

FIRST Impact Award - Team 8393

2025 - Team 8393

Team Number

8393

Team Nickname

The Giant Diencephalic BrainSTEM Robotics Team

Team Location

Baden, PA - USA

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.

BrainSTEM builds STEM programs where traditional education falls short. Over our 10+ year history 100% of members have graduated, pursued STEM-related degrees, and launched careers at leading companies in tech (e.g. Amazon), robotics (e.g. Astrobotic), research (e.g. Bettis Nuclear), healthcare and start-ups. They are committed to FIRST—one was a 2023 Dean's List Winner, another leads Penn State's Ri3D club, and many return to mentor and fund programs that break barriers for the next generation.

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.

Pittsburgh's industrial past has created 90+ unique neighborhoods, but opportunity isn't evenly distributed. Seeing local kids struggle to access STEM education for many reasons opened our eyes to the deeper truth that barriers to learning aren't local, they're universal. This realization drives our mission—both within and beyond Pittsburgh—building programs that break down educational, socioeconomic, medical, and geographic obstacles that prevent children from reaching their full potential.

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.

BrainSTEM is scaling STEM in Pittsburgh and beyond! We host 15+ FIRST tournaments annually, engaging 40+ corporate partners for funding, volunteers, and mentorship. We invest in international growth (e.g. Belize FLL), showcase FIRST on TV (US/International) and at industry events—expanding awareness/recruitment. But our best metrics are formerly disadvantaged students like Sree, who started on an FLL team we founded, did FTC, and now mentors teams—demonstrating FIRST's transformative power.

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

Our mission is to make STEM engaging, accessible, and intense—preparing students for rigorous, meaningful and impactful careers. We break down barriers to potential—from educational gaps (CS curricula/FLL events), socio-economic/racial divides (UPrep4Life/RAP/Westview HUB), medical challenges (Cortical Visual Impairment/Child's Reach/Ronald McDonald House), and geographical disparities (Belize/Haiti/Türkiye). We try to create pathways that turn potential into opportunity, wherever it's needed.

What impact has your team seen from your efforts described in the above question? How does your team measure impact?
Our programs have reached 6,500+ kids in the past 3 years. We have built lasting partnerships with groups like the Children’s Home of Pittsburgh, HaitiH2O, and M-Powerhouse to ensure sustainability. As a focused team, we prioritize high-impact initiatives—unlocking vision for children, planting STEM seeds in underserved communities, bringing resilience to Haiti, creating opportunity to Belize, and offering hope in Türkiye. An alchemy of ingenuity and compassion creating a brighter tomorrow.
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?
BrainSTEM inspires through action. Each member dedicates 75+ outreach hours annually. We pioneer impactful programs: teaching autistic students, creating tools for medically fragile kids, using ML to detect disease, empowering schools in Central America, funding medical teams in developing countries, and rebuilding STEM programs in earthquake-ravaged areas. Best practices get shared through global partnerships (e.g. SPARC), global conference talks (Inspire Around the Globe), and team mentorship.
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.
BrainSTEM creates and sustains FIRST teams. In 3 years, we’ve run 40 FLL events, started 4 FLL & 5 FTC teams, and mentored 16 FLL & 6 FTC teams. Our weekly scrimmages foster iterative engineering for 150+ teams, and we’ve funded 18 teams' competition costs. We’ve hosted 7 FLL-to-FTC transition camps, provided materials / train-the-trainer coaching to FIRST Belize to start 20 FLL teams, and helped introduce an FLL-based activity for PhD students at CMU—growing STEM leadership at every level.
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?
BrainSTEM programs break barriers to open opportunities. We've developed vision-learning tools for children with CVI, introduced STEM to long-term hospitalized kids, and taught CS/engineering to autistic students, inner-city schools, and kids in transitional housing. Our Univ. Prep Program, refugee STEM workshops, and free robotics camp for low-income students have opened pathways for students to explore STEM and higher education—allowing opportunity, not background, to define kids' futures.
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.
We build partnerships to amplify impact. We collaborated w/ 40+ companies at Children's Hosp. and work w/ mission-driven companies (e.g. TiER1, Bayer) to create volunteering opportunities. Nonprofit partners—M-PowerHouse, Chance to Change Lives, Biotech Board, Women in Bio, BCAP, and AACC—expand reach. With HaitiH2O, we funded a medical clinic for 252 patients, trained farmers in sustainable agriculture, launched a bakery microbusiness, and provided the first flushing toilets for 200+ students.
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.
Breaking barriers with STEM is our specialty. We worked with M-PowerHouse, PPS, Slippery Rock, PTC, and Dark Rhino Security to create a program in disadvantaged schools where students that successfully complete supplemental classes get enhanced admission to 2 colleges and guaranteed jobs in cybersecurity. The first 3 graduates started college and have 3.5+ GPAs. Other initiatives open doors for students from refugee, low-income, inner-city, and transitional housing backgrounds to explore STEM.

