

## Chairman's Award - Team 1816

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## 2019 - Team 1816

## Team Number

1816

## Team Name, Corporate/University Sponsors

The Dow Chemical Co./Medtronic/Graco/Microsoft/Seagate/PTC/HID Global/Ronin Media Productions/Cargill Inc./Velox CNC/Edina Education Fund/Jerry's do-it Best Hardware/TJ's Restaurant/Calvary Lutheran Church/Green Machine Boosters&Edina Senior High

**Briefly describe the impact of the *FIRST* program on team participants with special emphasis on the 2018/2019 year and the preceding two to five years**

We BUILD LEADERS & PROBLEM SOLVERS by giving students critical-thinking, technical & leadership skills needed to thrive in the 21st century workforce. Rookies are on-boarded at our annual retreat. Students get immersed in our culture, history & core values of respect, trust, inclusivity, commitment & joy of life. We incl students who can't afford our team dues (5/year). 100% of team graduates HS; 97% attend college; 84% of alums pursue STEM in college/careers.

**Describe the impact of the *FIRST* program on your community with special emphasis on the 2018/2019 year and the preceding two to five years**

We produced & appeared on PBS Hands on Science (50K+ viewers). Because of our efforts, our school now has a new STEM wing incl PLTW(9+ engineering classes offered & 1 class required for all 8500 EPS students to graduate). We work w/ Girl Scouts annually engaging them in our shop & earning their STEM badges. We run 71 unique annual demos incl: MN State Fair, Children's Hospital, Parades, School Carnivals, Elementary Open Houses/Science Fairs, Park Cleanup, TEDx, Chamber & housing shelters.

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

We make STEM AVAILABLE TO ALL by targeting underrepresented groups. We teach FLLjr to transient youth at a local homeless shelter, reaching 150+ students since 2013. We are submitting grants to support our all Somali FTC team, first such in Edina. We inspire girls with SWENext(Society of Women Engineers, est. 2015), GEMS(Girls Excelling in Math/Science est. 2016) & Girls, Science & Tech (Annual Demo to 10K+ 2016). We engaged 15+ special needs students at an Autism Camp in STEM activities.

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

We guarantee FIRST Thrives with our 1816 FIRST SUSTAINABILITY SYSTEM. We led Leadership & Core Values Seminars for 9 teams nationwide by request. We brought our process to both FIRST Championships in 2018 & have helped teams with 13 inquiries since. We created the SPLASH preseason training model, now adopted by 8+ events. We lead 9 interactive workshops at JUMPSTART(December training event). We held 3, 3-day customized bootcamps focused on team building, communication & robot build.

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

Last year, we started FRC 7019 (TechNOlogic-Edina) & ensured their sustainability by directly mentoring them 5 days a week. We adopted a student from another school for 2 years so he could return to his own school and start another FRC team. Our focus is on FRC team sustainability! We continue to support the 25 FRC teams we started since 2006. We collaboratively develop & customize sustainability & training programs for their own teams & for the betterment of all of FIRST.

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

We founded the 1st FTC team in the state of MN; this launched an extensive FTC network with 13 new teams in 10 years in Edina. There are now 25+ FIRST teams in Edina reaching 300+ kids. Because of our extensive investment & collaboration in fundraising & outreach, FTC continues to grow annually, including 2 all girls FTC teams. We send our students to all 6 elementary schools in our district to inspire students to start FLL teams. FLLjr has risen from 0 to 8 teams over the last 4 years.

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

In addition to our 11 preseason training events, we developed/hosted 3 in-person bootcamps (13 teams) & 5 online Skype sessions (45+ students from 5 teams) on the Chairman's Award/Leadership to help teams structure themselves & help them tell their stories and determine their identity, mission, vision and goals. 13+ teams contacted us for assistance to strengthen & expand their teams via our core values sustainability workshops.

**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)**

1M+ people worldwide visit our website annually to access our 97 sustainability, safety, technical, media & awards resources. Under our leadership, while working with a group of teams in the Twin Cities area, funding was secured for a "real" practice field. We also inspired FRC 4122-Obots(NY) to expand the team by over 100 members. Due to this expansion, 4122 created rookie team FRC 7004 in 2018. 1816 Mentors 4 FRC, 11 FTC & 7 FLL/FLLJr teams, investing 2000+ hours annually into FTC alone.

**Describe your Corporate/University Sponsors**

To ensure our sustainability, we do not rely on a single sponsor. We have 16 different sponsors (15 multi-year sponsors). Our partnership is so strong, 83% of our sponsors return annually. We keep sponsors regularly updated with our interactive newsletter. 35+students have interned with 8 sponsors in the last 5 yrs. Our larger sponsors are Dow-Medtronic-Graco-Microsoft-Seagate-PTC-HID-Cargill. Through fundraisers, the team raised \$15K to purchase a new router, mill & fund team scholarships.

