

Chairman's Award - Team 4613

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2019 - 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 with special emphasis on the 2018/2019 year and the preceding two to five years

Our alumni have attained extraordinary STEM achievements: Oliver Nicholls won over \$100,000AUD & the top award of ISEF (the world's biggest pre-college science competition) for his window-cleaning robot, Alastair Pilley is mentoring & upskilling FRC teams in China, & Sean Zammit received a programming scholarship at UNSW. Our students lead projects such as the REDBOX (FRC-compatible gearbox shipped to over 14 countries), & 3 of our alumni have become technical mentors in our team.

Describe the impact of the *FIRST* program on your community with special emphasis on the 2018/2019 year and the preceding two to five years

As a result of 4613's invigoration of STEM at Barker, the college has introduced elective iSTEM in Years 9-10, attended by >80 students. In 2018 4613 held robotics presentations at Chatswood Public School & the Catholic Education Office conference. We also presented at EduTech (the Southern Hemisphere's largest education conference) & hosted STEM competitions at Barker (2017-2018). This year, one of our mentors is also mentoring 6510 in strategy.

Team's innovative or creative method to spread the *FIRST* message

4613 achieves real connection with global teams. Last year we hosted Chinese students in our lab for 2 weeks during build season. Our students & mentors provided intensive training and guidance to design and manufacture their robot. In 2019 we provided Brazilian students from 1772 with internships in our team, integrating them into our team structure and fostering dramatic growth. 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

Our students apply lessons learnt in *FIRST* to life outside of the program. One of our alumni is currently participating in outreach & mentoring teams in China, while another has created the programming library ARACHNE & held workshops for local teams to simplify FRC coding. We mentor local teams (5573, 5876, 6510) in programming skills & on-field conduct, & instil our Junior School's FLL teams with a passion for STEM & the values of gracious professionalism in workshops twice a week.

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

Last year, 4613 independently formed the first ever FRC team in South Africa & provided assistance in their development. In 2016 we set up/mentored Brazilian team 5800 with 1772, & during late 2018, we worked with them again to form 2 new FRC teams in Brazil. We support the supply of parts to both 1772 & 5800. We have worked alongside international teams to start up & mentor numerous rookie Chinese Teams in China for the last 4 years. 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 encourages *FIRST* in all its forms. *FIRST* programs are now available at our sponsor school from Prep through to Year 12. Over the last 3 years 4613 has introduced over 200 Junior School & 150 Middle School students to Jr.FLL, FLL & FTC. 4613 students & mentors assist these teams twice a week during their respective build seasons. On a larger scale, we have been involved in the foundation & on-site assistance of *FIRST* Global teams across the world, such as Qatar, Brazil & South Africa.

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

4613 provides an abundance of programming & mechanical assistance. We have milled parts for 3132, 4729, 4739, 6510 & 5876, held mechanical/pneumatic workshops for 4802, 4739, 5801 & 6510, & more. We also reduced the shipping costs of *FIRST* parts by \$35,000 for all Australian teams. We have sponsored the travel of 2 Dean's List winners from team 1772 to attend championships. Last year we visited Qatar, mentoring their *FIRST* Global team, & keep close contact with & fund KoPs to Brazil's 1772.

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)

For the last 4 years 4613 students have travelled to China & mentored 3 new Chinese grassroot teams, providing essential mechanical & programmatic advice. We are also in daily contact with Brazilian & South African teams through the Discord platform to ensure their success during build season. From 2016-2017 we co-hosted a weekly mentor call across Australia to assist less experienced teams. At Barker, our FRC students teach pupils in Years 5-6 FLL & Years 7-8 fundamental robotics twice a week.

Describe your Corporate/University Sponsors

IFI (Robot Part Manufacturer), Barker College (Our School), CUYRA (robotics NGO in China), Blackwoods (Industrial Supplier), Rockwell Automation (Automation Supplier), Treotham (Automation Supplier), IGUS (Automation Supplier), Solidworks (CAD Software), Autodesk (CAD Software Supplier), Direct Automation (Equipment Supplier), AllPlastics (Material Supplier).

