

Chairman's Award - Team 125

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2017 - Team 125

Team Number

125

Team Name, Corporate/University Sponsors

Northeastern University / Textron Systems / Sonos Inc. / United Technologies / National Grid / PTC / BAE Systems & Boston Latin & Brookline High & Revere High

Briefly describe the impact of the *FIRST* program on team participants with special emphasis on the 2016/2017 year and the preceding two to five years

Team 125 impacts over 70 students from 5 high schools in Greater Boston annually. Though students come from schools with college entry rates as low as 69%, 100% of ours graduate and enter college or the military, and 85% major in STEM. Six students got internships from the team at places like SONOS, Digital Lumens and Goldenwish, LLC. In 2015, 1 of our students was a World Championship Dean's List Winner. Seven students received FIRST scholarships, including a full scholarship to Northeastern.

Describe the impact of the *FIRST* program on your community with special emphasis on the 2016/2017 year and the preceding two to five years

The NUTRONS impact the Greater Boston community by inspiring young students through support for K-12 robotics programs. Since 2012, we have collaborated with the Latino STEM Alliance (LSA) to provide low-cost robotics programs to elementary and middle schoolers by providing them with resources and volunteers. Our students founded three after-school robotics programs for elementary schools in Revere in 2014, and one after-school robotics program for middle school students in 2015.

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

Our team participates in several demos annually and has been featured in newsletters that reached over 20,000 people. Our team was featured in a Northeastern email to the entire student body as well as a Boston Metro feature reaching over 250,000 viewers. Since 2015 we have done 10 demos at schools and events such as Venture Cafe and the Boston Children's Museum Mini Maker Faire. Our demos reach outside of our lab space, gaining a huge audience and introducing FIRST to a broad audience.

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

NUTRONS students have taken the initiative to start and mentor LSA, FLL, and FTC teams. Over the past 3 years alone, we have reached 390 students and 20 teachers on 40 LSA teams. Our mentors run 3 NE FIRST district events and our off-season event Beantown Blitz since 2006, as well as Remote Kickoff for 20 percent of NE FRC teams. The NUTRONS also provide resources to other teams through seminars, Quick Build, Ask an Engineer, FIRST Help Now and FRC Rent a Mentor.

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

In an effort to start and sustain FRC teams, we have hosted our annual Quick Build where rookie and younger teams bring their kit of parts to our lab and leave with a fully built and programmed drive base. Since 2010, we have assisted building 84 robots with teams, 100% of the teams in attendance still exist today. FRC 4151 said "chassis construction and driving weren't really achievable until week 3 or 4 of build season, but last year at Quick Build we had both of them done by week 2".

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

This year NUTRONS students founded 3 FLL teams in Brookline funded by Lego Robotics camps they ran in the summer. In 2016 we helped Revere High School integrate FTC into the curriculum in the form a robotics class offered to students; now, there are 3 FTC teams at RHS. In partnership with the Latino Stem Alliance, we have successfully transitioned 20 students from LSA to FLL since 2010, creating a path to FTC and FRC teams.

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

NUTRONS students mentor LSA teams, FLL teams in Brookline, and Revere robotics. This pipeline of programs provides a path to progress through FIRST and eventually funnel into our FRC team. To give opportunity and exposure to FIRST, we created an FTC class at Revere HS. These teams increase our FRC student population by 10% annually. Since 2015, we've run the Revere FLL Qualifier to provide local FLL teams with an opportunity to compete and collaborate with other teams.

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)

NUTRONS include mentors and knowledgeable volunteers from the FIRST community to take part in our annual seminars. These seminars are one of the key ways that we help teams build stepping stones to reach their goals in a sustainable fashion. Expanding upon Ask An Engineer, we have partnered with Australian FRC team 3132 to take part in FIRST Help Now, and FRC 558 to assist in FRC Rent A Mentor this year. Through these partnerships we strive to provide teams with knowledge and skills to excel.

Describe your Corporate/University Sponsors

Our founding sponsors are Northeastern University and Textron Systems. In 1997, they partnered with students from Boston Latin School to start the NUTRONS and have helped sustain us since. For 4 years we have been recipients of the PTC grant and software. Since 2015, we have been recipients of the UTC grant through our mentors. This year we were awarded a \$10,000 Best Buy Community grant. Our professional partnerships and year-round grant efforts help sustain and support our team's endeavors.

Describe the strength of your partnership with your sponsors with special emphasis on the 2016/2017 year and the preceding two to five years

Our relationship with Northeastern University led us to a sponsorship by National Grid, which has strengthened for not only our team, but also created a mesh network of sponsorship for other student groups such as SWE. In 2015 SONOS began sponsoring our team, providing support well beyond funding. They have provided our students with internships, access to machinery, 3D printers, and products to raffle at events. Their sponsorship has expanded our design and fabrication capabilities.