Explain how you ensure your team and the initiatives you have created will be sustainable.	
As FLL Regional Partner, we engage every FLL student in Western PA. Our FLL-to-FTC transition camps offer scholarships to exceptional roboticists, and rookie-only BrainSTEM FTC teams provide steep learning curves & intense mentoring. All members participate in FTC for advanced skill development. Fundraising is secured from sponsors who value investment in education over personal promotion. Community partnerships ensure programs in STEM, healthcare, & underserved communities continue long-term.	
Highlight one area in which your team needs to improve and describe the steps actively being taken to make those improvements.	
FRC's complexity requires continuously climbing new engineering learning curves! Over 3.5 years, we've made deliberate strides—dedicated summer camps, mentorship from teams like 4467, expert engineering guidance, and alumni engagement. While we've improved, build timelines and weight optimization remain challenges. We are refining workflows, optimizing material selection, and implementing design efficiency strategies to improve performance and build more competitive, world-class robots.	
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.	
We constantly strive for deeper impact. At the Children's Home, we met medically-fragile kids eager to learn but unable to use traditional tech. We engineered adaptive tools—big buttons, easy dials, and a no-touch system for Allie, who could only wave her hand—giving access to learning tools. Digging deeper, we found kids suffering from Cortical Visual Impairment and built a software tool improving visual processing integrated with our adaptive tools. Work presented at National CVI Conference.	
Judge Feedback	
	For outreach, we try to create transformative moments for children—breaking barriers, unlocking access, opening possibilities, and changing futures. In your experience, what key factors make outreach programs the most personal and lasting in impact? An area the team has an opportunity to improve. Something that really impressed the judges.
Essay	
What if the only thing standing between a child and their future was a button they couldn't press? A classroom they couldn't reach? An opportunity they couldn't afford? A dream they couldn't chase—just because of where they were born? As BrainSTEM we are obsessed with questions like these and strive to develop answers. From adaptive learning tools for medically fragile children, to education access programs for underserved students, to international outreach creating bold opportunities—our Robots Without Borders program breaks the barriers that keep children from learning, dreaming, and achieving their full potential. BREAKING BARRIERS BLOCKING CHILDREN In 2010, BrainSTEM emerged as a beacon of hope in a community lacking STEM opportunities. Starting as a small FIRST LEGO League team, we saw STEM open doors, unlock potential, and create brighter futures—fueling us to think beyond borders and dismantle the educational, socioeconomic, geographic and medical barriers that stand between children and opportunity. STEM opens doors, and no child should be locked out.	

BUSTING BOUNDARIES IN FLL

FLL introduces thousands of children to STEM, but for 70% of these teams—traditional advancement rules make this first taste also their last—one event, one shot, then it's over. That's not how iterative engineering works. That's not how learning works. So in Western PA, we built a full season of competitions, increased engagement, and became the FIRST Regional Partner. When advancement restrictions created setbacks, we adapted—creating an “all-you-can-eat” season pass for up to 20 scrimmages followed by a championship. This model, blending low-stress educational and high-intensity competitive events, transformed student engagement, was adopted by a neighboring region, and reviewed by FIRST. As a region bordering three states, we embrace inclusivity, welcoming teams from anywhere—even hosting a team from Jamaica! Robots Without Borders!

Quantified Impact: Hosted 36 FLL events (including 115th event overall). 77% of WPA FLL teams in 3+ events. Started/coached 5 FLL teams, financially supported 19 teams, mentored 10 teams, personally advised 190+ teams, impacted 1500+ students.

BLAZING TRAILS TO FTC

Of 600K FLL students worldwide, only 20% move to upper-level FIRST programs. Recognizing the urgency of this issue, we created an immersive, one-week FLL-to-FTC transition camp, equipping teams and mentors with skills in CAD, 3D printing, robotics engineering, laser cutting, fabrication, and programming. Mini-classes give hands-on instruction in materials, drivetrains components and programming. Camps culminate with an intense building challenge and competition, igniting a passion for robotics and preparing teams for success. Our camps have produced Inspire and Dean's List winners, bridged the FLL-to-FTC gap, and propelled students toward limitless opportunities.

Quantified Impact: Hosted 10 summer camps, started 5 FTC teams, trained members of 9 additional teams, helped 4 schools start HS FIRST programs, provided free camps to underprivileged kids. Won FTC FIRST World Championship (Game & Inspire Award). Actively mentor 4 FTC teams. FTC Dean's List winner.

BREAKING DOWN SOCIO-ECONOMIC/RACIAL BARRIERS AND BUILDING BRIDGES

Poverty casts a long shadow in education, limiting access to science materials, advanced math, and STEM opportunities. Determined to change this, we began teaching supplemental CS classes in disadvantaged Pittsburgh Public Schools. Discovering the transformative impact of student-led instruction, we worked with partners to evolve our curriculum into a program that provides enhanced admissions opportunities into 2 partner colleges and guarantees employment for students as well. Three grads are now in college pursuing STEM degrees and the program is expanding into RAP (Robotics & Aeronautics Program), bringing drones & robotics to inner-city STEM education.

