



Team Neutrino

FIRST Robotics Team #3928

Chairman's Essay

2016

Born from violent astrophysical events like exploding stars and gamma ray bursts, neutrinos are tiny, nearly massless particles that travel close to the speed of light. They're fantastically abundant in the universe and move as easily through lead as humans move through air. The man who confirmed the existence of neutrinos, Enrico Fermi, once said, "It is no good to stop knowledge from going forward. Ignorance is never better than knowledge." Fermi's quote resonates with FRC 3928 Team Neutrino, motivating us to broaden our reach, establish and intensify our impact, and cultivate success.

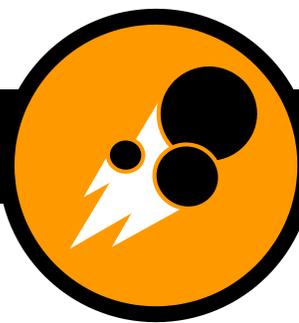
Broaden Our Reach

Our reach is spreading rapidly in our community. We promote FIRST through countless channels to a myriad of audiences: students, professionals, senior citizens, and everyone in between. Paving the way for the new generation of STEM is imperative to the team's success.

We meet the need for STEM education by maximizing all of our available resources. At the Edwards Elementary MakerSpace, we run a maker camp for 36 kids, which is a new approach to giving them hands-on experiences. It's also a successful fundraiser to maintain and update the MakerSpace facilities—we raised \$3,600 in 2015. Most importantly, we seize the chance to work with the kids and inspire the next generation of STEM students.

To broaden our impact, we collaborate with other teams at the Science Center of Iowa to bring FIRST to Des Moines. From the Girls in Science Festival to the Mini Maker Faire, our outreach efforts are varied and successful: each February we introduce girls to circuitry basics; each August we represent FRC on Robotics Day; each September we demo with other FIRST teams at the Iowa Mini Maker Faire.

We showcase our team at events to increase FIRST recognition: the 4-H Gala, Ames 4th of July Parade, Iowa State Fair, and 23 others in 2015. At



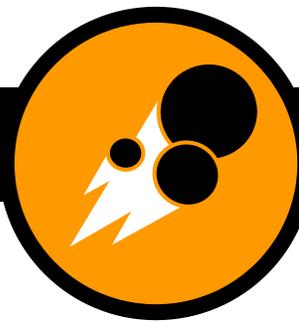
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the Iowa State Fair, our recognition grew when we partnered with the Governor's STEM Council, allowing us to reach 100,000+ people. We also demoed at the 2014 American Solar Car Challenge, which raced through Ames. Reaching 14,000+ people in one day, our visibility skyrocketed; Lane, who hadn't heard about FRC, couldn't believe we built the robot in six weeks. He joined the team in 2015, reinforcing 3928's beneficial effect beyond FIRST. Events like these are a great way for our team to network and present FIRST to a new audience who otherwise wouldn't have been reached.

Since 2012, 3928 has volunteered for the Ames Super Summer program, guiding students on a STEM path. It doubled in size in 2013 because of our involvement. In 2015, the coordinator stepped down and we stepped up to teach the classes, creating lesson plans and providing hands-on challenges, which are now public on our website. Team members volunteered for two other classes and demoed the robot for all three. Through these classes, we reach out to the community and recruit future members. Lucas, a current member, found 3928 through the camp. He says, "The camp introduced me to FIRST and made me realize that computer programming and engineering are interesting to pursue." Connections like these are a key reason for our outreach.

We know the importance of educating everyone about FIRST through programs like our maker camp—we see firsthand how it changes lives. We also understand the importance of a professional image and reaching out to the business world to recruit support. 3928 maintains robust standards to contact and work with supporters through monthly newsletters, thank you visits, and other recognition. The team operates like a small business, knowing we can't produce a well-developed product (robot) without sufficient funding. Our sponsors appreciate our business plan, which records our structure, goals, finances, SWOT analysis, and action plans. It provides integral documentation for internal use to ensure sustainability and for external use as a resource for sponsors. This allows businesses like Danfoss to see what their generosity enables us to accomplish.



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Our sponsor relationships have matured over the past year. In 2015, Interstate Batteries became a new sponsor. What began with a battery donation grew as we kept in contact through visits and newsletters. They were so impressed that Michael, an employee, became a mentor.

For the past three years, 3928 has sold FIRST e-Watt saver light bulbs at the City of Ames Eco Fair. Since this event falls during Minnesota North Star each year, we set up a livestream so community members can see us compete. In 2013, a former parent mentor who ran the booth said, "You had Girl Scout Troops, firefighters, farmers, retired folks, City of Ames employees and LOTS of others all cheering for you. The community is VERY proud!"

