Chairman's Award - Team 4253

Print Close

2021 - Team 4253

Team Number

4253

Team Nickname

Raid Zero

Team Location

Taipei, Taipei Special Municipality - Chinese Taipei

Describe the impact of the *FIRST* program on team participants within the last 3 years. This can include but is not limited to percentages of those graduating high school, attending college, in STEM careers, and in *FIRST* programs as mentors/sponsors.

FIRST has developed within our members a perennial passion for STEM and a spirit of service. 48% of our students are enrolled in STEM electives, 100% graduate every year, and 99+% of our team veterans pursue a career in STEM. Our alumni have also enrolled in top STEM institutions, such as MIT and Stanford, later joining major companies like NASA and Google. All our students, alumni, and mentors have played a vital role instituting FIRST in Taiwan and continue to spread the FIRST message.

Describe your community along with how your team addresses its unique opportunities and circumstances.

As the founder of the FIRST community in Taiwan, we were especially disheartened when the 2020 Science Park Taichung Regional, the first ever FRC regional in Taiwan, was canceled due to COVID-19. Yet, we remained committed to our mission of advocating STEM, volunteering as referees, inspectors, judges and CSA's at what became the Science Park Taichung Pilot Regional where we used the opportunity to share our love of robotics and grow alongside the 30+ teams we helped start throughout the years.

Describe the team's methods, with emphasis on the past 3 years, for spreading the FIRST message in ways that are effective, scalable, sustainable, and creative. How does your team measure results?

In 2019, the mayor of Taipei sent teachers and principals from 11 local schools to visit our lab and learn about our STEM-centric curriculum, hoping to emulate our system in their own institutions. We have also helped start 38 FRC teams as of 2021, running nationwide workshops and scrimmages in our lab to help these teams bloom. Video calling international teams in India, Vietnam, and more, we also provide rookie teams the resources they need to kickstart their own FRC programs.

Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.

As leaders in Taiwan's FIRST community, we have led customized training and workshops, volunteered to run official off-season FRC events, and have been a central point of information for all local teams. All 38 teams on the island always have access to our support and advice through our Facebook group FRC Taiwan, and our facilities through scrimmages and tours we host. We have been connecting with local vendors, manufacturers, and importers to make available FRC components to all teams.

Describe your team's initiatives to Assist, Mentor, and/or Start other *FIRST* teams with emphasis on activities within the past 3 years.

In 2018, we ran a 2-day intensive FRC camp with the government teaching 22 teams the basics of robotics. In 2019-20, we staffed the first off-season and official regionals in Taiwan as volunteer (head) referees, (lead) inspectors, CSA's and judges. We offer resources, advice and facilities to all 38 local FRC teams year round. We've advised local FLL teams at STEM promotion centers, mentored FTC teams in our lab, and formed 18 FLL explore informal teams through our HS Robotics Mentoring course.

Beyond starting teams, what initiatives have you done to help inspire young people to be science and technology leaders and innovators? What results have you seen from your efforts in the past 3 years?

We run customized workshops tailored to individual team's needs: we have taught numerous rookie teams the basics of CAD, prototyping, and mechanics, while teaching advanced pneumatic and electrical systems to more experienced teams. Additionally, our gender-balanced team models true inclusion and inspires everyone to become future STEM leaders. As a result, the STEM community in Taiwan nurtures a love for science and technology and celebrates inclusivity.

Describe the partnerships you've created with other organizations (teams, sponsors, educational institutions, philanthropic entities, etc.) and what you have accomplished together with emphasis on the past 3 years

Partnering with the Central Taiwan Science Park (a government org.) since 2018, we promote STEM in Taiwan through various workshops and competitions. Since 2019, we have collaborated with the Compass Alliance to provide free Chinese translations of FRC manuals and resources to teams worldwide. In 2020, we partnered with several past Chairman's award winners to host a livestream, the 24 Hours of STEM, in which we presented global speakers, sharing the plethora of opportunities that STEM offers.

Describe your team's efforts in the past 3 years to promote equity, diversity, and inclusion within your team, *FIRST*, and your communities.

4253 has been a gender-balanced team throughout the past few years as a result of collaborating with Girls in STEM and Girl Up for internal outreach, emphasizing that STEM is for everyone. Our close collaboration with the Taipei First Girls' High School has also allowed us to set a precedence for the Taiwanese FIRST community to follow, shattering traditional gender norms and advocating gender equality in STEM.

Explain how you ensure your team and the initiatives you have created will continue to run effectively for the foreseeable future

Our connections with Taiwanese and international FRC teams will only grow in the future as we expand our service to all corners of Taiwan and the world. Via close collaboration with the government, we will continue to play a chief role in hosting nation-wide FIRST events and in spreading STEM education by sharing our experience with local institutions. We will also maintain our online platforms, such as the FRC Taiwan Facebook group, to provide necessary assistance to all teams at any time.