To embed STEM in underserved neighborhoods, we built a sustainable program at WestView Hub—offering coding, robotics, summer camps, and launching an FLL team where graduates like Sree now mentor others. With Best of the Batch, we introduced robotics, trained students on 3D printers and laser cutters, and began planning a STEM camp for 100+ kids in Munhall. Work with STEM Coding Labs expands tech education for low-income families, creating new pathways where none existed.

For kids without stability, STEM isn't just a subject—it's a survival skill. It's a pathway to independence, a chance to build something no one can take away. At Auberle, a transitional housing facility, we helped children become LEGO superheroes for a day. At a disadvantaged PPS school, we launched an African-American FLL team, providing classes, mentorship, and tournament support—helping them win the New Community Award for local impact.

Quantified Impact: Taught supplemental STEM/CS classes to 50+ students, developed college/career pathway for students from neglected schools (3 grads in college), started STEM programs in multiple low-income areas, and started an award-winning FLL program for African-American students.

BLASTING INTERNATIONAL BORDERS AND HUMANITARIAN HURDLES

It wouldn't be Robots Without Borders without tackling some tough geographic barriers! Where you're born shouldn't define your future, and every child deserves the chance to pursue their ambitions. So we created hallmark programs proving how FIRST teams can dismantle barriers and expand STEM access worldwide.

In Belize, we met with school leaders and saw firsthand the challenges students faced in the Central American country. We provided 20 Spike kits for schools there, traveled to Belize City to deliver them, spoke with families, met with 150 new students, trained FLL mentors and advised FGC Team Belize as they prepared for their global competition.

In Türkiye, we partnered with FRC Team SPARC to revitalize STEM education in earthquake-ravaged Hatay, providing FLL material for displaced students and leading a robotics workshop for children with leukemia. FIRST Türkiye also named us official mentors as they launch a new FTC program.

Hoping to help children in Haiti—a country grappling with gang violence and economic instability, we spoke with experts like Rhonda Smith and committed to addressing their most urgent needs—funding a medical clinic that treated 252 patients, training 10 farmers in sustainable agriculture, helping launch a bakery, and constructing the first flushing toilets for 200 students.

Closer to home, we work with refugee communities in Pittsburgh, developing a model city-building program with Bhutanese refugees and expanding STEM learning for newly arrived families through Hello Neighbor.

BREAKING BONDAGE OF MEDICAL CHALLENGES

5.2M U.S. children are hospitalized annually, and 240M children worldwide live with disabilities. Many are locked out of learning and we've developed replicable programs using STEM to break these barriers. We helped establish a makerspace at a children's hospital providing a 3D printer/computer/instruction for kids facing long-term hospital stays. At Ronald McDonald House, we introduced STEM activity stations so siblings of critically ill children could engage with hands-on learning. "No one ever thinks about the families," said a grateful RMDH director.

Recognizing that traditional classrooms often fail kids with medical challenges, we created sensory-aware STEM classes for students on the Autism spectrum, now expanding to a full robotics summer camp.

Our work in camera vision also led to Mela-Know-More, a ML-driven melanoma detection tool trained on hundreds of thousands of images, proving how FIRST-driven skills can impact healthcare.

At the Children's Home of Pittsburgh, we met medically fragile children eager to learn but unable to use traditional learning tools due to severe motor impairment. We engineered adaptive input devices—big buttons, easy dials—even a no-touch system for Allie, a bright and determined girl who could only wave her hand. When the computer responded to her movement, she couldn't stop laughing.

Digging deeper we noticed some children weren't just struggling to interact, they were struggling to see. Cortical Visual Impairment (CVI) stole their ability to process sight, turning the world into a blur of shifting colors and disappearing shapes. These kids weren't blind, but they were locked out of learning. Working with specialists we built a software tool that trains visual processing based on salient features for hundreds of items. Useful for both clinical and home use, for the first time, parents can work collaboratively to improve their children's ability to see and

understand the world around them. The work was impactful enough that we were invited to present our software tool and adaptive devices at the national CVI medical conference, paving the way for broader adoption.

Quantified Impact: Makerspace at Children's Hospital with 14K inpatient stays (pilot examined by other children's hospitals). STEM activity stations at RMDH providing services to 1000+ families annually. Programming classes to students with ASD. STEM-enabled approach to melanoma diagnostics. Adaptive educational tools for medically-fragile children. CVI learning software that improves patient visual processing

ROBOTS WITHOUT BORDERS - CHILDREN WITHOUT LIMITS

From Belizean classrooms buzzing with robots to a clinic in Haiti offering vital care, our Robots Without Borders program is a symphony of action—each note a barrier broken, an opportunity created, a future unlocked. It's a young girl rebuilding after a disaster, a disadvantaged student finding a path to college, a medically fragile child giggling as she waves her hand and, for the first time, the world responds. These are the moments that matter. When possibilities replace obstacles. When borders fall. And when a child's future is no longer defined by what they couldn't do—but by how far they dare to go.;