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

FIRST is a competitive robotics challenge that presents a novel game annually for students and mentors of all ages. It's an opportunity for students to learn industry level skills outside of the classroom from professionals. Students and mentors from different backgrounds and skillsets come together to produce a multi-faceted project encompassing engineering skills, business skills, entrepreneurship skills and teamwork abilities, unparalleled by average school curriculum.

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

Team 125 is a very diverse team; we speak 8 different languages and come from ten different countries. Not only are we diverse with race and culture, but our mentor make up ranges in a variety of STEM, arts and teaching majors. We also have very young mentors; 90% are FIRST alumni, the majority are college students, or under the age of 32. The small gap in age between our mentors and students paired with our diversity and perseverance is what sets the NUTRONS apart from other teams.

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

Gabriela Interiano Paez

Essay

Every starts as a seed, sprouting deep roots to lay a sturdy base. With the right nutrients, it will grow to be strong, withstand storms, reach high, and provide shelter and support to others through every season. No two leaves are alike; each drifts off to other places, returning nutrients to the earth and helping other trees grow.

Roots

Team 125's seed was planted in 1997 by a Northeastern University freshman who was on a FIRST team in high school and wanted to provide that experience to others. Sprouting from that seed were the original 15 members of the NUTRONS, from the Boston Latin School, Northeastern University and Textron Systems. 20 years later, we are 80 members strong, representing 5 high schools, 7 universities and 8 technology companies in the Boston Area.

Ten years ago, there were less than 5 FRC teams and no competitions in Massachusetts. Through the generous funds provided in 2006 by the Smith Family Grant, a Boston-based grant for community improvement, the NUTRONS partnered with FIRST to establish and mentor 16 FRC teams. We are proud founders of the FRC Boston Regional Competition. As a result of our continued support of those teams and our commitment to provide competitions in our area, there are now over 25 self-sustaining FRC teams in the Greater Boston area, as well as FRC District Events in Reading, Revere, and Bridgewater, MA, run by NUTRONS mentors.

In an area where funding is low, budgets are constantly cut, and teachers are laid off, how do we fund a multi-school FRC team? We have fought through the turbulent budget storms that continue to affect so many school systems throughout the country. To secure the strong roots we have established as a successful team, we have worked hard to find new and creative ways to get funding. Since 2014, the NUTRONS work year-round to secure new sponsors and have raised over \$45,000 in grant money. Over 90% of these grants cover event registration and robot materials. This year, Team 125 obtained \$12,000 in grant money that will ease the burden of student expenses, making it possible for low-income students to travel with our team. For 12 years we have ran and hosted our own off-season event, Beantown Blitz, to raise money for our team and train new volunteers.

Trunk

Our history of dedication to our communities and FIRST are the strong roots of our team. But like any tree, its branches wouldn't reach as far as they do today without a strong trunk. Our mentors are that trunk. We are fortunate to have 25 mentors who tirelessly give their time to help us succeed. Of these mentors, 90% are FIRST alumni from 15 different FRC and FTC teams; 40% are women. This year, we have gained 10 new college mentors from 6 universities, all FIRST alumni.

NUTRONS' mentors have gone beyond FIRST-based initiatives to provide students with experiences to prepare them for their futures. Our mentors ran Career Day, a night full of professional development workshops. This included sessions such as resume writing, interview practice, and college application tips. Professional mentors have partnered with their employers to provide internships for Team 125 students at companies such as SONOS and Digital Lumens.

NUTRONS' mentors know first-hand the unparalleled experience FIRST provides and are passionate about paying it forward to a new generation. The small age gap between students and mentors allows for fundamental relationships to be established, encourages the flow of questions, and creates an inspiring environment for students to see where their future can take them.

Limbs

Growing from the sturdy trunk of the NUTRONS' tree are our strong limbs that extend into the FIRST community. Helping others gain knowledge and skill sets allows our community of teams in New England to sustain, succeed and grow. Team 125 conducts multiple year-round seminars and workshops to transfer knowledge and skills to teams with fewer resources and less experience. These seminars prepare teams for the upcoming season in technical and non-technical areas. They are developed each year by NUTRONS' lead students and undergraduate mentors and are available on our website alongside our University Day and Kickoff presentations, as well as other resources.