Establish and Intensify our FIRST Impact

A major contribution to both team 3928's success and stimulation of FIRST growth is the progression of programs we've implemented in Ames. To increase our reach, we publish lesson plans on our website to organize new teams and give them ideas for projects. We personally mentor 22 FIRST teams across Iowa to teach problem-solving and instill a passion for learning.

After the success of our pilot FLL Jr. program, Club Proton, 3928 started 11 FLL Jr. teams in three locations. Teaching these kids is a learning experience for all involved—mentor of three teams, co-captain Dagney, loves "seeing the kids' creativity and how they express this in their models." As these kids transition from elementary to middle school, we encourage them to join FLL.

The Ames Middle School (AMS) FLL Scrimmage is our oldest outreach event. We assisted with the event from 2011 to 2014 and ran it in 2015. We ref robot matches, give feedback on teams' projects, and present our robot and team. To become more involved with AMS FLL, we started a mentoring program and try-out system for each team in 2014.



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The Story County FLL program is incredibly valuable to 3928—many FLLers later join FRC, creating a circle of inspiration and keeping their passion for STEM alive. Through mentoring, we influence younger generations and give back to the program.

In 2013, 3928 alumna Sarah mentored Tiffany's FLL team. Now a member, Tiffany was inspired to give back; she mentored Joel's FLL team. "New-trino" Joel is mentoring FLL Jr., completing our circle of inspiration. Joel says his favorite part of mentoring is "getting to know the kids and helping them get excited about STEM."

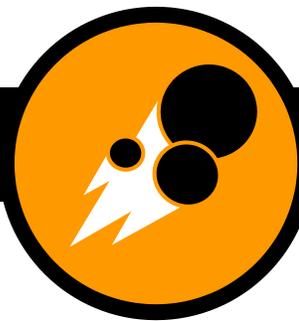
Cultivate Success

"I will let you fail," is one of the first things lead mentor Tony Milosch tells new team members. From there, they quickly learn that 3928 is entirely student-driven. Students do the work and mentors ensure it's constructive.

We cultivate success by laying a foundation for others to pursue STEM. Over 50% of 3928's students are FLL alumni, 80% of the team's mentors participated on FIRST teams, and 100% will continue in FIRST. This exemplifies the continuation of our circle of inspiration, ensuring sustainability.

More than anything, we value developing a reputation as an approachable, cohesive unit. We emphasize teamwork and Gracious Professionalism in all we do and this attitude of care and respect is vital in and out of FIRST. 3928 is well-regarded in the local and FIRST communities, and because of this positive reputation we are better able to overcome challenges.

Team 3928 was founded in 2011 at Ames High by nine high schoolers and seven FRC alumni. The team gained valuable insight into FRC and won Highest Rookie Seed at the Midwest Regional. In 2012, our resilience was put to the test when we lost our high school build space, but with our drive and passion, we found new partners in Iowa State University and 4-H and expanded to three Story County high schools. Last year, with the growth of



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our team, we moved our build space to the new Biorenewables Complex at ISU.

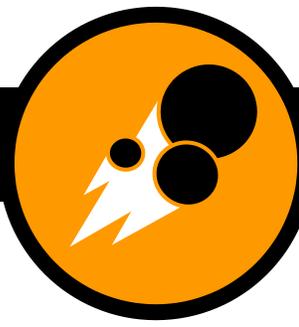
Our primary recruiting event is the fall Ames High Club Fest. At this event, we set up a booth to inform and answer questions from potential “New-Trinos.” Our Club Fest event has been growing in effectiveness: our conversion rate of interested students to team members was 70% this year—up from 40% in 2013.

All members work to make sure the “New-Trinos” find their place on the team. To improve the sustainability of 3928, the captain and co-captain appoint students to manage non-technical and technical aspects to pass down knowledge and experience. Our success is based on our team improvements, discoveries, and accomplishments, tying together individual strengths.

Not technically inclined, member Tiffany surprised herself by finding her niche. She “realized that the team was fabulous at integrating new members” and found her social media skills were relevant to FRC. Similarly, when alumna Rachael first heard about the team, she was only attracted to the non-technical aspects of FIRST. After joining, she found her passion in engineering instead.

Team 3928 creates a gateway to a path in STEM for present and future generations through FIRST. As 2015 alumnus Jeremy said, “FIRST has allowed me to better my life in more than one way and I don't know why I would ever stop. I will continue to be involved with FIRST for the rest of my life, even if it's only to see how else it changes and helps me one, five, ten, or even 20 years down the road.”

From huge events to bonding with individual FIRST teams, our influence is far-reaching and significantly enhances the community. Expansion of knowledge and passion for learning reflect both physicist Enrico Fermi's statement and FRC 3928 Team Neutrino's mission: expressing the



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impact we create by transforming separate individuals into a team of students and supporters dedicated to ensuring the success, sustainability, and education of STEM through FIRST.