

Chairman's Award - Team 4039

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2018 - Team 4039

Team Number

4039

Team Name, Corporate/University Sponsors

Lincoln Electric/CIMCORP Automation/ArcelorMittal Dofasco/Hamilton-Wentworth Catholic District School Board/Eaton/Magna International/GM Canada/McMaster-Mohawk W Booth School of Engineering Practice and Technology/Comfort First Heating and Cooling/Loudmouth Golf&St. Mary Catholic Secondary School

Briefly describe the impact of the *FIRST* program on team participants with special emphasis on the 2017/2018 year and the preceding two to five years

97% of team alumni in post-secondary STEM programs Dean's List Finalist 2015/17 - developed leadership skills Robotics scholarships/McMaster FIRST scholarships Specialist High Skills Major robotics coop - 9 students in 3 years Curriculum in CAD, machining, electrical, programming Additional resources: tools,3D printer,Arduino School with no computer science courses placing first at Board competitions x 3 years & Girls Coding Club Industrial Education Committee linking industry to curriculum

Describe the impact of the *FIRST* program on your community with special emphasis on the 2017/2018 year and the preceding two to five years

Started/sustained FLL Qualifier(2015),off-season FRC event(2015) Advocacy resulted in FRC district(2017),Board funding any FIRST team, practice field Demos at Science Centre (7500 visitors)x 2yrs, CNE (2017) & Santa Claus parade(170,000 spectators)x 4 yrs & Maker Fair(3500 visitors)x 3 yrs 60 girls with Arduino workshops,10 at library workshop & 12 cubs with STEM workshop Dominican Republic-Lego,NXT,laptop,training & solar lights with Spanish colouring book Inspired Finland FLL tournament

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

Instant of Inspiration-pop up demos at non-STEM events Advocacy for FIRST inclusion in Jump Start Canadian Tire funding Built support for FRC district McMaster Dean,& mayor via STEMley Cup VIP match Authored FIRST Living & Learning peer reviewed article for academic administrators(2,500 readers) Innovation Nation robot submission Girls R Brilliant female STEM role models-Youtube videos Inspired a segment on the Rick Mercer Report about FIRST CIMCORP sponsor exposure resulted in FLL in Finland

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

Embracing our motto"live within your means but then work really hard to expand"has resulted in consistent success and inspires others to see they can succeed with a simple,robust design & a lot of hard work Presentations at Swatposium & 2056 conference shared this At our event STEMley cup, our team did not compete to support our pre-rookie teams 5921&6342 with a robot, mentorship and team shirts FLL Saturdays a model of sustainability for FRC teams to support multiple FLL teams efficiently

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

Presentations at Board meetings & Science Fair, & tours of build space led to school board guaranteed funding for all teams We permanently shared mentors & equipment to start 5406 6342 shared build space, resources and mentors 2017 Established FRC Practice regulation field Off season event STEMley cup is an opportunity for team development & pre-rookie team formation Kick off support to other teams Educational resources on website

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

Advocacy secured Board funding for all FRC, FLL & Jr FLL teams Started 27 FLL teams since 2007, 4 JrFLL Majority of FLL teams we have started are still in operation Mentored 2 FLL teams each year we have existed Dominican Republic supplying used Lego,NXT,laptop,&training to promote interest in FLL Ran FLL off season event at Board Science & Robotics Fair to expose teachers to FLL Robotics Workshop at public library&Cubs stimulate interest Robot demos at FLL events inspire them to continue to FRC

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

Started FLL Qualifier(2015) & provide key roles head ref & judge advisor 16/17. FLL Coach-the-coach sessions, built practice tables, FLL Saturdays, & a practice tournament Volunteer at events & trained officials Boost Award - funds for a young FRC team Off season FRC Event - Chairman's 101, Rookie & Women in STEM sessions Presentations-Swatposium &2056 conferences Lead co-op scouting Advocated for practice field Member of Compass Alliance as tag team&help hub Share training materials/resources

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)

Ran FLL Practice Tournament assisted by other FRC teams teaching them about FLL & providing FLL teams with constructive feedback Our FLL Saturdays model shared & adopted by 4618 & 5406 supporting FLL teams Practice field-work with peer teams to secure funding, get equipment, build practice field STEMley Cup assisted by 5406- experienced teams paired with rookies to give them a competition experience Member of Compass Alliance as a tag team & help hub resource to all FRC teams

Describe your Corporate/University Sponsors

McMaster University- B tech funding, microcontroller workshop -Engineering program mentors, hosted new district/scholarship program Innovation Park supporting startups, business, research and offering collaborative space ArcelorMittal steel producer Hamilton Wentworth Catholic District School Board guaranteed funding Lincoln Electric welding,plasma cutting & robotic welding equipment CIMCORP multinational automation company mentors

Describe the strength of your partnership with your sponsors with special emphasis on the 2017/2018 year and the preceding two to five years