Describe the strength of your partnership with your sponsors with special emphasis on the 2018/2019 year and the preceding two to five years

4613 works closely with sponsors, who benefit from brand exposure, personalised promotional materials & invitations to events. They give parts & provide guidance for *FIRST* outreach projects. We hosted state-level STEM competitions at our school for the last 2 years. We saved teams ~\$35,000 through the free delivery of FRC parts from 2016-17 through our partnership with IFI. At EduTech we promoted sponsors such as IFI in our presentation. AllPlastics supplied Polycarbonate & Acrylic for REDBOX.

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

FIRST is a non-profit organisation that aims to inspire a new generation of scientists & engineers through its core values of teamwork, creativity, ingenuity & gracious professionalism. Through 4 different competition levels, students solve problems, & design & build robots to tackle unique challenges. The time-pressured competition environment encourages the learning of technical skills in a team setting, building individual confidence & thereby producing our future thinkers & innovators.

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

Team 4613's mission is to bring our ideas into reality & to challenge our thinking with out-of-the-box, innovative solutions, reinforcing their mental strategies. We strive at all moments to develop our minds in *FIRST*. When we want a climber capable of supporting a robot, we challenge ourselves to think up a solution. When our vision tracking isn't quite working, we challenge ourselves to identify the problem & fix it. We are all about learning to use our minds in STEM.

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

Declan Zammit

Essay

FIRST represents the aspiration to make a change in the world. Since the beginning of our history this aspiration has swept us from Australia, as a rookie team trying to find its place, to countries and cultures all across the globe. We mentored teams in China; we breathed life into FRC in Brazil; and last year we created the first African FRC team. This is the story of our journey.

At the time of our team's formation in 2013, FIRST did not run any official FRC competitions in Australia. Existing teams had to travel overseas to participate in competitions. Recognising this obstacle, we asked our school to provide the venue for the only Australian off-season competition at the time, Duel Down Under (DDU). 3132 did a great job running the event which we continued to hold at our school until 2015. We were happy with our contribution; the first FRC competition was held in Australia as a direct result of DDU's success. It raised the question - as a newcomer to FIRST what more could WE do? Since 2016, we have hosted and run an annual Week 0 scrimmage for Australian teams. By allowing local teams to play mock matches on a half field complete with game pieces and elements, we give 'real-game' experience before regionals. Teams also get the chance to refine their autonomous routines on a precisely measured field, which improves competition across the board.

By this point, however, we had begun to look for ways to spread the FIRST spirit overseas and not just within our own national boundaries. In 2015 we joined an international coalition of experienced teams with the aim of bringing FRC to China, with the advent of the country's first offseason event: the China Robotics Challenge (CRC). Before and during the event, senior students from our team assisted rookie teams by providing mechanical and programming workshops. 4613 students and mentors have returned each subsequent year since 2015 to grow the success of this partnership, spending a cumulative 9 weeks in China helping out more than 50 rookie teams. We taught attending teams the technical skills to build a robot, the competition skills to succeed under pressure, but more importantly the value of gracious professionalism. As a direct result of this widespread initiative, China held its first official FRC regional in 2017. In 2020, Chinese teams anticipate up to 4 FRC regionals throughout the country. We are thrilled to see the growth our partnerships in China have brought.

We have continued to grow our relationships with Chinese teams by hosting a group of students from 2 Chinese schools at our campus in the middle of the 2018 build season. Students under our instruction during this period developed the skills they needed to independently design and build their own robots. They returned 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 independently formed teams 6941 and 7586 due to our guidance and support. This progressive increase in teams is indicative of the solid foundation for FRC that we have helped establish in China and demonstrates the thoroughness with which we treat our international partnerships. The teams that we help are not temporary 'projects'; they are long-standing relationships characterised by unwavering help and support.