Describe your team's innovative strategies to recruit, retain, and engage your sponsors within the past 3 years

Raid Zero is financed completely by the Friends of TAS, an organization established by the school and supported by our community. Parents, faculty, and alumni come together to support us in a STEM-centric environment, with many of our sponsors coming from a technological background. In return, we display our endeavors to them through tours of our program and facilities. Without the need for external funding sources, we focus on persuading the gov. to sponsor other underfunded local teams.

Highlight one area in which your team needs to improve and describe the steps actively being taken to make those improvements.

Retaining new members and institutional knowledge have been our two biggest challenges. Our rapid working pace often overwhelms many underclassmen every year, discouraging them from committing to the team. To combat this, we founded our junior team Raid One last year to provide underclassmen experience without the high pressure of the varsity team. To preserve institutional knowledge too, junior members shadow division heads throughout the season to prepare for leadership in subsequent years.

Describe your team's goals to fulfill the mission of *FIRST* and the progress you have made towards those goals.

Driving the STEM revolution in Taiwan through independent efforts and government collaborations, we have raised awareness about the importance of STEM education and empowered youth to pursue STEM. We have created an emerging FIRST community of 38 FRC teams (as of 2021), influenced the Ministry of Education to dedicate $10M to a FRC facility called the Central Taiwan Science Park, and established a new FRC regional □ the Science Park Taichung Regional □ in Taiwan.

Briefly describe other matters of interest to the *FIRST* Judges, including items that may not fit into the above topics. The judges are interested in learning about aspects of your team that may be unique or particularly noteworthy.

4253 is at the center of Taiwan's FIRST community as the accessible central source of information and resources,

available to assist all 38 teams at any time. Furthermore, our team consists of unique members with various strengths and backgrounds; there is a place for everyone no matter their origins of music, sports, debate, and more. In our team where diversity is appreciated, and together, we celebrate STEM and shatter traditional norms in the Asia Pacific to create leaders of the future.

Essay

OBJECTIVE ZERO

As the first FRC team in Southeast Asia, Team 4253 "Raid Zero" shook the foundations of education in the East. Overturning traditional norms of standardized testing, we are leading a STEM revolution that values hands-on, collaborative learning. Our Objective Zero is two-tier: (1) inspire communities with STEM education and (2) build a sustainable ecosystem for FIRST to thrive.

OUR TEAM

Our modest genesis is formative to our mission. In 2012, 12 students and our mentor, Matt Fagen, gathered in the school's basement storage room and created a robot out of a metal bed frame, going on to win the Rookie All-Star Award at the Hawaii Regional, and unknowingly sparking a movement that has since produced 38 FRC teams and a new Science Park Taichung Regional in Taiwan! In a mere 9 years, our team grew from 12 students to over 150, winning our 8th blue banner last year and punching our ticket to World Championships for the 6th consecutive time.

Our accelerated growth has resulted in the formation of our junior team Raid One last year where younger students can garner experience and let their imaginations run wild without the high-stress of the varsity team. We anticipate our new system to further promote curiosity and challenge, ultimately empowering us to reach novel targets every year as per our limitless ambition.

Divided into six subdivisions - mechanical, design, electrical, programming, statistics, logistics, and outreach - we maximize efficiency while ensuring generational retention of knowledge through preseason training sessions led by veterans. Currently, our team has a 50-50 gender split from rookies up to the leadership team, derived from years of active outreach in collaboration with Girls in STEM. Inviting Middle School (MS) girls to the lab and introducing them to the machines and competition robots, we break gender norms of STEM as a traditionally male-dominated field.

SCHOOL SCIENCE & ENGINEERING INITIATIVES

Energized by our passion for robotics, our school's Robotics & Computer Science (CS) department has grown from 2 to 9 members including 2 shop-techs, an administrative assistant, and several faculty members with PhDs in their respective fields that teach 18 courses totaling 24 different sections. Our school community raised $10M to replace our dilapidated basement room with a six-story robotics facility: the Tech Cube. Unveiled in 2019, this building provides 4,380 square meters of facilities including an amphitheater with "tinker and maker" spaces on the Elementary School (ES) floor, a VEX arena and robotics design lab on the MS floor, and a high-performance computer lab, fabrication shop with state-of-the-art equipment, and a full-sized FRC field on the High School (HS) floors!

Our ES and MS students are exposed to STEM at a young age with course offerings ranging from Digital Literacy to Physical Computing. Working with introductory coding programs like Scratch and Tynker as well as educational devices like BeeBots, Ozobots, EV3's, and VEX Robotics, they develop the basics of quantitative problem solving.

On the other hand, our HS students have access to college-level courses where they learn artificial intelligence, quantum computing, and virtual reality (VR). In 2013, our school became the first in the region to introduce a Robotics & CS graduation requirement. As a result, more than 48% - four times the mandated percentage - of HS students are currently taking either a Robotics or CS class every semester. Last year, we launched a new Robotics Mentoring course, the first cross-institutional course of its kind in which HS students mentor ES FLL and FLL Jr. teams, cultivating an early enthusiasm for STEM and linking our common love for STEM across the school.

