

Chairman's Award - Team 4613

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2020 - Team 4613

Team Number

4613

Team Name, Corporate/University Sponsors

AARNet/Innovation First International/BirdDog&Barker College

Briefly describe the impact of the *FIRST* program on team participants within the last five years.

Many alumni have gained prestige within the engineering community. Oliver Nicholls is a great example, winning \$100000 AUD in ISEF (the largest pre-college science competition) with a window cleaning robot. A programming scholarship was given to Sean Zammit at UNSW due to his skills learnt in FRC, many alumni become mentors not only within Australian, but overseas, with students learning not only robotics skills, but marketing and business skills through the many facets of FIRST.

Describe the impact of the *FIRST* program on your community within the last five years.

The Redbacks have positively impacted the community since its inception. In 2017-19, Redbacks presented at EduTech, the largest education conference in the Southern Hemisphere. The Redbacks team have played a large part in cultivating iSTEAM at Barker, a STEM based subject with over 100 participants. 4613 regularly host robotics presentations, such as those at Chatswood PS, Catholic Education Office and STEM nights.

Describe the team's methods for spreading the *FIRST* message in ways that are effective, scalable, sustainable, and creative.

4613 achieves real connection with global teams. In 2018 we hosted Chinese students in our lab for 2 weeks during build season. Our students & mentors provided guidance to design and manufacture their robot through intensive trainings. The integration of Brazilian interns from 1772 into 4613's team structure during 2019, fostered dynamic growth between our teams. We build deep and quality relationships with all teams we partner with, focusing on longevity and continued impact.

Describe examples of how your team members act as role models and inspire other *FIRST* team members to emulate

The FIRST ethos has not only impacted our students but is emulated through their actions outside of the program. One of our alumni is currently participating in outreach & mentoring in China, while another has created the programming library ARACHNE & held workshops for local teams in FRC code. We mentor local teams in programming & instill our Junior School's FLL teams with a passion for STEM & the values of gracious professionalism that is continued throughout their FIRST participation.

Describe the team's initiatives to help start or form other FRC teams

In 2018, 4613 made history when it independently started the first FRC team in South Africa, 7523, and has mentored them ever since, through visits in build seasons as well as online video chats. During the 2016 and 2018 season 4613, alongside 1772 started Brazilian teams 5800, 6902 and 7033. Over the last 5 years, alongside international teams to start up & mentor numerous rookie Chinese Teams in China. In Australia we also helped start up 6510 & develop the skills of 5876.

Describe the team's initiatives to help start or form other *FIRST* teams (including Jr.FLL, FLL, & FTC)

4613 has provided the opportunities associated with FIRST to around 100 K-9 students across 6 FLL and FTC teams, making robotics available to students of all year levels at our school. Robotics has now become a compulsory subject in our Junior School, with students being taught critical skills that inspire FLL and FTC participation. Each team has regular mentoring from 4613 mentors and students, & this system allows participants the opportunity to move through the FIRST experience.

Describe the team's initiatives on assisting other *FIRST* teams (including Jr.FLL, FLL, FTC, & FRC) with progressing through the *FIRST* program

4613 has assisted the FIRST community through its various projects and workshops. Redbox, a legal FRC gearbox, has made it easy for many teams to build a functional robot. ARACHNE, a FIRST coding library, has allowed teams to program their robot. Redbacks have held many workshops for local teams such as 6510, 4802 and 5876 on mechanical, pneumatics and programming, many of which are published online for the whole FIRST community.

Describe how your team works with other *FIRST* teams to serve as mentors to younger or less experienced *FIRST* teams (includes Jr.FLL, FLL, FTC, & FRC teams)

Over the period of 5 years, 4613's students have travelled to China and mentored younger or less experienced teams, providing crucial advice from all aspects of robotics. We also mentor rookie Brazilian and South African teams through online chats on Discord. In 2016-17 we hosted a mentor call weekly to help assist young teams nationwide. At Barker, mentors assist FLL and FTC students of varying ages at least twice a week through their build seasons.

Describe your Corporate/University Sponsors

Robot Part Manufacturer: IFI School: Barker College Charity: CUYRA (Chinese NGO) Industrial Supplier: Blackwoods Automation Supplier: Rockwell Automation, Treotham, IGUS, Computer-Aided Design: SOILDWORKS Equipment Supplier: Direct Automation Material Supplier: AllPlastics Media Supplier: BirdDog

Describe the strength of your partnership with your sponsors within the last five years.