Back in 2016 we created such a partnership with Brazilian team 1772 in order to create 5800, the first new Brazilian FRC team since 2009. Although there were FRC teams in Brazil, most 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 and restricting the spirit of FIRST in Brazil. We therefore set our sights on reinvigorating FRC in South America. To ease the transition into the FRC build season, we machined 5800's chassis design during build season 2017 and sent it over to Brazil for the addition of specialised mechanisms. We care deeply about maintaining our relationships with both teams, whom we continue to support by giving mentor assistance, supplying parts, instructively hosting team members, and travelling to provide on-site assistance. During 2015 and 2017, the team sponsored the travel of Dean's List winners from 1772 to FIRST Championships in America. We also funded the transportation of the Kit of Parts to both 1772 and 5800 in 2016-17 and supplied them with at least A\$20,000 worth of tools and equipment, which they have use to run over 20 robotics workshops across Brazil annually. Our contributions have had far reaching impact. In conjunction with 1772, we have now started up 2 additional Brazilian teams: 6902 and 7033. Both teams have now attained sponsorships with our assistance. The teams we create are secure and self-sufficient; both 5800 and 6902 won the Rookie All Star award at regionals, and 6902 proceeded to win Rookie Inspiration at Championships in Houston.

In Australia, teams with the passion and drive to create competitive robots were inhibited by the expense of shipping required parts from international suppliers. So during 2016 we subsidised the shipping costs of robot parts to Australian teams, so that teams could obtain vital parts more affordably. Since the cost was still a significant obstacle, in 2017 we completely eliminated all transport costs of robot parts in partnership with our sponsor IFI to teams all around Australia. With our team funds, we completely covered the import fees, taxes, and local delivery costs - which meant that parts were now at the same price as those in the USA. In total, this initiative saved Australian teams approximately \$35,000 AUD. It also prompted our parts supplier to acknowledge the need for locally sourced parts in Australia and create a base here, establishing an important and long-lasting impact that will assist Australian teams for years to come.

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In 2018 we visited the inaugural FIRST robotics team in Qatar, creating another international relationship which we value strongly and will follow closely into the future. We participated in their first team meeting and used our experience to provide valuable guidance of what to expect from the FIRST Global competition season, spending time giving workshops and advice to the newly formed team.

We leverage our growing influence and passion for FIRST by giving our actions a voice at large conferences and presentations. Every year at our school's annual prize-giving night, attended by upwards of 2,000 people, we provide a robotics demonstration and explanation of our achievements. In 2018, we presented at Chatswood Public School to over 200 students, and at the Catholic Education Office's Professional Learning conference we taught 19 staff to build and program robot kits. The team gives similar presentations at annual co-curricular and STEM-focused nights hosted by the school, and for interested organisation such as Probus. In 2017 and 2018, we were honoured to represent robotics and FIRST at EduTECH, discussing FRC at the largest educational conference in the Southern Hemisphere which has over 10,000 attendees. We have featured in articles promoting engineering and STEM in one of the most reputed newspapers in the country, the Sydney Morning Herald. We have also appeared on 2 mainstream TV programs with SBS and ABC, advocating robotics education. By giving robotics a voice, we hope to inspire others on a global scale with an enthusiasm for engineering that first captured our imaginations almost 7 years ago.

That's why at the end of 2018 we looked to Africa. FIRST had spread all over the world; however 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 the global dynamic of FIRST. So last year, after searching through four targeted countries in Africa, we created, started up, mentored, and found sponsors for the continent's first FRC team 7523, the SpringBots from South Africa.

In Africa, we provided workshops to teach the SpringBots technical skills in mechanical, electrical, and programming subdisciplines. We have donated and constructed parts for building their robot and found them a sponsorship to subsidise the cost of participating in FRC. We furthermore sent a mentor in partnership with 1772 to give the team on-site assistance during the build season. But in addition to travelling to support 7523 on African soil, we have provided careful and dedicated advice and guidance to ensure that they are well-prepared for the 2019 build season. Students have used an online chat in providing programming assistance to the new team. Through the formulation of student-made workshops, and a constant presence online to answer any questions, we have helped the team to program a functioning robot during build season in preparation for competition. Due to our assistance, 7523 will be attending the Southern Cross Regional in Australia this year. We have helped to set up the team members' Australian Visas. In just under a week (from the submission of this essay), the new team is going to meet the president of South Africa, Cyril Ramaphosa, and present at the State of the Nation Address 2019. It is hard to imagine a more transformative experience for students our age halfway across the world.

FIRST gives young people the power to realise their dreams and ambitions, but it gives teams the power to spread that spirit and passion all over the world. Through FIRST's programs, the Redbacks have instigated change not only in our own backyard, but for hundreds of different people dotted across the globe. And our journey has only just begun.