PROMOTING STEM ACROSS BORDERS

Our aim to expand STEM consciousness traverses our school walls to entire cities and nations.

Under close collaboration with the government, we are at the forefront of the development of STEM education in Taiwan, where it has been sorely undervalued. STEM education has never been more imperative in our modern day society, and the priorities of the Taiwan Ministry of Education finally reflect that mindset as a result of our unabated championship.

In 2019, we hosted 31 teachers and principals sent by the mayor of Taipei and demonstrated our robotics program as a model for STEM education. We also welcomed 11 schools - potential rookie teams for the 2020 FRC season - to our lab to teach them about STEM curriculum development and extracurricular activities like FIRST and VEX Robotics.

Cutting across physical borders, we co-hosted a virtual festival last year celebrating STEM called the 24 Hours of STEM in collaboration with several other past Chairman's award winners. Through inviting inspirational speakers and FIRST veterans from around the world to speak, we were able to galvanize an interest towards STEM among students of all ages and nationalities. In one particular talk, we hosted an Indian FRC team that shed light on female experiences in STEM in an environment that critically discourages women from participating in traditionally male disciplines.

Furthermore, we aspire to cultivate long-term success for new teams around the world. We have partnered with the Compass Alliance in offering multinational support systems to teams by providing guidance, sourcing sponsors for domestic teams, and providing free, published resources for teams around the world. Translating the FRC game manual among other guides into Chinese, we tear down the daunting language barrier that impedes many Asian teams from fully engaging in FIRST. Moreover, we supplied over 2000 USD worth of components including a kit base to a newly formed team in Vietnam who had import difficulties at Kick-Off.

FIRST IN TAIWAN

Over the past decade, we have achieved a sustainable environment for FIRST to thrive in Taiwan, chiefly through close collaboration with the government.

As a result of our relentless advocacy to broaden FIRST opportunities to all, the government has acquired a full-time staff for FIRST to oversee FRC and robotics events in the country. A generous budget was also set aside dedicated to helping underfunded schools create STEM programs. Additionally, the Ministry of Education has dedicated a $10 million FRC facility named the Central Taiwan Science Park (CTSP) to robotics. This unprecedented facility serves as a beacon for Taiwan's FIRST community - a symbol of a changing educational culture in Asia.

Through various eye-opening events we hosted with the government - such as the first ever FRC workshops in Taiwan - local students discovered a world where they can dream without constraints, inspiring school administrators to initiate FIRST programs at their respective schools.

After planting the seeds of fascination towards FIRST, we actively helped teams bloom by assisting rookie teams to hit the ground running. We provided intensive training to 22 new government-sponsored FRC teams in 2018 during the "Robot in 2 Days" Camp, where we designed an "everybot" with locally accessible materials, organized lists of tools and materials needed from government sponsors, and guided every single team through the entire building, wiring, and programming process.

In February 2018, we aided rookie teams at the Power Up Off-season Regional in Taichung. Returning to the same venue in August 2019, we staffed the Taichung Off-season Regional for 19 teams, with our mentors, alumni, and even members filling critical roles like (head) referees, (lead) inspectors, CSA's, and judges. Our members also volunteered as mentors and helpers to teams that needed assistance during the event, helping teams overcome obstacles they encounter during competition.

In 9 years, we went from being the only FRC team in Taiwan to one of 39. Our direct influence in expanding the FIRST community here resulted in the first ever regional in Taiwan (Science Park Taichung Regional) in 2020, only to be compromised by the COVID-19 pandemic. Former FIRST President Don Bossi himself even visited our school in 2019 to witness the extensive contributions we made to FIRST Robotics and to attend the commitment ceremony for this new regional. Despite our hopes smothered, we immediately offered help to CTSP at what became the 2020 FRC Science Park Taichung 5G Pilot Regional, once again volunteering as essential administrative and advisory roles.

With the completion of the six-story Tech Cube in 2019, we immediately made it our base to further spread FIRST to Taiwan's budding STEM community. Through inviting teachers and students from all over the island, we have intently advocated robotics and FIRST programs through leading workshops for rookie teams on rapid prototyping, an introduction to pneumatics and electrical systems, and advanced CAD and programming. We have also organized workshops on team management and scrimmages to equip teams with know-hows and on-field experience.

Government organizations like CTSP continue to frequently communicate with us to seek support in initiating new programs and hosting events. Additionally, we strive to create a sustainable support system in the Taiwanese FIRST community through our creation of the FRC Taiwan Facebook group and frctw.com in collaboration with other local teams.

In a region where educational institutions and academic pressure stifles creativity and reinforce learning by rote memorization, Team 4253 has overturned age-old cultural attitudes towards education. From introducing Taiwanese students to the FIRST experience to seeing them flourish in our first regional competitions in Taiwan, we not only feel immense pride, but even greater motivation to bring the joy of STEM to a larger public, breaking any physical or cultural

borders that may exist. Chiseling at the system, we continue to etch a future where generations of students can engage in the unparalleled experiences of STEM.