Many sponsors wish to fund multiple teams through school board (Arcelor), FIRST Canada (GM,Eaton), practice field (Innovation Park) or events(PEO, Arcelor) CIMCORP-FIRST in culture hiring a Mentor&sponsored Finland's first FLL tournament School Board benefits from Arcelor funding for SHSM & attracting students Provide mentors (PythonX,Arcelor,CIMCORP)& scholarships (Arcelor,McMaster) Sponsors get demos, advertising, newsletters & dinner Parental sponsors continue after their child graduates

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

FIRST is about so much more than robots. Students work with adult professionals on real-world challenges learning engineering principles, problem-solving techniques, business & marketing skills & respecting deadlines & budget constraints. Unique from other programs, FIRST emphasizes collaborative skills like Gracious Professionalism & Coopertition, skills our future leaders will need to tackle our most complex challenges. FIRST kids spread the word that STEM careers are fun and STEM is cool.

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

Prior to 4039, there was 1 FLL & 1 FRC team in Hamilton. In 2018, there are 27 FLL teams,4 Jr.FLL teams,6 FRC teams(79% increase) 96% of growth due to 4039 and HWDCSB funding In our school board, 5/7 secondary schools have FRC team&55% of elementary schools have FLL Due to 4039,Hamilton now has FLL qualifier,FRC district. Off-season, practice field,&industrial sponsorship Dominican Republic FLL resources for 6 years 4039 sponsor exposure resulted in Finland hosting its first FLL Tournament

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

Angela Tollis

Essay

Spreading FIRST is a key metric of the success of an FRC team. Hamilton has seen exponential growth in FIRST over the last 7 years. This explosive growth can be attributed to the spotlight shone on STEM by MakeShift Robotics (FRC4039). Like a spark, MakeShift has ignited expansion by embodying the characteristics of a role model team: innovation, Gracious Professionalism, inclusivity, collaboration, impact, stimulating growth, & leadership.

Innovation

MakeShift is creative in all aspects of FIRST. Our team name, MakeShift has two meanings: we make the most of what we have, and we focus on "shifting" the perception of STEM education & careers. This is the basis for our rainbow transformation that represents the inspirational effect of the FIRST experience.

Another innovation was kindled by the rapid growth of FLL. As team numbers grew, 4039 found it difficult to travel out to so many elementary schools so we developed FLL Saturdays. Teams now come to St. Mary to be mentored but also to learn from each other. This sustainable model is being adopted by other teams.

Gracious Professionalism

Gracious Professionalism, "a way of doing things that encourages high quality work, emphasizes the value of others, & respects individuals & the community," is embedded in our culture. High quality work requires a well-rounded team. We provide training in robot design, teamwork, & business skills. We have been recognized with awards highlighting our holistic skills. From a robot performance perspective, 4039 has advanced to at least the quarter finals at the World Championship for the last 6 years.

MakeShift mentors & assists teams like 4618 & 5921. Despite enough funding, 5406 was unable to compete in 2013, so we permanently "shifted" 50% of our engineering mentors & equipment to them in 2014. Last year, 6342 shared our build space & mentors. 4039 provided part purchase suggestions for all rookie teams this year and are a Designated Compass Alliance Tag Team Guide and a HELP Hub with our Shared Practice Field.

MakeShift also assists & mentors FLL teams. This year 4039 directly mentored 2 FLL teams one of which was going to pull out of participation at a tournament before our intervention. We support board teams with coach orientation and all teams through the 2056 symposium "A MakeShift Roadmap to a Successful FLL Season".

Our team never forgets our humble beginnings & our gratitude to teams that helped us. This inspired our Boost Award. Each year we identify a young team with potential, & give them a boost of funding. At Swatposium, 4039 presented a workshop, "Competing with the Best, the MakeShift Way," articulating our respect for other teams & how we approach the challenge of performing beyond our means.

The best example of 4039's respect for others is our approach to running our off-season event, the STEMley Cup Championship assisted by 5406. For the last 3 years, the team unanimously voted to not compete with the robot. This meant that we deferred an opportunity to develop new teams members, & instead ensured our undivided attention went to guaranteeing other teams had the best possible experience. Withdrawing also ensured that 4039 could provide robots & full mentorship to our pre-rookie teams (5921 2015 & 6342 2016) allowing them to compete before their first season. A mentor from 5921 had such a good experience in 2015, when he moved to a new school, he requested our support again for his new rookie team. Based on this example, 5406 also withdrew this year to support the event. What better evidence of the impact of our role modelling than other teams following our lead.

Inclusivity

MakeShift promotes inclusivity within & outside our team. Encouraging girls' involvement has been a priority. Through a Speak-Up Grant, our team was able to support an All-Girls Vex Robotics team & an All-Girls Coding Club. Girls now represent 30% of our team.

Introducing young girls to strong female role models promotes their pursuit of STEM careers. Last year we created our Girls R Brilliant (GRB) campaign. Our students research & create presentations about 34 women to serve as role models over 2 years and are posted as YouTube videos. We hosted "Shining a Light on Women in STEM Lunch" at the STEMley Cup.

