

Chairman's Award - Team 2169

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2018 - Team 2169

Team Number

2169

Team Name, Corporate/University Sponsors

Boston Scientific Corp/UTC - United Technologies/UTC/Rotary Club of Prior Lake/Lunds & Byerlys Grocery/Engineering Partners/VTI security/Prior Lake-Savage Area Schools/Mankato State University (MSU)&Prior Lake High 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

Members of KING TeC have grown through their involvement in FIRST. In the past 5 years 83% of KING TeC graduates have pursued STEM-based post-secondary education. Alumni have gained technical experience at Sandia National Laboratory, National Instruments, the US Navy, and NASA. Through team leadership opportunities other alumni developed management skills, allowing them to head their own successful startups. From software engineers to entrepreneurs KING TeC fosters professional growth.

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

This year the team secured their own booth at the Minnesota State Fair during STEM Day at the Fair, which brought in 117,877 spectators. KING TeC represented FIRST by demonstrating their robot and program. FRC Team 2169 is proud to create, organize, and participate in over 40 outreach events annually including demonstrations in the Mall of America and their community. These events drive kids to pursue FIRST Robotics and STEM in the future and inform them of opportunities available in their area.

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

This summer, KING TeC students developed their Girls' FIRST Camp and Drone Camp. The camps were created and supervised by the students. KING TeC teamed up with AirVuz to create a video series on the drone camp which currently has over 4,000 views. The team also runs an in-house middle school robotics program called KING TeC Challenge which includes a student run competition at the end of the season. KING TeC students are mentors, referees, judge advisors, and game designers for the competition.

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

Twice per week, KING TeC hosts build sessions for every level of FIRST. Experienced high school students give back by mentoring in Jr. FLL, FLL, FTC, and KING TeC's own in-house middle school robotics program. These mentored students grow through the program and eventually become mentors themselves. Students use these experiences to teach classes and mentor other teams at all levels. KING TeC inspires through mentorship and driving others to have fun while learning about STEM.

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

As the area around the team is highly saturated with FRC programs, KING TeC instead helps teams build successful and sustainable programs. KING TeC does this by teaching a variety of classes at events like Minne Mania, FRC Kickoff in Mankato, and MN Splash. Class materials are available on KING TeC's website. New this year, KING TeC also hosted a Chairman's Roundtable and presentation in Duluth where teams could discuss creative ways to spread the message of FIRST throughout the community.

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

KING TeC has grown their program to include every level of FIRST. After ensuring sustainability within the team, KING TeC documented their success in numerous survival guides. This year KING TeC began a partnership with the Boys and Girls Club of the Twin Cities to create an FTC program for their students. The FTC program has dedicated B&G club supervisors, students, and a support FRC/FTC team. This program has been designed to expand into every B&G Club with the help of other teams nationwide.

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 mentoring all levels of FIRST, KING TeC uses their events and survival guides to assist other FIRST teams. KING TeC provides FTC and FRC-specific guides designed to help rookie teams through their build seasons. All guides and presentations are readily available for download on KING TeC's website. 2169 also hosts and runs a Mock FLL Tournament, allowing teams to demonstrate their work and test their robots in the environment of a real competition.

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)

KING TeC mentors over 40 teams across Jr. FLL, FLL, FTC, and its own in-house middle school program. On Tuesdays and Thursdays in the fall and winter, all the subprograms meet under one roof and work on their robots and projects. FRC students mentor teams and provide guidance throughout the the build season. During the summer, KING TeC provides hands on training for all their FTC teams with a weekly set of training sessions. These trainings help prepare students for the challenges ahead.

Describe your Corporate/University Sponsors

KING TeC has a variety of sponsors, ranging from local companies to large corporations. Due to extensive involvement in the community, KING TeC has made connections with many local businesses, including Engineering Partners International, Laveen Machine & Engineering, Lunds & Byerlys, and the Prior Lake Rotary. In addition to local support, the team is sponsored by PTC, Seagate, and Boston Scientific. Monetary and material donations provided by these sponsors are crucial in sustaining the team.

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

KING TeC continues to maintain relationships with their sponsors. The team hosts an Engineering Symposium, open to all Prior Lake students, where local engineers discuss their path to a STEM career. This year KING TeC sponsors ran a seminar for potential mentors new to the team. The team also maintains a close relationship with our school board by informing them of 2169's successes and participating in the first all-staff meeting of each school year at the request of the superintendent.