Our sponsors enable us to reach our fullest capabilities through provision of parts and products for our robots and outreach projects, whilst in turn gaining positive brand image through corporate-social responsibility. IFI has allowed our team to provide free shipping for Australian teams, balancing the playing field between Australia and the world, saving costs of up to ~\$35000. AllPlastics helped provide us with the resources available to create Redbox.

Describe how your team would explain what *FIRST* is to someone who has never heard of it

FIRST aims to not only create a new league of innovators and engineers, but to deeply instil moral in all its participants, through sportsmanship, teamwork and Gracious Professionalism. Through its multiple programs and cleverly calculated gameplay, students grow and evolve through a love of robotics, while learning the design process, building techniques and crucial computer skills which will prove most helpful in the workplace, all while developing lifelong friendships along the way.

Briefly describe other matters of interest to the *FIRST* judges, if any

4613 strives to bring originality, brainpower and innovation to FIRST, by making our ideas reality despite adversity, and to expand upon ever-growing young minds. We struggled to design a double climb compatible with this years game, but we did. We struggled to design and code a reliable and powerful shooting system with vision tracking, but we did. We struggled to wrap our heads around coding swerve modules for the first time, but we did. At 4613, we strive to learn through difficulty.

For FRC teams older than 5 years, briefly describe your team's broader impact from its inception.

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Team Captain/Student Representative that has double-checked this submission.

Austin Caie

Essay

FIRST inspires the generation of today to be the ones that change the world of tomorrow. Through our involvement in FIRST programs we, the Barker Redbacks, have been forged into constant innovators, who aspire to greater heights and seek to recharge the next generation of STEM professionals. Our projects raise the bar both in Australia and around the world, and empower teams, communities, and countries, to develop STEM capability through FIRST.

From simple beginnings in a mentor's garage, the Barker Redbacks began in 2013 in Australia, a country with no existing regionals and teams you could count on two hands. From 2013-15 we hosted the off-season Duel Down Under competition, run by 3132, and teamed up with our sponsor AARNET to stream it online, which was an immediate success reaching hundreds and quickly starting to grow local Australian FIRST. Annually, we've run a Week 0 scrimmage for Australian teams, that allows them to practice on our half-field in a competition environment. Through such events, as well as the workshop, part manufacturing, and tool lending services we've made available to our local community, we've directly aided teams like 4802, 4739, 5876, and 6510, in growing their respective FIRST presence in their local communities.

At our school, we have created an integrated FIRST progression that incorporates 250 students each year, from Grades 5-12, who participate in two FLL teams, four FTC teams and 1 FRC team. By taking charge of the STEM culture at our school, we prompted the iSTEAM course to be introduced, which sees hundreds of students take part in it every year. In 2016, our school extended our reach to support Indigenous Australian students by providing them with quality education at an affordable cost. Alongside this initiative, we have organised STEM/Robotics workshops for these students which we hope to have instilled into them the value of discovery and innovation.

In Greater Australia we saw teams with the passion and drive to create competitive robots being restrained by the expense of shipping parts from international suppliers. So in 2016 we subsidised the cost of shipping robot parts for all Australian teams, and in 2017 onwards, in partnership with our sponsor IFI, we extended this to completely eliminate all transport costs. This made robot parts the same price here as in the USA. In one year, we saved Australian teams approximately \$35,000 AUD, prompting IFI to create a base here that has, and will continue to, similarly assist for years to come.

In 2015 we joined an international coalition of experienced teams, with the aim of bringing FRC to China through the country's first off-season event then known as the China Robotics Challenge (now RCC). This involved senior members of our team who travelled there running design, strategy, mechanical and programming workshops. Over the five years we have taken part, we have helped innumerable teams, spending a cumulative eleven weeks in China directly assisting more than 50 rookie teams. As a result of our participation in this international competition, China held its first official FRC regional in 2017, which we were also able to attend.

In the middle of the 2018 Build Season, we continued to grow this relationship by hosting a group of students from two Chinese schools at our campus. During this period, students developed the skills they needed to independently design and build their own robots under our instruction, returning to China not just as more knowledgeable students, but as mentors equipped to further spread their experience to the communities around them. These students have since independently formed teams 6941 and 7586 due to our guidance and support. In 2019 one of our alumni travelled to China to mentor the first all female FRC Team Mulan (7529) in China, working with them for seven weeks and attending their competitions overseas. With his guidance the team was able to win the Rookie All Star Award. Additionally, he provided workshops and assistance to five other local teams. The teams that we help are not temporary projects, they are long-standing relationships characterised by unwavering help and support. We are thrilled to see how our partnerships in China have charged them with a desire to participate in FIRST and STEM programs.

