

## Chairman's Award - Team 1816

### Team Number

1816

### Team Name, Corporate/University Sponsors

Medtronic/The Dow Chemical Co./Graco/PTC/Smiths Medical/HID Global/Seagate/Dunn & Semington/Cargill Inc./Edina Education Fund/Dunwoody College of Technology/Proto Labs/Stratasys/NPC Robotics/Waytek Wire/Jerry's do-it Best Hardware/Calvary Lutheran Church/TJ's of Edina/Green Machine Boosters&Edina Senior 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

FIRST's emphasis on mentoring & interactions w/sponsors, community leaders & professionals exposes us to experiences out of our comfort zone. As STEM professionals-to-be, we help organize, lead FIRST-NAC. 86% of members pursue STEM in college; 80% of alums are in STEM careers. Of our 33 women graduates, 70% are in STEM careers. 50% of members state interest in mentoring FIRST after high school. 8 alumni are current season mentors.

### 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

FIRST-Edina student engagement up 40% 2015-to-2017. No STEM included in 1st HS addition plan 10 years ago; by building in school theater workshop, corridors, we made FIRST visible enough to convince community to add new engineering/PLTW classrooms, incl. 1816 homebase in Fall 2017. Now 9 PLTW courses in Edina Schools. Our federal reps all publicize STEM support; US Sen Al Franken's after-school mentored STEM amendment in 2015-ESSA + directive written for State Sen. Franzen.

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

1816s Minnesota Advocacy Conference teaches advocacy to teams that miss FIRST-NAC. 100+ attendees hear keynotes state FRC can be active STEM advocates. 1816 writes draft language for ESSA MN STEM funding as SF 264 intro'd by Edina Sen Franzen. Is key example of combined STEM+Civics in prezis to 9th grade Gov't classes. 90+ outreach appearances in 2016-17 incl: LEGO Robotics to kids in shelters; MN State Fair, Star Studio/Children's Hospital. Varsity Sport TV Prep45 airs doc on 1816&FIRST robotics.

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

1816 invests 260 hrs into MAC incl. student-led small groups. Goal-Stretch FRC teams to expand outreach beyond FIRST mentoring. 1816 invests 1800+ hours mentoring FLL Jr, FLL, FTC in 2017. 2 team alums+1816s faculty advisor also mentoring FRC 2239. 1816s STEMtoberfest showcases 1816 kids as heroes to homeless kids who don't have access to STEM, but find they always will have a home w/a FIRST team. 8 members are National Merit Scholars; peer mentoring EHS students in math, writing, college prep.

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

1816 inspired formation of 22+ teams, making them successful, spreading the FIRST ethos, growing FRC in MN. MN now is mature state with number of FRC teams (21st in population, 3rd in number of teams). We are a support net to MN Teams-sustainability is key. Our focus is on younger FIRST Teams, especially those before HS via FLL Jr, FLL, FTC; Teaching other teams how to make their own geographies successful via "Hub" teams, MN SPLASH & Kickoffs in 8 cities.

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

LEGO Robotics intro-camps via Edina community camps & Girl Scout Robotics camps raises FIRST visibility community-wide. In Edina, 40% increase to 293/2017 vs 210/2015 students engaged. Demos at all 6 Edina elementary schools, netted 225+ prospects! 1816 directs queries onward to identified teams/mentors for inclusion. Direct sponsored teams include: Jr. FLL 4730, FLL 5096/Nerd Herd, support with LEGO kits, fees. 1816 inspired formation of 2 all-girl FTC teams- SHENanigans & Tough Cookies.

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

This year 1816 has 28 members-half the team-who were on younger FIRST teams, including our 4 student leaders! 21 1816 students invested 1800+ hours into 18 FLL, FTC, FLL Jr teams in Edina. This strengthens our feeder system, ensuring sustainability at the high school level and creating a pathway for students to progress from FLL Jr on through FRC. Inquires about FIRST programs via website and outreach appearances are directed to age-appropriate 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)**

1816s lead mentor steps in as 2239's faculty advisor when 2239 lost their lead; 2-1816 alum mentors also help 2239. Another 1816 mentor joins 2129 when they lost their leads. At Medtronic, we recruit/train mentors alongside other Medtronic teams. We lead SW Mpls Hub w/FRC 2502 We are 1/5 coordinating teams for FIRST National Advocacy Conference. Founded MN SPLASH (2007); expanded to Northern MN Splash/Itasca, 7 Rivers Robotics Coalition, Jumpstart, aiding other FRC teams in pre-season trainings.

**Describe your Corporate/University Sponsors**

This year, founding sponsor Medtronic surprised us, continuing sponsorship of 1816. This underscores Medtronic's belief that 1816 drives MN FIRST forward. Dow, Graco, Cargill are multiyear sponsors that contribute both tech & non-tech mentors to our team. 2 sponsors are medical device companies; Dow (Fortune 500), PTC are FIRST strategic partners, and we have mentors from these top-ranked sponsors; (63%) of sponsors are in STEM. HID, Seagate newest sponsors.

