

FIRST Impact Award - Team 5449

2025 - Team 5449

Team Number

5449

Team Nickname

Prototype

Team Location

Beijing, BJ - China

Describe the impact of the *FIRST* program on team participants within the last 3 years. Think about percentages of those graduating high school, attending college, in STEM careers, leadership skills, and serving as mentors/sponsors in *FIRST* programs.

Skills: Conducted technical courses (CAD, programming, etc.) for new members (1 to 15), led by experienced team members. Delivered 15 STEM lectures for underprivileged students and local primary schools. 2 youth mentors each season. Future: 100% university enrollment, 90% pursue STEM programs at Duke, UCB, CMU, etc. Graduates apply skills at Google, Apple, Amazon, Tencent, etc. 3 alumni remain as team mentors.

Describe your community along with its unique opportunities and circumstances. Think about your geographic region, diversity of town/school, language barriers, socioeconomic barriers, and cultural expectations.

Team 5449 operates in Beijing, a city abundant in academic resources and competition. A quarter of China's top 30 universities are located here. Mentors from local universities offer technical support. We've shared this mentorship model with 3 other teams. Local students rarely engage in hands-on projects due to academic pressure. Team 5449 supports over 10 FRC/FTC teams in our city. We assist schools in establishing new teams, currently founding 5.

Describe the team's methods, with emphasis on the past 3 years, for spreading the *FIRST* Mission in ways that are effective, scalable, sustainable, and creative.

5449 is transforming education in China, where hands-on projects are scarce due to Gaokao pressures Team Impact: 90% of members experience hands-on projects for the first time at 5449, and 85% set life goals/career choices post-joining Aiding engineering programs: hands-on engineering projects for physics Olympic teams every year Social Welfare: In partnership with a major student-run organization, 5449 has educated 200 underprivileged students in STEM online, inspiring them to go to college

Describe your team's goals and the progress you have made towards them to fulfill *FIRST's* Vision.

Goals: make science and technology become the first choice for students - Present: ranked top3 in school clubs, involved in every club activity in school, making science & tech the most popular major choice in college for students in our school - Future: 91% of alumni work for top technology companies (e.g. Google, Tencent), 5 established their own technology companies, 3 participated in rocket launching in USC

What impact has your team seen from your efforts described in the above question? How does your team measure impact?

Assistance: 20 teams that built robots based on our open-source robotics won awards at 2025 FTC qualifiers, and 4 became champions Internal: Team 5449 grew from 15 to 40 members. Robotics club reached 200 students, gender