We also saw in Brazil that many of their teams had become inactive due to the lack of a national competition following the Global Financial Crisis in 2008, leading to a halt in the creation of new teams, restricting the spread of FIRST in Brazil. We therefore set our sights on reinvigorating FRC in South America, creating Magic Island Robotics (5800) in a partnership with The Brazilian Trail Blazers (1772) in 2016, the first new Brazilian FRC team since 2009. We care deeply about maintaining our relationships with both of these teams, who we have continued to support with mentor assistance, part supply, team member hosting, and on-site assistance to this year. This relationship resulted in us sponsoring the travel of Dean's List winners from 1772 to FIRST Championships in 2015/17, the transportation of their Kit of Parts in 2016/17 and us supplying them with at least \$20,000 worth of tools and equipment, which have been used to run over 20 robotics workshops annually across Brazil. In conjunction with 1772, we have now started up an additional two Brazilian teams, STRIKE (6902) and Roosters (7033). The teams we created have proven to be secure and self-sufficient, all gaining sponsorships with our assistance. 5800 and 6902 have since won the Rookie-All-Star award, and 6902 has won Rookie Inspiration at Championship.

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In the 2018 off-season we saw there were still no FRC teams on the entire African continent. We saw this as a clear opportunity to spread the FIRST message to a new audience and make a significant contribution to our global dynamic. So in South Africa we created, mentored, and found sponsors for, SpringBots (7523), the continent's first FRC Team. We provided workshops to teach the SpringBots technical skills in the mechanical, electrical, and programming subdisciplines. We have donated and constructed parts for building their robot and found them a sponsorship with DOW to subsidise the cost of participating in FRC. In partnership with 1772, we sent a mentor to give the team on-site assistance during the build season. In addition to travelling to support 7523 on African soil, we provided advice as well as guidance to ensure that they were well-prepared for the 2019 build season. Through the formulation of student-made workshops, and a constant online presence to answer any questions, we helped the team to program a functioning robot during build season. Due to our assistance, 7523 attended the Southern Cross Regional in Australia after we helped them set up their Australian visas, and won the Rookie-All-Star Award as well as Rookie Inspiration at the FIRST Championships.

In 2019, The SpringBots met the president of South Africa, Cyril Ramaphosa, and presented at the State of the Nation Address, reaching hundreds of thousands of people across the country.

In 2018, we took another opportunity to grow strong international connections, when we visited the Qatar FIRST Global team. We participated in their team meetings, providing guidance, insight and advice on robot construction as well as in general FIRST operations - its competitive nature as well as its values.

Aware of the global lack of resources to help teams program, we volunteered to partake in the FRC 2019 Control System Beta Test, and ran an Open House to explain the new development system. We've also published our programming workshops yearly online attracting hundreds of views from teams globally.

Every year at our school's annual prize-giving night, attended by upwards of 2,000 people, we provide a robotics demonstration. We presented at our local Chatswood Public School to over 200 students, and at the Catholic Education Office's Professional Learning conference where we taught 19 staff to build and program robot kits. We give, and have given, these talks at countless STEM-focused nights at our school each year. We have also given these talks to organisations such as Probus to extend our reach to the older generation as well, assisting them in getting involved in STEM activities even in retirement.

At EduTech (the largest education conference in the Southern Hemisphere with more than 10,000 attendees) every year since 2017, we have given a presentation about robotics and FIRST. This has introduced the program to thousands of educators who have brought the program back to their schools all across Australia.

We've also built a significant online presence, with our yearly "Robot Reveal Videos" attracting over 190,000 Youtube views from members of the public across the world. Mentioned by many high-profile news organisations such as The Daily Telegraph, the Sydney Morning Herald, SBS, and the ABC, we've broadcast the constructive work that our team vision has accomplished since its inception. SBS has discussed how we prepare students for the 'jobs of the future', and the Sydney Morning Herald has talked about the groundbreaking work of our alumni.

From our inception we have held, attended, and started STEM and FIRST events that have reached thousands across Australia and the World. By starting, and continuing to support, self-sufficient teams in Brazil and South Africa, by facilitating the growth of teams in China, and by removing shipping costs for Australian teams, we have shown people everywhere what it truly means to be part of an international FIRST program. Using FIRST, we have reached our local and national communities, through events and large showcases respectively. To infinitely recharge the world with STEM, we know that we need to instigate sustainable change in many places and levels. We hope you agree that this is what we've done, and will continue to do, well into the future.