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

17 (89%) of 1816's 2017 19 sponsors are multiyear. Team appearances and visits are integral to sponsor engagement. Ex:1816 was featured at PTC's family day with 250 people; PTC sought out 1816 specifically to gain insight into how FIRST teams can better utilize Creo & Windchill; 2-1816 alums hosted a multi-team seminar on how to build robots using Creo. Team members are highly-sought by sponsors for internships-1 at Medtronic, 2 at HID, 1 at Smiths Medical. Robot Day at Jerry's features FRC.

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

FIRST is the premiere afterschool, hands-on, mentored, STEM engineering project competition. FIRST fosters teamwork, problem solving, collaboration, leadership, responsibility, pride & achievement, with core values of cooperation and gracious professionalism. It is a varsity sport for the mind that launches the next generation of STEM professionals. FIRST is working to change world culture by creating/fostering real heroes that will solve the world's myriad problems for the good of all.

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

Finding space in Edina High School to build robots-We fill the hallways, great visibility for FIRST but not ideal conditions. Successful advocacy on \$125 million bond yields new engineering wing. Fall 2017 we move to Project Lead the Way, a program we helped establish (2008).We bring FIRST to new audiences and to use our experience to expand FIRST and make FIRST Accessible to All. Our vision remains clear: Inspire new generations to become STEM Heroes.

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

Simone Vaillancourt

**Essay**

FIRST Team 1816-The Green Machine understands that to change our culture to value STEM, we must make FIRST and STEM truly Accessible to All. 1816 is deeply committed to growing FIRST; ensuring that STEM, particularly FIRST, is available to all students; and to be a vibrant force for change by growing strong student leaders ready and driven to make change happen.

**Growing FIRST**

With few FRC teams nearby in 2006, we invented our own future, by building robots and inspiring the start of 22 FRC teams. Minnesota FRC today is flourishing with 208 teams, 4 regionals, and a growing number of off-season events. Now, 1816 is a resource and support net to all MN FRC teams. From programming help on-site & remotely; to consults with FRC 2502, 4778, 5690 on their awards submissions, to our veteran mentors leading other teams. FRC 2129 now has an 1816 veteran mentor as lead; 1816s faculty advisor also is lead mentor for FRC 2239, aided by 2-1816 alumni mentors. 2239 now joins us for pre-build trainings, Kickoff & outreach including the Medtronic Robotics Showcase. We established MN SPLASH annual training events in 2007 to ensure FRC teams are ready for competition. Our

SPLASH model is used by teams in Duluth/Itasca, the Twin Cities, St. Cloud and LaCrosse, WI. In St. Cloud, we presented 11 of 32 seminars, fully supporting host FRC 4607-CIS.

Strengthening teams is the motivation for establishing the Southwest Metro Hub, an informal organization of FRC teams that promotes the sharing of information & experiences. While 1816 originally led the Hub, it quickly grew to all teams sharing the meeting host and event duties. We use the Southwest Hub meetings to network & strengthen our FIRST community.

Increased FIRST sustainability also comes from nurturing younger teams. Since founding the oldest enduring FTC team in MN (FTC 2887), we now work with 7 Edina FTC teams. 1816 students have provided support & guidance to 84 younger teams in the last 5 years; many of those students are now Team members and leaders. There is no doubt that student mentors inspire and sustain long-lasting passion in kids, resulting in continuation with FIRST programs as team members, volunteers at events, and adult mentors of FIRST teams.

New this season is the FIRST Robotics Showcase, both to raise the visibility of Medtronic as a longtime sponsor and encourage employees to become FIRST mentors. 1816, alongside 2052, 2239 & 2987, spoke with dozens of employees, 26 of which attended a mentor training session. These newly-trained mentors all were assigned to specific FRC teams in need.

Following every appearance at school carnivals, on TV, or in local magazines we see new activity on our website-people seeking FIRST opportunities for themselves or their children. We direct many onward to Edina's 27+ FTC, FIRST LEGO League, FIRST LEGO League Jr. teams, including 2 all-girls FTC teams.

1816s website draws ~1 million hits annually and is a powerful resource for teams looking for FIRST information. Teams frequently ask permission to borrow our resources, including FRC 433-The Firebirds & FRC 2220, who link us as an extension of their own outreach resources. Most popular are Safety, Fundraising & Sponsorship, Team Handbooks, Advocacy, and Making FIRST a Varsity Sport.

#### FIRST for ALL/Advocacy

As 1816 looked to grow FIRST, we realized that under-served populations had no exposure to STEM, so we focused on bringing FIRST and STEM to them-providing STEM opportunities to All. Due to our efforts, STEM is now easier to access in Edina, growing well beyond standard academic subjects to robotics summer camps & clubs. We inspired the establishment of Project Lead the Way, which now offers 6 sections at our high school. Our in-school presence began when an 1816 student got us into the Thespians' set-construction workshop; it quickly expanded into adjacent hallways, making hands-on robotics very visible. When it became clear that school facilities required substantial upgrades, 1816 students and mentors were key participants on multiple committees. This led to a successful \$125 million referendum in 2015, which include dedicated workshop & engineering/PLTW classrooms. We move into new space in fall 2017! At annual appearances before the Edina City Council we deliver a "State of STEM" report cablecast to >40,000 households. This greater visibility raises respect and interest across the community, and fuels the fervor of our greatest superfan, our Mayor Jim Hovland--and piquing the interest of our State and US Senators.