ratio improved to 4:1 City Impact: Helped establish 5 new FRC/FTC teams Media: Featured in "The Little Teenager" doc with 27M views. Interviewed by Beijing and Hunan TV (Top media in China) . Invited by FRC 9085 Brazil for "Harpy Travel" series, showcasing our team on YouTube
Please provide specific examples of how your team and team members act as role models within the <i>FIRST</i> community with emphasis on the past 3 years. How do you share these best practices with other teams?
Our initiatives showcase Gracious Professionalism in FIRST support: As the oldest team in our country, we've operated for 11 years We are the first Chinese team (first 10 globally) to join the FTC 2025 OpenAlliance, influencing 20+ teams through ChiefDelphi, with 4 teams winning championships (e.g., 16095, 21981) Supported 2024 FRC China Offseason with practice fields. Hosted 2025 FTC Beijing Scrimmage and workshop for local team collaboration, and promoted local workshops (e.g., FTC 20827)
Describe your team's initiatives to Assist, Mentor, and/or Start other <i>FIRST</i> teams with emphasis on activities within the past 3 years.
In FIRST, we offer global support: Team members contributed in 2024 FGC Team China and won the world championship Founded new teams with funding and tech help (e.g. FRC 10214 FTC 28119) Direct tech aid & CNC machining services to local teams (e.g. FRC 10558 FTC 12527 16095) Innovated tech for international teams (e.g. FRC 1165 AZ FTC 24006 CA) Shared FTC CAD and vision code on Chief Delphi, impacting 20+ domestic teams (e.g. 20827 21981) Hosted local FIRST workshops and scrimmages for ~10 teams
What other initiatives have you created, grown, sustained, or participated in (<i>FIRST</i> or otherwise) to help inspire young people to be science and technology leaders and innovators? What outcomes have you seen from your efforts in the past 3 years?
On campus at RDFZ, China's top high school: Robotics club: Top 3, showcased at school's club festivals to 4k students, on-campus robotics (e.g. rehabilitation robot/garbage transportation robot), hosted Maker Carnival & AI creator week School courses: Taught robotics, offered FRC/FTC classes to recruit members. Off-campus: Monthly STEM/FIRST lectures at 3 schools to boost interest STEM subject education online for minority area Outcomes: ~200 club members, 4 new FRC/FTC school teams in our city
Describe the partnerships and relationships that you've created with other organizations (teams, sponsors, educational institutions, government, philanthropic entities, etc.) and what you have accomplished together, with emphasis on the past 3 years.
5449 expands reach through partnerships: -Collaboration enterprise & institutes: visit and internships (DJI, Tencent, Chinese Academy of Sciences, Peking University) -Sponsorship model: Secures 150k CNY sponsorship annually, hosted "AI creator week" with NVIDIA (e.g. share products, lectures) -Middle School Maker Campsite: Offers free summer camp through Beidou Space and Time Company -Government Cooperation: "Beijing Robot Golden Peng Club", a paradigm club for middle schools in the city
Describe your team's efforts in the past 3 years to promote equity, diversity, and inclusion within your team, <i>FIRST</i>, and your communities.
5449 promotes diversity and inclusion within STEM by: -Gender equity: balancing the gender mix of the team from 15:1 to 4:1 -Girls of Steel: collaborated with FRC 3504 to establish an all-girls FTC team -Prototype for special: Inspired hearing-impaired children with STEM and FLL introduction activities in our lab. -Minority Leadership: team captain from minority areas for the past 3 years -Left behind children: educational aid for STEM subjects to left-behind children
Explain how you ensure your team and the initiatives you have created will be sustainable.
5449 implements sustainability through our team structure and programs: -Foundation classes at school: veteran students teach new members, fostering a sustainable cycle of knowledge -Student-run robocamps: mastering a robotics summer camp for free to companies each summer -Social welfare program: cooperating with the largest

student-managed social welfare organization in our city(introduces 200 kids aged 5-14 from minority or poverty areas to STEM subjects every year)	
Highlight one area in which your team needs to improve and describe the steps actively being taken to make those improvements.	
As a team both involved in FRC & FTC, we find it hard to coordinate between two programs. We continue to address this through: -dividing work: members voluntarily choose the parts of each project they wish to be responsible for - Project management board: subteams use shared documents to mark events, goals, deadlines for the whole team to see -Subteam meetings dedicated to reflection: every member shares feedback and suggestions -Surveys: receive anonymous feedback on & resolve issues on the team	
Briefly describe other matters of interest to the <i>FIRST</i> 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, particularly noteworthy, or had a large impact.	
5449 is a role model in school, city, and nation: -the first club conducted school-level elective classes teaching various robotics classes -Shared club's story "Love and Perseverance" to 500+ on school public day -Hosted 5 city congress representatives, 100 teachers from national tech conferences -Represents our school for the visit of educational inspectors from British Wellington School, featured on their paradigm bulletin -The video of our Robocamp has been used in FGC 2025 opening video	
Judge Feedback	
	In the selection of the FIRST Impact Award, do you value the breadth of influence (e.g. the number of people covered) or the depth (e.g. changing individual cognition or behavior) more? What's your suggestion for our team to balance the priorities? An area the team has an opportunity to improve. Something that really impressed the judges.
Essay	

We inspire, We innovate, We impact At Haidian, the "Education Center" in Beijing, the FRC team 5449 is formed by students from The High School Affiliated with Renmin University of China, a model and benchmark in STEM education. For 14 years, we have redefined STEM education by combining rigorous technical skills with unwavering inclusivity. We are not just a robotics team; we are architects of dreams, breaking down barriers for students who once saw engineering as out of reach. Guided by FIRST's principles of "Gracious Professionalism" and "Coopetition," we have transformed classrooms into innovation hubs, auditoriums into STEM laboratories, and stereotypes into opportunities and challenges. This essay will document how we turn sparks of curiosity into global impactful flames.