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

Starting as an FRC team of 21 students, KING TeC has evolved into a robotics enterprise comprised of Jr. FLL, FLL, FTC, FRC, and their own in-house middle school program with over 200 students from the district. KING TeC also impacts students at local outreach events such as STEM Day at the State Fair, Scott County Fair, and multiple STEM-based summer camps. KING TeC's impact in their community prompted the city of Prior Lake to name October 12th, the day the team was founded, as KING TeC Day.

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

FIRST is an international organization which creates an environment where science, technology, engineering, and math are as exciting as sports. The robotics program provides youth with the opportunity to learn and practice lifelong skills including leadership, communication, and time management. Over the years, numerous corporations have extensively supported FIRST for one reason: the students in this program are the future - they are the engineers, programmers, and designers of tomorrow.

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

Michael Bros

Essay

Success is a moving target. 11 years ago, KING TeC defined success as a rolling robot on the field. Since then, 21 students have become nearly 250, and the Prior Lake-Savage community has been immersed in robotics culture. Over the last decade, the team has created, refined, and documented the K-12 KING TeC enterprise. Now, our target has shifted past building one organization to sustaining hundreds and changing the world. To ensure all teams have the opportunity to experience their own successes, we build robotics kingdoms.

KING TeC maintains an active presence in our community through continued involvement in local events in addition to providing new and exciting STEM-based initiatives. Every year, KING TeC hosts an exhibit during STEM Day at the Minnesota State Fair. This year we demonstrated our robot and program to 117,877 fairgoers. Children actively engage with our robot and KING TeC members while parents learn about robotics programs available across the state. Each year, KING TeC's commitment to outreach grows - this year, we participated in over 40 community events.

To provide robotics opportunities throughout the summer, we organize and run a variety of STEM-based camps including programs for FLL, VEX, and FTC. These camps provide engaging opportunities for students in our school district to develop their passion for STEM beyond the options provided during the school year. This summer, KING TeC students created two new initiatives: a Girls' FIRST Camp and a Drone Camp. Both were organized, executed, and mentored by KING TeC members and impacted 49 total students. The Drone Camp was even covered in a documentary series by Air V?z, a media sharing platform dedicated to drone videography. Their viewers were excited to see KING TeC bringing new technology and STEM education to students in a creative manner. Many viewers commented wishing they could have gone to our drone camp as a kid.

Our team primarily recruits new members at yearly back-to-school events. This year, we demonstrated our program at all schools in our district: our high school, two middle schools, and eight elementary schools. We also expanded our recruitment process to include two local private schools and a charter school. Through these events KING TeC fosters an inviting environment, allowing all students in our community to participate in FIRST.

KING TeC considers it critical to immerse students in STEM at an early age. In 2016, we made one of the largest single orders of Jr. FLL kits, allowing all grade K-3 students in our district the opportunity to participate in Jr. FLL. This year, there were 27 students on 6 teams in the KING TeC Jr. FLL division. Our members establish an early connection with Jr. FLL students by personally mentoring them through their simple machines and projects. Through engagement with KING TeC students, these kids aspire to become the next generation of STEM leaders.

From grades 4-8, students build their robotics knowledge in FLL. Each year, KING TeC organizes an FLL Mock Tournament at our high school. This year's event provided 10 FLL teams with the experience of a competition in a friendly and constructive environment. KING TeC members organize and run the event by serving as referees, judges, and mentors for all FLL teams present. This year, to assist our 7 FLL teams with their water-themed projects, KING TeC organized and hosted a showing of Dean Kamen's 'Slingshot' documentary and invited local engineers for all 41 FLL students to interview. This event serves as one of the first opportunities for younger students to develop communication skills, a necessary strength for the professional world.

In 2008, Minnesota lacked a statewide robotics program for middle school students. To extend STEM to this integral demographic, KING TeC started its own in-house middle school robotics program with a competition based on FIRST principles. Today, FRC members work with 82 middle school students throughout their build seasons. This culminates in a tournament for all 15 teams with a game designed by KING TeC members. This in-house program, now known as KING TeC Challenge (KTC), provides further opportunities for students in our community to engage in STEM and continue building relationships with KING TeC members.