The weekend after kickoff, Team 125 runs an event called "Quick Build" where rookie and young teams from NE FIRST bring their kit of parts to our lab and leave with a built and programmed drive base. Quick Build not only serves as a way to get teams on track with their robot and strategies; it develops a relationship between younger teams and the NUTRONS' early on. This workshop prevents teams from giving up early on, and gives them the skills and confidence they need to succeed. FRC 4151, a 5 year participant of Quick Build, said: "Chassis construction and driving weren't really achievable until week 3 or 4 of build season, but last year at Quick Build we had both of them done by week 2". In 7 years, Team 125 has assisted in building 84 robots at our Quick Build.

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A year-round 24/7 support system was developed alongside the Smith Family Grant teams in 2006. Starting out as a booth at the Boston Regional, NUTRONS' team members would help teams during the event. FRC 2648 lead mentor said: "In our first few seasons, one of the main reasons we liked to attend the Boston Regional was because we knew that we would have Ask An Engineer to support us." Eleven years later, it continues to operate, assisting over 30 teams annually as an email-based Q&A system where teams submit their questions and receive a response within 24 hours.

This year we have expanded our remote Q&A with Australia-based FRC 3132 FIRST Help Now messenger call center. Team 125 is one of 13 teams from around the world on call for 12 hours a week to assist teams. We've also expanded by taking part in FRC 558's Rent A Mentor program, providing support meetings or classes to teams in need.

Helping others gain knowledge and skill sets allows FIRST teams to sustain, succeed and grow.

Branches

From the strong limbs grow our team branches that reach out to the Greater Boston Community. Giving back to the Greater Boston community is a year-round endeavor for Team 125. Since 2012 we have partnered with the Latino STEM Alliance (LSA), a local nonprofit, to bring affordable robotics teams to low-income communities. Our team creates the game, builds practice and competition fields, trains teachers, creates tutorial videos, and provides over 80% of the volunteers to run the annual competition. Through community STEM initiatives, we give students and educators the opportunity to see themselves as capable problem-solvers and leaders in their communities.

In an effort to recruit new team members and to spread awareness of Team 125 and STEM, we demonstrate our robot at local schools and events. Since 2015 we have participated in 10 demos, reaching over 20,000 people in the Greater Boston area. One of the most memorable demos was in the fall of 2016 at the Venture Cafe in Cambridge. Every student left with a 2 month internship at Goldenwish LLC where they learned to work with augmented reality for physical therapy. Additionally, in 2015 the NUTRONS' were featured in a Northeastern email to the entire student body as well as a Boston Metro newspaper feature reaching over 250,000 viewers.

Twigs

Our work with LSA gave our students the confidence and experience to expand FIRST programs in their local communities. In 2015, the NUTRONS' expanded robotics in Revere, MA by creating LEGO robotics teams at 3 elementary schools and a robotics program for middle schoolers, mentored by Team 125 students. This year, a NUTRONS' lead mentor integrated FTC into Revere's School Curriculum to get more students working hands on in STEM, and to recruit more FRC members. The HS class has 21 students, broken into 3 FTC teams that are self-run; our mentor is the only teacher supervising the class and provides mentoring alongside upperclassmen. An upperclassman

who helped with this monumental transition has this to say about her efforts: "I feel a sense of pride knowing that I helped bring robotics programs to younger students in my city. I learned so much from being on the NUTRONS, and now I've passed all that knowledge and skills down to the students I mentored in FTC."

In 2015, the NUTRONS ran the inaugural Revere FLL Qualifier for 24 teams and hosted it at Revere High School, expanding to 32 teams in 2016. NUTRONS sophomores ran FLL camps to raise funds to start, run and mentor 2 FLL teams in Brookline in the summer of 2016.

Team 125 students strive to pass on the opportunities and knowledge they have gained to others in their communities year-round.

Leaves

Our students grow from our branches, developing unique characteristics and gaining nutrients from our roots and trunk. In the Summer of 2016, a sophomore worked to develop training videos on her own to help LSA teachers and students in the fall. After kickoff, several NUTRONS students became young entrepreneurs, developing NUTRONS' PowderWorks to provide powder coating services to any team at an affordable price. Team 125 provides different avenues for students to further develop STEM, social and life skill sets in an exciting environment with supportive mentors and peers.

Team 125 has a 100% graduation rate, with all of its members enrolling in college or joining the military, 8 alumni have returned to mentor our team. 85% of students who attend college major in a STEM-related field. Seven NUTRONS' alumni have won FIRST scholarships, and in 2015 one became a Championship Dean's List winner.

Big things have small beginnings. A college freshman, who wanted to share his love of FIRST, planted the seed from which an incredible tree has grown. Our FRC team of 20 years has impacted thousands of students in the Greater Boston area and hundreds of FIRST teams. Our greatest achievements are not what we build, but the lives we inspire to grow.