Team Structure - Empowering Students Through Collaboration At the core of Team 5449 lies a student-driven ecosystem where passion drives purpose. Our 49 'members are divided into three specialized groups, each contributing to our success. The Programming group specializes in autonomy, coding robots to navigate intricate challenges with precision, leveraging JAVA and visual programming for peak performance. The Structural group brings designs into practice, transitioning from CAD modeling to hands-on assembly. Beyond technical innovation, the Media and Outreach group extends our impact beyond competitions—securing sponsorships, producing documentaries, running social media campaigns, and forging partnerships with national media to amplify our impact.

Mentorship - Aligning as a Catalyst Behind every success are mentors like Mrs. Su and Mr. He. As esteemed Woodie Flowers laureates, Mrs. Su navigated bureaucratic hurdles to secure funding for international competitions, laying the foundation for our global aspirations. Meanwhile, Mr. He, a talented mechanical engineer, transformed our lab into a hub of creativity and innovation. Both two mentors are professors at prestigious universities, providing research skills and experience, influencing the coach alignment for other teams. Their

dedication is tireless: even late at night, they are refining strategies, sending updates, and offering advice as we prepare for competitions. Beyond the technical rigor, they foster a sense of family, hosting pizza nights and gatherings to strengthen our team bonds. “Prototype Architects” - A pass-on credibility We track progress through shared digital boards, where members mark milestones like “Autonomous Code Finalized” or “Sponsorship Proposal Approved.” As “prototypers”, we are never fulfilled with our achievements and actively forge ahead, looking forward to setting iterations, upgrading robots and thriving the team. Based on this team spirit, attendance isn’t mandatory—it’s an active commitment. “When I miss a meeting, I feel like I’m letting my team down. We’re all in this together” is what we often say. Being part of the team, the spirit always carries on and spreads on the campus.

Community Impact - Our aspirations On campus, we are ranked top1 in school STEM clubs, involved in every club activity in school, making science & tech the most popular major choice in college for students in our school. The 91% of 5449 alumni now work for top technology companies worldwide (e.g. Tencent, Google, Apple, Amazon), 5 established their own technology companies, 3 participated in rocket launching in USC. Through unwavering commitment and a culture of excellence, Team 5449 has not only shaped the future of STEM at our school but also propelled its alumni to leadership roles in top tech industries and groundbreaking innovations worldwide. Outside school, we bridge gaps and inspire futures. Team 5449 has become a portal to STEM education. In 2024, we partnered with Orange College, a student-led NPO, to deliver monthly online robotics courses to 200 children in remote provinces like Guizhou and Xinjiang. To further expand access, we launched the Robotics on Campus program, shipping Arduino-based kits to 50 schools nationwide, sparking curiosity and hands-on learning in electrical engineering. Also, being the Jinpeng Technology division club of robotics, we participated in the Beijing Science and Technology Week and provided training to primary and secondary school students in the city, receiving recognition and acknowledgment from the Beijing Government. Beyond virtual education, we actively bring STEM to life through large-scale local events. We have organized three inter-school STEM festivals, where over 1,200 students from 15 schools competed in coding challenges and robot races. Our impact extended to the 2025 China qualifier season, where 20 teams built award-winning robots using designs from our open-source Chief Delphi posts—five of them claiming championship titles. To strengthen the local robotics community, we hosted the 2024 FTC Beijing Scrimmage and an interactive workshop, inviting 10 teams-ranging from rookies to veterans-to foster collaboration, share expertise, and promote sustainable STEM initiatives beyond competition. Even more, our trained team member was selected to be the Team China representative in FGC 2024, winning the first place. Granted, participating in FRC, a skill-required and fund-demanding competition, 5449 takes the initiative to devote to assist local teams (e.g. 10214, 10558) with full-practice fields, mechanical equipment, and management experiences. To challenge gender stereotypes, we founded an all-female FTC team, creating an inclusive space for girls in robotics. Our female-led FTC team secured 1st place at the 2024 FTC Shanghai Qualifiers. Beyond competition, we mentored 30 middle school girls through weekly workshops, inspiring the next generation of female engineers. Seeking a global perspective, our collaboration with a Chinese video streaming platform Bilibili on the documentary The Little Teenager became a cultural trend, garnering 27 million views and sparking nationwide discussions on youth innovation and perseverance. The documentary captured the authentic journey of our team—whether it was students troubleshooting code at 2 AM, refining their engineering solutions under pressure, or celebrating victories with tears after each intense match. We have produced a similar documentary for FRC 9085’s TV program Harpy Travels that had debut on YouTube in 2024. These moments resonated deeply not only with the FRC community but also with aspiring young innovators across the country. The documentary amplified our team’s aspirations to impact, serving as the most powerful publicity we have ever received. It attracted new talent while fostering a greater influence for robotics education.