In addition, the team has also supported students in other schools without robotics programs. 4039 has provided a successful robotics workshop at the public library & connected with Let's Talk Science to expand this program. This year, we facilitated a session for Cubs to assist them to earn their STEM badge. The team sent 7 students over 4 years with our school's DREAMS (Dominican Republic Education & Medical Support) project, providing donated Lego, NXTs, laptops & training to schools in an impoverished area. This year we initiated the Make A Spark project building solar battery lights to allow access to simple lighting systems for a country which is predominantly challenged to meet the needs. These were accompanied by a Spanish colouring book to teach the children the science behind the lights.

Collaboration

MakeShift improves the lives of everyone involved in the team, including mentors. A MacMentor secured cooperative experiences in a Sponsor Company that lead to permanent employment. A teacher associated with has been 4039 given the role of Board FLL Convener shepherding this program & securing her employment. A 4039 parent is a Board consultant to expand the collective FRC sponsorship.

Sponsors also benefit. CIMCORP, a Finish-Canadian automation company, was purchased by a Japanese company. Updates about the team & FIRST helped to build relationships between these different companies & cultures. This sparked interest in Finland and, this year, they have had their first FLL tournament. ArcelorMittal, a major employer & steel producer in Hamilton, sponsors our board to invest in future employees. This year, 4039 will participate on the Industrial Education Committee for the board to enhance practical learning in the curriculum building alliances like our Arcelor model.

Impact

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Our team routinely participates in STEM-focused outreach like Robot Rules at the Science Center, LEAP camp & the Innovation Nation Competition. Our robot is found at community events like the Santa Claus parade, the C.N.E. & the Hamilton Maker Faire. FIRST was the focus of an episode of the Rick Mercer Report in 2016 due to MakeShift advocacy. Our team authored an article in Leaders & Learners, a journal for all Canadian school administrators, sharing the benefits of FIRST. This year we introduced the Instant of Inspiration approach, showing up at events doing pop up robot demonstration. 4039 is active in charitable work while inspiring like the Terry Fox Run, cystic fibrosis car wash, donating game pieces to the Boys & Girls Club for 2 years & Gaming Night to raise proceeds for the McMaster Children's Hospital. In the last 4 years we've shared FIRST with more than 183,000 people.

Growth

A role model team demonstrates sustained impact. MakeShift has improved the learning experiences of students at St. Mary. 97% of our team graduates have pursued post-secondary training in STEM related fields. Prior to 4039, St. Mary had no on-site computer science, no machine shop facilities, & no STEM-based clubs. Now, robotics team involvement earns members credits under the Specialist High Skills Major co-operative program.

This impact has spread to other schools in our School Board. MakeShift advocacy made it easier for all teams that followed. MakeShift's direct example inspired the creation of new FIRST teams, resulting in 4 more FRC teams, 27 FLL teams & 4 FLL Jr teams. One superintendent is "hoping to extend the budget to \$600,000."

All of Hamilton benefits from 4039's efforts. Our team secured a practice field hosted in a retired school. It now supports teams who could not secure build space within their own schools. The facility has CAD access, machinery, & a regulation field. In addition, 4039 has been successful in running FIRST events, supporting accessibility, affordability & opportunities for everyone.

Leadership

A role model team should be leading growth and illuminating the path for others. Despite some well-established FRC teams in our area, there was no sustained FLL team development, no FRC growth & no events in the broader Hamilton area until MakeShift came on the scene.

Our team initiated, hosted, & ran annual FLL practice tournaments for 5 years. Because of this, Hamilton was selected to run an official FLL qualifier. MakeShift hosted & ran this event in 2015 and 4039 fulfilled key roles (Judge Advisor & Head Referee) to support & plan the event since then.

To support the move to the District model in Ontario & help train volunteers, FIRST needed teams to organize off-season FRC competitions, 4039 stepped forward. With 5406's assistance, we hosted & ran the STEMley Cup Championship for 3 years. The event focusses on supporting pre-rookie teams. Over the years 8 pre-rookie/rookie teams were provided with event experiences unique to STEMley. Our event alone was hand-selected to test instant replay protocols for FIRST in 2016.

For many years, 4039 has been negotiating with McMaster University to host an official FRC event. At the STEMley Cup, a VIP robot match brought the mayor of Hamilton, the Dean of Engineering at McMaster, & significant sponsors together, who helped move this forward. Because of 4039 advocacy, McMaster now hosts an FRC district event & provides FIRST scholarships (\$90,000).

Making the Shift

MakeShift is a role model and leader in our School Board & FIRST, benefitting peer teams with funding, recognition, & mentor support. We have powered Hamilton growth in FLL Jr, FLL & FRC, & resources. 4039 has enhanced the richness of experiences in our area as evidenced by our lead mentor winning the McMaster Alumni Association Community Impact Award. MakeShift is illuminating the way to inspiration through modelling innovation, core values, inclusion & collaboration.