Using experience from the KTC program, KING TeC brought FTC to Minnesota in 2009. KING TeC ran a world-qualifying tournament and initiated a statewide FTC culture that is one of the largest in the world today. This year, we had 10 teams in our FTC program, including a new all-girls team. These 60 students are mentored by FRC members and have full access to our machines and workshop, helping advance their robotics careers.

Each Tuesday and Thursday evening in the fall, every KING TeC robotics team works in our high school. Students in grades K-12 engage in STEM under the same roof and are provided mentorship by experienced KING TeC high school students. Each build night, over 15,000 square feet of our high school is dedicated to impacting kids of all ages and inspiring students to pursue STEM. These work nights demonstrate the magnitude of the KING TeC kingdom.

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KING TeC showcases our K-12 robotics enterprise to the community through Minne Mania. This event, originally known as Minne Mini, began in 2010 as the first FRC offseason regional in Minnesota, where 36 teams played in a repeat of the previous year's game. Minne Mini remains the longest continuing offseason FRC regional in Minnesota and requires all 88 KING TeC high school students to manage. Three years ago, KING TeC expanded this event into one of the only occasions outside of the FIRST Championship to include all levels of FIRST by hosting a Jr. FLL Expo, a full-day FTC showcase, and an FLL Qualifier along with the FRC regional. The event was renamed Minne Mania, a robotics celebration with over 2,000 attendants. We invite our school board, sponsors, and local politicians to the event for VIP tours. Modeled after the student ambassador tours at the FIRST championship, tours are given by KING TeC students. Attendees love seeing how we as a team inspire the community to pursue STEM education and serve as an example for other teams to emulate.

Minne Mania starts with a multitude of classes, from Chairman's to advanced programming and drivetrain design taught by KING TeC students. We also encourage other teams to present their own classes at Minne Mania, giving all teams the option to educate and learn. The classes we teach at Minne Mania are also taught at other events such as MN Splash, FRC Kickoff in Mankato, and other off-season regionals.

Our alumni point to leadership and public speaking opportunities as key experiences gained from the KING TeC program during our annual alumni reunion: Pizza and Panel. We invite our alumni back for dinner, games, and a Q&A panel for current team members to learn about life after high school. 87% of KING TeC alumni pursue STEM-based post secondary education. Many of our past members have written back to us, describing how their experiences on KING TeC have helped them with their education, professional careers, and creating their own startups. Team alumni believe that FIRST does not end after high school. Many KING TeC alumni have joined robotics related programs such as GOFIRST, a collegiate robotics group. Some alumni have also gone on to mentor other teams including a member from the class of 2017 mentoring rookie FRC Team 6844 in Provo, Utah.

KING TeC shares the knowledge we gained over 11 years through our series of FIRST Survival Guides, designed to help young teams build sustainable programs. We have expanded our Six Week FRC Survival Guide into a comprehensive database for both the FRC build season and offseason. The FRC Survival Guide is available on the KING TeC website, Android devices, and in our pits at each competition. In addition, we have created an FTC Survival Guide covering a variety of topics providing an all-encompassing resource for teams with differing levels of experience. The FTC Survival Guide is also available on the KING TeC website and is presented as a resource for all FTC students in our program.

This season, KING TeC sought to spread our proven system of sustainability through a new project: The Kingdom Initiative. We brought the world of FIRST to a new population of students by partnering with the Boys and Girls Club of the Twin Cities, an organization dedicated to providing academic success and healthy lifestyles to all young people, especially those who need it most. KING TeC started an FTC team at their location and provided some of our most experienced FRC members to guide them through each week of their season. The directors of the Boys and Girls Club of the Twin Cities were so impressed by KING TeC's experience in program building and the passion shown by the Boys and Girls Club students towards STEM that KING TeC is now working with them to franchise The Kingdom Initiative to all Boys and Girls Club locations across the United States. To achieve this, KING TeC created a new series of Survival Guides for all parties involved with The Kingdom Initiative: the new FTC team, adult mentors, student mentors, and franchising teams. This collection, along with our preexisting FRC and FTC Survival Guides, provide any team across the nation with the tools to build and spread sustainable FIRST programs.

KING TeC began as 21 kids in a barn with minimal funding, limited resources, and an idea. 11 years later, we have established a K-12 robotics kingdom with almost 250 students. Now, we are spreading our system of sustainability to other teams, helping them build their own kingdoms and spread the message of FIRST. The kingdoms we build form an empire, bringing STEM across the globe and into the future. Our actions create a new target - a world where every student can belong to a robotics kingdom.