Innovation - A Transformation from Lab to Social Impact In partnership with Beijing Traffic School, we designed our modular rehabilitation robot to address a critical healthcare gap, introducing interchangeable modules for upper and lower limb training that reduced production costs by 60% and enabled simultaneous use by four patients. Tested at Beijing Union Medical College Hospital, it received surprising reputation. The project earned us a national patent and recognition from the State Intellectual Property Office. Beyond healthcare, we built a garbage-transferring robot that significantly improved garbage-transporting efficiency on campus, helping us filing 3 other patents. Overall, we embraced open-source innovation, publishing our FTC and FRC robot’s CAD designs as well as vision code on Chief Delphi, leading to adoption by over 20 teams globally, including FTC 20827, 21981, 24006 from Shenzhen to LA. We also hosted 30 live coding webinars to help FGC teams worldwide, drawing a thousand viewers from Egypt to Argentina. A mentor from Team 1165 (Arizona) remarked, “Your transparency elevated the entire FIRST community.”

Strengthening the STEM ecosystem further, we secure 150,000 CNY annually from sponsors like NVIDIA, providing GPUs and CUDA based training systems for machine learning in visual programming; Stanley, our reliable sponsor, donating tools for our building and assembly; and Limelight, our new alliance from Chief Delphi. Partnering with startups like TechBridge, we co-developed a VR robotics simulator, enabling students without lab access to practice virtually. By transforming laboratory innovation into real-world impact, we are advancing healthcare, education, and global collaboration in STEM. Sustainability - Leading Us Toward Future Peer-to-peer learning is at the core of our sustainability efforts. The FRC robot club on campus established the very first student-led courses. At the same time, alumni like Borong Xu, a senior software engineer, returns annually to mentor, reinforcing a cycle of knowledge-sharing. "Teaching here reminds me why I fell in love with robotics," he shared. Beyond the classroom, our student-run initiatives expand STEM accessibility—hosted Robocamps train over 200 children annually, with 30 scholarships awarded to low-income families in 2024. Our alumni network remains strong, with 100% of graduates attending top universities (Duke, UC Berkeley, Tsinghua) and 90% pursuing STEM careers, while 3 alumni continue to mentor, ensuring long-term guidance. Looking ahead, we aim to establish 10 new FRC/FTC teams across China by 2027 and launch national STEM equity funds to support robotics education in rural schools. By cultivating mentorship, accessibility, and innovation, we are building a sustainable future for STEM in China and beyond. With every patent we file, every student we mentor, and every barrier we break shows the 5449 motto: to ignite curiosity, build futures, and ensure that FIRST's flame burns brighter for future generations. Again, being prototypers has not only impacted our mindset, but embedded the spirit into our lifestyles. Team 5449 creates a lasting impact, empowering diverse voices in STEM and proving that robotics is not just about technology—it's about transforming lives.;