Our efforts in Minnesota alone were not going to have the impact we wanted, so we took our efforts to Washington DC to have a national impact. What started at a local committee hearing in 2011 grew to regular visits with Sen. Al Franken and his staff, and expanded to our other MN federal legislators via the FIRST National Advocacy Conference (NAC). We are a founding Team of NAC and believe in the importance of ongoing contact to press STEM funding requests. Through NAC, we have been able to grow FIRST and STEM throughout the nation. These consistent appearances were noted by Sen. Franken as inspiration to write an amendment into federal education legislation (ESSA) to provide funding for programs like FIRST.

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In September, we hosted the first-ever Minnesota Advocacy Conference, teaching STEM advocacy skills to FRC teams unable to attend NAC. 100+ members from 13 teams listened intently to keynote speaker MN State Senator Melisa Franzen when she stated, "When we call you to the State Capitol, you will come to support STEM." At Sen. Franzen's request, we wrote a draft of a directive asking that the MN Dept of Education channel specific ESSA-STEM funding to mentored-activities like FIRST. This draft was included in SF 264, introduced on Jan 23, 2017. 1816 is also the cornerstone of Sen. Franzen's late-February "District 49 Day" at the MN State Capitol.

Changing culture drives our FIRST for All mission: To be the voice for those who struggle to find a pathway to STEM. Through 90+ student-led outreach activities 2016-17, we inspire students & the community-at-large to experience the innovation & creativity of STEM. When we say "All," we truly mean everyone: Children in homeless shelters, Edina students (especially those in underrepresented groups), and millions of students who will be impacted by ESSA-STEM education funding. We run free, weeklong immersion events to give children in shelters like People Serving People & Simpson Housing the FIRST & STEM experience. For many, it's the only time they have this chance. "This is an opportunity they don't get in their daily lives and it's one they do not forget," says Matt Johnson, PSP educational services director.

Our female members & mentors were invited to showcase FIRST Robotics at the annual Girls, Science and Technology day at the MN Science Museum. It was critical to the event organizers to put emphasis on women in STEM to engage

the 11,000 girls & their families who attended. 50% of our Team's core student leadership positions are filled by women; 27% of our 26 mentors are female. 1816 students support clubs like GEMS and created a chapter of SWENext, both of which are geared to girls in engineering. Our Team also supports two all-girl FTC teams.

#### Student Impact

Students on our team more often choose to pursue STEM both during and after their time on the Team than the general population at our school. Our sponsors consistently choose to support our mission to inspire STEM-engaged students by providing financial support, internships, and, for 8 mentors, personal investments of time and resources. Internships via sponsors are powerful life-changers. 1816 students & alumni have interned with Medtronic, our founding sponsor; Dow; Smiths Medical, and HID. Dan Purdy's Medtronic internship in 2009 provided confidence to pursue an aerospace engineering major. He is now the lead sustaining engineer on the prop planes at Cirrus Aircraft in Duluth and a robot inspector at the Northern Lights Regional there each year. "FIRST gave me the skills I use to give back to my community and to FIRST itself, paying it forward," Purdy says.

STEM-related college majors are where 86% of our 108 team's graduates take action to drive our future. About 80% of our alumni pursue professional STEM careers, bringing gracious professionalism and a drive to change the world to their companies. Of our 33 women graduates, 70% are in STEM majors and careers, a higher % than the general population. "1816 inspired & gave me confidence to pursue STEM in college. Being a part of 1816/FIRST motivates me to mentor, encourage & be a role model to younger girls interested in STEM," says Rebecca Earl. 50% of current members state they are interested in continuing a relationship with FIRST after high school, following the lead of those that came before them. This year, 2 college grads and 6 undergrads mentor & guide 1816s direction. One far-reaching result is our annual Team Retreat, designed to maximize the assimilation of team culture and to establish strong team relationships as each new season begins. Strong student leadership has always been a hallmark of 1816 and one we work to maintain.

1816 is the foundation of FIRST in Minnesota. Our efforts have changed the culture of MN from one with little recognition of STEM to one where STEM thrives and grows. "We are becoming known as the State of Robotics, not just the State of Hockey," MN Sens. Klobuchar and Franken proudly proclaim. Our determination to promote FIRST impacts students across our city, state and nation. Our sustainability efforts have put us on firm financial footing and helped us grow to 49 members from 16. Through advocacy and FIRST for All, we've made STEM an option for students who otherwise never would have had the opportunity. Our "Eyes are on the Future" and we don't plan to stop creating the future any time soon.