**Describe the strength of your partnership with your sponsors with special emphasis on the 2018/2019 year and the preceding two to five years**

Dow has continued to grow in support from an initial \$5K/yr grant in 2009 to \$10K/yr grant today. At sponsor demos, we showcase FIRST & excite parents, kids & future mentors about STEM. We also test Vuforia, an augmented reality software from sponsor PTC for applications in an FRC setting. They asked us to do this because of our extensive yearly visits showcasing our robot. Due to the impact we have on our sponsors, they regularly reach out to support additional rookie FIRST teams.

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

FIRST is the premier worldwide after-school, mentor-based, hands-on STEM engineering competition. FIRST fosters 21st century skills of teamwork, problem solving, collaboration, leadership & pride in achievement. FIRST's vision is to change our culture to value & idolize engineers, mathematicians & scientists like we currently look up to rock stars & professional athletes. FIRST seeks to increase diversity within the STEM workforce so it more accurately represents the general population.

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

To have greater local, state & nationwide impact, we turned to ADVOCACY. We give an annual STEM report to our city council & school board. We created the MN Advocacy Conference, Robots in the Rotunda & STEM Advocacy Day (11 Teams/11 Meetings per yr). Annually since 2013, we help organize/attend the FIRST National Advocacy Conference(1K+ students/mentors, 546 Meetings). We got language added to the Every Students Succeed Act so federal funds can be used by FIRST teams in underserved areas.

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

Simone Vaillancourt

## Essay

When we started in 2005, STEM extra-curricular programs scarcely existed. There were only 2 FIRST teams in MN, a dearth of STEM courses & little to no dedicated funding for STEM. This was absolutely unacceptable to us. We have since made it our personal responsibility to expand & sustain FIRST as a vehicle to change culture to value STEM. Our mission is to create bold, confident leaders who transform culture to promote, value & celebrate STEM. We do this by:

- Building leaders & problem solvers;
- Guaranteeing FIRST thrives; &
- Making STEM available to all.

### BUILDING LEADERS & PROBLEM SOLVERS

To drive culture change, we build leaders & problem solvers by giving our students technical, critical thinking & leadership skills. This begins with our annual team retreat, where our team members are immersed in our culture & history. Students develop relationships while promoting an understanding of our team's core values. Last year, every student participated in an interactive process to develop our core values, which characterize our entire team.

Our team structure maximizes leadership opportunities for students. Our senior co-captains lead the team while training the 2 assistant captains. 12 formal leadership opportunities are available to our students. In 2019, girls are 25% of our Team leadership.

In 2017-18, our leadership system was put to the test when we graduated 50%+ of our students. With only 17 returning members, we relied heavily on our leadership to train & acclimate new students to continue to achieve our mission of culture change.

"Coming into Team 1816, I expected to improve my programming & teamwork abilities & I certainly did. What I didn't expect was to learn how to teach & mentor children from grade 6 through grade 11," said 1816 lead programmer Andrew. Students from our team continue to change culture & drive STEM after graduating. 1816 alums are sought out for internships by companies like Microsoft, Google & Tesla. After college, Alumni use the skills & values they learned with our team in the workforce at companies like YouTube, Facebook & Target. Alumni also earn graduate degrees like MSs & PhDs in computer science & immunobiology, one even works in the Canadian Government on remote sensing & hyperspectral imagery applications.

"1816 not only immersed me in engineering challenges, but the team also encouraged me to think like an engineer. Exceptional engineers consider the perspectives of all stakeholders involved & the implications of their work on others. 1816 provides the foundation for achieving this high standard of excellence." said 2014 alumnus Ken.

### GUARANTEEING FIRST THRIVES

As we develop our students to become leaders & problem solvers, we use them to expand our sustainability system, which fosters & enhances FIRST teams & programs in our schools, community, state & nation. To promote a successful sustainability system to other teams, we first ensure the viability of our own team. We created a successful feeder system, which brings us a continuous stream of qualified team members. We invest 2000+ hours annually mentoring 18 Edina FIRST teams. Participation in Edina FIRST now averages 260+ students/year, up 24% since 2015. We mentor 2nd-year FRC 7019-Edina; 2239-Hopkins, 5172-Greenbush & ALL 11 FTC teams (2 are all girls teams & 5 are new to EHS).

The 2nd component of sustainability is a constant flow of qualified & willing adult mentors. Lack of mentors is the leading cause of the collapse of a FIRST team. At our annual Medtronic showcase, we inspire employees to mentor other teams. We hold annual training workshops that have developed 25 new mentors. Because of training we provided, 100% of the mentors on Rookie FRC 7038 returned to support the team. "Without 1816s support & guidance, we couldn't have possibly started the team & we certainly would not still be around for our second year," said Jim Burke, 7019 lead mentor. The final leg of our sustainability is a diverse sponsorship acquisition process. This summer our team expanded our work with sponsors by hosting demos at PTC & Seagate to continue to foster a positive, ongoing & collaborative relationship. We also turned to community fundraising projects, with 5 events, we connected with 400+ community members to raise \$15,000.

