

“We don’t build robots, we build a future”

Our team can seem like a contradiction. A team of seven years that seems rookie in its enthusiasm. A small team with a big passion. Yet team 4817 is a unique team shaped by unique circumstances. We were the first and still are the only FRC team in Singapore and one of two FRC teams in Southeast Asia. After years of building up a FIRST infrastructure in our school from scratch, we have updated our mission statement. FIRST is not an individual challenge -- FIRST for all is an integral part of our team’s mission and as FRC pioneers in Southeast Asia; we aim to spread the spirit of FIRST within our region.

The key to our newfound success is engaging and inspiring the community around us through our deep knowledge of the FIRST community. Outreach can come in many forms. Some elements are to expand FIRST in the region, while others are to expand FIRST in our school. No form of outreach is too small. We view every student we’ve impacted as tremendous progress. Our progress is marked by our investment in long-term initiatives that we trust will have an incalculable impact in the future.

Our regional outreach is extensive, and we’re just beginning. This year, we’ve mentored seven FLL teams, volunteered at the local FLL tournament, and contacted the local FLL organization about its expansion - an effort we’ll continue to pursue in the coming year. We’ve also focused on expanding the FRC program in our region. We’ve helped representatives at the Muhammadiyah 2 Cilacap School from Central Java, Indonesia who are looking to start the first FRC team in Indonesia. In recognition that FRC starts at the grassroots level, we are actively engaged in involving the broad STEM community. Due to the lack of a local FTC presence many budding robotics enthusiasts are left with no clear pathway once they grow out of the FLL program. Our FRC demonstration at the local FLL tournament gave kids who might otherwise drop robotics a reason to continue with FIRST. Furthermore, we are working with local organizations to establish an local FTC program in the upcoming years.

The next part of our outreach effort is engaging our local community. We’ve focused on robotics not as an insular activity but as something that can bring people of all backgrounds together. Recognizing the value of rookie inspiration and the power of a crowd, we put out a suggestion box to help us find new design ideas. We have also streamlined our efforts on bringing robotics to our school. In just six years, we have grown from an inexperienced after-school club of five students, to now over 100 students enrolled in 5 classes, and even more students coming in after-school to work on a variety of projects. Despite the lack of an official Middle School robotics program, we have coached a Middle School FLL team and connected them with experts to equip them with design, programming and presentation skills.

Furthermore, we recognize that the best thing we can do to promote FIRST in our region is to be positive role models and inculcate the values of gracious professionalism. There’s a inclination to insulate ourselves and hide design ideas for the sake of preserving competitive advantage, but we take the opposite route. We share the events of every meeting with the larger community, keeping them up-to-date with live engineering notebook entries published on our website. To ensure our robots exemplify engineering principles, we place preliminary design and safe lab practices at utmost importance.

We’re also not afraid to ask for help. Wonderful mentors from our sponsors at the McLean Robotics Institute and Singapore American School have helped us explore and push beyond our limits. We connected with Woodie Flowers Award winning mentor Tony Bertucci from Team 418 in Texas for technical assistance. We’ve also had the privilege to share our work with distinguished guests like Mr. Paul Andersen from Bozeman Science, Doug Parker from nuTonomy and James King from i.am.

We remember what it was like to be a rookie team years ago. It's been a long journey since then, and we've amassed vast knowledge through the guidance of our sponsors and communities. We're highly cognizant of the fact that in our region, many schools don't have as many resources that we do, and local sponsors have a number of interests competing for funding. It's critically important for rookie teams that they are structurally enabled. Thus, One Degree North is creating a database of resources to help rookie teams build efficient devices starting with our Engineering Notebook, which allows the community to see our problems and solutions in real time.

With such a small team, building institutional knowledge is always a challenge. One Degree North members focus on utilizing our collective creative potential for our more comprehensive aims. Training new members is crucial to ensuring the sustainability of our team and helps take us further towards our goal of FIRST for all. To ensure that all team members, veterans and rookies alike, have the opportunity to be involved with all aspects of the team, we publish daily engineering notebook entries on our website. Our website serves as both a promotional platform to keep our sponsors in the loop and a sustainable knowledge platform. As an upperclassmen dominant team this build season and growing rookie group, we are taking steps to ensure the longevity of our FRC team and its mass of knowledge. We plan to hold our first ever off-season build challenge this year, giving younger members a chance to gain hands-on experience in all facets of robot creation.

Our major strength is derived from our mentors and veteran students. They are responsible for cultivating our team dynamic; they have created a precise balance of engaging, caring, and mentoring while inculcating a deep culture of independence. Our team upholds FIRST's values of gracious professionalism and cooperitition by emphasizing the importance of strong working relationships between students and mentors alike. Alumni members often join our build and planning sessions to give advice and mentor younger students. Veteran team members lead rookie members towards independence by equipping them with the skills needed to build a successful team. Mentors provide guidance to team members by exposing them to real-world application and perspectives. They adhere to a hands-off policy, empowering students to make final calls on team decisions.

There are pros and cons to having such a small team, but to us it signifies that our core group is super committed. Instead of a traditional team hierarchy, we are sure that we recognize the opinions of all our team members, and we all contribute to each area. At the same time, we also strive to grow our robotics program through traditional open houses and presentations at the annual International Club Fair.

Outreach makes us ask ourselves a difficult question: what does FIRST mean to us? FIRST is about robotics, certainly, but there are many robotics tournaments. FIRST is different. It's about preparing a generation of students to think deeply and innovate under varying circumstances and still maintaining fundamental principles of courtesy, sharing and outreach. It gives students an opportunity to integrate mind with hand and apply what they have learned in a classroom setting to the real world.

Part of helping Singapore expand robotics is changing a culture that values theory over experimentation and does not see the importance of hands-on and project-based learning. The attitude of robotics as a second-tier activity is a perception that we have to fight constantly. It's an uphill battle, but we're seeing progress. We must remind people that principles learned in the classroom are useless until their altruistic application.

We have written about our status alone in the Southeast Asian region, but we hope that next year we can write that we are one of three, four, five teams until the region is saturated with the kind of FIRST energy that we've tried to create that that's no longer a distinction. We come

to Sydney representing a region of potential engineers, innovators and FIRSTers, but in our challenges we've realized there needs to be a unique impetus for change in Singapore. Our team is exactly that. We've already had an immeasurable impact on robotics in Singapore, and we're just getting started.

So why should we be considered for the Chairman's Award? It's true that our outreach efforts may not match a team with countless more years of experience, but our outreach is unique in the sense that we're working from scratch in a community of intrinsic obstacles. We have surmounted enormous obstacles and are now ready to share our success with others, as our FIRST spirit demands. We stand with inspirations like Winston Churchill in a gleaming hope that "this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning." We are proud to stand in pride as a small team from a small country with a big hope.