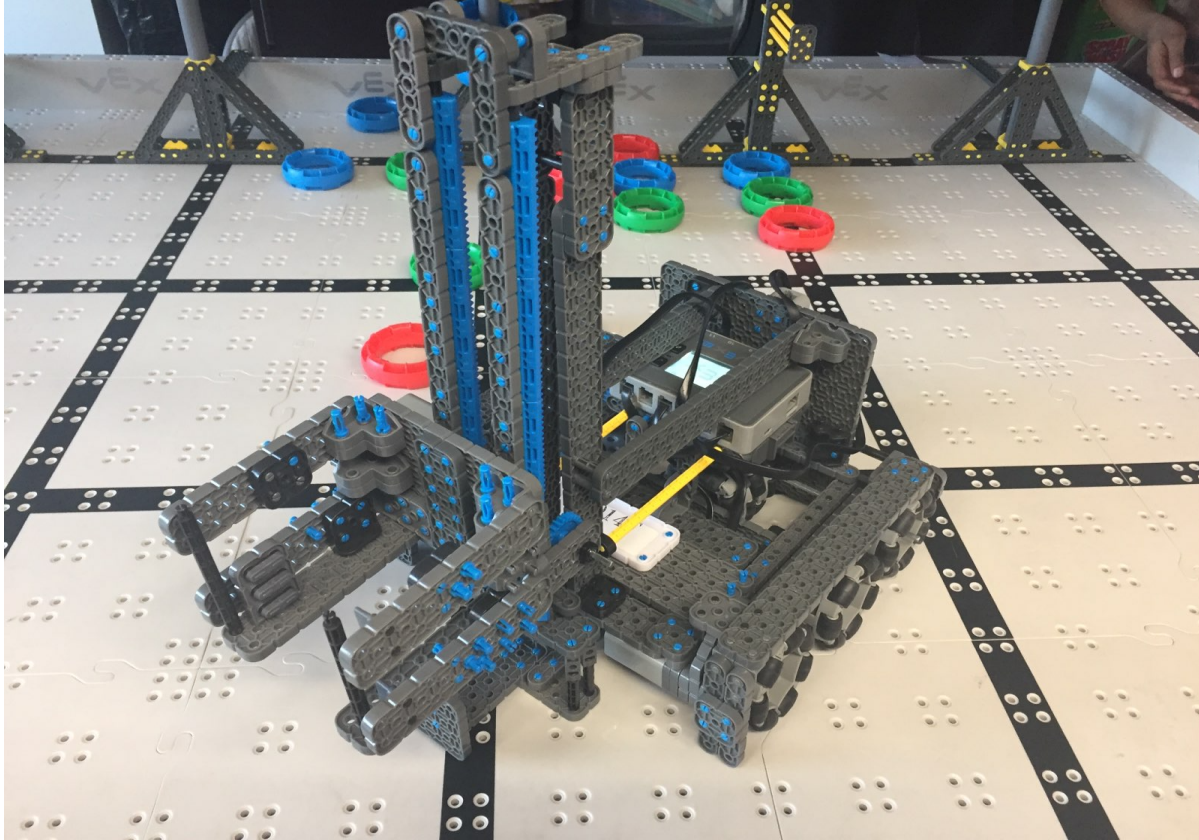
BOSS Prototype

Ultimately, however, we concluded that Facetime robots used by doctors to check-in remotely with their patients could be adapted for other uses as well, such as to help sick students keep up with their schoolwork. This led to our creation of the robot prototype, “BOSS, Being Out of School Sick.” In our STEM project, BOSS uses Facetime and travels from class to class, simulating the pattern of the student who is at home sick, allowing the student to interact in real-time with his/her teachers and classmates.

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Tension Claw

Our diverse viewpoints also helped in robot design. “I’m stumped,” Sushant said dejectedly. “The claw on our robot is too heavy and unreliable in grabbing the rings.” “What if we use tension to capture the rings?” suggested Supriti. There were a few murmurs, and then Vishal spoke up. “The claw would require excellent, driver skill because it has to be lined up exactly. What if we try grabbing the rings from the top?” he argued. “True, but with driver practice we can eliminate that problem,” Shayla responded. “Also, we would need to use a motor to grab from the top, and we are already using five motors,” Monika said. “Alright, let’s try it!” Vishal agreed.

Trial and error has been our mantra. In fact, we have found that with five team members, using different combinations of members in building and driving has been very

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successful. At times, we have split up by gender to build some aspect of the robot. More

often, though, we mix and match team members, especially in driving practice, so that

everyone gets a chance to work with each other. Not only does this help team bonding, but

we have also found that this mixing has resulted in the best ideas emerging.

That is how we created our tension claw and eventually created three of them, which we call the “three pointer,” to carry all nine rings off the uniform pegs on the side of the field and deposit them onto the towers. With our new design and strategy, we expect to score 125 points consistently and make a return trip to VEX World’s!

How does the Hexperts’ story end? How do they perform at State’s? Do they make it to Louisville again? Stay tuned, as you hear the Hexperts cheer in the background:

“Let’s go Hexperts; let’s go! Ringmaster!”



Garfield Center field trip – pictured with Shruti Krishnagiri

Credits: “Our Secret Power”

The Sandpiper Hexperts, Team 2014F

(Monika Mukerji, Supriti Bhopale, Shayla Mukerji, Vishal Garimella, Sushant Bhopale)