During the 2018 season, after seeing the success of our own core values, we brought our process to 13+ teams, helping them establish what their team stands for. Core Values is key to team sustainability. It is one of the best ways to bring rookies on board with a firm explanation of team culture, history & what it means to be on a FIRST team.

Our team sustainability resources are on our website so teams around the world can implement, improve upon & increase their own viability. Our website receives 1M+ views annually. We provide 97+ resources to teams worldwide, ranging from workshop & pit safety to fundraising & sustainability tips. We've also turned our resources into 20+ interactive presentations we gave last year alone at offseason/regional competitions & both World Championships. 1816 connects rural & urban FRC in order to utilize the strengths that each area brings to the table. Throughout the last 3yrs we developed a relationship with 5172, fortifying this friendship through our now-annual SwampFest retreat. Through our partnership, we successfully run a weekend camp connecting teams from the cities & rural Roseau County through 7 FIRST-themed workshops & bootcamps. With a different focus every year, we strengthen teams while building bonds to further connect & sustain them.

**Essay - page 2**

1816 was first in MN to offer varsity letters in FRC. Due to our work with the Minnesota State High School League, this will be the 8th year of the MSHSL FRC State Championship. This event raises the visibility & credibility of FIRST as a varsity sport & has helped teams statewide by providing mentor stipends, facilities & travel. Other states (TX, CT & NJ) followed our model.

To have a big impact beyond our community & the state of Minnesota, we turned our attention to advocacy. We started our advocacy efforts locally with our annual State of STEM report to the Edina City Council. In 2015, our collaboration with Edina Public Schools helped pass a \$125M referendum that added new Makerspaces & Project Learning (PLTW) classrooms.

To expand our advocacy efforts statewide, we founded the MN Advocacy Conference in 2016, which brought together 100+ people from 13+ teams. We trained them how to approach & advocate to elected officials. In 2017, the conference grew into our annual STEM Advocacy Day in the MN State Capitol rotunda. Education policy makers join us for annual STEM policy meetings, where they seek our input regarding STEM legislation. In 2017, a team member wrote a STEM directive & testified alongside our MN Senator. In 2018, we wrote a STEM bill that was introduced with the help of our MN Senator Melisa Franzen & Rep Dario Anselmo. These bills have been used as models by other teams in their state funding requests, and in proposed 2019 MN legislation.

We are a founding team of the annual FIRST National Advocacy Conference (NAC), helping to organize & run this event. Since 2013, we visit our federal legislators annually in DC, to gain support for funding for after-school, mentor-based STEM engagement activities as part of the Every Student Succeeds Act. The ESSA targets funds towards schools that would otherwise never be exposed to programs like FIRST. Last year, we advocated for the Perkins Career & Technical Education Act, gaining support from both of our MN senators & turning it into law.

**MAKING STEM AVAILABLE TO ALL**

To TRULY change culture, we must increase the numbers of girls, transient homeless & special needs students who are exposed to STEM.

We have an extensive outreach & FIRST robot demo program that excites, inspires & energizes girls. We present annually at the Fox9 Girls, Science & Technology event at the Minnesota Science Museum. While there, we connect with 11,000+ attendees & 30+ Girl Scout troops to help them earn their STEM badges & help girls connect with local FIRST teams. This year, we demoed robots & the FIRST LEGO Jr program at the SWE National Conference, Minneapolis, representing all of FIRST from our Edina Robotics program.

Homeless students' lives are more transient in nature, inhibiting them from being exposed to a real world project based STEM experience. Annually we reach 40+ students in MN homeless shelters by bringing in a modified FLLJr experience. This helps them understand & value STEM while increasing self confidence, problem solving & communication skills.

"When we start working with these students, they tell us how they want to be football & basketball players & it is incredibly rewarding & meaningful to me when the students afterwards tell us they want to be a doctor or work for NASA," said outreach lead Nate.

To further our reach in urban & inner city populations, we turned our attention to television. Because of our visibility, recognition & credibility, we were contacted by the producer of Twin Cities Public Television's Hands-On Science program to write an episode for the show on FIRST Robotics. We invited 4 teams & their robots where female team members were featured in the March 2018 episode, which aired nationally on television & online.

We work with special needs students to ensure that they have the same opportunities as everyone else. This year we brought STEM education & robot demos to Rolling Acres Autism camp. We worked with 15+ students to excite & engage them in STEM. We continue to work with & accommodate special needs students, helping them achieve a bright future through STEM.

**CULTURE CHANGE IS INEVITABLE**

The Green Machine is the epicenter of culture change. By giving our students the skills to be 21st century workforce leaders, strengthening FIRST through our Sustainability System & pushing to make STEM accessible to everyone, culture change is inevitable!